Immingham Green Energy Terminal

TR030008

Volume 3

3.3 Funding Statement

Planning Act 2008

Regulation 5(2)(h)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

September 2023

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

Immingham Green Energy Terminal

Development Consent Order 2023

3.3 Funding Statement

Regulation Reference	APFP Regulation 5(2)(h)
Planning Inspectorate Case Reference	TR030008
Application Document Reference	TR030008/APP/3.3
Author	Associated British Ports Air Products BR

Version	Date	Status of Version
Revision 1	21 September 2023	DCO Application

Table of contents

1 Introduction

1.1.1 This Funding Statement (the "Statement") relates to the application by Associated British Ports ("ABP") (Company number: ZC000195 and registered office: 25 Bedford Street, London, WC2E 9ES), for development consent for the Immingham Green Energy Terminal (the "Project").

1.1.2 ABP is the applicant for development consent for the construction, operation and maintenance of a multi-user bulk liquid terminal (the "Application") located on the eastern side of the Port of Immingham ("the Port") within the area shown edged red on the land plans submitted with the Application (the "Site").

1.1.3 The Application seeks authorisation for the alteration to an existing harbour facility (i.e. the Port) for the construction of a new jetty for the import and export of liquid bulks together with associated development which includes the construction and operation of a green hydrogen production facility for the production of green hydrogen from imported ammonia on the Site.

1.1.4 The green hydrogen production facility and the associated pipework on the jetty would be owned and operated by Air Products (BR) Limited. ("Air Products").

1.1.5 The proposed alteration of the existing harbour facility constitutes a Nationally Significant Infrastructure Project ("NSIP") as identified in s14(1)(j) and under Part 3, s24(2) and s24(3)(c) of the Planning Act 2008 (the "2008 Act") as it comprises:

a. "The alteration of harbour facilities" (i.e. the existing Port of Immingham) – s24(2);

b. "The harbour facilities are in England" – s24(2)(a); and

c. "The effect of the alteration is expected to be to increase by at least the relevant quantity per year the quantity of material the embarkation or disembarkation of which the facilities are capable of handling" – s24(2)(b); and

d. "The relevant quantity is… in the case of facilities for cargo ships, 5 million tonnes" – s24(3)(c).

1.1.6 Given the above, the Applicant is submitting the Application to the Secretary of State for Transport (the "Secretary of State") for development consent pursuant to s37 of the 2008 Act. The new jetty and topside infrastructure (including the associated pipework on the jetty) would comprise the NSIP (i.e. the principal development). The pipeline and development of the Site areas for the transfer and storage of the ammonia and the hydrogen production, storage and distribution would comprise "associated development" for the purpose of section 115 of the 2008 Act.

1.1.7 The definition of the "undertaker" in the draft development consent order ("DCO") includes ABP (defined as the "Company"). It also includes Air Products in respect of certain powers set out in the definition which relate to temporary use of land, authority to survey and investigate land and protective works. The definition of "Undertaker" in the draft DCO also includes "*any person who has the benefit of the Order in accordance with section 156 (benefit of order granting* *development consent) of the 2008 Act*". Air Products will have the benefit of the DCO by virtue of the grant of a lease for that part of the Site on which the hydrogen production facility is to be located. Article 46 of the draft DCO sets out that the powers relating to compulsory acquisition of land and rights are to be for the benefit of ABP only.

1.1.8 This Statement has been prepared further to the requirements of Regulation 5(2)(h) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (the "APFP Regulations") and in accordance with the Department for Communities and Local Government guidance, 'Planning Act 2008: Application Form Guidance' as an Application document.

1.1.9 This Statement is required because the proposed DCO would authorise the compulsory acquisition of land or interests in land. Regulation 5(2)(h) requires in respect of such a DCO a statement of reasons (this is provided as a separate application document (see Document Reference TR030008/APP/3.2) and a "*statement to indicate how an order that contains the authorisation of compulsory acquisition is proposed to be funded*" (i.e. this Statement). This Statement is submitted in support of ABP's Application for development consent for the Project.

1.1.10 The Government's application form guidance explains:-

"25. Where an applicant intends to compulsorily acquire land, an interest in land or rights over land, information relating to this must be set out within a statement of reasons, a funding statement …

26. The statement of reasons should set out the reasoning for why the compulsory acquisition powers being sought in the application are necessary to enable the proposed development to proceed. A funding statement must contain sufficient information to enable the Secretary of State to be satisfied that, if it were to grant the compulsory acquisition request, the proposed development is likely to be undertaken and not be prevented due to difficulties in sourcing and securing the necessary funding."

1.1.11 In addition the Government's guidance on the compulsory acquisition of land[1] explains:

"9. The applicant must have a clear idea of how they intend to use the land which it is proposed to acquire. They should also be able to demonstrate that there is a reasonable prospect of the requisite funds for acquisition becoming available. Otherwise, it will be difficult to show conclusively that the compulsory acquisition of land meets the two conditions in section 122 (see paragraphs 11-13 below)."

1.1.12 Paragraphs 17 and 18 of the guidance are the key paragraphs in respect of this Funding Statement. They explain:

"17. Any application for a consent order authorising compulsory acquisition must be accompanied by a statement explaining how it will be funded. This statement should provide as much information as possible about the resource implications

[1] Planning Act 2008: Guidance related to procedures for the compulsory acquisition of land September 2013

of both acquiring the land and implementing the project for which the land is required. It may be that the project is not intended to be independently financially viable, or that the details cannot be finalised until there is certainty about the assembly of the necessary land. In such instances, the applicant should provide an indication of how any potential shortfalls are intended to be met. This should include the degree to which other bodies (public or private sector) have agreed to make financial contributions or to underwrite the scheme, and on what basis such contributions or underwriting is to be made.

18. The timing of the availability of the funding is also likely to be a relevant factor. Regulation 3(2) of the Infrastructure Planning (Miscellaneous Prescribed Provisions) Regulations 2010 allows for five years within which any notice to treat must be served, beginning on the date on which the order granting development consent is made, though the Secretary of State does have the discretion to make a different provision in an order granting development consent. Applicants should be able to demonstrate that adequate funding is likely to be available to enable the compulsory acquisition within the statutory period following the order being made, and that the resource implications of a possible acquisition resulting from a blight notice have been taken account of.

1.1.13 This Statement explains how (i) the acquisition of the land necessary to build the Project will be funded should the compulsory purchase powers sought within the DCO be exercised; and (ii) how the Project generally is to be funded. It should be read alongside the Statement of Reasons that justifies the powers of compulsory acquisition that are sought in the DCO and in particular sections 4-6 of the Statement of Reasons.

2 The Applicant (ABP) & Air Products

2.1 Associated British Ports (ABP) (the "Applicant")

2.1.1 ABP is a statutory body corporate constituted by the Transport Act 1981 following the privatisation of the British Transport Docks Board. ABP is the largest ports group in the United Kingdom ("UK"), owning and operating 21 ports and other transport-related businesses across England, Wales and Scotland. The principal activities of ABP comprise the ownership, operation and development of port facilities and the provision of related services in the UK.

2.1.2 On the Humber, ABP owns and operates four ports, namely the Port and the ports of Hull, Grimsby and Goole, which together constitute the largest ports complex in the UK. The Port is the largest and busiest of ABP's four Humber ports.

2.1.3 ABP's statutory undertaking at Immingham, the 'statutory port estate', covers some 480 hectares. The majority of the port estate falls within the administrative boundary of North East Lincolnshire Council, although the western part of the Port falls within the administrative boundary of North Lincolnshire Council.

2.1.4 The Port comprises a number of discrete operational areas handling a diverse trade base including liquid fuels, solid fuels, ores, and Roll-on Roll-off ("Ro-Ro") freight being handled from existing in-river jetties. These include the Eastern and Western Jetties, the Immingham Oil Terminal, the Immingham Gas Terminal, Immingham Outer Harbour and the Humber International Terminal.

2.1.5 The Project, if consented, would be located fully within an extended Port of Immingham Statutory Harbour Authority ("SHA") area where the Applicant is the SHA. In this capacity, the Applicant has a set of powers and duties which include management and regulation of the safety of navigation and marine operations in its SHA area.

2.1.6 Humber Estuary Services ("HES") is the SHA for the wider estuary and Competent Harbour Authority ("CHA") with respect to pilotage for the Humber Estuary and the ABP docks, and other port facilities therein. As the CHA, HES has the power to issue Pilotage Directions that prescribe which vessels require a Pilot or Pilot Exemption Certificate holder when navigating within the CHA area.

2.1.7 In addition to the Project, ABP is also proposing to construct a new Ro-Ro facility within the Port principally to service the embarkation and disembarkation of commercial cargo. The facility would include an element of passenger use when the demands of the Ro-Ro cargo operation allow. The proposed Ro-Ro facility is being promoted as an NSIP and is known as the Immingham Eastern Ro-Ro Terminal ("IERRT"). IERRT would comprise on the marine side the construction of a new Ro-Ro jetty with three berths, together with required dredging and on the landside, the provision of an area for unit load/vehicle storage and necessary new Terminal buildings. IERRT is at the examination stage, but is entirely separate from the Project. The IERRT project is subject to a separate commercial agreement between ABP and the operator of IERRT which is outside the scope of this Statement. The IERRT project does not impose any impediment to delivery of the Project as ABP will in its ordinary course of business routinely promote more than one Project at the same time.

2.2 Air Products – developer for the Associated Development

2.2.1 Air Products (company number: 02532156 and registered office: Hersham Place Technology Park, Molesey Road, Walton On Thames, Surrey, KT12 4RZ) is a world-leading industrial gases company that has been in operation for nearly 80 years, and more than 60 years in the UK and Ireland. Air Products has over 1,000 UK and Ireland employees working across 35 production facilities, in addition to a number of hydrogen refuelling stations and hydrogen, nitrogen and oxygen plants. The company develops, engineers, builds, owns and operates some of the world's largest industrial gas projects.

2.2.2 Air Products is a wholly owned subsidiary of Air Products Group Limited (company number: 3101747 and registered office: Hersham Place Technology Park, Molesey Road, Hersham, Walton-On-Thames, England, KT12 4RZ). The ultimate group parent company is Air Products and Chemicals Inc (registered number: 567613 and registered legal address C/O The Corporation Trust Company, 19801, Wilmington, Delaware, USA) ("APCI"). Air Products Group Limited is a wholly owned subsidiary of APCI. In 2020, Air Products announced the signing of an agreement for a world-scale green hydrogen-based ammonia production facility powered by renewable energy, being its first green hydrogen-based ammonia production facility and sited in NEOM in the north-west corner of the Kingdom of Saudi Arabia. It will produce green ammonia for export to global markets. Air Products plans to invest in a new green hydrogen production facility at Immingham, supported by a downstream distribution network. The plan is to import renewable (green) ammonia to convert into green hydrogen to help decarbonise the UK's industrial activities and, in particular, to fuel heavy transport, such as Heavy Good Vehicles and buses. Heavy transportation is one of the most challenging and polluting sectors to decarbonise and a priority for meeting net zero in the UK.

2.3 ABP & Air Products

2.3.1 ABP and Air Products entered into an agreement for lease on 13 September 2022 (the "AFL") in relation to the alteration of the existing harbour facility at the Port by ABP for delivery of the Project.

2.3.2 The AFL (and accompanying documentation) governs the commercial arrangements between ABP and Air Products with regard to the grant of a lease to Air Products from ABP for those parts of the Site known as the East Site and the West Site for delivery of the Air Products hydrogen production facility and the grant of a licence to Air Products for the use of the new jetty. The AFL also governs the arrangements for the delivery and funding of the infrastructure between ABP and Air Products and the arrangements for compulsory acquisition of land and rights pursuant to the DCO by ABP.

3 Funding for the Project

3.1.1 ABP is the freehold owner of the majority of the Site as shown on the land plans submitted with the Application, and in respect of the marine elements of the Site has a long leasehold interest from the Crown (999 years lease dating from 1 January 1869).

3.1.2 The Book of Reference lists those third party land interests and rights which will need to be acquired in order to deliver the Project. Powers to suspend or interfere with third party easements or rights are sought over that third party land where it is subject to being compulsorily acquired, where rights are to be created over it or during the exercise of temporary possession powers. Similarly, powers to suspend or interfere with third party easements or rights would also apply in respect of certain of ABP's existing land ownership. In each case this is where such powers will be required to deliver the Project. Compulsory acquisition of land is sought for the residential properties on Queens Road which abut the West Site, as well as over plots where the land is either unregistered, where there are third party leasehold interests and vacant possession is required for the Project, or over parts of public highway which are also proposed to be stopped up. The acquisition of existing rights or creation of new rights is sought over a number of plots, primarily relating to the installation and retention of pipelines and utilities for the Project. Protective provisions have been included in the Draft DCO relating to existing infrastructure within the Order limits. While the temporary removal of street furniture along Kings Road is proposed to be done under highways powers, temporary possession and use of third party land will be required in connection with the temporary modifications of overhead lines connecting to those specified properties. Please refer to sections 3-4 of the Statement of Reasons and the Book of Reference for a detailed discussion of the powers sought over specific plots and the land interests affected.

3.1.3 Section 4 of this Statement below considers funding for acquisition of third party land and rights and CPO compensation claims. This section of the Statement is focused on costs and funding for the delivery of the Project (excluding land acquisition costs and any compensation payments).

3.1.4 The delivery of the Project and its subsequent operation and management is to be funded by a combination of funding from ABP and Air Products and is not dependent on any external source of funds outside of the ABP and Air Products groups of companies.

3.1.5 For ABP, the year 2021 saw significant growth in cargo and passenger volumes and consequently revenues as a result of the recovery from the Covid-19 pandemic and strong underlying performance.

3.1.6 The consolidated accounts for the year 2022 for ABP (to 31 December 2022) show ABP's strong financial standing. A copy of the last set of filed accounts for ABP are included in Appendix 1 to this Statement.

3.1.7 ABP actively manages its finances to ensure it has sufficient available funds for its operations. ABP understand (and reports in its accounts) that the ABP group will continue to provide suitable resources to ABP to meet its needs.

3.1.8 ABP’s year-end accounts show £42.8 million of cash as at 31 December 2022. Please refer to ABP’s audited accounts as at 31 December 2022, which are attached as Appendix 1.

3.1.9 It should be noted in this context that ABP makes long-term investments in developing port infrastructure. ABP generates positive operating cash flow which it uses to make further long-term investments. In 2022 ABP generated £352.8 million in operating cash flow, £135.6 million of which was reinvested in port related assets.

3.1.10 Air Products is able to fund the delivery of its part of the Project through funding provided by APCI. It is not dependent on any external source of funds outside of the APCI group of companies (in the usual course of business it may apply for any grants or funding as are made available from time to time). The funds are to be made available to Air Products through a combination of additional equity and intercompany loans from 100% APCI subsidiaries as required.

3.1.11 Group parent company APCI is listed on the New York Stock Exchange. APCI is rated by the global credit rating agencies at A/A1 by S&P Global Ratings and A2/P1 by Moody’s for Long and Short Term debt respectively. Attached in Appendix 3 are the latest reviews from S&P Global Ratings (dated February 2023) and Moody’s (dated 27 February 2023) highlighting the strength of APCI’s Balance Sheet and Cashflow.

3.1.12 Given the strength of its credit rating APCI has access to the US Capital Markets and issues US Dollar Bonds and Eurobonds as required to fund global investment activity across the group. Two bonds were issued in March 2023, a ten year US Dollar Bond for $600 million and a 12 year Eurobond for Euro 700 million. Both Bonds were designated “green bonds” with proceeds specifically designated to be used for “eligible projects” which includes expenditure and investments related to pollution prevention such as green and blue hydrogen and ammonia, such as proposed as part of the Project.

3.1.13 As at 31 March 2023, APCI had estimated additional debt capacity of $7.1 billion and also had a cash balance of $2.2 billion. Total forecast global capital expenditure by APCI for the year ended 30 September 2022 was $4.65 billion and forecast for the year ended 30 September 2023 is $5.0 billion to $5.5 billion.

3.1.14 Please refer to the Annual Report and Financial Statements for Air Products (30 September 2021) and the APCI (and subsidiaries) Annual Report (30 September 2022) at Appendix 2 to this Statement.

3.1.15 Given ABP’s experience at financing and delivering major projects and the substantial net assets of ABP (as shown on the latest set of accounts at Appendix 1) and of Air Products as set out above, the Secretary of State can be satisfied that sufficient funds will be available for delivery of the Project and payment of any CPO compensation claims. Although likely cost for each party of implementing the Project is commercially sensitive, it is comfortably within the normal range of projects that both companies promote.

4 Funding for CPO Compensation Claims

4.1.1 As explained above, the majority of the Site is either owned by ABP or leased from the Crown by virtue of a long lease. As set out above and more particularly detailed in the Book of Reference, there are a number of third party interests that will need to be acquired permanently or temporarily in order to deliver the Project. The majority of these third party interests relate to acquisition of residential or part residential properties along Queens Road and rights to be acquired to deliver the pipeline corridor from the East Site to the West Site. It is possible that compensation may be payable in respect of other matters, such as interference with rights of third parties (those known are identified in the Book of Reference).

4.1.2 ABP and AP are currently in detailed negotiations with the owners of the relevant residential Queens Road properties for the acquisition of their properties and at the point of submission of the Application, Air Products has already acquired one residential property (31 Queens Road) and two commercial properties (20 and 21 Queens Road). Heads of terms are agreed on three other residential properties and are with lawyers to progress. Negotiations are progressing with the other landowners with a view to acquiring these interests during the Application process in advance of confirmation of the DCO. Were there to be a legally valid blight claim or claims in advance of confirmation of the DCO, funding would be available to settle that claim at that stage in the same way as funding has been available to acquire a number of property interests in advance of submission of the Application.

4.1.3 Notwithstanding the ongoing negotiations to acquire the third party interests by private treaty, it is recognised that it may not be possible to reach agreement with the third party for the acquisition of their interest. As a result, ABP may need to rely on the CPO powers under the DCO for the acquisition of necessary rights and interests for delivery of the Project.

4.1.4 Expert advice has been taken from Gateley Hamer on the likely quantum of CPO compensation in relation to the interests that are to be acquired. Whilst this advice is commercially sensitive and confidential, this Statement can confirm that the estimated level of CPO compensation by Gateley Hamer represents approximately 1% of the total level of funding available for delivery of the Project.

5 Conclusion

5.1.1 This Statement explains how the Project (including the funding for any CPO compensation claims) will be funded.

5.1.2 In light of what is set out in this Statement, the Secretary of State can be satisfied that there is sufficient funding available for delivery of the Project and payment of all CPO compensation in relation to acquisition of any land or rights required for delivery of the Project.

Appendix 1

ASSOCIATED BRITISH PORTS

(Reference Number ZC000195)

ANNUAL REPORT AND ACCOUNTS 2022

ASSOCIATED BRITISH PORTS

ANNUAL REPORT AND ACCOUNTS 2022

Strategic report

The directors present the strategic report of Associated British Ports for the year ended 31 December 2022.

1. Principal activities

The principal activities of Associated British Ports ("ABP" or the "company") comprise the ownership, operation and development of port facilities and the provision of related services in the United Kingdom ("UK"). The company owns and operates 21 general cargo ports around the UK, and provides facilities (principally land, quays, storage sheds and warehouses, cargo handling equipment and access to open water) and services (including stevedoring, warehousing and bagging) for users of its ports

2. Development, performance and financial position of the business

2.1 Health and Safety

The nature of the company's business means that the health and safety ("H&S") of its employees and other persons involved in its operations presents a continuous challenge requiring proactive and sustained leadership and management. Effective management of H&S matters considerably contributes to the prevention of loss of life, serious injury and damage to infrastructure.

The company manages this principal risk to the business through enforcement of rigorous policies and procedures in addition to behavioural training, strong communications and understanding in the context of H&S in the ABP workplace. These key strands are robustly supported by a strong commitment from the Board and are designed to achieve continuous improvement through a rolling 5-year H&S strategy.

H&S training has been revitalised across the company with employees embarking on an immersive training experience designed to promote behavioural and cultural change. With the addition of core media-based training, employees also have access to simple, high quality training modules, and feedback from our employee engagement survey acknowledges the focus on safety within ABP.

The group continues to use a suite of KPIs to measure and improve its H&S performance. Progress against the group's primary safety performance indicator is detailed below:

	Target	**2022**	**2021**	**Change from 2021**
Number of accidents resulting in lost working days per one thousand employees[1]	<11	2.59	2.50	3.6%

[1] Includes the company's employees and agency staff.

Statistically, 2022 maintains the improvement from 2019 where the lost working days per one thousand employees was 10.68. Safety at ABP is at the centre of everything we do. This ethos and safety awareness, which through strong leadership at all levels within ABP and the promotion of a zero-harm safety culture across the organisation, has undoubtedly contributed to the improvement.

Strategic report (continued)

2. Development, performance and financial position of the business

2.1 Health and Safety (continued)

Good progress continues to be made in behavioural safety, workplace transport initiatives, and a continual safety improvement programme in each of our regions as well as improvements to personal protective equipment for ABP's operatives and the wider safety management system. The ABP 'Spot It' reporting system, which permits any ABP staff and others to report any H&S observations, continues to improve and is being used more extensively as the system matures. 2022 saw another round of ABP`s behavioural safety programme, Beyond Zero, conducted online for ABP colleagues, targeting 100% attendance (barring absences such as maternity leave). Furthermore the 2023 Beyond Zero training programme has been developed and will be delivered across the business during 2023. During 2023 a revised Safety Leadership training program will also be rolled out for management teams.

The company continues to work on delivering a secure environment for ABP to conduct its commercial business by ensuring it protects its people and its business, it safeguards its assets and the assets of its customers and does not accept breaches of security anywhere on its estate.

While there is an organisation-wide emphasis on health and safety which has helped ABP achieve its lowest number of Lost Time Accidents in 2020, 2021 and 2022, there was sadly a workplace fatality at ABP in January 2023. The incident occurred when an ABP pilot in the Humber came off a rope ladder while he was boarding an inbound ship. The Marine Accident Investigation Branch ("MAIB") and the Maritime and Coastguard Agency ("MCA") both attended the scene. The pilot boat was inspected by the MCA and there were no recommendations or directions given in relation to ABP's operations and procedures and there was no stoppage of work. The incident is being thoroughly investigated by both ABP and the MAIB. ABP is committed to learning any and all lessons from the incident to help prevent it occurring again.

2.2 Financial performance and KPI's

The following KPIs are considered by the Board of Associated British Ports Holdings Limited ("ABPH") to provide a good representation of the performance of the business:

- Tonnage and unitised volume indicate the level of cargo throughput at the group's ports which is a key driver of revenue;
- Passenger volumes is an indication of the level of cruise and ferry activities at the group's ports, significant increase in passenger numbers and vessel calls will have an impact on associated revenue;
- Revenue, underlying operating profit (see group income statement page 27), operating profit, profit after finance costs and profit before tax indicate the financial performance of the business; and
- Capital expenditure indicates the level of investment the company undertakes to maintain and increase the scope of operations and obtain future economic benefits. The delivery of capital projects is tracked as they may have significant impacts on financial performance (see group cash flow statement page 30).

The alternative performance measure above is defined as follows:

- "Underlying operating profit" is defined as operating profit before movement in fair value of investment properties, depreciation/amortisation/write off of fair value uplift of assets acquired in a business combination, impairment of fixed assets, net unrealised gain/loss on fuel derivatives and exceptional items.

Strategic report (continued)

2. Development, performance and financial position of the business

2.2 Financial performance and KPI's

These performance measures are used by the ABP Board to monitor the underlying performance of the company, excluding the impact of accounting valuations resulting from recognising certain assets at fair value. They are included in regular finance reports to the ABP Board.

Performance against each of these KPIs is as follows:

- Bulk cargo tonnage handled by the company's ports (excluding Southampton conservancy only volumes) decreased by 6.9% to 52.4m tonnes in 2022 (2021: 56.3m tonnes) and unitised cargo remained at 3.0m units (2021: 3.0m units) due to challenging trading conditions globally in the trade vehicles and containers sector resulting from the recent economic downturn.
- Cruise and ferry passenger volume increased by 240.4% to 2,592.2k (2021: 761.5k) due to the lifting of COVID 19 restrictions, leading to better occupancy and higher vessel calls.
- The company's revenue increased by 14.4% to £662.5m (2021: £579.0m) primarily driven by an increase in cruise (+41% to £35.1m (2021: £24.9m)), ferry (+51.7% to £9.1m (2021: £6.0m)), coal & coke (+68.8% to £28.5m (2021: £16.9m)), break bulk (+4.9% to £92.5m (2021: £88.2m)), other dry bulk (+11.2% to £148.5m (2021: £133.6m)), revenue from unitised commodities (+9.2% to £147.4m (2021: £135m)) and pilotage and conservancy activity (+8.3% to £65.5m (2021: £60.5m)), partly offset by a decrease in forest product revenue.
- Pre-tax profit amounted to £360.6m (2021: £228.1m) and the company recognised a tax charge for the year of £76.2m (2021: £102.4m). Cash generated by operations totalled £352.8m (2021: £268.4m).
- Cash generated by operations totalled £352.8m (2021: £268.4m).
- Net cash outflow from investing activities is £135.6m (2021: £145.4m), includes £156.6m (2021: £178.7m) of capital expenditure.

The company's activities form the principal activities of the group of its intermediate parent undertaking, ABPA Holdings Limited ("ABPAH"). Further details of the development, performance and outlook of the ABPAH group and information relating to financial and non-financial KPIs are provided within the Annual Report and Accounts of ABPAH.

The company had net assets of £2,829.1m as at 31 December 2022 (2021: £2,714.3m) including cash of £42.8m (2021: £98.3m). The company's cash resources are managed through a centralised treasury function, which closely monitors and manages risks of the group owned by the company's ultimate parent undertaking, ABP (Jersey) Limited ("ABPJ"), in relation to liquidity, interest rate and capital risks, along with credit risk relating to cash.

2.3 Sustainability

Progress against the company's primary sustainability performance indicator is detailed below:

	Target	**2022**	**2021**[2]	**Change from 2021**
CO_2e emissions (tonnes)[1]	< prior year	42,527	44,757	5%

[1] Calculated based on the company's consumption of electricity, gas, oil, petrol and diesel converted to CO_2e at rates published by the Department for Environment, Food and Rural Affairs, Scope 1 & 2.
[2] Restated to reflect actuals in Q4 2021.

2. Development, performance and financial position of the business (continued)

2.3 Sustainability (continued)

In 2022 the company's reported carbon emissions decreased by 5.0% on an absolute basis compared to 2021.

Following another round of external audits the group's Environmental Management System continues to be certified to ISO 14001 and the ABP Energy Management System successfully retained certification to ISO 50001.

Energy Efficiency and Emissions Reduction Action Taken

As part of its drive to improve energy efficiency and successfully maintain ISO 50001 certification of ABP`s energy management system, ABP continued to identify and implement energy efficiency and emission reducing projects across the business in 2022. These include lighting, high efficiency transformers and further deliveries of new, more energy efficient pilot vessels and new electric harbour cranes that are delivering significant energy and emissions reductions.

ABP has renewable energy generation at 17 of its 21 ports, in the period covered by the report, and generated 27.9GWh (2021: 22.4GWh) of renewable energy on site. This work continues and ABP has committed to invest in the delivery of additional fuel-efficient pilot boats, electric cranes and reach stackers and other equipment over the course of the next five years to continue to reduce scope 1 emissions.

In February 2023, the group launched its sustainability strategy, focussed on reduction of GHG emissions and energy efficiency, air quality, protection of the natural environment, waste management and water management. The strategy includes a target of becoming a net zero business by 2040 (across Scope 1 and Scope 2 emissions). In formulating the strategy, a number of consultations were held with directors, the group's shareholders and employee representatives to gather feedback and ideas, many of which were included as part of the climate transition roadmap. Feedback from discussions with large customers on their energy transition plans was also taken into account.

2.4 People

People Strategy

To enable and underpin delivery of our business strategy, a Company wide people strategy was developed and agreed in 2020. The strategy has 5 strategic themes: A healthy and safe place to work; getting the basics right; growing and retaining a highly skilled workforce; strong managers and leaders at every level; and creating a diverse and inclusive workplace. In 2022 we continued to make good progress in each area of the strategy.

A healthy and safe place to work

Our in-house training teams delivered safety training programmes to employees at all levels of the organisation with the continuation of our virtual Beyond Zero training. Safety training is also provided to all new employees as part of their induction programme, and specific safety training for managers takes place throughout the year. Further, we commenced our 3 year programme of immersive behavioural safety training. We also gained approval in 2022 from the Institute of Environmental Management and Assessment ("IEMA") to become an approved training centre and will commence delivery of Environmental Awareness training in 2023.

Strategic report (continued)

2. Development, performance and financial position of the business (continued)

2.4 People (continued)

A healthy and safe place to work (continued)
We made a discretionary cost of living payment to some employees most likely to be affected by rising costs and we gave all employees a gift-card to celebrate the festive season. We also launched a range of measures to help with our colleagues' wellbeing, including the Bravo scheme to recognise colleagues' efforts and a financial wellbeing programme.

We continued our discretionary Company Sick Pay ("CSP") 'top up', for employees who would not otherwise be eligible, for Covid related absence.

In 2022, we were pleased to launch our group-wide Mental Health First Aiders scheme, which trains colleagues to support ABP's commitment to improving mental health and wellbeing at work and to be a point of contact for someone experiencing a mental health issue.

Other benefits that ABP provides to support our employees include private medical insurance which includes a digital health service giving access to GPs, an annual flu vaccine at an employee's place of work or local pharmacy, and free access 24 hours a day to a confidential helpline run as part of our employee assistance programme ("EAP") by an external provider.

Getting the basics right
In 2022 we continued to provide a range of employee benefits that support physical, mental and financial wellbeing. In addition to our employee policies, we provide benefits including a salary sacrifice electric vehicle car scheme; pension scheme; life assurance; holiday buy scheme; cycle2work scheme; ABP Rewards employee discount scheme and access to a transport credit union. In 2022, we also granted employees 2 additional discretionary bank holidays in recognition of the late Queen Elizabeth's Platinum Jubilee celebrations and state funeral.

For the first time in 2022, we issued all employees with a Total Reward Statement to help them understand the total value of their salary and benefits. It also highlighted other benefits that they may not have taken up to help them make the most of what ABP offers its employees.

Growing and retaining a highly skilled workforce
A total of 12 senior appointments were made in 2022 (compared to 19 in 2021). 17% of the appointments were internal promotions.

We continue to offer opportunities for apprentices and graduates to improve our long-term talent pipeline. In 2022, we increased the numbers of places on both schemes with 20 new apprentices being recruited in roles varying from IT, health and safety and business administration to more traditional areas such as marine pilots, marine operations and engineering. We expanded our graduate intake in 2022 with 7 new graduates being taken on covering port management, IT, procurement, commercial and engineering asset management.

We are pleased that all our existing apprentices and graduates who completed apprenticeships/graduate programmes in 2022 successfully transitioned into full time roles in ABP.

Strategic report (continued)

2. Development, performance and financial position of the business (continued)

2.4 People (continued)

Growing and retaining a highly skilled workforce (continued)
Our inaugural Accelerated Leaders Talent Programme ("ALP"), which aims to support a cohort of senior leaders and accelerate their career development, is now in the second year. This will strengthen our internal succession plans for key senior roles. In 2023 we will look to supplement this with a new programme designed to develop our port leaders of the future.

Strong managers and leaders at every level
Our investment in training, development and learning continued in 2022 through a mix of in-house delivery from our training and development department, ABP Academy, and some external providers. We launched a new suite of people manager training "Lead my Team". This training is provided for all people managers and has 4 mandatory modules. Training effectiveness is evaluated and 100% of colleagues who have attended, 460 in 2022, stated they would recommend the modules to other colleagues. For all training delivered, 97% of colleagues who completed evaluation forms post training delivered by the Academy stated that the effectiveness of the training was "very good" or "good", with 925 also stating that the training courses had met their training objectives.

In total 1,875 training courses were held in 2022 across ABP, an increase of 252 from 2021 including 45 Induction training sessions for new starters; an increase of 10 induction sessions from 2021.

Alongside classroom-based training, 3,292 e-learning modules were delivered and our investment in technology for training was also progressed in 2022, with the development of safety training scenarios using virtual reality.

A Diverse and Inclusive workforce
Our Diversity & Inclusion ("D&I") network groups - ability, faith, LGBT+ and gender, continued to build awareness and support key initiatives internally and externally to demonstrate our commitment. Our Southampton and East Anglia ports achieved the Diversity in Maritime Charter with Maritime UK in 2021 and plans are underway to extend this.

In 2022, we have invested in developing a more diverse approach to recruitment, this includes upskilling the team, deploying software to ensure our communications are inclusive and training managers.

ABP is proud to have supported, for the third year in a row, International Day of Disabled Persons in 2022 by lighting up our iconic buildings in Cardiff and Kings Lynn in purple as part of the #PurpleLightUp movement.

We are committed to giving full and fair consideration to applicants for employment who are disabled and to provide disabled employees with opportunities for training, career development and promotion. If an employee becomes disabled during their employment every effort is made to ensure that, wherever possible, the person can either continue in their present role or a different role by arranging appropriate training and making reasonable adjustments. Our ability (mental health and disability) D&I employee network provides a safe space for colleagues to support each other and raise awareness around disability matters.

Strategic report (continued)

3. Principal risks and uncertainties

ABP's policy with respect to risk management is to direct resources to ensure that ABP, as far as possible, aligns its exposure to risk with defined risk appetite thresholds that are based on preventing harm to colleagues and other port users, and preventing adverse financial impacts.

The principal risks facing the company, based on the residual risk to the business are recorded in the company's risk and control register. The top risks are grouped based on their potential to impact on health and safety or the company's financial results.

The company's two principal safety risks relate to the potential for a major incident, either on a tenanted site or an ABP controlled site, as a result of the high-risk operations carried out across the ports and the potential for fatalities, or serious injuries, to colleagues, or other port users, as a result of either a workplace transport accident or physical terrorist attack.

- Tenant Loses Control of Operation: ABP's predominantly landlord-tenant operating model means that a high proportion of activities carried out across our ports are done so outside of ABP's direct control. These activities often include heavy industrial operations and the handling of dangerous cargoes such as ammonium nitrate. Consequently, there is a risk that a tenant, operating independently, experiences a fire or explosion on their site that results in harm to colleagues, or other port users, and prolonged business interruption at a port. In response, ABP has improved processes to ensure only tenants who can operate safely are onboarded and to assure ourselves of a tenant's compliance to their statutory and contractual obligations. Even with these control checks in place, ABP acknowledges that this will remain a significant risk to the business given the potential for a catastrophic health and safety outcome and the limited control ABP has at tenanted sites.
- Fire/Gas/Explosion: With ABP's increasing involvement in operations, there is a risk of a fire or explosion on an ABP controlled site. Robust, proactive controls are in place which help to prevent this risk from materialising. These include fire and Dangerous Substances and Explosive Atmospheres Regulations ("DSEAR") risk assessments to identify potential hazards, cargo care measures and essential maintenance of plant and equipment. ABP colleagues are also trained to respond to an incident should it arise. Fire and Control of Major Accident Hazards ("COMAH") regulations awareness training are complemented by regular drilling of emergency plans, which involve local resilience forums and other key stakeholders. Undertaking 'lessons learned' and sharing best practice across the group will continue to help to further improve ABP's controls, whilst audits are undertaken to verify the effectiveness of current controls.
- Workplace Transport Accident: This risk applies across all ABP's ports but has been highlighted as an especially high risk in the port of Southampton, due primarily to the very high volume of cruise passengers but also other port users. There are existing controls in place at the ports which help to mitigate the risk, including mobile speed cameras, segregation of plant and people, safe systems of work and training, with additional actions underway to further reduce this risk, including improving road conditions, improving telematics in ABP vehicles, fixed speed cameras and using CCTV with artificial intelligence.

Strategic report (continued)

3. Principal risks and uncertainties (continued)

- Physical Terrorist Attack: This risk applies across many of ABP's ports. The ports of Southampton and Plymouth are recognised as high risk locations due to their passenger operations whilst other ports are also potential targets for example given a number have within them COMAH sites. Controls are in place to help mitigate this risk; including access controls, fencing/barriers, CCTV and, where deemed necessary, additional security staff. ABP works closely with local resilience forums and emergency services.

The group's principal financial risks relate to the loss of business from a major customer, multiple customers, or tenant, failures leading to an adverse impact on the group's EBITDA. In response to these risks, ABP has reviewed the risk status of top customers and proactively engages with them to find commercial solutions and retain their business. ABP monitors all its customers and maintains close relationships with these key customers.

The company's principal technological risk remains that of cyber-attack. A continuing trend in phishing scams and malicious software creation, and a global spike in cyber-attacks during the Covid-19 pandemic, means that ABP is at risk of an e-mail, web browser-based or internet-based cyber-attack that could compromise the company's corporate computer system. ABP acknowledges that an in-depth, multi-layered defensive approach is essential to best protect against such attacks. As such, ABP continues to block e-mails and websites that may contain malware/viruses; has taken steps to encrypt and harden end-points against attack and has engaged a specialist security threat-hunting service to proactively monitor for attacks. ABP acknowledges the crucial role our people play in preventing an attack and therefore ensures that all staff receive annual awareness training. Extensive assurance work in 2021 and 2022 identified areas for controls improvement and in response a number of actions have been undertaken, with more planned, to mitigate this risk. Ongoing penetration testing to identify weaknesses in our network, and the removal of vulnerable legacy applications, continue to help ABP manage this risk.

In addition, ABP's risk management approach requires the identification and mitigation of longer-term strategic risks, which are concentrated around the environment, public policy and regulation and technology, innovation and competition. In response to climate change risks and challenges ABP launched its Sustainability Strategy on 28 February 2023, focussed on reduction of GHG emissions and energy efficiency, air quality, protection of the natural environment, waste management and water management. The strategy includes a target of becoming a net zero business by 2040 (across Scope 1 and Scope 2 emissions). In formulating the strategy, a number of consultations were held with directors, the group's shareholders and employee representatives to gather feedback and ideas, many of which were included as part of the climate transition roadmap. Feedback from discussions with large customers on their energy transition plans was also taken into account.

Treasury matters throughout ABP are controlled centrally and carried out in compliance with policies approved by the Board of Associated British Ports Holdings Limited, the company's immediate parent undertaking. The company's liquidity, interest rate and capital risks, along with credit risk relating to cash, are managed by the group.

The company's other financial risks are credit and foreign exchange risk. For further details of the company's financial risk management objectives and policies, see note 16 to the accounts.

Strategic report (continued)

4. Section 172 Statement

The Board recognises the importance of stakeholder engagement in delivering the long-term and sustainable success of the company. When making decisions the directors have regard to the potential consequences over the short, medium and long-term, the reputation of the business and also their responsibilities and duties to stakeholders. ABP's main stakeholders are its employees, customers, local and national government, suppliers, the communities in which ABP operates and the environment.

To support the directors and assist them in complying with their duties, management is required to provide feedback on their engagement with relevant stakeholders which the Board takes into account when considering matters and making decisions.

Directors receive training on their duties as part of their induction, which is refreshed on an ongoing basis as necessary. The following section outlines how we engage with, and have regard to, each of our key stakeholder groups.

4.1 Employees

ABP's employees are fundamental to our success, and we cannot deliver our strategy and continue to grow without an engaged, safe, and well-trained workforce. We obtain feedback and views from our employees on a regular basis which enables us to continuously improve and develop, particularly in relation to our health and safety processes and practices.

What matters to our employees	
• A safe and healthy working environment • Diversity, equality and inclusion • Growth and development opportunities	• Recognition and fair reward • Communication • Correct tools and equipment to perform their roles well
How ABP measures	
• Lost time accidents and sickness absence rates • Gender pay gap and diversity of employees • Internal hire rates (including promotions) • Attendees on development programmes and training attendance	• Employee turnover • Employee engagement survey responses • 'Spot-Its' • Whistleblowing reports
How ABP engages	
• Weekly 'Pulse' newsletter on updates from around the business • Direct engagement with trade unions • Regular employee 'Town Halls' • Issuing safety alerts and giving 'toolbox' talks. • CEO business briefings at port locations and virtually • Bi-annual Senior Leadership Team conference	• Actioning and reviewing near misses, incidents or concerns identified through the 'Spot-It!' portal • Anonymous employee engagement survey with associated action plans • Sharing regular information on financial and economic factors affecting the performance of the group

Strategic report (continued)

4.1 Employees (continued)

How the Board complements the engagement efforts	
• CEO and Director led briefings to enable direct feedback and questions • Consideration of engagement survey result and action plans	• Regular visits to ports by Board members to engage directly with the local workforce • Meeting as Harbour Authority and Safety Board with a specific focus on health and safety and the Port Marine Safety Code

Actions and Decisions	
• Action plans to address outcomes from employee engagement survey • Virtual delivery of Beyond Zero 2022 with a focus on reinforcing ABP's safety culture, and the continued roll-out of 'Thrive' behavioural safety training • Launch of new Employee Recognition Programme, ABP Bravo!	• New ABP mental health and wellbeing policy launched • Launch of financial wellbeing programme providing financial awareness and education sessions for colleagues

4.2 Customers

The company's future success is dependent on the maintenance and development of its relations with current and potential customers. ABP works closely with our customers at port, regional and corporate level to understand their needs and develop facilities and services to meet their requirements.

What matters to our customers	
• Building long term sustainable partnerships of mutual value • Availability of infrastructure and resources to support customer operations	• Clear communication regarding port-based activities • Sustainability and de-carbonisation of port operations

How ABP measures	
• Direct customer feedback through day-to-day activities and joint projects • Net promoter, customer satisfaction, and customer effort scores	• Business growth • Annual customer engagement survey feedback

How ABP engages	
• Regular dialogue with our customers to understand current and future challenges • Port user groups to provide a forum for feedback and discussion on key topics • Bi-annual update to customers	• Publication of the Annual Review and bi-annual 'Report' magazine • Attending industry events alongside customers and partners • Hosting customer events

Strategic report (continued)

4.2 Customers (continued)

How the Board complements the engagement efforts	
• Meeting with key customer representatives • Considering feedback from customers, including when discussing new projects and opportunities	• Customer representatives presenting directly to the Board on their business/sector and outlook • Sponsoring action plans to address customer survey feedback

Actions and Decisions	
• Instigation of bi-annual customer updates • New terminal operating system introduced	• Investment in new infrastructure and equipment to support customer activities • Shore power connectivity in Southampton in support of decarbonisation

4.3 Local Authorities and National Government

ABP has a unique position as the UK's largest port operator and is an essential part of the supply chain for key industries throughout the UK. Government policy in respect of matters such as trade and the environment impact the way that businesses operate and accordingly, engagement with local and national government helps ABP to understand topical issues and to work with both government and our customers on areas of shared interest.

What matters to local authorities and national government	
• Local/Regional employment opportunities and economic growth • Support for the Government's climate strategy, including achieving Net Zero by 2050	• Enabling the controlled flow of people and goods into/out of the UK • Effective support of supply chains for local businesses and industry/agriculture

How ABP measures	
• Using our strong relationships with local authorities to ensure solutions are delivered within planning requirements • Targeted surveys of stakeholder perception	• Feedback from discussions on projects, consultations and applications for grant funding • Ability to deliver business core objectives with consent and support of relevant government bodies

How ABP engages	
• Directly with leading government departments, including the Department for Transport and the Cabinet Office • Membership of trade associations and business groups that engage with national government on policy issues e.g. the UK Major Ports Group and Renewable UK	• With executive agencies of government including the Marine Maritime Organisation and the Environment Agency. • Through regular dialogue with local authorities and Local Enterprise Partnerships • Hosting engagement events, regionally and centrally

Strategic report (continued)

4.3 Local Authorities and National Government (continued)

How the Board complements the engagement efforts

- Meetings with local and national government representatives
- Consideration of engagement and views of local and national government when reviewing project proposals

Actions and Decisions

- Working closely with government on key industry issues, including in relation to supply chain resilience and the green energy transition
- Revision of project proposals to take into account feedback from government stakeholders
- Holding engagement and thought leadership events
- Working with local authorities and Local Enterprise Partnerships to establish Freeports
- Attendance at political party conferences, sponsoring roundtable discussions and webinars and speaking at online conferences on policy issues

4.4 Suppliers

ABP relies on its suppliers to provide products and services that enable us to deliver our strategy. We seek to engage the best supply chain partners to sustainably deliver value and performance for the business and we regularly work with local and small businesses in our port communities.

We recognise that strong relationships, regular communication and engagement with our suppliers are key to delivering our projects in a timely and cost-efficient manner and ensuring that specifications are aligned with the needs of the business and our customers.

What matters to suppliers

- Clear and transparent communication of requirements and expectations
- Timely decision making
- Smooth onboarding of new suppliers
- Payment in accordance with agreed terms

How ABP measures

- By successful outcomes, such as delivery of equipment on time and on budget
- By seeking regular supplier feedback in respect of payment processes and the use of supplier portal
- Absence of disputes/unresolved issues
- Monitoring of payment period for invoices, and delays in the process (e.g. due to failure to match an invoice with a purchase order)

How ABP engages

- Through the use of a supplier portal to enable organisations to register and tender for contracts, complete due diligence and correspond directly with ABP
- Through regular dialogue and close collaboration with suppliers and contractors to ensure projects are delivered on time and in budget

Strategic report (continued)

4.4 Suppliers (continued)

How the Board complements the engagement efforts

- Regular review by the Board's Audit and Risk Committee of credit risk reports
- Review by the Audit and Risk Committee of whistleblowing reports, which would include any concerns or suspicions of malpractice raised by suppliers
- Receiving reports on project progress updates and any supplier issues

Actions and Decisions

- Operating framework agreements put in place with suppliers to ensure cost efficiency, quality of service and clear terms of engagement
- Increasing payment methods for suppliers through use of purchasing cards (P cards)

4.5 Communities

ABP recognises the importance of local communities to its continued success and the impact its decisions can have on those communities across its port estate. We seek to develop relationships based on mutual trust and respect and to understand the issues that matter locally.

What matters to local communities

- Being a good neighbour and supporting the local community
- Consultation with local community, in particular when significant projects are planned
- Acceptable levels of noise and air pollution
- Company's commitment to sustainability
- Job creation and contribution to regional economy

How ABP measures

- Monitoring air quality and greenhouse gas emissions
- Tracking social and environmental incidents
- Donations to charities and local/national community organisations
- By measuring the group's wider economic impact, principally through:
  - the value of trade handled at our ports
  - jobs supported in regions where we operate
  - the value of our contribution to the economy measured in Gross Value Added ("GVA")

How ABP engages

- Feedback from communities and residents on significant project proposals
- Through sponsorship and fundraising by ABP and its employees for a number of charities and community organisations

How the Board complements the engagement efforts

- Through allocation of budget to support community and charity projects
- Investment in sites to mitigate the effect of habitat loss
- Through consideration of local community impacts when project proposals are being reviewed by the Board for approval
- Overseeing the group's sustainability strategy

Strategic report (continued)

4.5 Communities (continued)

Actions and Decisions

- ABP sponsorship of marathons in Southampton, Newport, Cardiff and the Humber.
- Sponsorship of Welsh National Opera
- Beach cleaning and tree planting initiatives, including project to plant 21,000 trees, in partnership with Trees for Cities, in celebration of the late Queen's jubilee
- Becoming a member of the Lowestoft Kittiwake Partnership in support of local action to protect kittiwakes, an endangered species
- Sponsorship of a variety of regional charities located in the communities where ABP's ports operate
- Approval of the group's sustainability strategy

4.6 Environment

ABP is committed to developing its business to meet the needs of its customers in a sustainable way, with due regard for both its operations and the environment. Engaging with stakeholders is key to supporting our planning and licence applications and ensuring we are able to meet legislative requirements. When planning projects, ABP also works with stakeholders to ensure sustainability and mitigate or reduce the impact of its projects on the environment where possible.

What matters in respect of the environment

- Reducing greenhouse gas emissions ("GHG") and carbon emissions
- Promotion of biodiversity/protection of wildlife
- Air quality and pollution control
- Noise control/reduction
- Effective waste management practices, minimizing environmental impact

How ABP measures

- Air and water quality monitoring
- Tracking and monitoring waste
- Tracking key carbon GHG reduction metrics
- Monitoring energy performance
- ISO 14001 and 50001 Energy Management certification across all ports and terminals

How ABP engages

- Engaging with key environmental stakeholders, the Environment Agency, the Department for Environment, Food & Rural Affairs and the Marine Management Organisation in respect of major projects and initiatives
- Attendance at local port user groups to understand the key issues faced by port users and give feedback on how any environmental issues or concerns are being addressed
- Member of the Zero Carbon Humber initiative

How the Board complements the engagement efforts

- Development of the ABP strategy which includes renewable energy generation and storage as a key strategic direction
- Continued investment in renewable energy projects and infrastructure
- Consideration of the environmental impact as a key aspect of the decision-making process, particularly in all major project decisions
- Approval of ABP's first sustainability strategy and oversight of implementation and progress

Strategic report (continued)

4.6 Environment (continued)

Actions and Decisions	
• Approval of a green hydrogen production plant project on the Humber and other projects supporting renewable energy • Development of ABP's first sustainability strategy with a target of reaching Net Zero by 2040	• Purchase of lower emission plant and equipment pursuant to ABP's strategy • Roll out of Institute of Environmental Management and Assessment accredited training by the ABP Academy

5. Principal and Strategic Decisions

Outlined below are examples of principal and strategic decisions which have been taken by the ABP Board during the year and how they have had regard to the interests of stakeholders.

5.1 Customer Investment

Stakeholders, Issues and Factors Considered: Customers, Infrastructure Investment, UK Government, Local Communities, Environment, Long Term Impact

During the year the Board considered and approved a number of capital expenditure projects which support customers across the regions. One such example was the approval of a project, in partnership with Air Products, a large industrial gases producer and distributor, to develop a green hydrogen production facility at the Port of Immingham. Under the proposals ABP would contribute significant capital expenditure in new infrastructure to develop and construct a new deep-water riverside jetty to handle green ammonia imports. Air Products would make a substantial investment in the hydrogen plant and associated plant and equipment on ABP land. The jetty would also be designed to accommodate other cargoes connected to the energy transition, including the import of liquified CO_2 from carbon capture and storage projects for sequestration in the North Sea. The investment would be underpinned by the customer entering into a long-term contract and lease, which would generate a long-term revenue stream for the group.

In making the decision to proceed with the project, the Board received in depth management proposals following negotiations with the customer, internal assessments and financial modelling and considered key factors, including environmental impacts. In addition to the commercial and strategic rationale for the project which enhances shareholder value, the benefits of the project include supporting the UK Government's plans for a low-carbon economy, significant growth and benefits to the local region, including the provision of jobs for supply chains and local businesses, and the elimination of significant greenhouse gas emissions.

5.2 Equipment Investment

Stakeholders, Issues and Factors Considered: Customers, Environment, Business Reputation, Employees, Suppliers

The Board recognises the importance of having high quality, effective equipment and infrastructure in order to support customer operations and ensure a positive customer experience. In the first quarter of 2022, the directors approved a significant investment to purchase three new mobile harbour cranes ("MHCs") for the Port of Immingham.

Strategic report (continued)

5.2 Equipment Investment (continued)

When approving the proposal to replace the existing aging cranes, the directors considered the resilience that the new MHCs would provide and the benefit for both existing and future customers of more reliable and efficient cranes. The new MHCs would be optimised for larger vessels in the post panamax class, in addition to being mobile and modular so they could be used at Immingham and throughout the Humber region, if business requirements changed. The Board also ensured that the new MHCs would be consistent with ABP's aim to reduce its carbon footprint: the new cranes comprise a diesel generator run on HVO fuel (a cleaner fuel than diesel) with the option to switch to all electric, which achieves a greater performance while reducing fuel consumption. The design of the MHC also offers greater safety improvements in the driver's cab, which aligns to ABP's core value of ensuring a safe working environment.

Following a tender to award the contract, ABP worked closely with the chosen supplier, utilising an agreed quality assurance programme to ensure that the MHCs met the required specification and were delivered on time and on budget.

5.3 Sustainability Strategy
Stakeholders, Issues and Factors Considered: Environment, Employees, Customers, Local Communities, Business Reputation

ABP is committed to supporting progress towards the UK's legal commitment to net zero greenhouse gas emissions ("GHG") by 2050 and we continue to invest in assets, facilities and ways of working that will reduce ABP's carbon footprint and improve the environments in which we operate. In addition, we believe it is important to support our customers in building more sustainable supply chains, encouraging more freight movement by rail and water and supporting the increasing use of renewable energy.

During 2022, the Board approved a sustainability strategy for the group, focussed on reduction of GHG emissions and energy efficiency, air quality, protection of the natural environment, waste management and water management. The strategy includes a target of becoming a net zero business by 2040 (across Scope 1 and Scope 2 emissions). In formulating the strategy, a number of consultations were held with directors, the group's shareholders and employee representatives to gather feedback and ideas, many of which were included as part of the climate transition roadmap. Feedback from discussions with large customers on their energy transition plans was also taken into account.

Considerations for the Board, when approving the proposal, included the feedback received from the consultations, consequences of the decision and the impact over the longer term, the risks and opportunities for the business which arise from climate change, the potential financial implications of meeting the sustainability targets, and the reputation of the group for setting high standards in conducting its operations.

By Order of the Board

[redacted]

Marina Wyatt
Director

24 April 2023

Directors' report

The directors present the report and the audited accounts of Associated British Ports (number ZC000195) for the year ended 31 December 2022.

1. Principal office
The company's principal office is 25 Bedford Street, London, WC2E 9ES.

2. Dividends
The company paid interim dividends of £180m during the current year (2021: £130m) to its parent undertaking to facilitate the payment of external loans and interest by its parent undertakings. The directors do not recommend the payment of a final dividend (2021: £nil).

3. Directors
The directors of the company during the year and up to the date of these accounts were as follows:

Director	Role
Bird, SA	Regional Director, Humber
Harston, AF	Regional Director, Wales and Short Sea Ports
McCartain, MBW	Director, Safety, Engineering and Marine
Pedersen, HL	Chief Executive Officer
Rumsey, AJ	Chief HR Officer
van Weezel, HA	Chief Information Officer
Walker, JW	Chief Commercial Officer
Welch, AJM	Regional Director, Southampton
Wyatt, MM	Chief Financial Officer

4. Directors' indemnities
ABP (Jersey) Limited, the company's ultimate parent undertaking, maintains directors' and officers' liability insurance and pension fund trustees' liability insurance which give appropriate cover for any legal action brought against the directors and officers of the company.

Qualifying third party indemnity provisions (as defined by s.234 of the Companies Act 2006) for the benefit of directors and officers were in force for all directors and officers during the year and remain in force in relation to certain losses and liabilities which directors and officers may incur (or have incurred) in connection with their duties, powers or office.

5. Human resources policies
ABP's personnel resources strategy includes commitments to the highest possible standards of health and safety, equal opportunities, employee development, clear and fair terms of employment, access to information, provision of market-competitive salaries, incentive schemes and benefits, as well as the maintenance of effective relationships with unions and contractors. Details of how ABP engages with employees are provided in the Employees section of the Section 172 Statement on pages 9-10. The group of companies owned by ABP (Jersey) Limited ("the group") monitors a range of indicators to assist it with the management of its employees.

The group monitors the gender and ethnic diversity of all employees and is committed to ensuring that all segments of its communities have the opportunity to participate in and contribute towards the success of its business. As noted on page 6 the company is also committed to giving full and fair consideration to applicants for employment who are disabled and to provide disabled employees with opportunities for training, career development and promotion. If an employee becomes disabled during their employment every effort is made to ensure that, wherever possible, the person can either continue in their present role or a different role by arranging appropriate training and making reasonable adjustments.

Directors' report (continued)

6. Corporate Governance Statement

In line with the requirements of the Companies (Miscellaneous Reporting) Regulations 2018, Associated British Ports ("ABP") has adopted the Wates Corporate Governance Principles for Large Private Companies ("Wates Principles") as its corporate governance code. The company is the principal operating subsidiary within the group headed up by ABP (Jersey) Limited and adheres to a group-wide corporate governance framework which follows best practice and is considered suitable for its ownership, size, structure, and complexity of operations.

Details of how the company has applied the Wates Principles throughout the year are outlined below. Further information on the wider governance framework can be found in the annual report and accounts of ABPA Holdings Limited.

6.1 Principle One – Purpose and Leadership

The company's ports are an integral part of supply chains within multiple sectors of the UK economy and our purpose is to support our customers in "Keeping Britain Trading". We seek to accomplish this by being recognised as the best port operator in the UK. ABP's purpose is aligned with, and built upon, a foundation of five core values: Health & Safety; Openness & Honesty; Teamwork & Respect; Making a Difference; and Exceeding Expectations.

ABP is committed to a pro-active safety culture, ensuring a safe working environment and looking after the welfare of all our employees and port users. Safety culture is monitored through KPIs and also our 'Spot-It!' reporting system, which is designed to capture any safety, marine or environmental incident, near miss or observations that could cause injury or impact the environment and to share best practice throughout the organisation. Other methods used by the Board to monitor culture include: feedback at regular regional staff briefings undertaken by Board members; employee engagement surveys; reviewing whistleblowing disclosures; and trade union engagement.

Directors have regular dialogue with, and receive feedback from, the group's shareholders whose representatives sit on the Board of Associated British Ports Holdings Limited ("ABPH"), the company's immediate parent undertaking.

6.2 Principle Two – Board Composition

The Board of ABP comprises members of the group's executive team: the Chief Executive Officer ("CEO"); Chief Financial Officer ("CFO"); three Regional Directors; and five directors of key functions (listed under 'Directors' above). The size and composition of the Board is considered to be appropriate given the nature of the company and its position within the group. Appointments to the Board of ABP are made by the Board of ABPH, on the recommendation of the group Remuneration and Nomination Committee ("RemCo").

The Board benefits from directors who have a broad range of skills, backgrounds and knowledge. Their experience of the ports industry, in addition to other sectors and industries, allows them to add a valuable contribution.

ABP recognises the benefits of diversity on the Board and throughout the organisation and has continued to support efforts to increase diversity across the Maritime Industry, remaining a signatory of the Women in Maritime and Mental Health in Maritime pledges as well as being a Diversity in Maritime Charter organisation.

Directors' report (continued)

6.2 Principle Two – Board Composition (continued)

Board meetings are chaired by the CEO and provide an open and constructive forum for directors to be kept up to date on developments across all business areas, provide oversight of operational matters and make informed decisions. Directors have agreed those matters which are reserved for the Board's consideration and an annual governance calendar is used to support the setting of the Board's agenda, ensuring relevant matters are considered at appropriate times throughout the year.

On appointment, directors receive a thorough induction programme which includes port visits, meetings with key members of management and the group's shareholder representatives. In addition, directors all receive training on their duties and other key legislation/regulation, as required. Board meetings have historically been held at different ports during the year, so directors have the opportunity to tour locations as a Board and meet local staff and customers.

6.3 Principle Three – Director Responsibilities

Each director has a clear understanding of their accountability and responsibilities. The Board receives accurate, comprehensive and timely information on the company's business and financial performance to enable appropriate monitoring and effective oversight of key matters. The group's finance function is staffed by appropriately qualified individuals who ensure the integrity of financial information provided to the Board. The group is externally audited by Ernst & Young LLP ("EY"), with internal audit services provided by appropriate external specialists to assess financial and other internal controls and health and safety processes.

As noted above, there is a schedule of matters reserved specifically for the Board, although where appropriate, some decisions are delegated to, or led by, those directors with the most relevant knowledge and industry experience. In addition, certain material matters are required under a shareholders' agreement to also be approved by the Board of ABPH and, in some cases, the group's shareholders.

The Board has at least four formal scheduled meetings each year, with ad hoc meetings held as necessary, to ensure matters are considered and progressed in a timely manner. In addition, the company is the Statutory Harbour Authority ("SHA") for 22 ports and harbours, including the Humber Estuary. The Board meets separately, at least four times a year, as the Harbour Authority and Safety Board ("HASB") to exercise certain duties as the SHA. The HASB has its own remit in relation to its powers and duties as a SHA and in respect of health and safety matters. Papers for Board and HASB meetings are usually circulated well in advance of a scheduled meeting to ensure sufficient time for directors' review and consideration.

On an annual basis, each director is required to declare any potential conflicts of interest, and at each Board meeting directors are prompted to raise any conflicts of interest they have in any matters that are to be discussed. If conflicts of interest are raised, appropriate safeguards are put in place.

Directors' report (continued)

6.4 Principle Four – Opportunity and Risk

The Board is committed to the long-term sustainable growth of the company and to seeking opportunities whilst ensuring effective oversight and mitigation of risk. Longer term and strategic initiatives to create value are identified through the strategic review, annual five-year planning exercises and the Port Master Planning process. This also enables the business to determine the level of long-term infrastructure investment that may be required to secure and achieve growth. Other opportunities may also be identified through quarterly business reviews and day to day activities.

The Board recognises the importance of effective risk management to preserve value. Risks are managed in accordance with the group risk management policy and within the group's risk appetite, both of which are approved by the Board of ABPH, on the recommendation of the group's Audit and Risk Committee. The risk management policy, risk appetite thresholds and longer-term emerging risks are kept under review and updated, as appropriate, at least annually.

Processes are in place to ensure that inherent and emerging risks are identified in a timely manner and are then appropriately managed. The group maintains risk registers covering key operational and strategic risks and regular reports are provided to the Board, as part of their oversight of risk management and controls. Proposals for Board approval are always required to detail risk considerations and mitigation. Further information on the company's principal risks can be found in the Strategic Report on pages 7 to 8.

6.5 Principle Five – Remuneration

ABP is committed to executive remuneration structures which are aligned to the company's culture and values and promote the long-term sustainable success of the business and the interests of the group's shareholders. The group's policy is to provide appropriate and fair levels of remuneration and incentives at a level which attracts and retains high-quality directors, senior management and employees.

The remuneration of the CEO, CFO and other ABP directors is determined by the Board of ABPH, on the recommendation of the RemCo. The RemCo comprises entirely Non-Executive Directors of ABPH and no director of ABP is present during discussion of their own remuneration. In line with its terms of reference, the RemCo seeks to provide responsible incentives that encourage enhanced performance and reward individual contributions to the long-term strategic goals of the group. When considering the remuneration of the ABP Board, and annual salary increases, the RemCo takes into account the pay and conditions across the wider ABP group.

The Board annually publishes ABP's Gender Pay Gap Report, which details the progress made to reduce the pay gap between men and women.

6.6 Principle Six – Stakeholder Relationships and Engagement

The Board recognises the impact its decisions can have on its internal and external stakeholders and understands the importance of engagement with stakeholders to achieving its long-term strategy. Further information on the company's stakeholders and engagement methods can be found in the Strategic Report on pages 9 to 15.

Directors' report (continued)

7. Future outlook
The directors do not foresee any material changes in the principal activities of the company.

8. Matters disclosed in the strategic report
The directors consider the following matters of strategic importance and have chosen to disclose these in the strategic report:

- Financial risk management objectives and policies and details of the company's exposure to liquidity, interest rate, foreign exchange, credit and capital risk and other risk disclosures; and
- Employee involvement and engagement and how the directors have had regard to employee interests, the need to foster business relationships with stakeholders and the impact on the environment, including on principal and strategic decisions.

9. Auditor re-appointment
The auditor, Ernst & Young LLP, was appointed by Associated British Ports Holdings Limited, the company's Holding Company, in accordance with s.10(1) of Schedule 2 of the Transport Act 1981 and, having indicated its willingness to continue in office, Ernst & Young LLP will continue as auditor to the company.

10. Audit information
The directors of the company at the time of approving the directors' report are listed above. Having made enquiries of fellow directors and the company's auditor, each of these directors confirms that:
- so far as he or she is aware, there is no relevant audit information (that is, information needed by the company's auditor in connection with preparing his report) of which the company's auditor is unaware;
- each director has taken all the steps that he or she ought to have taken as a director in order to make himself or herself aware of any relevant audit information and to establish that the company's auditor is aware of that information; and
- each director is aware that it is an offence to make a knowingly false statement.

By Order of the Board

[redacted]

AM Morgan
Secretary
25 Bedford Street
London, WC2E 9ES

24 April 2023

Statement of directors' responsibilities in respect of the preparation of the annual report and accounts

The directors are responsible for preparing the annual report and accounts in accordance with applicable United Kingdom law and regulations.

Company law requires the directors to prepare financial statements for each financial year. Under that law the directors have elected to prepare the company financial statements in accordance with UK adopted International Accounting Standards ("IAS"). Under company law, the directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the assets, liabilities and financial position of the company and of the profit or loss of the company. In preparing these financial statements, the directors are required to:

- select suitable accounting policies in accordance with IAS 8 Accounting Policies, Changes in Accounting Estimates and Errors and then apply them consistently;
- make judgements and accounting estimates that are reasonable and prudent;
- present information, including accounting policies, in a manner that provides relevant, reliable, comparable and understandable information;
- provide additional disclosures when compliance with the specific requirements in IAS is insufficient to enable users to understand the impact of particular transactions, other events and conditions on the company financial position and financial performance;
- in respect of the company financial statements, state whether IAS, have been followed, subject to any material departures disclosed and explained in the financial statements; and
- prepare the financial statements on the going concern basis unless it is appropriate to presume that the company will not continue in business.

The directors are responsible for keeping adequate accounting records that are sufficient to show and explain the company's transactions, disclose with reasonable accuracy at any time the financial position of the company and enable them to ensure that the company financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Under applicable law and regulations, the directors are also responsible for preparing a strategic report, directors' report and corporate governance statement that comply with that law and those regulations. The directors are responsible for the maintenance and integrity of the corporate and financial information included on the company's website.

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF ASSOCIATED BRITISH PORTS

Opinion

We have audited the financial statements Associated British Ports (the company) for the year ended 31 December 2022 which comprise the Income Statement, the Statement of Comprehensive Income, the Balance Sheet, the Statement of Cash Flows, the Statement of Changes in Equity and the related notes 1 to 27, including a summary of significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and UK adopted international accounting standards.

In our opinion, the financial statements:

- give a true and fair view of the company's affairs as at 31 December 2022 and of its profit for the year then ended;
- have been properly prepared in accordance with UK adopted international accounting standards; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Conclusions relating to going concern

In auditing the financial statements, we have concluded that the directors' use of the going concern basis of accounting in the preparation of the financial statements is appropriate. Our evaluation of the directors' assessment of the company's ability to continue to adopt the going concern basis of accounting included:

- In conjunction with our walkthrough of the ABP (Jersey) Limited ('the Ultimate Parent Company' and together 'Group') financial statement close process, we confirmed our understanding of the Group's going concern assessment process and also engaged with management early to ensure all key factors were considered in their assessment, the period chosen by management was the 18-month period ended 30 June 2024;
- We obtained management's going concern assessment, including the Group's cashflow forecasts and the Group's forecast covenant compliance calculations on the external borrowings for the going concern review period. We obtained a letter of support from the Ultimate Parent company covering the period to 30 June 2024. The Group headed by the Ultimate Parent company has modelled an adverse scenario in their cash forecasts and covenant calculations in order to incorporate unexpected changes to the forecasted liquidity and covenant compliance of the Group;
- We have tested the factors and assumptions included in modelled scenario and the adverse scenario for the cashflow forecasts and forecast covenant calculations. We considered the appropriateness of the methods used to calculate the cashflow forecasts and forecast covenant compliance and determined through inspection and testing of the methodology and calculations that the methods utilised were appropriately to be able to make an assessment for the company and the wider Group. We performed reverse stress testing to ascertain the headroom within the forecast covenant compliance and also to exhausting liquidity, and considered whether factors or circumstances could plausibly arise that could lead to a breach of loan covenants or exhausting liquidity; and

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF ASSOCIATED BRITISH PORTS (continued)

Conclusions relating to going concern (continued)

- We considered the mitigating factors included in the cashflow forecasts and forecast covenant compliance calculations that are within control of the Group. This included reviewing of the Group's non-operating cash outflows and evaluating the Group's ability to control these outflows as mitigating actions if required. We also agreed credit facilities available to the Group to loan agreements and confirmations obtained from lenders.

Based on the work we have performed, we have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the company's ability to continue as a going concern for the period to 30 June 2024.

Our responsibilities and the responsibilities of the directors with respect to going concern are described in the relevant sections of this report. However, because not all future events or conditions can be predicted, this statement is not a guarantee as to the company's ability to continue as a going concern.

Other information

The other information comprises the information included in the annual report, other than the financial statements and our auditor's report thereon. The directors are responsible for the other information contained within the annual report.

Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in this report, we do not express any form of assurance conclusion thereon.

Our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the course of the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether this gives rise to a material misstatement in the financial statements themselves. If, based on the work we have performed, we conclude that there is a material misstatement of the other information, we are required to report that fact.

We have nothing to report in this regard.

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the strategic report and the directors' report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the strategic report and directors' report have been prepared in accordance with applicable legal requirements.

Matters on which we are required to report by exception

In the light of the knowledge and understanding of the company and its environment obtained in the course of the audit, we have not identified material misstatements in the strategic report or directors' report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF ASSOCIATED BRITISH PORTS (continued)

Matters on which we are required to report by exception (continued)

- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit

Responsibilities of directors

As explained more fully in the directors' responsibilities statement set out on page 22, the directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

Explanation as to what extent the audit was considered capable of detecting irregularities, including fraud

Irregularities, including fraud, are instances of non-compliance with laws and regulations. We design procedures in line with our responsibilities, outlined above, to detect irregularities, including fraud. The risk of not detecting a material misstatement due to fraud is higher than the risk of not detecting one resulting from error, as fraud may involve deliberate concealment by, for example, forgery or intentional misrepresentations, or through collusion. The extent to which our procedures are capable of detecting irregularities, including fraud is detailed below. However, the primary responsibility for the prevention and detection of fraud rests with both those charged with governance of the entity and management.

Our approach was as follows:

- We obtained an understanding of the legal and regulatory frameworks that are applicable to the company and determined that the most significant are those that relate to the reporting framework (Companies Act 2006 and UK adopted international accounting standards)
- We understood how Associated British Ports Limited is complying with those frameworks by making enquiries of management and those responsible for legal and compliance procedures and the Company Secretary. We corroborated our enquiries through our review of board minutes and papers provided to the Audit and Risk Committees and noted that there was no contradictory evidence.

INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF ASSOCIATED BRITISH PORTS (continued)

Explanation as to what extent the audit was considered capable of detecting irregularities, including fraud (continued)

- We assessed the susceptibility of the Company's financial statements to material misstatement, including how fraud might occur by meeting with management within various parts of the business to understand where they considered there was susceptibility of fraud. We also considered performance targets and their influence on efforts made by management to manage Key Performance Indicators. Where this risk was considered higher, we performed audit procedures to address each identified fraud risk. These procedures included testing manual journals and were designed to provide reasonable assurance that the financial statements were free from fraud or error.
- Based on this understanding we designed our audit procedures to identify noncompliance with such laws and regulations. Our procedures involved a review of board minutes to identify any noncompliance with laws and regulations, a review of the reporting to the Audit and Risk Committee on compliance with regulations, enquiries of Legal Counsel and of Management.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at https://www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditor's report.

Use of our report

This report is made solely to the company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the company and the company's members as a body, for our audit work, for this report, or for the opinions we have formed.

[redacted]

Steven Lunn (Senior statutory auditor)
for and on behalf of Ernst & Young LLP, Statutory Auditor
London
26 April 2023

Income statement for the year ended 31 December

	Note	2022 £m	2021 £m
Revenue	2	**662.5**	579.0
Cost of sales		**(301.4)**	(259.5)
Gross profit		**361.1**	319.5
Administrative expenses		**(123.9)**	(105.2)
Other income		**7.1**	1.9
Increase in fair value of investment properties	10	**148.4**	45.0
Operating profit	3	**392.7**	261.2
Analysed between:			
Underlying operating profit before the following items:		**245.1**	216.0
Increase in fair value of investment properties	10	**148.4**	45.0
Net unrealised gain on fuel derivatives		**0.8**	2.7
Exceptional items	3,5	**(1.6)**	(2.5)
		392.7	261.2
Finance costs	6	**(33.6)**	(33.2)
Finance income	6	**1.4**	0.1
Profit after realised finance costs[1]		**360.5**	228.1
Unrealised foreign exchange gains	6	**0.1**	-
Profit before taxation		**360.6**	228.1
Taxation charge	7	**(76.2)**	(102.4)
Profit for the year attributable to equity shareholder		**284.4**	125.7

1 Profit after finance costs excludes unrealised gains and losses from foreign exchange contracts.

The company declared interim dividends of £180.0m in the current year (2021: £130.0m).

All results are derived from continuing operations in the United Kingdom.

Statement of comprehensive income for the year ended 31 December

	Note	2022 £m	2021 £m
Profit for the year attributable to equity shareholder		**284.4**	125.7
Other comprehensive income/(expense):			
Other comprehensive income/(expense) not to be reclassified to profit and loss in subsequent periods:			
Surplus arising on revaluation of investment property	10	**52.5**	14.9
Deferred tax on revaluation of investment property	20	**(7.7)**	(3.6)
Remeasurement (loss)/gain relating to net retirement benefit liabilities	13	**(45.2)**	60.4
Deferred tax associated with remeasurement loss/(gain) relating to net retirement benefit asset	20	**10.8**	(12.3)
Other comprehensive income for the year, net of tax		**10.4**	59.4
Total comprehensive income for the year, net of tax, attributable to equity shareholder		**294.8**	185.1

Balance sheet as at 31 December

	Note	2022 £m	2021* £m
Assets			
Non-current assets			
Intangible assets	8	**51.5**	51.0
Property, plant and equipment	9	**1,402.1**	1,411.8
Investment property	10	**2,494.0**	2,224.4
Investments	11	**54.6**	54.6
Retirement benefit assets	13	**15.3**	62.8
Derivative financial instruments	15	**0.5**	0.5
Trade and other receivables	12	**1.9**	4.9
		4,019.9	3,810.0
Current assets			
Derivative financial instruments	15	**1.8**	0.7
Trade and other receivables	12	**118.0**	103.1
Cash and cash equivalents		**42.8**	98.3
		162.6	202.1
Total assets		**4,182.5**	4,012.1
Liabilities			
Current liabilities			
Borrowings	14	**(2.4)**	(1.7)
Derivative financial instruments	15	**(0.2)**	-
Trade and other payables	17	**(175.3)**	(155.8)
Deferred income	18	**(41.6)**	(37.8)
Provisions	19	**(28.1)**	(19.3)
Current tax liabilities		**-**	(2.1)
		(247.6)	(216.7)
Non-current liabilities			
Borrowings	14	**(579.3)**	(598.4)
Derivative financial instruments	15	**(0.1)**	-
Retirement benefit liabilities	13	**(26.6)**	(41.1)
Trade and other payables	17	**(77.0)**	(66.9)
Deferred income	18	**(104.9)**	(90.8)
Provisions	19	**(14.6)**	(19.8)
Deferred tax liabilities	20	**(303.3)**	(264.1)
		(1,105.8)	(1,081.1)
Total liabilities		**(1,353.4)**	(1,297.8)
Net assets		**2,829.1**	2,714.3
Holding company's equity			
Revaluation reserve		**1,896.7**	1,687.5
Accumulated losses		**932.4**	1,026.8
Total holding company's equity		**2,829.1**	2,714.3

**Comparatives have been reclassified to conform to current presentation*

The financial statements were approved by the Board and signed on its behalf on 24 April 2023 by:

[redacted]

MM Wyatt
Director

Statement of cash flows for the year ended 31 December

	Note	2022 £m	2021 £m
Cash flows from operating activities			
Cash generated by operations	21	**352.8**	268.4
Interest paid		**(29.7)**	(13.1)
Interest received		**0.8**	0.1
Lease interest paid		**(0.5)**	(0.7)
Income tax paid		**(19.0)**	(4.7)
Net cash inflow from operating activities		**304.4**	250.0
Cash flows from investing activities			
Net proceeds from sale of property, plant and equipment		**1.0**	1.1
Net proceeds from sale of investment property		**3.9**	0.9
Net proceeds from sale of land held for sale		**0.8**	(0.7)
Government grants received		**15.3**	32.0
Purchase of intangible assets		**(9.6)**	(8.5)
Purchase of property, plant and equipment		**(117.0)**	(151.8)
Purchase of investment property		**(30.0)**	(18.4)
Net cash outflow from investing activities		**(135.6)**	(145.4)
Cash flows from financing activities			
Repayment of borrowings		**(221.2)**	(186.6)
Payment of principal portion of lease liabilities		**(3.1)**	(2.9)
Net cash outflow from financing activities		**(224.3)**	(189.5)
Change in cash and cash equivalents during the year		**(55.5)**	(84.9)
Cash and cash equivalents at 1 January		**98.3**	183.2
Cash and cash equivalents at 31 December		**42.8**	98.3
Cash and cash equivalents at 31 December is analysed between:			
Bank accounts		**3.6**	69.6
Deposits		**28.2**	18.0
Rent deposit accounts		**11.0**	10.7
Cash and cash equivalents at 31 December		**42.8**	**98.3**

Statement of changes in equity for the year ended 31 December

	Revaluation reserve	Retained earnings	Total
	£m	£m	£m
At 1 January 2022	1,687.5	1,026.8	2,714.3
Profit for the year	156.7	127.7	284.4
Other comprehensive income	52.5	(42.1)	10.4
Total comprehensive income	**209.2**	**85.6**	**294.8**
Dividends declared	-	(180.0)	(180.0)
At 31 December 2022	**1,896.7**	**932.4**	**2,829.1**

	Revaluation reserve	Retained earnings	Total
	£m	£m	£m
At 1 January 2021	1,627.6	1,031.6	2,659.2
Profit for the year	45.0	80.7	125.7
Other comprehensive income	14.9	44.5	59.4
Total comprehensive income	**59.9**	**125.2**	**185.1**
Dividends declared	-	(130.0)	(130.0)
At 31 December 2021	**1,687.5**	**1,026.8**	**2,714.3**

The revaluation reserve is used to record unrealised increases in the fair value of fixed assets, primarily investment properties. Decreases in the fair value of fixed assets are recognised in the revaluation reserve to the extent that they reverse increases previously recognised.

Notes to the financial statements

1. Accounting policies

1.1 Basis of preparation

Under the Transport Act 1981, Associated British Ports Holdings Limited, the company's intermediate parent undertaking, has powers over Associated British Ports ("ABP") corresponding to the powers of a holding company over a wholly owned subsidiary undertaking.

The financial statements have been prepared on a going concern basis and on the historical cost basis, except for investment property and derivative financial instruments which have been measured at fair value.

The financial statements are presented in sterling and all values are rounded to the nearest tenth of a million (£m) except where otherwise indicated. The financial statements provide comparative information in respect of the previous period. Where current presentation has been changed to aid understanding of the financial statements the comparatives have been reclassified to follow the new presentation.

Consolidation exemption
These separate financial statements contain information about Associated British Ports as an individual company and do not contain consolidated financial information as the parent of a group. The company has taken advantage of the exemption available under s400 of the Companies Act 2006, from the requirement to prepare and deliver consolidated financial statements, as the results of the group are included in the consolidated financial statements of its intermediate parent undertaking, ABPA Holdings Limited, which are available from 25 Bedford Street, London, WC2E 9ES.

Going concern basis
The directors have carried out a review, including consideration of appropriate forecasts and sensitivities, which indicates that the company will have adequate resources to continue to trade for the period to 30 June 2024. In particular the directors have considered the following:

- For the year ended 31 December 2022 the company generated cash from operations of £352.8m and the company expects to maintain strong cashflow generation;
- The company has net current liabilities of £85.0m; and
- The company has net assets of £2,829.1m.

The company's future viability is ultimately dependent upon the performance of the wider trading group owned by the company's intermediate parent undertaking, ABPA Holdings Limited ("ABPAH"), and group management's decisions on the flow of capital. ABP (Jersey) Ltd, the company's ultimate parent undertaking, has confirmed that it will continue to finance the company to enable it to meet its liabilities as they fall due.

The group's business plan was developed taking in consideration the impact of the ongoing war in Ukraine and the current economic crisis, driven by macro-economic factors, and their impact on business performance. Management continues to monitor the impact of these factors and their potential business impacts and do not expect them to adversely impact the going concern assumption, based on the significant proportion of revenue that is contractually guaranteed, limited impact from them on 2022 performance, and the group's ability to take effective mitigating actions to counter downside scenarios. The group has demonstrated the ability to deliver cost control measures and cost saving initiatives and to establish strict criteria for capital investment.

Notes to the financial statements

1. Accounting policies (continued)

1.1 Basis of preparation (continued)

Going concern basis (continued)
Management will continue to forecast the group's results as new information becomes available and have modelled different scenarios, including a downside scenario, where headroom against the leverage covenant becomes limited within the going concern period, before mitigating actions are applied. If the actual results are significantly worse than forecast, the group has the option of pursuing further mitigating measures that are under its own control to cut costs and preserve cash. These include further reductions in variable staff and other variable costs to match reduced activity, delaying or holding back its capital programme, reassess interest payments to shareholders and, if the downside period persists, structurally reviewing costs for further savings. As a result of the successful actions taken in the past and having identified contingency plans to react to potential adverse scenarios, management have concluded that the group should generate sufficient cash and EBITDA to continue as a going concern and to avoid breaching its loan covenants.

Liquidity risk is principally managed by maintaining cash and borrowing facilities at a level that is forecast to provide reasonable headroom in excess of the expected future needs of the group. As at 31 December 2022, the group had access to £280m of committed and undrawn borrowing facilities, which are available for between two and four years. Debt maturities are spread over a range of dates, ensuring the group is not exposed to a material refinancing in any one year. In addition, the group has in place £160m of debt service reserve liquidity facilities to cover annual interest costs. These are renewed annually and are drawn with a final maturity of 2028 if not renewed. The group has debt falling due for repayment during the period to 30 June 2024 of £420m, including £328.4m included in current liabilities. The group plans to raise additional debt to repay the maturing facilities and is confident of doing so given the group's strong track record of refinancing its debt facilities over time. £100m has already been refinanced in 2023. However, in the unlikely event that the group is not able to raise new finance as planned due to circumstances outside its control, the available committed undrawn facilities are sufficient to repay all of the debt falling due. Further, the group would also consider delaying interest payments to shareholders if required to maintain a sufficient liquidity buffer to mitigate unexpected events.

Given the nature, maturity dates and counterparties of the above liabilities, as well as the group's track record of its ability to refinance debt and generate cash flow, the directors are confident that the company has the ability to continue to meet its liabilities as they fall due until 30 June 2024 and therefore the financial statements have been prepared on a going concern basis.

Statement of compliance
These financial statements have been prepared in accordance with UK adopted International Accounting Standards ("IAS").

Notes to the financial statements

1. Accounting policies (continued)

1.1 Basis of preparation (continued)

Changes to presentation
Some presentation has been changed in the financial statements to aid understanding. Items reclassified are:

- Finance costs and income have been presented to distinguish between realised finance costs and income and unrealised gains and losses on the revaluation of financial instruments carried at fair value and from the effects of changes in foreign exchange rates on loans denominated in foreign currency. These unrealised gains and losses will have no impact on the income statement over the lives of the instruments and their exclusion gives a better understanding of the true profit or loss of the underlying business (note 6).
- Right of use assets relating to leased property, plant and equipment has been included within property plant and equipment as they are not material. The amount of right of use assets included in property, plant and equipment is disclosed in note 10.
- Land held for sale of £nil (2021 £0.8m, 2020 £0.5m)has been included within other receivables as it was not considered to be material(note 12).

1.2 Changes in accounting policies

New standards and amendments adopted
No new standards effective for the first time for the annual reporting period commencing 1st January 2022 have a material impacts on the consolidated financial statements of the company.

New standards, amendments and interpretations issued but not yet effective
The IASB and IFRIC have issued a number of standards, amendments and interpretations with an effective date of implementation for accounting periods beginning after the start of the company's current financial year. The directors do not anticipate that the adoption of the new standards, amendments and interpretations will have a material impact on the company's financial statements in the period of initial application.

The company has not early adopted any standard, interpretation or amendment that has been issued but is not yet effective.

1.3 Critical estimates, judgements and assumptions

Estimates
The critical estimates in applying these policies are as follows:

- Valuation of investment property – note 10
- Valuation of defined benefit pension scheme liabilities – note 13
- Provisions for retrospective industrial diseases – note 19

Judgements
In the process of applying the company's accounting policies, management have made the following judgements which have the most significant effect on the amounts recognised in the financial statements:

- Classification of investment property – see accounting policy in note 1.4
- Measurement of deferred taxation of investment property – see accounting policy in note 1.4

Notes to the financial statements

1. Accounting policies (continued)

1.4 Significant accounting policies

The directors consider the following to be the most important accounting policies in the context of the company's operations.

Revenue recognition
Revenue comprises the amounts receivable in respect of contracts with customers and rental income from investment properties.

Revenue from contracts with customers
Revenue from contracts with customers is recognised when the performance obligations under the contract have been satisfied. The allocation of the transaction price to the performance obligations depends on the type of service being provided.

- Call revenue is related directly to the visit of a vessel to the port and includes fees for pilotage, conservancy, environmental charges, dues for accessing the port, and mooring fees. Each service is a performance obligation and revenue is recognised once provision of the service is complete. All call related performance obligations are completed once a vessel has docked at the port.
- Traffic revenue is related to the volumes of cargo crossing the quay and primarily consists of consolidated rate charges covering multiple services including cargo dues, passenger dues, carriage and the loading and unloading of cargo from vessels. Each service is an individual performance obligation. Revenue is allocated to each service based on the estimated standalone selling price of that service, usually based on a tariff rate. Revenue is recognised once provision of the service is complete.
- Cargo operations revenue relates to the handling, processing and storage of cargo before or after it has been loaded to a vessel. Each process or service is a performance obligation and usually has an identifiable selling price. Revenue is recognised when the process or service is complete. Storage revenue is recognised over the period that the cargo is stored.
- Shortfall revenue relates to contracts with customers that have minimum volume guarantees which, if not achieved by the customer result in additional revenue to the company to cover the shortfall in volumes. These shortfall revenues, are assessed both over the life of the contract as well as each reporting period end, and subsequently recognised over the remaining term of the contract when it is highly probable a significant reversal will not occur.
- Fixed revenue does not vary with the number of vessel visits, volumes of cargo or any other measure of customer activity, and primarily consists of fixed payments to compensate the company for investments in capital infrastructure for specific customers. Fixed revenue is largely recognised over time, spread over the term of the underlying contract.
- Utilities revenue relates to the supply of electricity and other services to tenants. Revenue is recognised as utilities are supplied.
- Dredging revenue relates to dredging services both for specific customers at our own ports and by ABP's dredging operations working in non-ABP locations. Revenue is recognised when the dredging work is completed.
- Other revenue consists of individual services provided to customers, primarily sales of environmental consultancy services and provision of marina facilities. Each service is a performance obligation and revenue is recognised at a point in time when the performance obligation is complete or, where appropriate, over time as the service is provided. Where revenue is recognised over time the transaction price is allocated based on the time spent on the performance obligation in the period of recognition against the time the performance obligation will take to complete.

Notes to the financial statements

1. Accounting policies (continued)

1.4 Significant accounting policies (continued)

Revenue recognition (continued)

If a customer pays consideration before the performance obligations under the contract are completed, a contract liability is recognised at the earlier of the date payment is made or is due. Contract liabilities are recognised as revenue when the performance obligations are complete.

Agent versus principal relationships
When a third party is involved in providing goods or services to the group's customers, management determines whether the group is a principal or an agent in these transactions by evaluating the nature of the promise to the customer. The group is a principal and records revenue on a gross basis if it controls the promised goods or services before transferring them to the customer. If the group's role is only to arrange for a third party to provide the goods or services then the group is an agent and will record revenue at the net amount that it retains for its agency services.

Lease income from investment properties
Lease payments from operating leases are recognised as lease income over the lease term on a straight line basis. Variable lease income is recognised as lease income in the period in which it is earned.

Impairment of non-financial assets
The company assesses at each reporting date whether there is an indication that an asset may be impaired. If any indication exists, or when annual impairment testing for an asset is required, the company estimates the asset's recoverable amount. An asset's recoverable amount is the higher of an asset's or a cash-generating unit's fair value less costs of disposal and its value in use, and is determined for an individual asset unless the asset does not generate cash inflows that are largely independent of those from other assets or groups of assets. Where the carrying amount of an asset exceeds its recoverable amount, the asset is considered impaired and is written down to its recoverable amount.

In assessing value in use, the estimated future cash flows are discounted to their present value using a discount rate that reflects current market assessments of the time value of money and the risks specific to the asset.

Impairment losses are recognised in the income statement in those expense categories consistent with the function of the impaired asset, except for property previously revalued where the revaluation was taken to equity. In this case the impairment is recorded first against any previously recognised revaluation gains in respect of that asset in other comprehensive income.

An assessment is made at each reporting date as to whether there is any indication that previously recognised impairment losses may no longer exist or may have decreased. If such indication exists, the company estimates the asset's recoverable amount.

A previously recognised impairment loss is reversed only if there has been a change in the assumptions used to determine the asset's recoverable amount since the last impairment loss was recognised. The reversal is limited so that the carrying amount of the asset does not exceed its recoverable amount, nor exceed the carrying amount that would have been determined, net of depreciation, had no impairment loss been recognised for the asset in prior years.

Notes to the financial statements

1. Accounting policies (continued)

1.4 Significant accounting policies (continued)

Revenue recognition (continued)
To the extent that an impairment loss on the same revalued asset was previously recognised in the income statement, a reversal of that impairment loss is also recognised in the income statement.

Intangible assets with finite useful lives are reviewed for indications of impairment at least annually, either individually or at each cash-generating unit level, as appropriate. When circumstances indicate that the carrying value may be impaired an impairment review is carried out as described above.

Investment property
Property (including land held for development and property held by the company as a right of use asset under a lease) is classified as investment property if:

- it is not occupied by the company or used by the company for the provision of operational port services that are material in nature (e.g. stevedoring);
- it is a defined area (land, buildings, jetties and other fixed structures) and one or more users pay an amount, whether rental or commercial revenue for use of that area for a period of one or more years; and
- any "ancillary services" provided by the company at the property are insignificant to the arrangements as a whole. Ancillary services are deemed to be significant when they take place within the property, the value of the services exceeds one quarter of the estimated rental value of the property and they are provided under a non-cancellable contract.

All completed investment property is measured at fair value. Investment property in the course of construction is measured at cost (including interest and other appropriate net outgoings) until such time as it is possible to determine fair value, consistent with the criteria in measuring completed investment property, with the exception of underlying land, which is included at carrying value before construction commenced.

Valuations are conducted annually by the directors and reviewed by external valuers at least once every five years. Surpluses or deficits arising on the revaluation of investment property are recognised in the income statement and then transferred from accumulated losses to the revaluation reserve.

Transfers of investment properties to operational assets are made at fair value at the date of change in use or classification.

Transfers of property from property, plant and equipment to investment property are at carrying value. Subsequent to transfer, investment property will be carried at fair value. The initial revaluation gain or loss arising on an asset transferred from property, plant and equipment to investment property is treated as follows:

- an upward revaluation movement is recognised in other comprehensive income and accumulated in the revaluation reserve. However, the increase is recognised in the income statement to the extent that it reverses a revaluation decrease of the same asset previously recognised in the income statement; or

Notes to the financial statements

1. Accounting policies (continued)

1.4 Significant accounting policies (continued)

Investment property (continued)

- a downward revaluation movement is recognised in the income statement. However, the decrease shall be recognised in other comprehensive income to the extent of any credit balance existing in the revaluation surplus in respect of that asset. The decrease recognised in other comprehensive income reduces the revaluation reserve.

The group reviews potential tax liabilities and benefits to assess the appropriate accounting treatment. Tax provisions are made if it is probable that a liability will arise. Tax benefits are not recognised unless it is probable that they will be obtained. Assessing the expected realisation of the value of investment property through sale or use requires judgements to be made based on past experience and the current tax environment.

Property, plant and equipment

Property, plant and equipment is measured at cost, subject to depreciation and impairment and includes assets held by the company as right of use assets under leases.

Depreciation is provided on a straight-line basis spread over the expected useful lives of the various types of asset and having taken account of the estimated residual values. Estimated residual values are reviewed and updated annually. Estimated useful lives extend up to a maximum of 50 years for capital dredging costs, dock structures, roads, quays and buildings, up to 30 years for floating craft and range between 2 and 30 years for plant and equipment. Freehold land is not depreciated.

Transfers of property from property, plant and equipment to property and land held for sale are made at the lower of market value on the date of transfer or the carrying value at the last balance sheet date.

Retirement benefits

In respect of defined benefit plans, obligations are measured at their discounted present value using the projected unit credit method, while benefit plan assets are recorded at fair value. The operating and financing costs of such benefit plans are recognised as staff costs in the income statement; operating costs are spread systematically over the expected service lives of employees and financing costs are recognised in the periods in which they arise. Remeasurement gains and losses and the effect of the asset ceilings are recognised immediately in the statement of other comprehensive income. Curtailment gains and losses arising as a consequence of either significant amendments to the terms of defined benefit plans, or significant reductions in the number of employees covered by the plans, are recognised in the income statement when the curtailment occurs.

The net retirement benefit liability or asset recognised in the balance sheet represents the actual deficit or surplus in the company's defined benefit plans. Any surplus resulting from this calculation is limited to the present value of any economic benefits available in the form of refunds from the plans or reductions in future contributions to the plans.

The company participates in a number of multi-employer defined benefit pension schemes. Where the company is able to determine its share of the assets and liabilities on a consistent and reliable basis it accounts for these schemes as defined benefit schemes; where it is unable, it accounts for these schemes as defined contribution schemes. Further information on these schemes is contained within note 13.

1. Accounting policies (continued)

1.4 Significant accounting policies (continued)

Retirement benefits (continued)
Payments to defined contribution schemes are charged as an expense as they fall due.

Financial instruments
The company measures financial assets at amortised cost if both of the following conditions are met:
- The financial asset is held in order to collect contractual cash flows; and
- The contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

Trade and other receivables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method, less any allowance for expected credit losses. A trade receivable represents the company's right to an amount of consideration that is billed and unconditional (i.e. only the passage of time is required before payment of the consideration is due). Accrued income is revenue that has been earned but not yet billed due to the timing of revenue recognition being different from contract payment schedules. Accrued income is considered as a contract asset when revenue is being recognised under IFRS 15 and consideration is conditional (i.e. meeting a condition other than the passage of time is required before payment of the consideration is due).

At each reporting date, the company performs an impairment analysis for all trade and other receivables to measure the allowance for expected credit losses ("ECLs"). ECLs are recognised in two stages. For credit exposures for which there has not been a significant increase in credit risk since initial recognition, ECLs are provided for default events that are possible within the next 12 months. For credit exposures for which there has been a significant increase in credit risk since initial recognition, a loss allowance is calculated for credit losses expected over the remaining life of the exposure, irrespective of the expected timing of the default. The company has established a provision matrix that is based on its historical credit loss experience, adjusted for forward-looking factors specific to the debtors and the economic environment.

Movements in the provision for expected credit losses of receivables are recorded within administrative expenses.

Trade and other payables are recognised initially at fair value and subsequently measured at amortised cost, using the effective interest method.

Borrowings are initially recognised at fair value, net of transaction costs (being incremental costs that are directly attributable to the inception of borrowings) incurred and are subsequently held at amortised cost. Any difference between the amount initially recognised and the redemption amount is recognised in the income statement over the period of the loan, using the effective interest method.

A financial liability is derecognised when the obligation under the liability is discharged, cancelled or expires. When an existing financial liability is replaced by another from the same lender on substantially different terms, or the terms of an existing liability are substantially modified, such an exchange or modification is treated as the derecognition of the original liability and the recognition of a new liability. The difference in the respective carrying amounts is recognised in the income statement.

Notes to the financial statements

1. Accounting policies (continued)

1.4 Significant accounting policies (continued)

Financial instruments (continued)
When the contractual cash flows are renegotiated or modified but do not result in the derecognition of the financial liability, the difference between the net present value of the modified contractual cash flows discounted at the financial liability's original effective interest rate and the present value of the existing financial liability, is recognised in profit or loss.

Derivative financial instruments utilised by the company comprise fuel swaps and caps and forward foreign exchange contracts. All such instruments are used for hedging purposes (albeit they are not designated as such for accounting purposes) to manage the risk profile of an existing underlying exposure of the company in line with the company's risk management policies. All derivative financial instruments are initially recorded in the balance sheet at fair value and are measured at fair value thereafter. The company's derivatives are not designated as hedges, therefore fair value gains and losses are taken to the income statement following the same classification as the underlying transaction.

Derivatives are classified as current and non-current based on the present value of future cash flows.

Financial assets and financial liabilities are offset and the net amount is reported in the balance sheet if there is a currently enforceable legal right to offset the recognised amounts and there is an intention to settle on a net basis and to realise the assets and settle the liabilities simultaneously.

1.5 Other accounting policies

Exceptional items

Exceptional items are those significant items which are separately disclosed on the face of the income statement by virtue of their size or incidence to enable a full understanding of the company's financial performance.

Interest income
Interest income is calculated and recorded using the effective interest method. Interest income is included in finance income in the income statement.

Borrowing costs
Borrowing costs directly attributable to the acquisition, construction or production of an asset that necessarily takes a substantial period of time to get ready for its intended use or sale are capitalised as part of the cost of the respective assets, including qualifying assets within investment properties measured at fair value. All other borrowing costs are expensed in the period in which they occur. Borrowing costs consist of interest and other costs that the company incurs in connection with the borrowing of funds. Interest expense is calculated and recorded using the effective interest method.

Leases

Company as lessor
Leases where the company does not transfer substantially all the risks and rewards incidental to ownership of the asset are classified as operating leases.

Notes to the financial statements

1. Accounting policies (continued)

1.5 Other accounting policies (continued)

Leases (continued)
Initial direct costs incurred in negotiating an operating lease are added to the carrying amount of the leased asset and recognised over the lease term on the same basis as lease income. Variable lease income is recognised as lease income in the period in which it is earned.

Leases where the company does transfer substantially all the risks and rewards of ownership of the asset are classified as finance leases. Finance leases are recorded in the balance sheet as a receivable, at an amount equal to the net investment in the lease. Subsequently finance income is recognised based on a pattern reflecting a constant periodic rate of return.

Company as lessee
Lease liabilities are recognised at the commencement date of the lease. Lease liabilities are measured at the present value of lease payments to be made over the lease term. The lease payments include fixed payments less any lease incentives receivable, variable lease payments that depend on an index or a rate, and amounts expected to be paid under residual value guarantees.

The lease payments also include the exercise price of a purchase option reasonably certain to be exercised by the company and payments of penalties for terminating a lease, if the lease term reflects the company exercising the option to terminate. The present value of the lease payments are calculated using the company's incremental borrowing rate at the lease commencement date if the interest rate implicit in the lease is not readily determinable.

After the commencement date, finance expense is recognised over the lease term to reflect the accretion of interest and increases the amount of lease liabilities. The lease liabilities are reduced by the capital and interest payments made. In addition, the carrying amount of lease liabilities is remeasured if there is a modification, a change in the lease term, a change in the fixed lease payments or a change in the assessment of an option to purchase the underlying asset. The amount of the remeasurement of the lease liability is also recognised as an adjustment to the right of use asset.

Variable lease payments that do not depend on an index or a rate are recognised as expenses in the period in which the event or condition that triggers the payment occurs.

The company applies a single recognition and measurement approach for all leases except for short term leases and leases of low value assets. The company applies the short term lease recognition exemption to its leases with a lease term of 12 months or less and also applies the lease of low value assets recognition exemption to leases that are considered of low value. Lease payments on short term leases and leases of low value assets are recognised as expenses on a straight-line basis over the lease term.

Right of use assets are recognised at the commencement date of the lease, which is the date the underlying asset is available to use. Right of use assets are initially measured at cost. The cost of the right of use assets includes the amount of lease liabilities recognised, initial direct costs incurred and lease payments made at or before the commencement date less any lease incentives received.

Notes to the financial statements

1. Accounting policies (continued)

1.5 Other accounting policies (continued)

Leases (continued)
Right of use operating assets are subsequently measured at cost less any accumulated depreciation and impairment losses and adjusted for any remeasurement of lease liabilities. Unless the company is reasonably certain to obtain ownership of the leased asset at the end of the lease term, the recognised right of use operating assets are depreciated on a straight-line basis over the shorter of their estimated useful lives and the lease term. Right of use operating assets are subject to impairment.

Right of use assets that meet the definition of investment property are classified as investment property and subsequently measured at fair value. Refer to the investment property accounting policy set out in note 1.4 under Investment Property.

Intangible assets
Purchased intangible assets are recognised at fair value on the date of acquisition if they relate to a business combination or otherwise are recognised at cost.

Software is amortised over periods of between 2 years and 10 years on a straight-line basis from the time the asset is available for use.

Other intangible assets are amortised over periods of between 2 years and 25 years from acquisition on a straight-line basis.

Development costs incurred on internal projects are only capitalised where the following have been demonstrated:
- the technical feasibility of completing the intangible asset so that it will be available for use or sale;
- the intention to complete the intangible asset and use or sell it;
- the ability to use or sell the intangible asset;
- how the intangible asset will generate probable future economic benefits;
- the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset; and
- the ability to measure reliably the expenditure attributable to the intangible asset during its development.

Investments
Investments in subsidiaries are stated at cost. The company assesses at each reporting date whether there is any indication that the investment may be impaired.

Cash and cash equivalents
The company defines cash and cash equivalents as short-term highly liquid investments readily convertible into known amounts of cash. They are normally represented by bank deposits with an original maturity of less than three months and without significant penalties on early access/redemption less Bank Overdrafts that are repayable on demand. Accounts holding amounts identified for repaying rent deposits over which the company has control are included in cash and cash equivalents.

Notes to the financial statements

1. Accounting policies (continued)

1.5 Other accounting policies (continued)

Government grants
All government grants are recognised in the Income Statement as other income. Grants relating to income are recognised in the Income Statement as other income on a systematic basis that matches the timing of the related costs that they are intended to compensate. Grants relating to assets are recognised in the Income Statement on a systematic and rational basis over the expected useful life of the asset to which the grant relates.

Grants received, but not immediately recognised in the Income Statement, are included in deferred income in the Balance Sheet. Cash received relating to assets is shown in the cashflow statement under investing activities.

Provisions
Provisions are recognised when the company has an obligation in respect of a past event, it is probable that an outflow of resources will be required to settle the obligation and a reliable estimate can be made of the amount. Provisions are discounted when the time value of money is considered material.

Taxation
Current tax, including UK corporation tax, is provided at amounts expected to be paid (or recovered) using the tax rates and laws that have been enacted or substantively enacted by the balance sheet date.

Deferred tax is recognised in respect of all temporary differences, except to the extent that the deferred tax asset or liability arises from: (a) the initial recognition of goodwill; or (b) the initial recognition of an asset or liability in a transaction which is not a business combination and which at the time of the transaction affects neither accounting profit nor taxable profit.

Temporary differences are differences between the tax base value of assets and liabilities and their carrying amount as stated in the financial statements. These arise from differences between the valuation, recognition and amortisation bases used in tax computations compared with those used in the preparation of financial statements.

Deferred tax assets or liabilities are measured at the tax rates that are expected to apply in the periods in which the temporary differences are expected to reverse, based on tax rates and laws that have been enacted or substantively enacted at the balance sheet date.

Deferred tax assets are recognised to the extent that it is probable that future taxable profit will be available to facilitate the realisation of such assets.

The company offsets deferred tax assets and deferred tax liabilities if and only if it has a legally enforceable right to set off current tax assets and current tax liabilities and the deferred tax assets and deferred tax liabilities relate to income taxes levied by the same taxation authority.

Notes to the financial statements

1. Accounting policies (continued)

1.5 Other accounting policies (continued)

Foreign currencies
Transactions in currencies, other than the company's functional currency, are recognised at the rates of exchange prevailing on the dates of the transactions. At each balance sheet date, monetary assets and liabilities that are denominated in foreign currencies are retranslated at the rates prevailing at that date. Exchange differences are recognised in the income statement in the period in which they arise.

Dividends
Dividend receipts and payments are recognised in the period when they become a binding obligation on the paying company.

Notes to the financial statements

2. Revenue

The disaggregation of the company's revenue by type of services is set out below:

	2022 £m	2021 £m
Revenue		
Call	**105.0**	98.9
Traffic	**254.1**	234.3
Cargo operations	**36.7**	35.3
Shortfall	**19.0**	10.5
Utilities	**30.1**	17.7
Dredging	**16.3**	8.3
Fixed	**23.0**	18.4
Other	**25.1**	14.4
Total revenue from contracts with customers	**509.3**	437.8
Rental income from investment properties	**153.2**	141.2
Total lease income	**153.2**	141.2
Total revenue	**662.5**	579.0

The timing of revenue recognition often differs from contract payment schedules, resulting in revenue that has been earned but not billed. These amounts are included in accrued income. Amounts billed in advance but not yet earned are recorded and presented as part of deferred income. Invoiced revenue should be received in accordance with the terms agreed within the revenue contract.

Lease income excluding variable lease income amounted to £153.0m (2021: £141.1m) and variable lease income amounted to £0.2m (2021: £0.1m).

Revenue from contracts with customers
The transaction price allocated to performance obligations that are unsatisfied or partially satisfied as at 31 December is as follows:

	2022 £m	2021 £m
Not later than one year	**1.2**	1.1
Total	**1.2**	1.1

Notes to the financial statements

3. Operating profit

Operating profit is stated after charging/(crediting):

	2022 £m	2021 £m
Depreciation		
Property, plant and equipment - included in cost of sales	**86.1**	82.9
Property, plant and equipment - included in administrative expenses	**3.0**	2.6
Right of use assets - included in cost of sales	**1.8**	1.5
Right of use assets - included in administrative expenses	**0.8**	0.8
Amortisation		
Intangible assets - included in cost of sales	**0.4**	0.4
Intangible assets - included in administrative expenses	**8.4**	7.4
Loss on disposal of property, plant and equipment, investment property, property and land held for sale and right of use assets	**6.7**	3.1
Expense relating to short term leases	**2.5**	2.0
Expense relating to leases of low value assets	**0.1**	0.1
Variable lease expenses	**0.2**	0.2
Repairs and maintenance expenditure on investment property and property, plant and equipment	**33.3**	24.5
Third party labour and sub-contractor haulage	**36.1**	31.6
Utilities and fuel	**49.3**	32.2
Expected credit losses of trade and other receivables	**(0.5)**	(0.2)
Exceptional items		
Staff costs (released)/provided	**(0.1)**	0.8
Other costs released	**-**	(0.1)
Staff costs charged directly to the income statement	**0.1**	0.5
Other costs charged directly to the income statement	**1.6**	1.3

4. Audit fees

Remuneration received by Ernst & Young LLP is detailed below and has been borne by the company.

	2022 £'000	2021 £'000
Fees payable to the company's auditor for the audit of the company's annual accounts	**316**	257
Fees payable to the company's auditor in respect of:		
Audit of the accounts of the group companies	**486**	415
Other services	**31**	10

Notes to the financial statements

4. Audit fees (continued)

In addition to the above services, Ernst & Young LLP acted as auditor to the company's main defined benefits pension scheme – The Associated British Ports Group Pension Scheme. The appointment of auditors to the company's pension schemes and the fees paid in respect of those audits are agreed by the trustees of each scheme, who act independently from the management of the company. The aggregate fees paid to the company's auditor for audit services to the pension schemes during the year were £31,500 (2021: £25,000).

5. Directors and employees

Staff costs are analysed as follows:

Staff costs	2022 £m	2021 £m
Wages and salaries	**120.3**	107.8
Social security costs	**14.3**	11.9
Pension costs (note 13)	**13.3**	12.3
	147.9	132.0
Exceptional costs	**-**	1.3
Total staff costs	**147.9**	133.3

During 2022 no staff costs (2021: £1.3m) were recognised as part of the £1.7m (2021: £2.5m) exceptional costs.

The monthly average number of people employed during the year was 2,297 (2021: 2,245).

Directors emoluments are analysed as follows:

Emoluments paid to directors of the company	2022 £m	2021 £m
Short-term employee benefits	**5.4**	5.1
Post-employment benefits	**0.5**	0.5
Total directors emoluments	**5.9**	5.6

Emoluments comprise amounts paid to the directors of the company by the company, with two (2021: two) directors being paid by the immediate parent undertaking.

Key management compensation is analysed as follows:

Key management compensation	2022 £m	2021 £m
Short-term employee benefits	**5.4**	5.1
Post-employment benefits	**0.5**	0.5
Total key management compensation	**5.9**	5.6

Notes to the financial statements

5. Directors and employees (continued)

Key management comprises the directors of the company, including two directors (2021: two) who were also directors of the immediate parent undertaking.

Nine (2021: nine) of the directors are eligible to join the Legal & General Worksave Mastertrust (MyPension Plan) ("Mastertrust"). At 31 December 2022 four (2021: four) directors were contributing members of Mastertrust. No (2021: none) director was a deferred member of the defined benefit section of the ABPGPS and nine (2021: nine) directors received an allowance for contributions towards pensions schemes unconnected with the company.

Highest paid director	2022 £m	2021 £m
Short-term employee benefits	**1.5**	1.5
Post-employment benefits	**0.1**	0.1
Total highest paid director	**1.6**	1.6

6. Finance costs/(income)

	2022 £m	2021 £m
Interest on amounts due from parent undertaking	**36.1**	35.5
Interest on lease liabilities	**0.5**	0.7
Net interest charge on net defined benefit liabilities	**-**	0.7
Other finance costs	**0.4**	0.2
Less: interest capitalised on non-current assets under construction	**(3.4)**	(3.9)
Finance costs	**33.6**	33.2
Other finance income	**(0.9)**	(0.1)
Net interest income on net defined benefit asset	**(0.5)**	-
Finance income	**(1.4)**	(0.1)
Unrealised foreign exchange loss	**0.1**	-
Net finance costs	**32.3**	33.1

7. Taxation

Analysis of charge/(credit) for the year	2022 £m	2021 £m
Current year tax	**34.6**	29.8
Prior period adjustments	**(0.7)**	(1.4)
Current tax	**33.9**	28.4
Current year deferred tax	**42.1**	13.3
Rate change adjustments	**-**	60.1
Prior period adjustments	**0.2**	0.6
Deferred Tax (note 20)	**42.3**	74.0
Taxation	**76.2**	102.4

Notes to the financial statements

7. Taxation (continued)

Current taxation in 2022 and 2021 represents a charge for group relief surrendered by a parent undertaking and tax on profits remaining after offset of group relief. See note 20 for future expected tax rate changes.

The deferred tax charge (2021: charge) results from the fair value movements on investment property and pensions and movements resulting from qualifying additions to capital allowances pools.

Tax on items credited/(charged) to Other Comprehensive Income	**2022 £m**	**2021 £m**
Deferred tax associated with remeasurement gain/loss relating to net retirement benefit liabilities	**10.8**	(12.3)
Deferred tax on revaluation of investment property	**(7.7)**	(3.6)

The taxation charge for the year is higher than the standard rate of taxation in the UK of 19.0% (2021: 19.0%). The differences are explained below:

	2022 £m	**2021 £m**
Profit before taxation	**360.6**	228.1
Profit before taxation multiplied by standard rate of corporation tax in the UK of 19.0% (2021: 19.0%)	**68.5**	43.3
Effects of:		
Items not allowable for tax	**(1.5)**	(0.3)
Deferred taxes measured at higher tax rates	**9.7**	-
Rate change adjustments	**-**	60.1
Tax in respect of prior years	**(0.5)**	(0.7)
Total tax charge for the company	**76.2**	102.4

Effective tax rate	**21.1%**	44.9%
Total tax charge for the company	**76.2**	102.4
Effects of permanent differences:		
Related party debt - disregarded	**1.1**	1.0
Depreciation on non-qualifying assets	**(1.8)**	(1.2)
Other non-qualifying	**2.2**	0.5
Prior year adjustment	**0.5**	0.7
Deferred taxes measured at higher tax rates	**(9.7)**	-
Rate change adjustment	**-**	(60.1)
Tax charge for the company after removing permanent differences	**68.5**	43.3
Tax rate after permanent differences	**19.0%**	19.0%

Tax in respect of prior years relates predominantly to revised allocation of capital expenditure in the filed corporation tax returns.

Notes to the financial statements

8. Intangible assets

Acquired intangible assets	Software £m	Other £m	Total £m
2022			
Cost			
At 1 January	154.0	10.3	164.3
Additions	5.0	4.5	9.5
Transfer within Intangible assets	(0.1)	0.1	-
Transfer to Investment property	(0.2)	-	(0.2)
Disposal	(2.8)	(0.5)	(3.3)
At 31 December	**155.9**	**14.4**	**170.3**
Accumulated amortisation			
At 1 January	(107.3)	(6.0)	(113.3)
Charge for the year	(7.5)	(1.3)	(8.8)
Transfer to Investment property	0.2	-	0.2
Disposal	2.7	0.4	3.1
At 31 December	**(111.9)**	**(6.9)**	**(118.8)**
Net book value			
At 1 January	46.7	4.3	51.0
At 31 December	**44.0**	**7.5**	**51.5**

Acquired intangible assets	Software £m	Other £m	Total £m
2021			
Cost			
At 1 January	147.1	9.1	156.2
Additions	6.9	1.2	8.1
At 31 December	**154.0**	**10.3**	**164.3**
Accumulated amortisation			
At 1 January	(100.6)	(4.9)	(105.5)
Charge for the year	(6.7)	(1.1)	(7.8)
At 31 December	**(107.3)**	**(6.0)**	**(113.3)**
Net book value			
At 1 January	46.5	4.2	50.7
At 31 December	**46.7**	**4.3**	**51.0**

Software comprise IT software acquisition and subsequent development costs.

Other intangible assets cost at 31 December 2022 included a 2011 payment in relation to the Transport Infrastructure Fund in connection with the expansion of rail infrastructure at Southampton of £5.9m (2021: £5.9m).

Notes to the financial statements

9. Property, plant and equipment

	Operational land	Buildings	Dock structures, quays and dredging	Floating craft	Plant and equipment	Assets in the course of construction	Total
	£m	£m	£m	£m	£m	£m	£m
2022							
Cost							
At 1 January	424.9	332.4	820.1	78.7	567.3	160.4	2,383.8
Additions	-	4.7	21.4	5.8	16.3	79.4	127.6
Transfers within property, plant and equipment	(1.4)	8.1	6.6	3.3	29.2	(45.8)	-
Transfers (to)/from investment property	(27.8)	(3.7)	(2.5)	-	(3.6)	(15.0)	(52.6)
Disposals and write off	0.1	(0.1)	(0.3)	(0.4)	(13.7)	(0.2)	(14.6)
At 31 December	**395.8**	**341.4**	**845.3**	**87.4**	**595.5**	**178.8**	**2,444.2**
Accumulated Depreciation							
At 1 January	(0.4)	(149.6)	(430.0)	(57.8)	(334.2)	-	(972.0)
Charge for the year	(0.2)	(14.0)	(37.9)	(5.8)	(33.8)	-	(91.7)
Transfers	-	3.5	1.3	-	2.8	-	7.6
Disposals and write off	-	0.1	0.3	0.4	13.2	-	14.0
At 31 December	**(0.6)**	**(160.0)**	**(466.3)**	**(63.2)**	**(352.0)**	**-**	**(1,042.1)**
Net book value							
At 1 January	424.5	182.8	390.1	20.9	233.1	160.4	1,411.8
At 31 December	**395.2**	**181.4**	**379.0**	**24.2**	**243.5**	**178.8**	**1,402.1**

Notes to the financial statements

9. Property, plant and equipment (continued)

	Operational land	Buildings	Dock structures, quays and dredging	Floating craft	Plant and equipment	Assets in the course of construction	Total
	£m	£m	£m	£m	£m	£m	£m
2021*							
Cost							
At 1 January	427.8	301.5	801.4	75.3	533.6	95.6	2,235.2
Additions	1.6	15.1	9.3	2.3	12.2	120.8	161.3
Transfers within property, plant and equipment	-	18.0	9.5	1.3	27.2	(56.0)	-
Transfers (to)/from Investment property	(1.8)	(1.8)	0.6	-	(0.1)	-	(3.1)
Transfers to/(from) property and land held for sale	(0.5)	-	-	-	-	-	(0.5)
Transfer of Grants due to change in accounting policy	-	-	-	-	-	-	-
Disposals and write off	(2.2)	(0.4)	(0.7)	(0.2)	(5.6)	-	(9.1)
At 31 December	**424.9**	**332.4**	**820.1**	**78.7**	**567.3**	**160.4**	**2,383.8**
Accumulated Depreciation							
At 1 January	(0.2)	(139.1)	(393.1)	(53.4)	(306.7)	-	(892.5)
Charge for the year	(0.2)	(13.2)	(37.3)	(4.6)	(32.5)	-	(87.8)
Transfers (to)/from investment property	-	2.5	-	-	-	-	2.5
Transfer of Grants due to change in accounting policy	-	-	-	-	-	-	-
Disposals and write off	-	0.2	0.4	0.2	5.0	-	5.8
At 31 December	**(0.4)**	**(149.6)**	**(430.0)**	**(57.8)**	**(334.2)**	**-**	**(972.0)**
Net book value							
At 1 January	427.6	162.4	408.3	21.9	226.9	95.6	1,342.7
At 31 December	**424.5**	**182.8**	**390.1**	**20.9**	**233.1**	**160.4**	**1,411.8**

*Comparatives have been reclassified to conform with current presentation

The amount of borrowing costs capitalised within property, plant & equipment during the year ended 31 December 2022 was £2.8m (2021: £3.1m). The weighted average rate used to determine the amount of borrowing costs eligible for capitalisation was 6.5% (2021: 6.3%).

Notes to the financial statements

9. Property, plant and equipment (continued)

The tables above include recognised right of use assets detailed below:

Right of use assets	Operational land	Buildings	Floating craft	Plant and equipment	Total
	£m	£m	£m	£m	£m
2022					
Cost					
At 1 January	2.4	4.3	-	7.1	13.8
Additions	-	-	1.3	0.5	1.8
At 31 December	**2.4**	**4.3**	**1.3**	**7.6**	**15.6**
Accumulated Depreciation					
At 1 January	(0.4)	(1.7)	-	(5.9)	(8.0)
Charge for the year	(0.2)	(0.6)	(0.5)	(1.3)	(2.6)
At 31 December	**(0.6)**	**(2.3)**	**(0.5)**	**(7.2)**	**(10.6)**
Net book value					
At 1 January	2.0	2.6	-	1.2	5.8
At 31 December	**1.8**	**2.0**	**0.8**	**0.4**	**5.0**

Right of use assets	Operational land	Buildings	Floating craft	Plant and equipment	Total
	£m	£m	£m		
2021					
Cost					
At 1 January	2.2	4.1	-	6.7	13.0
Additions	0.2	0.2	-	0.9	1.3
Disposals and write off	-	-	-	(0.5)	(0.5)
At 31 December	**2.4**	**4.3**	**-**	**7.1**	**13.8**
Accumulated Depreciation					
At 1 January	(0.2)	(1.2)	-	(4.8)	(6.2)
Charge for the year	(0.2)	(0.5)	-	(1.6)	(2.3)
Disposals and write off	-	-	-	0.5	0.5
At 31 December	**(0.4)**	**(1.7)**	**-**	**(5.9)**	**(8.0)**
Net book value					
At 1 January	2.0	2.9	-	1.9	6.8
At 31 December	**2.0**	**2.6**	**-**	**1.2**	**5.8**

The group as the lessee leases various operational land, buildings and plant and equipment under non-cancellable lease agreements. The lease terms vary and range from 1 to 999 years for operational land, 10 to 15 years for buildings and 2 to 16 years for plant and equipment.

Notes to the financial statements

9. Property, plant and equipment (continued)

These leases have various escalation clauses and renewal rights and there are no financial restrictions placed upon the lessee by entering into these leases.

10. Investment property

	Port-related investment properties £m	Other investment properties £m	Land at ports held for development £m	Total £m
2022				
At valuation				
At 1 January	1,940.8	235.7	47.9	2,224.4
Additions	16.0	3.7	11.5	31.2
Disposals	-	-	(7.9)	(7.9)
Transfers within investment property	(10.0)	9.6	0.4	-
Transfers to property, plant and equipment	30.6	10.3	4.1	45.0
Transfers (to)/from property and land held for sale	-	-	0.4	0.4
	1,977.4	**259.3**	**56.4**	**2,293.1**
Surplus on revaluation	27.3	24.3	0.9	52.5
Increase in fair value of investment properties	90.4	58.8	(0.8)	148.4
At 31 December	**2,095.1**	**342.4**	**56.5**	**2,494.0**

Notes to the financial statements

10. Investment property (continued)

	Port-related investment properties £m	Other investment properties £m	Land at ports held for development £m	Total £m
2021				
At valuation				
At 1 January	1,876.3	219.9	48.8	2,145.0
Additions	14.5	1.8	3.5	19.8
Disposal	(0.3)	(0.3)	-	(0.6)
Transfers within investment property	1.7	(0.4)	(1.3)	-
Transfers to property, plant and equipment	(1.1)	1.7	-	0.6
Transfers (to)/from property and land held for sale	-	0.1	(0.4)	(0.3)
	1,891.1	**222.8**	**50.6**	**2,164.5**
Surplus on revaluation	13.0	1.9	-	14.9
Increase/(decrease) in fair value of investment properties	36.7	11.0	(2.7)	45.0
At 31 December	**1,940.8**	**235.7**	**47.9**	**2,224.4**

During the year £52.5m (2021: £14.9m) was credited directly to the revaluation reserve reflecting the increase to fair value of the properties transferred from property, plant and equipment to investment property (previously recorded at cost). An increase of £148.4m (2021: £45.0m) in the fair value of investment properties was recognised directly in the income statement.

There are no restrictions on the realisability of investment property or the remittance of income and proceeds of disposals.

The amount of borrowing costs capitalised within investment property during the year ended 31 December 2022 was £0.6m (2021: £0.8m). The weighted average rate used to determine the amount of borrowing costs eligible for capitalisation was 6.5% (2021: 6.3%).

All gains and losses recorded in the income statement for recurring fair value measurements categorised within Level 3 of the fair value hierarchy are attributable to changes in unrealised gains or losses relating to investment property held at the end of the reporting period.

Basis of valuation
Investment properties fair value has been estimated on the basis of market value in accordance with the Appraisal and Valuation Standards issued by The Royal Institution of Chartered Surveyors ("RICS"), which is consistent with fair value as defined by IFRS 13. Investment property valuations are conducted annually by the company's internal valuation team and are reviewed by external valuers at least once every five years, the most recent being as at 31 December 2018. The valuation of investment property as at 31 December 2018 was reviewed by independent valuers, Savills (UK) Limited, Chartered Surveyors regulated by RICS. The company's internal valuation team comprises regionally based Chartered Surveyors, including RICS Registered Valuers, led by the Group Head of Property.

Notes to the financial statements

10. Investment property (continued)

The highest and best use for all investment property is considered by management to be the current use, except where a property is in the process of being developed. In these circumstances, the future intended use of the asset is considered to be its highest and best use.

Completed investment property including right of use investment property
The valuations adopt conventional investment valuation methodology by assessing the income from the investment assets and then capitalising against an investment yield. Deductions have been made to reflect stamp duty and the other costs that would be incurred by a purchaser of the asset, namely legal and surveyors' fees. The main assumptions considered in arriving at the fair value of investment property are the current or estimated rental values, forecast variable income (typically set with regard to historic income) and prevailing market yields. The valuations also take into account the wider port operating costs either by applying an appropriate amount of such costs against the revenues generated by the property and/or by an adjustment to the yield.

The valuation of investment property has been categorised as a Level 3 fair value measurement under IFRS 13, being a recurring fair value measurement using significant unobservable inputs.

The revenue streams for many of the properties are variable, and in some cases unique to their specific use. The company has therefore used historic data and knowledge of its specialist sector to assess the likely sustainable income streams going forward. The nature of the assets and the potential variability or sustainability of income has also led to the application of a range of yields to the income reflecting the specific prospects and risks associated with the individual assets. Income from these assets typically falls into two parts, a core rental for the asset together with other income derived, for example, by reference to the volume of goods or equivalent brought across the dock, often subject to a minimum guaranteed volume.

The investment property valuations are reviewed by the Regional and Group finance teams and discussions are held with the internal valuation team to determine whether changes in the valuation from the prior year are reasonable. Discussions are then held with the Chief Financial Officer before presenting the results to the company's independent auditors.

The table below summarises the significant inputs used in the fair value measurement of the company's principal investment properties:

2022	Port-related investment properties	Other investment properties and land held for development	Total
Observable			
Average income per acre £'000	99.7	9.6	50.9
Income range per acre £'000	0 - 577	0 - 142	0 – 577
Unobservable			
Yield – average %	11.5	11.9	11.6
Yield – range %	5.0 – 33.3	5.0 – 17.5	5.0 – 33.3
Other assumptions			
Other purchasers' costs %	1.8	1.8	1.8

Notes to the financial statements

10. Investment property (continued)

2021	**Port-related investment properties**	**Other investment properties and land held for development**	**Total**
Observable			
Average income per acre £'000	96.7	8.1	48.4
Income range per acre £'000	0 - 523	0 - 157	0 – 523
Unobservable			
Yield – average %	11.4	12.0	11.6
Yield – range %	6.0 – 33.3	5.8 – 17.5	5.8 – 33.3
Other assumptions			
Other purchasers' costs %	1.8	1.8	1.8

The most sensitive input to the valuation of investment property is the yield, which for 2022 averages 11.6% (2021: 11.6%). A decrease in the average yield of 0.5% would result in an increase in the aggregate valuation of £112.0m (2021: £100.2m) and an increase in the average yield of 0.5% would result in a decrease in the aggregate valuation of £102.7m (2021: £91.9m). Yields are not dependent on any other significant unobservable inputs used in the valuations.

Rental income

Rental income, excluding other income, generated from the company's investment property portfolio amounted to £153.2m (2021: £141.2m) and related operating expenses amounted to £3.3m (2021: £2.5m). Direct operating expenses relating to vacant property are considered to be immaterial.

11. Investments

	Investment in subsidiaries £m
At 31 December 2021	54.6
At 31 December 2022	**54.6**

A list of the company's subsidiary undertakings is set out in note 26.

The company has direct investments in all its subsidiaries with the exception of W.E,D. Services Limited which is owned indirectly through W. E. Dowds (Shipping) Limited. The directors have assessed the impairment of investments using the assumptions from the group business plan. The directors are satisfied that the recoverable amount is greater than the carrying value of investment in subsidiaries. No reasonable change in assumptions could result in impairment.

Notes to the financial statements

12. Trade and other receivables

	2022 £m	2021* £m
Non-current		
Accrued income	**1.8**	1.6
Other receivables	**0.1**	3.3
Total non-current trade and other receivables	**1.9**	4.9
Current		
Gross trade receivables	**76.8**	70.4
Amounts due from group undertakings	**1.5**	1.5
Prepayments	**6.9**	7.2
Accrued income	**29.3**	22.1
Other receivables	**12.6**	12.3
Gross current trade and other receivables	**127.1**	113.5
Allowance for expected credit losses	**(9.1)**	(10.4)
Total current trade and other receivables	**118.0**	**103.1**

*Comparatives have been reclassified to conform to current presentation

Amounts due from group undertakings are not overdue for repayment and are not considered impaired. Details of the amounts due from related parties are disclosed in note 22.

All trade receivables are non-interest bearing. Disclosure of the financial risks related to these financial instruments is in note 16.

As at 31 December 2022, contract assets of £0.9m (2021: £1.3m) were included in current accrued income net of an allowance for expected credit losses of £nil (2021: £nil).

Other receivables mainly comprise costs incurred relating to damage to property that is recoverable from third parties, including insurers, costs incurred where compensation, at least equal to the costs, is expected to be obtained and recoverable VAT. It also includes expected receipts from property and land held for sale of £nil (2021: £0.8m).

Notes to the financial statements

12. Trade and other receivables (continued)

Movements in the company's loss allowance measured at an amount equal to the lifetime expected credit losses are as follows:

	2022 £m	2021 £m
At 1 January	**(10.4)**	(10.6)
Provision for the expected credit losses	**(2.3)**	(3.6)
Expected credit losses reversed	**2.8**	3.3
Receivables written off as uncollectable	**0.8**	0.5
At 31 December	**(9.1)**	(10.4)

The provision for expected credit losses relates to gross trade receivables and accrued income and is based on the expected credit loss by age, plus an adjustment for material current observable data. The provision for loss allowance measured at an amount equal to the twelve month expected credit loss for the year ended 31 December 2022 was £nil (2021: £nil).

The ageing of gross trade receivables and accrued income, and the expected credit loss by age, is as follows:

Aged analysis of gross trade receivables, accrued income	2022 £m	2021 £m	2022 %	2021 %
Not yet overdue	**98.7**	81.3	**8.3**	11.0
Up to 3 months	**8.3**	10.4	**1.0**	7.3
3 to 6 months	**0.8**	0.2	**67.7**	55.0
Over 6 months	**0.3**	0.6	**100.0**	100.0

As at 31 December 2022 the company held trade receivables that were past due but not impaired, as set out in the table below. These relate to a number of independent customers for whom there is no recent history of default and where terms and amounts have not been renegotiated in the last year.

The ageing of these trade receivables is as follows:

Aged analysis of overdue gross trade receivables	2022 £m	2021 £m
Up to 3 months	**8.2**	9.8
3 to 6 months	**0.3**	0.1
Total past due but not impaired receivables	**8.5**	9.9

There are no significant receivables of the company that are denominated in foreign currencies. The company does not hold any collateral as security.

Notes to the financial statements

13. Pension commitments

The company participates in a number of pension schemes:

- The Associated British Ports Group Pension Scheme ("ABPGPS") – a funded defined benefit scheme;
- The Pilots National Pension Fund ("PNPF") and the Merchant Navy Officers Pension Fund ("MNOPF") – two industry wide defined benefit ("DB") schemes for non-associated employers;
- The Legal & General Worksave Mastertrust ("MyPension Plan") – a multi-employer defined contribution arrangement;
- The Ensign Retirement Plan ("ERP") – a multi-employer defined contribution mastertrust arrangement; and
- Unfunded retirement benefit arrangements in respect of former employees.

On 1 January 2021 the PNPF DB section was closed to new entrants and a Cash Balance Section established to cove marine and non-marine workers of the participating bodies who meet certain criteria. ABP apprentice are enrolled in the Cash Balance Section.

Except for unfunded retirement benefit arrangements, the assets of the group's pension arrangements are held in trust funds independent of the group.

Summary

Income statement

The total pension charge included in the company income statement was as follows:

	2022 £m	2021 £m
ABPGPS and unfunded retirement benefit arrangements	**1.8**	2.2
Industry wide schemes	**0.1**	0.1
Defined contribution arrangements	**11.4**	10.0
Net pension charge recognised within operating profit	**13.3**	12.3
Net interest (income)/charge on net defined benefit liabilities	**(0.5)**	0.7
Net pension charge recognised in profit before taxation	**12.8**	13.0

Balance sheet

The retirement benefit assets and obligations as at 31 December were:

	2022 £m	2021 £m
ABPGPS – net funded pension assets	**15.3**	62.8
ABPGPS – net unfunded pension liability	**(1.6)**	(2.0)
	13.7	60.8
PNPF	**(25.0)**	(39.1)
Net retirement benefit (liability)/asset	**(11.3)**	21.7
Net retirement benefit assets total	**15.3**	62.8
Net retirement benefit obligations total	**(26.6)**	(41.1)
Net retirement benefit (liability)/asset	**(11.3)**	21.7

Notes to the financial statements

13. Pension commitments (continued)

During the year the ABPGPS scheme recorded an actuarial loss due to negative returns on the schemes assets, this was partially offset by a liability gain due to a significant increase in the discount rate. As a result the scheme's surplus has decreased to £13.7m (2021: £60.8m surplus).

The Pilots National Pension Fund scheme recorded an actuarial gain during the year due to changes in financial assumptions as the actuarial loss due to negative returns on the scheme's assets was more than offset by the liability gain primarily due to the increase in the discount rate. As a result the scheme's deficit decreased to £25.0m (2021: £39.1m).

Schemes accounted for on a defined benefit basis

ABPGPS and unfunded retirement benefit arrangements

The ABPGPS is closed to new members but has continued accrual.

The last triennial valuation of the ABPGPS was as at 31 December 2020. The valuation of the liabilities as at 31 December 2022 has been derived by projecting forward the position as at 31 December 2020. This exercise was performed by an independent actuary, Willis Towers Watson. The present value of the defined benefit obligations and the related current service cost were measured using the Projected Unit Credit method. The present value of pension liabilities has been determined by discounting pension commitments (including an allowance for salary growth) using a high-quality corporate bond yield.

The Recovery Plan and Schedule of Contributions agreed following the 2020 triennial valuation will remain in place until the 2023 valuation has been finalised and any new Plan or Schedule agreed. The current Recovery Plan and Schedule of Contributions require the group to make deficit reduction contributions of £3.5m per annum until 31 December 2025 and employer contributions at the rate of 22.5% of contributory pay until 31 December 2021 and 42.3% of contributory pay with effect from 1 January 2022. The average duration of the defined benefit plan obligation at the end of the reporting period is 11 years. The scheme is assumed to run on until there are no beneficiaries and all benefits have been paid out. At that point, on the winding-up of the Scheme, there would be no benefits to be increased using the surplus. The group has the unconditional right to a refund of any surplus assets on the winding up of the scheme.

The liability associated with the unfunded retirement benefit arrangement has also been determined by the actuary, Willis Towers Watson, using the same assumptions as those used for the ABPGPS.

Based on summary membership data, and taking a simplified approach to determine an estimate, with no explicit margins for prudence, it has been estimated by the actuary, Willis Towers Watson, that the financial effect of equalising benefits due to the Guaranteed Minimum Pensions (GMPs) in the ABPGPS was approximately 0.1% increase in the Scheme's liabilities as at 31 December 2018 and this view is unchanged. Willis Towers Watson have subsequently estimated that the additional uplift required allowing for GMP equalisation of past transfers, following the Lloyds court case at the end of November 2020, would be nil (when rounded to the nearest £0.1m).

The surplus is recognised gross as it is anticipated that the recovery will be by way of reduced contributions over the life of the scheme. Deferred tax on the difference between the amounts recognized and payments made is included within deferred tax through the income statement or other comprehensive income to follow the recognition in the changes in value.

Notes to the financial statements

13. Pension commitments (continued)

Schemes accounted for on a defined benefit basis (continued)

The Pilots National Pension Fund ("PNPF")
The PNPF is an industry-wide defined benefit scheme, with all categories of members being either employed or self-employed. The last completed triennial valuation was at 31 December 2019, which was approved on 23 March 2021, and revealed a deficit falling short of that anticipated by the Recovery Plan put in place following completion of the 2010 valuation. The triennial valuation as at 31 December 2022 is expected to be finalised in early 2024. This additional deficit has resulted in a further Recovery Plan being put in place with Participating Bodies from 1 January 2021. No change has been made to the first Recovery Plan and these payments continue as planned.

Under the initial Recovery Plan the group is required to make payments towards the funding of the deficit with payments of £6.0m in 2021 and £6.2m in 2022, with contributions thereafter rising by 3.4% each year until 2028. Under the 2019 Recovery Plan the group is required to make payments towards the funding of the deficit with payments of £188,988 in 2021, £390,816 in 2022, and £808,188 in 2023, with contributions thereafter rising by 3.4% each year until 2028. The PNPF Trustee determined the group's share of the liabilities in the PNPF to be 35.5% as at 31 December 2010. As a result of the valuation exercise as at December 2019 the group's share of the relevant liabilities has reduced to 29.9%. The average duration of the defined benefit plan obligation at the end of the reporting period is 11 years. The Trustee of the PNPF has the power to determine how any excess of the Fund's assets over its liabilities that is not required shall be used. This could include reductions in contributions or refunds to participating bodies.

Under the terms of the PNPF scheme rules and the trustee powers the group is exposed to actuarial risks associated with the current and former employees of other participating entities. As such, the group's share of the liabilities of the scheme is sensitive to changes in the overall membership composition of the scheme and the experience in rates of retirement, mortality, cash commutations, augmentations and increase in salaries.

Other risks associated with the group's share of the net liabilities of the scheme include potential challenges from participating bodies to the allocation of liabilities in relation to self-employed members to sponsoring employers and the impact of participating bodies leaving the scheme (e.g. under Section 75 of the Pensions Act).

On 1 January 2021 the PNPF DB section was closed to new entrants and a Cash Balance Section established.

Notes to the financial statements

13. Pension commitments (continued)

Schemes accounted for on a defined benefit basis (continued)

Assumptions

The major financial assumptions used by the actuary as at 31 December were as follows:

	ABPGPS		PNPF	
	2022	**2021**	**2022**	**2021**
	%	**%**	**%**	**%**
Inflation CPI	**2.75**	2.90	**2.30**	2.40
Inflation RPI (short term/long term)	**3.25**	3.30	**3.20**	3.10
Rate of increase in pensionable salaries	**2.00**	2.00	**2.30**	2.40
Rate of increase for pensions in payment[1]	**3.05**	3.10	**3.00**	3.00
Rate of increase for pensions in payment[2]	**2.35**	2.35	**3.70**	3.60
Rate of increase for pensions in payment[3]	**2.75**	2.90	**2.30**	2.40
Discount rate	**4.90**	1.85	**4.90**	2.00

[1] *ABPGPS - (earned before 1 April 2007) (RPI capped at 5% p.a.); PNPF - (maximum 5%; minimum 0%)*
[2] *ABPGPS - (earned on or after 1 April 2007) (RPI capped at 3% p.a.); PNPF - (maximum 5%; minimum 3%)*
[3] *ABPGPS - (earned before 1 April 2007) (CPI uncapped); PNPF - (in deferment in excess of Guaranteed Minimum Pension)*

Assumptions used by the actuary are the best estimates chosen from a range of possible actuarial assumptions which, due to the timescales covered, may not necessarily be borne out. The most significant assumption is the discount rate.

The mortality assumptions are based on standard mortality tables which allow for future mortality improvements. The assumptions as at 31 December were as follows:

	ABPGPS		PNPF	
	2022	**2021**	**2022**	**2021**
	Years	**Years**	**Years**	**Years**
Male life expectancy retiring at age 60 in 15 years	**26.7**	26.6	**27.0**	27.0
Female life expectancy retiring at age 60 in 15 years	**29.0**	28.9	**29.7**	29.7

Sensitivities

The sensitivity analysis below has been determined based on reasonably possible changes of the assumptions occurring at the end of the reporting period assuming all other assumptions are held constant:

	ABPGPS		PNPF	
	2022	**2021**	**2022**	**2021**
Increase in liabilities	**£m**	**£m**	**£m**	**£m**
Decrease in discount factor by 0.5%	**23.7**	43.8	**5.0**	9.0
Increase in inflation rate by 0.5%	**16.8**	33.4	**4.0**	3.0
Increase in rate of mortality of a 60 year old by 1 year	**16.2**	29.1	**2.0**	7.0
Increase in allocated share of the PNPF liability by 5%	**-**	-	**4.2**	6.5

Notes to the financial statements

13. Pension commitments (continued)

Schemes accounted for on a defined benefit basis (continued)

Balance sheet

Changes in fair value of scheme assets were as follows:

	ABPGPS		PNPF	
	2022	**2021**	**2022**	**2021**
	£m	**£m**	**£m**	**£m**
Fair value of scheme assets at 1 January	**642.9**	640.2	**101.0**	101.8
Amounts recognised in income statement:				
Interest income	**11.7**	9.1	**2.0**	1.4
Remeasurement gain/(loss) in OCI:				
Return on assets, excluding amounts in net interest	**(212.4)**	16.1	**(26.4)**	1.0
Contributions by employees	**0.1**	0.1	**-**	-
Contributions by employer	**6.7**	6.0	**6.6**	6.3
Benefits paid	**(28.8)**	(27.5)	**(9.4)**	(9.1)
Administrative expenses paid	**(1.2)**	(1.1)	**(0.3)**	(0.4)
Fair value of scheme assets at 31 December	**419.0**	642.9	**73.5**	101.0

Changes in fair value of scheme obligations were as follows:

	ABPGPS		PNPF	
	2022	**2021**	**2022**	**2021**
	£m	**£m**	**£m**	**£m**
Fair value of scheme obligations at 1 January	**(582.1)**	(638.1)	**(140.1)**	(152.1)
Amounts recognised in income statement:				
Current and past service costs	**(1.8)**	(2.2)	**-**	-
Interest cost	**(10.5)**	(9.1)	**(2.7)**	(2.1)
Remeasurement gain in OCI:				
Remeasurement gain/(loss) from changes in demographic assumptions	**-**	30.2	**-**	0.1
Remeasurement gain from changes in financial assumptions	**184.1**	1.8	**38.6**	6.6
Experience (loss)/gain	**(25.1)**	6.7	**(4.0)**	(2.1)
Contributions by employees	**(0.1)**	(0.1)	**-**	-
Benefits paid directly by the company	**0.2**	0.1	**-**	-
Benefits paid	**28.8**	27.5	**9.4**	9.1
Administrative expenses paid	**1.2**	1.1	**0.3**	0.4
Fair value of scheme obligations at 31 December	**(405.3)**	(582.1)	**(98.5)**	(140.1)

The current service cost represented 34.5% (2021: 39.9%) for the ABPGPS and unfunded retirement benefit arrangements of the applicable pensionable payroll.

As at 31 December 2022, the cumulative remeasurement result recognised in the group's other comprehensive income amounted to a loss of £106.3m (2021: loss of £52.9m) for the ABPGPS and unfunded retirement benefit arrangements and a gain of £20.9m (2021: £12.7m) for the PNPF.

Returns on assets and interest on liabilities are determined by reference to the actuarial assumptions adopted at the beginning of each financial period. The actual return on assets for 2022 was a loss of £200.7m (2021: gain of £25.2m) for the ABPGPS and unfunded retirement benefit arrangements and a loss of £24.4m (2021: gain of £2.4m) for the PNPF.

Notes to the financial statements

13. Pension commitments (continued)

Schemes accounted for on a defined benefit basis (continued)

The scheme's assets were represented by investments in:

ABPGPS	2022 %	2021 %
Liability matching and hedging investments or assets*	**55.7**	36.6
Bond funds	**5.5**	21.4
Diversified growth funds	**4.3**	14.0
Private credit funds	**14.5**	10.5
Emerging market funds	**0.0**	5.7
Property	**18.5**	11.0
Cash	**1.5**	0.8

* *The group and Trustee have developed a 'flight plan' for the scheme which incorporates a long-term funding target and corresponding investment strategy. In line with this strategy, a proportion of the scheme's assets are held in LDI funds in order to hedge a proportion of the interest rate and inflation risk.*

PNPF	2022 %	2021 %
Partners Growth fund	**35.7**	35.4
Corporate bonds	**14.9**	9.9
Risk Hedge	**1.1**	0.3
Fund of hedge funds	**-**	-
Diversified growth funds	**2.0**	5.4
Liquidity fund	**23.3**	17.7
Gilts	**21.8**	27.8
Cash	**1.2**	3.5

Historical record – ABPGPS and unfunded retirement benefit arrangements

Amounts for the current and previous years are as follows:	2022 £m	2021 £m	2020 £m	2019 £m	2018 £m
Fair value of scheme assets	**419.0**	642.9	640.2	623.3	591.3
Present value of funded scheme obligations	**(403.7)**	(580.1)	(635.8)	(602.0)	(548.0)
Present value of unfunded obligations	**(1.6)**	(2.0)	(2.3)	(2.1)	(2.2)
Net assets recognised in the balance sheet	**13.7**	60.8	2.1	19.2	41.1
Remeasurement gain/(loss) due to changes in assumptions	**184.1**	32.0	(56.9)	(65.9)	43.1
Experience gain/(loss) on scheme obligations	**(25.1)**	6.7	(1.0)	(3.6)	15.0
Experience gain/(loss) on scheme assets	**(212.4)**	16.1	36.2	40.4	(24.6)
Remeasurement gain/(loss) relating to net retirement benefit assets/liabilities recognised in other comprehensive income	**(53.4)**	54.8	(21.7)	(29.1)	33.5

Notes to the financial statements

13. Pension commitments (continued)

Schemes accounted for on a defined contribution basis (continued)

Historical record – PNPF

Amounts for the current and previous years are as follows:	**2022 £m**	2021 £m	2020 £m	2019 £m	2018 £m
Fair value of scheme assets	**73.5**	101.0	101.8	114.0	108.3
Present value of funded scheme obligations	**(98.5)**	(140.1)	(152.1)	(172.6)	(167.8)
Net liabilities recognised in the balance sheet	**(25.0)**	(39.1)	(50.3)	(58.6)	(59.5)
Remeasurement gain/(loss) due to changes in assumptions	**38.6**	6.7	(9.4)	(10.8)	10.4
Experience (loss)/gain on scheme obligations	**(4.0)**	(2.1)	23.8	(2.3)	(2.4)
Experience gain/(loss) on scheme assets	**(26.4)**	1.0	(10.8)	10.1	(5.1)
Remeasurement gain/(loss) relating to net retirement benefit liabilities recognised in other comprehensive income	**8.2**	5.6	3.6	(3.0)	2.9

The Merchant Navy Officers Pension Fund ("MNOPF")

The MNOPF is a multi-employer arrangement operated across the shipping industry. It operates with no segregation of the assets and liabilities relating to different employers and the trustees allocating a 'share' of funding deficits to employers. The MNOPF has secured approximately £2bn of liabilities in respect of pensioner members with Pension Insurance Corporation through two transactions in 2020 and 2022. The assets of the MNOPF were approximately £3.3bn at 31 March 2021, including the value of this 'buy-in' policy. The buy-in transactions remove the financial and demographic risks associated with the insured pensioner members. The last actuarial valuation as at 31 March 2021 was a technical provision surplus of 102% and on the same basis as at 31 March 2022 was still 102%. The MNOPF closed to future benefit accrual on 31 March 2016.

ABP has approximately a 0.1% share of the MNOPF deficit based on the liabilities in respect of former employees and a share of the orphan liabilities. There are no new recovery plans in place following the latest valuation.

In 2022 and 2021 the group had no contributions to this scheme and expects no contributions to be payable in 2023.

The Legal & General Worksave Mastertrust ("MyPension Plan")

This is the company's primary pension arrangement for new and current employees, is a qualifying arrangement to meet auto enrolment legislation, and has approved mastertrust status from the Pensions Regulator.

In 2022 the group expensed as defined contribution pension costs a total of £11.6m (2021: £10.2m) of contributions to this plan.

The Ensign Retirement Plan ("ERP")

The ERP is an industry-wide mastertrust pension arrangement available to employers and employees who may, or may not, be associated with the maritime industry. The plan falls under independent trustee governance but is partly funded by the Trustee of the MNOPF and sits alongside the defined benefit arrangement within the framework of the MNOPF.

Notes to the financial statements

13. Pension commitments (continued)

Schemes accounted for on a defined contribution basis (continued)

The ERP has approved mastertrust status from the Pensions Regulator and is a defined contribution pension arrangement. The company has enrolled apprentices into the plan.

In 2022 the company expensed as defined contribution pension costs a total of £63,318 (2021: £27,180) of contributions to this plan.

The defined contribution pension cost represents the actual contributions payable by the group to the Legal & General and Ensign Mastertrusts. At 31 December 2022, there were no amounts outstanding as being due to these arrangements from the group (2021: £nil).

Schemes accounted for on a cash balance basis

The Pilots' National Pension Fund Cash Balance Section
The Cash Balance Section of the Pilots' National Pension Fund was established on 1 January 2021 to cover Pilots, marine and non-marine workers who meet certain criteria. ABP Apprentices started to be enrolled in the Cash Balance Section with effect from 1 September 2021.

14. Borrowings

	2022 **£m**	**2021** **£m**
Current		
Lease liabilities	**2.4**	1.7
Total current borrowings	**2.4**	1.7
Non-current		
Amounts due to parent undertaking	**574.7**	591.9
Lease liabilities	**4.6**	6.5
Total non-current borrowings	**579.3**	598.4

Amounts due to parent undertaking represents a loan from the company's immediate parent undertaking, Associated British Ports Holdings Limited. More detail on the company's related party borrowings is set out in note 22.

The carrying amounts of lease liabilities and the movements during the year are set out below:

	2022 **£m**	**2021** **£m**
At 1 January	**8.2**	9.8
Additions	**1.9**	0.5
Interest expense	**0.5**	0.7
Payments	**(3.6)**	(3.6)
Remeasurement	**-**	0.8
At 31 December	**7.0**	8.2

Notes to the financial statements

14. Borrowings (continued)

Lease liabilities are secured on the related leased assets. Disclosure of the financial risks related to these financial instruments is disclosed in note 16. Details of contingent liabilities in relation to the ultimate parent undertaking's group borrowings are set out in note 24.

15. Derivative financial instruments

The company uses derivatives to manage its exposure to fuel prices and foreign exchange rates. As the company does not designate any of its derivatives as hedges, the fair value changes are recognised in the income statement in accordance with the company's accounting policy set out in note 1. The terms and fair value of derivative financial assets and liabilities held by the company at the balance sheet date were:

2022	Expiry	Notional	Net amounts of financial assets presented in the balance sheet £m	Net amounts of financial liabilities presented in the balance sheet £m
At fair value through profit and loss				
Fuel swaps and caps	2022-2025	26.4m litres	2.3	(0.3)
Fair value of derivative financial instruments			**2.3**	**(0.3)**
Derivatives not offset in the balance sheet*			-	-
Net amount			**2.3**	**(0.3)**

*Right to offset under master netting arrangements.

2021	Expiry	Notional	Net amounts of financial assets presented in the balance sheet £m	Net amounts of financial liabilities presented in the balance sheet £m
At fair value through profit and loss				
Fuel swaps and caps	2022-2024	26.4m litres	1.2	-
Fair value of derivative financial instruments			**1.2**	**-**
Derivatives not offset in the balance sheet*			-	-
Net amount			**1.2**	**-**

*Right to offset under master netting arrangements.

Notes to the financial statements

15. Derivative financial instruments (continued)

Derivatives are analysed between current and non-current as follows:

	2022 £m	2021 £m
Current assets	**1.8**	0.7
Non-current assets	**0.5**	0.5
Total assets	**2.3**	1.2
Current liabilities	**(0.2)**	-
Non-current liabilities	**(0.1)**	-
Total liabilities	**(0.3)**	-

Disclosure of the financial risks related to these financial instruments is disclosed in note 16.

16. Financial instruments

The company's policies regarding financial instruments are set out in the accounting policies in note 1. Risk and numerical disclosure is set out below.

Fair value of financial instruments
The fair value of financial assets and liabilities are an estimate of the amount at which the instrument could be exchanged in a transaction between willing parties, other than in a forced or liquidation sale.

The carrying amounts of financial assets and financial liabilities in the financial statements approximate to their fair value. The following methods and assumptions were used to estimate the fair values:

- The fair value of cash and cash equivalents, current trade and other receivables and current trade and other payables approximate to their carrying amounts due to the short-term maturities of these instruments;
- The fair value of amounts due to parent undertaking approximates to their carrying amounts as they bear interest at a rate linked to the ABPA Holdings group weighted average cost of external debt and there have been no significant changes in credit risk since the issue of the instruments. A cash flow projection approach has been used with reference to observed market returns and accords to Level 2 in the fair value hierarchy; and
- The derivative financial instrument swaps are not traded in an active market, hence their fair value is determined by using discounted cash flow valuation techniques. These valuation techniques maximise the use of observable market data where available, including fuel prices and implied volatilities, and rely as little as possible on entity specific estimates and accords to Level 2 in the fair value hierarchy; and
- The fair value of foreign exchange contracts is based on market price, corresponding to Level 1 in the fair value hierarchy.

Financial risk management
Treasury matters throughout the company are controlled centrally and carried out in compliance with policies approved by the Board of Associated British Ports Holdings Limited ("ABPH"), the company's immediate parent undertaking. The Board of ABPH monitors treasury matters and approves significant decisions. The treasury function's purpose is to identify, mitigate and hedge financial risks inherent in the group's business operations and capital structure.

Notes to the financial statements

16. Financial instruments (continued)

Fair value of financial instruments (continued)

The company's liquidity, interest rate and capital risks, along with credit risk relating to cash, are managed by the group. The company's other main financial risks are foreign exchange and credit risk. The company aims to manage these risks to an acceptable level.

The company does not use financial instruments for speculative purposes.

Liquidity risk
Liquidity risk is managed in accordance with the Treasury Policy which applies to the entire group of the company's ultimate parent undertaking, ABP (Jersey) Limited. This ensures that cash and committed borrowing facilities are maintained at levels that provide a reasonable headroom in excess of the forecast requirements of all entities within the group. Management monitors rolling forecasts of the group's liquidity reserves (comprised of committed undrawn borrowing facilities and cash and cash equivalents) on the basis of expected cash flows.

The table below analyses the company's financial liabilities, excluding finance leases which are disclosed further below, based on undiscounted contractual payments:

	Borrowings (excluding lease liabilities) £m	Lease liabilities £m	Derivative financial instruments £m	Trade and other payables £m	Total £m
2022					
Not later than one year	37.6	2.8	-	177.3	217.7
More than one year but not more than two years	75.3	1.4	-	76.3	153.0
More than two years but not more than five years	112.9	2.0	-	-	114.9
More than five years	1,008.0	50.6	-	-	1,058.6
Total payments	**1,233.8**	**56.8**	**-**	**253.6**	**1,544.2**

	Borrowings (excluding lease liabilities) £m	Lease liabilities £m	Derivative financial instruments £m	Trade and other payables £m	Total £m
2021					
Not later than one year	37.1	2.6	-	155.8	195.5
More than one year but not more than two years	74.3	1.6	-	45.8	121.7
More than two years but not more than five years	111.3	3.2	-	10.3	124.8
More than five years	1,055.4	50.6	-	10.8	1,116.8
Total payments	**1,278.1**	**58.0**	**-**	**222.7**	**1,558.8**

Notes to the financial statements

16. Financial instruments (continued)

Financial risk management (continued)

Principal and interest on borrowings due to parent undertaking are payable on final maturity in 2040, however payments may be required prior to this date should the borrowing facility limit be reached. The maturity analysis above reflects interest payments being made in line with the year in which it arises, with no compounding, in order for the borrowing to remain within the facility limits.

The company had the following committed but undrawn borrowing facilities available at 31 December, through its immediate parent undertaking, Associated British Ports Holdings Limited ("ABPH"), in respect of which all conditions precedent had been met:

	2022 £m	2021 £m
Expiring in:		
More than five years	**225.3**	208.1
Undrawn borrowing facilities	**225.3**	208.1

This facility is only available up to the committed undrawn borrowing facilities available to the wider group through ABPH's immediate parent undertaking, ABP Acquisitions UK Limited, which as at 31 December 2022 was £280.0m (2021: £350.0m).

Market risk

Interest rate risk

The company's loan with its immediate parent undertaking, ABPH, is linked to the wider group's cost of debt. Interest rate risk is managed on a group basis by the wider group, owned by the company's ultimate parent undertaking, ABP (Jersey) Limited, maintaining an appropriate balance between fixed and floating debt and using interest rate swaps when appropriate to economically hedge against changes in interest rates. Further detail on how the group manages interest rate risk is included in the strategic report of ABPA Holdings Limited.

Foreign exchange risk

The company principally invoices its customers and settles its expenses in sterling. Accordingly, currency exposure arising from transactions being settled in other currencies tends to arise infrequently. Where such exceptions are significant, any related exposure is managed through forward currency contracts.

Credit risk

Credit risk with banks and financial institutions is managed by the wider group. The group monitors the credit risk of banking counterparts, tracking credit default swap rates and credit ratings of actual and potential counterparties. Cash deposits of the group at the year end were all with counterparties with a credit rating of A3 or better and the weighted average maturity of deposits was 1 days from 31 December 2022.

Customer credit risk is managed locally in line with a company policy which is designed to ensure that the company's exposure to concentration of credit is appropriately managed through implementation of credit checks and limits.

Notes to the financial statements

16. Financial instruments (continued)

Financial risk management (continued)
Based on the quality and diversity of its customer base and institutions with which cash is deposited, management considers the company's exposure to concentration of credit risk not to be material. The company uses external credit rating agencies to assess and monitor its trade receivables.

An impairment analysis is performed at each reporting date to determine the expected credit losses. The analysis reflects the time value of money and reasonable and supportable information that is available at the reporting date about past events, current condition and forecasts of future economic conditions. Based on the impairment analysis the company ensures that the allowance for expected credit losses is at least 0.5% of the amount of trade receivables held on the balance sheet at the reporting date.

Given the counterparties of the receivables, as set out in note 12, management considers the company's exposure to credit risk to be minimal. The maximum exposure to credit risk at 31 December 2022 is the carrying amount of each class of receivable. The maximum exposure to credit risk at the reporting date for derivative instruments is their fair value.

Capital risk
The company manages its capital to ensure that it will be able to continue as a going concern while maximising shareholder value and to ensure that it has the resources and the capacity to meet its operational requirements and to facilitate the execution of its strategy.

The company's overall strategy remains unchanged from 2021.

17. Trade and other payables

	2022 £m	2021 £m
Current		
Trade payables	**28.3**	24.6
Amounts due to group undertakings	**60.8**	59.0
Amounts due to subsidiary undertakings	**16.0**	12.6
Accruals	**64.1**	52.8
Other creditors	**2.3**	3.4
Taxation	**3.8**	3.4
Total current trade and other payables	**175.3**	155.8
Non-current		
Amounts due to subsidiary undertakings	**45.8**	45.8
Accruals	**19.1**	10.3
Security deposits	**12.1**	10.8
Total non-current trade and other payables	**77.0**	66.9

Security deposits comprise amounts paid by property tenants that are held under rent deposit deeds.

Notes to the financial statements

17. Trade and other payables (continued)

All trade and other payables are non-interest bearing. Details on amounts due to related parties are disclosed in note 22.

18. Deferred income

	Contract Liability	Deferred Property Income	Government grants	Total
	£m	£m	£m	£m
At 1 January 2021	**8.2**	**86.1**	**6.3**	**100.6**
Credited to income statement during the year	(3.7)	(27.6)	(1.4)	(32.7)
Amounts received in advance and deferred	4.8	23.9	32.0	60.7
At 31 December 2021	**9.3**	**82.4**	**36.9**	**128.6**
Credited to income statement during the year	(2.8)	(30.3)	(6.7)	(39.8)
Amounts received in advance and deferred	14.3	28.2	15.2	57.7
At 31 December 2022	**20.8**	**80.3**	**45.4**	**146.5**

Deferred revenue is analysed between non-current and current as follows:

	2022	2021
	£m	£m
Current	**41.6**	37.8
Non-current	**104.9**	90.8
Total deferred income	**146.5**	128.6

The non-current deferred revenue principally relates to deferred property income received in advance for investment properties which will be spread over the terms of the leases.

Government grants received during the year of £15.2m related predominantly to the Border Control Posts scheme overseen by the Port Infrastructure Fund and the new Horizon Cruise Terminal in Southampton.

Notes to the financial statements

19. Provisions

	Restructuring	Self Insurance	Other	Total
	£m	£m	£m	£m
2022				
At 1 January	0.3	15.5	23.3	39.1
(credited)/charged to income statement during the year	(0.1)	(6.7)	11.3	4.5
Utilised in the year	(0.1)	(0.1)	(1.0)	(1.2)
Amortisation of discounting	-	0.3	-	0.3
At 31 December	**0.1**	**9.0**	**33.6**	**42.7**
Expected utilisation within one year	0.1	0.1	27.9	28.1

	Restructuring £m	Self insurance £m	Other £m	Total £m
2021				
At 1 January	0.9	15.6	11.8	28.3
Charged to income statement during the year	0.4	-	13.7	14.1
Utilised in the year	(1.0)	(0.3)	(2.2)	(3.5)
Amortisation of discounting	-	0.2	-	0.2
At 31 December	**0.3**	**15.5**	**23.3**	**39.1**
Expected utilisation within one year	0.3	0.5	18.5	19.3

Provisions are analysed between non-current and current as follows:

	2022	2021
	£m	£m
Current	**28.1**	19.3
Non-current	**14.6**	19.8
Total provisions	**42.7**	39.1

Restructuring
The restructuring, started in 2019, is now complete. The restructuring provision of £0.1m remains to cover final costs.

Self insurance
The company self-insures various matters and carries a provision in respect of employer's liability in relation to certain industrial diseases.

The company's exposure in relation to retrospective industrial diseases has been subject to a full review in 2022 and an updated model constructed by an independent actuary. Potential liabilities have been projected forward until 2074 using information on incidence type, number of claims, life expectancy of claimants, value of claims and the company's share of the exposure. Cash flows, where appropriate, have been projected and discounted on a pre-tax basis using a discount rate of 3.8% (2021: 2.63%). The actuarial assessment identified a reasonable discounted estimate of the reserves to be in the range £7.0m to £11.7m. In the light of uncertainty associated with asbestos related claims, the group provides in the middle of the range.

Notes to the financial statements

19. Provisions (continued)

Other

Other provisions include:

- £5.6m in respect of a Grade II listed building where ABP has a statutory obligation to maintain the building and recognises the need to carry out essential works.
- £15.2m in respect of land at various ports which has been identified as contaminated as a result of previous use. The provisions are in respect of remediation needed to ensure that ABP remains in compliance with environmental regulations.
- £5.9m in respect of work identified as necessary to keep the navigation channel open and clear of debris

20. Deferred tax

The UK corporation tax rate change from 19% to 25% (effective 1 April 2023) was enacted 10 June 2021. As a result the deferred tax balances are remeasured at 19% or 25% (2021: 19% or 25%) as appropriate for the period in which they are expected to crystalise.

The movement on deferred tax is shown below:

	2021 £m	Adjustments in respect of previous periods charged/ (credited) to income statement £m	Adjustments in respect of previous periods charged to OCI £m	Charged/ (credited) to income statement £m	Charged/ (credited) to OCI £m	2022 £m
Accelerated tax depreciation	110.0	0.3	-	0.8	-	111.1
Revaluation of operational land and investment properties	165.2	-	-	37.5	7.7	210.4
Capital losses	(12.7)	-	-	(0.5)	-	(13.2)
Retirement benefit obligations	5.4	-	-	2.5	(10.8)	(2.9)
Other	(3.8)	(0.1)	-	1.8	-	(2.1)
Net deferred tax liability	**264.1**	**0.2**	-	**42.1**	**(3.1)**	**303.3**

Notes to the financial statements

20. Deferred tax (continued)

	2020	Adjustments in respect of previous periods charged/ (credited) to income statement	Adjustments in respect of previous periods charged to OCI	Charged/ (credited) to income statement	Charged/ (credited) to OCI	2021
	£m	£m	£m	£m	£m	£m
Accelerated tax depreciation	79.7	0.7	-	29.6	-	**110.0**
Revaluation of operational land and investment properties	116.2	-	-	45.4	3.6	**165.2**
Capital losses	(9.5)	-	-	(3.2)	-	**(12.7)**
Retirement benefit obligations	(9.4)	-	0.2	2.5	12.1	**5.4**
Other	(2.8)	(0.1)	-	(0.9)	-	**(3.8)**
Net deferred tax liability	**174.2**	**0.6**	**0.2**	**73.4**	**15.7**	**264.1**

The company has unrecognised capital losses of £314.1m (2021: £314.1m) that have no expiry date and are only available for offset against gains from future sales of land and buildings from the port estates. These have not been recognised, as gains from future property sales cannot be projected with sufficient certainty.

21. Cash flow reconciliations

Reconciliation of Profit before taxation to cash generated by operations:	2022 £m	2021 £m
Profit before taxation	**360.6**	228.1
Finance costs	**33.6**	33.2
Finance income	**(1.4)**	(0.1)
Net unrealised gain on operating derivatives	**(0.8)**	(2.7)
Depreciation of property, plant and equipment and right of use assets	**91.7**	87.8
Amortisation of intangible assets	**8.8**	7.8
Loss on write off of intangibles and disposal of property, plant and equipment, investment property, property and land held for sale and right of use assets	**6.7**	3.1
Decrease in provisions	**3.3**	10.6
Increase in fair value of investment properties	**(148.4)**	(45.0)
Difference between pension contributions paid and defined benefit pension charge through profit and loss	**(11.7)**	(10.1)
Operating cash flows before movements in working capital	**342.4**	312.7
Decrease in trade and other receivables	**(15.7)**	(16.3)
Increase in trade and other payables	**26.1**	(28.0)
Cash generated by operations	**352.8**	268.4

Cash generated by operations includes movements in rent related security deposits which are restricted cash.

Notes to the financial statements

21. Cash flow reconciliations (continued)

The table below shows the cash and non-cash changes in liabilities arising from financing activities:

2022	At 1 January liability £m	Cash flows £m	Non-cash changes £m	At 31 December liability £m
Long-term intercompany borrowings	(591.9)	251.0	(233.8)	**(574.7)**
Lease liabilities	(8.2)	3.6	(2.4)	**(7.0)**
Total	**(600.1)**	**254.6**	**(236.2)**	**(581.7)**

2021	At 1 January liability £m	Cash flows £m	Non-cash changes £m	At 31 December liability £m
Long-term intercompany borrowings	(606.8)	199.7	(184.8)	**(591.9)**
Lease liabilities	(9.8)	3.6	(2.0)	**(8.2)**
Total	**(616.6)**	**203.3**	**(186.8)**	**(600.1)**

22. Related party transactions

The company's UK retirement benefit schemes are managed by The Associated British Ports Group Pension Scheme ("ABPGPS") (see note 13). During the year, the company charged ABPGPS £0.2m (2021: £0.2m) in respect of administrative services.

The company has entered into related party transactions and/or holds balances with the following related parties:

Name	Relationship
Associated British Ports Holdings Limited	Immediate parent
ABP Acquisitions UK Limited	Intermediate parent
ABP (Aldwych) Limited	Group undertaking
ABP Marchwood Limited	Group undertaking
ABP Marine Environmental Research Limited	Group undertaking
ABP Property Development Company Limited	Group undertaking
ABP Security Limited	Group undertaking
ABP Southampton Properties Limited	Group undertaking
Auto Shipping Limited	Group undertaking
Grosvenor Waterside Asset Management Limited	Group undertaking
Grosvenor Waterside Investments Limited	Group undertaking
Immingham Bulk Terminal Limited	Group undertaking
Millbay Development Company Limited	Group undertaking
ABPH Marine (Guernsey) Limited	Group undertaking
UK Dredging Management Limited	Wholly owned subsidiary
Whitby Port Services Limited	Wholly owned subsidiary
Aldwych Logistics Investments Limited	Wholly owned subsidiary
The Teignmouth Quay Company Limited	Wholly owned subsidiary
Colchester Dock Transit Company Limited	Wholly owned subsidiary
Exxtor Shipping Services Limited	Wholly owned subsidiary
Humber Pilotage (C.H.A.) Limited	Wholly owned subsidiary

Notes to the financial statements

22. Related party transactions (continued)

Ipswich Port Limited	Wholly owned subsidiary
Northern Cargo Services Limited	Wholly owned subsidiary
Southampton Free Trade Zone Limited	Wholly owned subsidiary
ABP Safeguard Limited	Wholly owned subsidiary
RPM Industrial Site Services Limited	Wholly owned subsidiary
W.E. Dowds (Shipping) Limited	Wholly owned subsidiary

The company has the following borrowings with the related party:

Entity	Due date	Rate per annum	2022 £m	2021 £m
Associated British Ports Holdings Limited	2040	6.8%	**(574.7)**	(591.9)

The following table shows the borrowing transactions that have been entered into by the company with Associated British Ports Holdings Limited, together with period end balances, for the relevant financial year:

Associated British Ports Holdings Limited	**2022 £m**	**2021 £m**
Intercompany borrowing at start of the year	**(591.9)**	(606.8)
Increase in payable	**(17.7)**	(24.1)
Interest charged – 6.8% per annum (2021: 6.5%)	**(36.1)**	(15.0)
Dividends accrued	**(180.0)**	(130.0)
Dividends paid	**132.0**	100.0
Interest paid	**29.8**	58.0
Net cash paid	**89.2**	26.0
Intercompany borrowing at end of the year	**(574.7)**	(591.9)

The company also has the following balances due from/(to) related parties:

	2022 £m	**2021 £m**
ABP (Aldwych) Limited	**1.5**	1.5
Immingham Bulk Terminal Limited	**(8.6)**	(8.6)
W.E. Dowds (Shipping) Limited	**(4.4)**	(0.9)
Grosvenor Waterside Investments Limited	**(38.9)**	(38.7)
ABP Acquisitions UK Limited	**-**	-
The Teignmouth Quay Company Limited	**(11.7)**	(11.7)
ABP Property Development Company Limited	**(5.0)**	(5.0)
ABP Southampton Properties Limited	**(4.1)**	(4.1)
ABP Marine Environmental Research Limited	**(3.2)**	(1.7)
Auto Shipping Limited	**(0.5)**	(0.5)
ABPH Marine (Guernsey) Limited	**(0.1)**	(0.1)
Grosvenor Waterside Asset Management Limited	**(0.1)**	(0.1)
Millbay Development Company Limited	**(0.1)**	(0.1)
ABP Security Limited	**(0.1)**	(0.1)
Total current balances	**(75.3)**	(70.1)

Notes to the financial statements

22. Related party transactions (continued)

Colchester Dock Transit Company Limited	**(5.3)**	(5.3)
Exxtor Shipping Services Limited	**(11.2)**	(11.2)
Humber Pilotage (C.H.A.) Limited	**(2.0)**	(2.0)
Ipswich Port Limited	**(24.7)**	(24.7)
Northern Cargo Services Limited	**(1.1)**	(1.1)
Southampton Free Trade Zone Limited	**(1.5)**	(1.5)
Total non-current balances	**(45.8)**	(45.8)

The following tables show the current account transactions that have been entered into by the company with related parties, together with period end balances, for the relevant financial year:

Immingham Bulk Terminal Limited	2022 £m	2021 £m
Intercompany (payable)/receivable at start of the year	**(8.6)**	(9.3)
Movement for the year	**-**	0.7
Intercompany payable at end of the year	**(8.6)**	(8.6)

W.E. Dowds (Shipping) Limited	2022 £m	2021 £m
Intercompany (payable)/receivable at start of the year	**(0.9)**	(1.2)
Movement for the year	**(3.5)**	0.3
Intercompany (payable)/receivable at end of the year	**(4.4)**	(0.9)

ABP Acquisitions UK Limited	2022 £m	2021 £m
Intercompany payable at start of the year	**-**	(35.2)
Movement for the year	**-**	35.2
Intercompany payable at end of the year	**-**	-

ABP Marine Environmental Research Limited	2022 £m	2021 £m
Intercompany payable at start of the year	**(1.7)**	(2.0)
Movement for the year	**(1.5)**	0.3
Intercompany payable at end of the year	**(3.2)**	(1.7)

Grosvenor Waterside Investments Limited	2022 £m	2021 £m
Intercompany payable at start of the year	**(38.7)**	(38.7)
Movement for the year	**(0.2)**	-
Intercompany payable at end of the year	**(38.9)**	(38.7)

23. Financial commitments

Capital commitments

	2022 £m	2021 £m
Capital expenditure contracted but not provided for	**38.6**	16.0

Notes to the financial statements

24. Contingent liabilities

As part of the security package for borrowing facilities of the wider group owned by the company's ultimate parent undertaking, certain wider group companies have granted a guarantee and fixed and floating charges over their respective assets including over real property owned by them and shares in subsidiary undertakings (excluding Associated British Ports ("ABP") and its subsidiary undertakings) and various other assets including the rights of the company's immediate parent undertaking, Associated British Ports Holdings Limited's rights in relation to its principal subsidiary undertaking, ABP. No guarantees or security have been granted by ABP or its subsidiary undertakings in respect of such borrowing facilities.

The company makes contributions to two industry-wide defined benefit pension schemes, which have various funding levels. The company's ability to control these schemes is limited and therefore the impact on the company's future cash flows and cost base from these schemes is uncertain. Further details on these schemes are set out in note 13. In the event of the funding position of these schemes deteriorating ABP could have a resulting liability. It is not possible to quantify the possible liability.

25. Leases

Company as lessor
The company's lease income is set out in note 2.

The company leases various areas of land, buildings and other operational assets across its port facilities to its customers. The lease terms vary depending on the nature of the property and are unique to each property. The length of lease for properties contributing to the lease income receivable below ranges from less than one year to 119 years. Where renewal rights exist these rights are either contractual or statutory in nature.

Maturity analysis of future minimum lease income receivable under non-cancellable operating leases is as follows:	**2022 £m**	**2021 £m**
Not later than one year	**110.9**	96.5
More than one year but not more than two years	**92.6**	80.2
More than two years but not more than three years	**86.8**	70.5
More than three years but not more than four years	**80.3**	64.8
More than four years but not more than five years	**64.4**	60.0
More than five years	**783.3**	793.6
Total	**1,218.3**	1,165.6

Company as lessee
Expenses relating to short term leases, leases of low value assets and variable lease expense are set out in note 3.

The nature of the company's leasing activities, the carrying amounts of right of use assets recognised and the movements during the year are set out in note 9.

Right of use assets that meet the definition of investment property are included in note 10.

The carrying amounts of lease liabilities and the movements during the year are set out in note 14. The maturity analysis of lease liabilities is set out in note 16.

During the year the company had total cash outflows for leases of £3.6m (2021: £5.9m).

Notes to the financial statements

26. Subsidiary undertakings

All subsidiaries have a registered address of 25 Bedford Street, London, WC2E 9ES and operate in England and Wales, unless otherwise stated. The company's controlling interest in subsidiary undertakings is represented by ordinary shares. All ordinary shares have voting rights in the same proportion to the shareholding.

	% held by Company
Subsidiary undertakings: Ports and transport	
W.E. Dowds (Shipping) Limited	100
Subsidiary undertakings: Group services	
UK Dredging Management Limited	100
W.E.D. (Services) Limited	100
Subsidiary undertakings: Dormant	
ABP (Pension Trustees) Limited	100
ABP Marchwood Limited	100
ABP Safeguard Limited	100
ABP Secretariat Services Limited	100
Aldwych Logistics Investments Limited	100
Colchester Dock Transit Company Limited	100
Exxtor Shipping Services Limited	100
Grosvenor Waterside (Cardiff Bay) Limited	100
Humber Pilotage (C.H.A.) Limited	100
Ipswich Port Limited	100
Northern Cargo Services Limited	100
RPM Industrial Site Services Limited	100
Slater's Transport Limited	100
Southampton Free Trade Zone Limited	100
The Teignmouth Quay Company Limited	100
Whitby Port Services Limited	100

Notes to the financial statements

27. Holding company and ultimate controlling parties

Under the Transport Act 1981, Associated British Ports Holdings Limited has powers over Associated British Ports corresponding to the powers of a holding company over a wholly-owned subsidiary undertaking. The company's intermediate parent undertaking, ABPA Holdings Limited ("ABPAH"), produces consolidated financial statements that comply with UK adopted International Accounting Standards ("IAS"). Copies of these financial statements may be obtained from ABPAH, at its registered office at 25 Bedford Street, London, WC2E 9ES, which is also the principal office of Associated British Ports ("ABP"). The consolidated financial statements of ABPAH are the smallest group in which ABP is included.

The ultimate parent undertaking and controlling party is ABP (Jersey) Limited ("ABPJ"), a limited liability company registered in Jersey. ABPJ produces consolidated financial statements that comply with International Financial Reporting Standards as adopted by the European Union and are available from its registered office at 44 Esplanade, St Helier, Jersey, JE4 9WG. The consolidated financial statements of ABPJ are the largest group in which the company is included.

ABPJ is owned by a consortium of investors as shown below:

2022	**% of A Ordinary shares**	**% of B Ordinary shares**	**% of Preference shares**
Borealis ABP Holdings B.V. (owned by OMERS Administration Corporation)	22.10	22.10	22.09
Borealis Ark Holdings B.V. (owned by OMERS Administration Corporation)	7.90	7.90	7.91
CPP Investment Board Private Holdings (6) Inc. (owned by Canada Pension Plan Investment Board)	30.00	33.88	33.88
9348654 Canada Inc.	3.88	-	-
Cheyne Walk Investment Pte Limited (owned by GIC (Ventures) Pte Limited)	20.00	20.00	20.00
Wren House Infrastructure LP (controlled by Kuwait Investment Authority)	10.00	10.00	10.00
Anchorage Ports LLP (owned by Hermes GPE Infrastructure Fund LP, Hermes Infrastructure (SAP I) LP and Hermes Infrastructure (Alaska) LP)	6.12	6.12	6.12
	100.00	**100.00**	**100.00**

Notes to the financial statements

27. Holding company and ultimate controlling parties (continued)

2021	% of A Ordinary shares	% of B Ordinary shares	of Preference shares
Borealis ABP Holdings B.V. (owned by OMERS Administration Corporation)	22.10	22.10	22.09
Borealis Ark Holdings B.V. (owned by OMERS Administration Corporation)	7.90	7.90	7.91
CPPIB (Hong Kong) Limited (owned by Canada Pension Plan Investment Board)	30.00	33.88	33.88
9348654 Canada Inc.	3.88	-	-
Cheyne Walk Investment Pte Limited (owned by GIC (Ventures) Pte Limited)	20.00	20.00	20.00
Kuwait Investment Authority (controlled by Kuwait Investment Authority)	10.00	10.00	10.00
Anchorage Ports LLP (owned by Hermes GPE Infrastructure Fund LP, Hermes Infrastructure (SAP I) LP and Hermes Infrastructure (Alaska) LP)	6.12	6.12	6.12
	100.00	**100.00**	**100.00**

All share classes held by CPPIB (Hong Kong) Limited, a wholly-owned subsidiary of Canada Pension Plan Investment Board ("CPPIB"), were transferred to CPP Investment Board Private Holdings (6) Inc., also wholly-owned by CPPIB, on 30 April 2022, as part of an intragroup reorganisation. The transaction did not impact the percentage holdings of any other shareholder.

Appendix 2

COMPANIES HOUSE
3 0 JUN 2022
EDINBURGH MAILBOX

Registration number: 02532156

Group Package Accounts

Air Products (BR) Limited

Annual Report and Financial Statements

for the Year Ended 30 September 2021

THURSDAY

SB7ABP6U

SCT 30/06/2022 #25

COMPANIES HOUSE

Air Products (BR) Limited
Contents

Air Products (BR) Limited

Strategic Report for the Year Ended 30 September 2021

The directors present their strategic report for the year ended 30 September 2021. This strategic report has been prepared in accordance with The Companies Act 2006.

Principal activity
The principal activity of the company continues to be the sale of industrial gases.

Fair review of the business
The trading results for the year and the company's financial position at the end of the year are as shown in the attached financial statements.

Safety of all stakeholders has remained company's highest priority, particularly in the face of the challenges posed by the COVID-19 pandemic. Despite the uncertainty of the duration of COVID-19 and the sustained risk of emergence of new variants, the company continued to serve its customers and remained focused on sustainability as well as its commitment to advancing diversity and inclusion amongst the workforce.

The profit for the financial year was £7,853,000 (2020: £19,922,000) and the operating profit was £8,607,000 (2020: £21,012,000). The main driver of the decrease in profit for the year was an increase in power costs as a result of the global energy crisis. The company's operations are energy intensive and therefore significant increases in energy costs have a corresponding impact on profitability.

Key performance indicators
The directors monitor the financial performance of the business based on specific key performance indicators (KPI's). Operating profit is used as a measure of overall profitability. Operating profit decreased from £21,012,000 in 2020 to £7,853,000 in 2021, expressed as a percentage of sales it decreased from 26.1% in 2020 to 9% in 2021, driven by the increase in energy rates.

Section 172 statement
The directors are aware of their duty under section 172(1) (a) to (f) of the Companies Act 2006 to act in a manner they consider, in good faith, would be most likely to promote the success of the company for the benefit of its members as a whole and, in doing so, to have regard (amongst other matters) to:

a) the likely consequences of any decision in the long term;
The directors understand the demands of the business and what is needed for the company to be successful and meet the group's long-term strategic goals of becoming the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to customers. Management meets on a regular basis to review and discuss important issues affecting business operations and to formulate a long-term plan to enable the company to be successful in achieving its strategic objectives.

b) the interests of the company's employees;
The directors believe that employees are the company's most valuable asset and are critical to long-term success. The company itself does not directly have any employees but utilises staff from other group companies to deliver its operations. They continue to develop the company's 4S culture (Safety, Speed, Simplicity and Self-Confidence) to create a work environment where all employees feel that they belong and matter. Talent related initiatives, including employee recruitment and development, diversity and inclusion, and compensation and benefit programs, are focused on building and retaining a talented staff base, which is critical to achieving long-term objectives. Employee safety and wellbeing is a key goal within overall business strategy.

c) the need to foster the company's business relationships with suppliers, customers and others;
The directors understand the need to engage in positive and mutually beneficial relationships with suppliers, customers, and others in order to operate successfully and deliver on strategic objectives. The company engages with a wide range of suppliers and customers, from small regional companies to large multinationals, with the aim of establishing long-term relationships which benefit all parties.

Suppliers are viewed as integral members of the business and management seeks to engage with companies who share the same commitment to ethical business practices and who can help deliver value. Suppliers are required to abide by and conform to the company's global Code of Conduct in business dealings and support sustainability through the principles outlined in Air Products' Expectations of Suppliers.

d) the impact of the company's operations on the community and the environment;
The directors are aware of the impact operations have on the environment and local community. The company supports the communities in which it has a presence. The company is committed to limiting the impact of operations on the environment through its long-term strategy and is actively involved in developing new processes and technologies to improve long-term sustainability.

e) the desirability of the company maintaining a reputation for high standards of business conduct;
The directors view integrity as a core value of the company and expect all business operations to be executed in an ethical manner. Commitment to this behaviour is reinforced through the company's code of conduct which identifies a clear framework and required standards. Employees receive annual trainings to ensure that standards of business ethics are both met and maintained on an ongoing basis; and

(f) the need to act fairly as between members of the company.
The company is a wholly owned subsidiary of Air Products Group Limited.

Principal risks and uncertainties

Competitive pressure in the UK is a continuing risk for the company. To manage this risk, the company strives to provide value-added products to its customers and maintain strong relationships with both customers and suppliers. The company's business is affected by fluctuations in the price of key raw materials and utilities, although purchasing policies, contracts and practices seek to mitigate, where practical, such risks.

As expected, while the Brexit trade agreement has resulted in increases in certain supply chain costs, the company has not suffered any significant impact on production operations or its financial position as a result of Brexit. Furthermore, due to the measures taken to mitigate impacts where possible, and the fact that the vast majority of customers and production are based in the UK, the directors do not anticipate future impacts from the current Brexit trade agreement.

The COVID-19 global pandemic significantly impacted the UK economy beginning in March 2020 when the government implemented various measures to control the spread of the virus. Consistent with the directors' initial assessment, to date, the impact of COVID-19 on the financial position of the company has been limited.

Financial risk management

The company aims to manage financial risks to avoid potential negative impacts on the results of business operations.

Cash flow risks

The company participates in a group cash pooling arrangement to minimise cash flow based risks. In addition, financial risks related to interest rate and foreign exchange fluctuations are actively managed through the use of derivate financial instruments such as forward contracts.

Credit risk

The company's principal financial assets are bank balances and cash, trade and other receivables, and investments. The company's credit risk is primarily attributable to its trade receivables. The amounts presented in the balance sheet are net of allowances for doubtful receivables. An allowance for impairment is made where there is an identified loss event which, based on previous experience, is evidence of a reduction in recoverability of the cash flows.

The credit risk on liquid funds and derivative financial instruments is limited because the counterparties are banks with high credit ratings assigned by international credit ratings agencies. The company has no significant concentration of credit risk, with exposure spread over a large number of counterparties and customers.

Liquidity risk

In order to maintain liquidity to ensure that sufficient funds are available for ongoing operations and future developments, the company participates in a group cash pooling arrangement.

Future developments
The company is well positioned to continue its focus on growing its core UK Industrial Gases business. Management remains focused on safety and delivering value added products and services for customers in the future.

Environmental matters
The company recognises the importance of its environmental responsibilities, monitors its impact on the environment, and designs and implements policies to mitigate any adverse impact that might be caused by its activities. Initiatives aimed at minimising the company's impact on the environment include safe disposal of waste, recycling and reducing energy consumption.

Approved by the Board on 30th June 2022 and signed on its behalf by:

[redacted].....
J. Escorihuela
Director

Hersham Place Technology Park
Molesey Road
Walton-on-Thames
Surrey
KT12 4RZ

Air Products (BR) Limited

Directors' Report for the Year Ended 30 September 2021

The directors present their annual report and the audited financial statements for the year ended 30 September 2021.

Proposed dividend
The directors proposed no dividend during the year 2021 or to date of this report (2020: £nil).

Directors of the company
The directors who held office during the year were as follows:

R. Boocock (resigned 19 January 2021)

C. Stinner (resigned 15 December 2021)

S. Lowe

D. Leney (resigned 15 February 2022)

The following directors were appointed after the year end:

J. Escorihuela (appointed 15 February 2022)

B. Hussa (appointed 15 December 2021)

Certain directors benefited from qualifying third party indemnity provisions in place during the financial year and at the date of this report.

Going concern
The company's business activities, together with the factors likely to affect its future development and position, are set out in the Business Review section of the Strategic Report on page 2.

At the time of signing of these financial statements no material uncertainties exist related to events or conditions that may give rise to significant doubt as to the company's ability to continue in operations for the foreseeable future. The entity continues to generate positive cash flows from operations which provides the directors with reasonable expectation that the company will be able to meet its financial obligations as they fall due for at least 12 months from the date of the approval of the financial statements.

In making a judgement regarding going concern, the directors have also considered the long-term economic impact of the COVID-19 pandemic. The impact on the company's operations and financial position have been limited to date. The directors continue to monitor and assess the long-term effect of COVID-19 on the wider economy but do not anticipate any significant impact on operations or financial position in the coming financial year. As a result, they continue to adopt the going concern basis in preparation of these financial statements.

Financial risk management and future developments
Financial management and future developments are included in the strategic report and form part of this report by cross reference.

Political donations
The company made no political donations or incurred any political expenditure during the year (2020: nil).

Streamlined Energy and Carbon Reporting (SECR)
In April 2019, the UK Government introduced new legislation called Streamlined Energy and Carbon Reporting (SECR) that requires some large companies to report on their greenhouse gas (GHG) emissions in their annual directors reports as well as the principle measures used improve the company's energy efficiency.

Air Products business in the UK comprises production, distribution and selling of industrial and medical gases, mainly to professional industrial users. More details can be found at https://www.airproducts.co.uk/. Air Products' UK business is also part of Air Products and Chemicals Inc., a Delaware corporation listed on the U.S. stock exchange and a Fortune 500 company. Air Products publicly discloses greenhouse gases data and targets in its annual sustainability report at https://www.airproducts.com/company/sustainability/sustainability-report.

Industrial gases production is energy intensive and the main carbon emissions for Air Products' UK business (close to 90%) are associated with the electricity used for the cryogenic distillation of air to produce oxygen, nitrogen, and argon. These and other products are distributed via pipelines, road tankers and /or in compressed gas cylinders.

GHG emissions and energy usage data for period 1st October 2020 to 30th September 2021 is shown in table 1. Note that there are no offshore activities.

Table 1	**Scope[1]**	**Units**	**2,021**	**2,020**
Energy equivalent usage for activities which the company owns or controls				
Energy equivalent of gaseous fuel for combustion or process use	1	MWh	13,695	25,892
Energy equivalent of from use of fuel for product distribution and on-site use of vehicles	1	MWh	-	-
Energy equivalent from business travel (owned vehicles and company lease cars)	1	MWh	-	-
Energy equivalent of purchase of electricity, heat, steam and cooling purchased for own use [2]	2	MWh	476,464	543,158
Emissions for activities which the company owns or controls				
Emissions from Gaseous fuel for combustion or process use	1	Tonnes CO2e	2,795	5,255
Emissions from use of fuel for product distribution and on-site use of vehicles	1	Tonnes CO2e	-	-
Emissions from business travel (owned vehicles and company lease cars)	1	Tonnes CO2e	-	-
Emissions from Purchase of electricity, steam, heat or cooling for own use[1]	1	Tonnes CO2e	111,083	115,329

Total Gross Scope 1 & Scope 2 emissions1 and 2		**Tonnes Co2e**	113,878	120,584
Emissions from business travel [3]	3	CO2e	-	-
Emissions from contracted transport [4]	3	CO2e	-	-

[1] Definitions
Scope 1 (Direct) GHG emissions- These include emissions from activities owned or controlled by the organisation that release emissions into the atmosphere. They are direct emissions. Examples of Scope 1 emissions include emissions from combustion in owned or controlled boilers, furnaces, vehicles, and emissions from chemical production in owned or controlled process_
equipment.

Scope 2 (Energy indirect) emissions -These include emissions released into the atmosphere associated with the consumption of purchased electricity, heat, steam and cooling. These are indirect emissions that are a consequence of the organisation's activities, but which occur at sources not owned or controlled by the company.

Scope 3 (Other indirect) emissions -Emissions that are a consequence of the company's actions, which occur at sources not owned or controlled by the company and which are not classed as Scope 2 emissions. Examples of Scope 3 emissions are business travel by means not owned or controlled by the organisation, waste disposal which is not owned or controlled, or purchased materials. The methodology is based on the DEFRA environmental reporting guidelines, using invoice and metered data. The transport data is based on fuel usage with an allocation per business entity based on monthly invoice samples.

[2] Emissions from business travel are not material
Globally Air Products has applied a 2% materiality threshold to its Scope 3 emissions since 2019. Emissions related to business travel have been estimated in prior years (2018 and earlier) and did not meet the 2% materiality threshold. As a result, the emissions are considered not relevant and thus are not calculated for UK businesses.

[3] Emissions from contracted transport are not material (<2% of Scope 3 emissions)
Energy Efficiency Actions Taken
The number of UK industrial gas producers is small. For that reason, specific energy efficiency improvement measures are considered commercially sensitive and are not included in this report. In general terms Air Products does use such measures as advanced plant control systems, maximization of plant loadings, advanced scheduling and logistics planning, transport fleet management, and driver training as well as investing in renewable energy sourcing.

GHG Intensity Metric
Due to the above-mentioned confidentiality concerns, GHG intensity metrics are not disclosed. Note that Air Products is part the British Compressed Gases Association (BCGA) Climate Change Agreement (CCA) and public reporting against our target intensity measurement for our energy intensive activities can be found at https://www.gov.uk/government/publications/climate-change-agreements-cca-biennial-report. CCA reporting is on a calendar year basis, whereas this report, as per the UK guidance, is stated on a fiscal year basis (1st October to 30th September).

Disclosure of information to the auditor's

The directors who held office at the date of approval of this directors' report confirm that, so far as they are each aware, there is no relevant audit information of which the Company's auditor is unaware; and each director has taken all the steps that they ought to have taken as a director to make themselves aware of any relevant audit information and to establish that the Company's auditor is aware of that information.

This confirmation is given and should be interpreted in accordance with the provisions of s418 of the Companies Act 2006.

Auditor

Deloitte LLP have expressed their willingness to continue in office as auditor and will be proposed for reappointment at the next Annual General Meeting.

Approved by the Board on 30th June 2022 and signed on its behalf by:

[redacted]..........

J. Escorihuela
Director

Air Products (BR) Limited

Statement of directors′ responsibilities in respect of the Directors′ Report and the financial statements

The directors are responsible for preparing the Strategic Report, the Directors' Report and the financial statements in accordance with applicable law and regulations.

Company law requires the directors to prepare financial statements for each financial year. Under that law they have elected to prepare the financial statements in accordance with UK accounting standards and applicable law (UK Generally Accepted Accounting Practice), including FRS 102 The Financial Reporting Standard applicable in the UK and Republic of Ireland.

Under company law the directors must not approve the financial statements unless they are satisfied that they give a true and fair view of the state of affairs of the company and of the profit or loss of the company for that period. In preparing these financial statements, the directors are required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether applicable UK accounting standards have been followed, subject to any material departures disclosed and explained in the financial statements; and
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the company will continue in business.

The directors are responsible for keeping adequate accounting records that are sufficient to show and explain the company's transactions and disclose with reasonable accuracy at any time the financial position of the company and enable them to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the company and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

The directors are responsible for the maintenance and integrity of the corporate and financial information included on the Company's website. Legislation in the United Kingdom governing the preparation and dissemination of financial statements may differ from legislation in other jurisdictions.

Independent Auditor's Report to the Members of Air Products (BR) Limited

Report on the audit of the financial statements

Opinion

In our opinion the financial statements of Air Products (BR) Limited (the 'company'):

- give a true and fair view of the state of the company's affairs as at 30 September 2021 and of its profit for the year then ended;
- have been properly prepared in accordance with UK accounting standards, including FRS 102 The Financial Reporting Standard applicable in the UK and Republic of Ireland; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

We have audited the financial statements which comprise:

- the profit and loss account;
- the balance sheet;
- the statement of changes in equity; and
- the related notes 1 to 19.

The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including Financial Reporting Standard 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" (United Kingdom Generally Accepted Accounting Practice).

Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the auditor's responsibilities for the audit of the financial statements section of our report.

We are independent of the company in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the Financial Reporting Council's (the 'FRC's') Ethical Standard, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Going concern

In auditing the financial statements, we have concluded that the directors' use of the going concern basis of accounting in the preparation of the financial statements is appropriate.

Based on the work we have performed, we have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the company's ability to continue as a going concern for a period of at least twelve months from when the financial statements are authorised for issue.

Our responsibilities and the responsibilities of the directors with respect to going concern are described in the relevant sections of this report.

Independent Auditor's Report to the Members of Air Products (BR) Limited (continued)

Other information

The directors are responsible for the other information. The other information comprises the information included in the annual report, other than the financial statements and our auditor's report thereon. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in respect of these matters.

Responsibilities of directors

As explained more fully in the directors' responsibilities statement, the directors are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the directors either intend to liquidate the company or to cease operations, or have no realistic alternative but to do so.

Auditor's responsibilities for the audit of the financial statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

A further description of our responsibilities for the audit of the financial statements is located on the FRC's website at: www.frc.org.uk/auditorsresponsibilities. This description forms part of our auditor's report.

Extent to which the audit was considered capable of detecting irregularities, including fraud

Irregularities, including fraud, are instances of non-compliance with laws and regulations. We design procedures in line with our responsibilities, outlined above, to detect material misstatements in respect of irregularities, including fraud. The extent to which our procedures are capable of detecting irregularities, including fraud is detailed below.

We considered the nature of the company's industry and its control environment, and reviewed the company's documentation of their policies and procedures relating to fraud and compliance with laws and regulations. We also enquired of management about their own identification and assessment of the risks of irregularities.

We obtained an understanding of the legal and regulatory framework that the company operates in, and identified the key laws and regulations that:

- had a direct effect on the determination of material amounts and disclosures in the financial statements. These included UK Companies Act and tax legislation; and
- do not have a direct effect on the financial statements but compliance with which may be fundamental to the company's ability to operate or to avoid a material penalty.

We discussed among the audit engagement team regarding the opportunities and incentives that may exist within the organisation for fraud and how and where fraud might occur in the financial statements.

As a result of performing the above, we identified the greatest potential for fraud in the following area, and our specific procedures performed to address it are described below:

- Manual adjustments to revenue: We have tested the design and implementation of controls involving management revenue adjustments and estimation process; we have used journal entry detail to identify manual entries to revenue and ensured the appropriateness of each entry selected; we have reconciled the transaction system subledger of revenue to the general ledger, ensuring all manual entries are included in the population subject to testing.

In common with all audits under ISAs (UK), we are also required to perform specific procedures to respond to the risk of management override. In addressing the risk of fraud through management override of controls, we tested the appropriateness of journal entries and other adjustments; assessed whether the judgements made in making accounting estimates are indicative of a potential bias; and evaluated the business rationale of any significant transactions that are unusual or outside the normal course of business.

In addition to the above, our procedures to respond to the risks identified included the following:

- reviewing financial statement disclosures by testing to supporting documentation to assess compliance with provisions of relevant laws and regulations described as having a direct effect on the financial statements;
- performing analytical procedures to identify any unusual or unexpected relationships that may indicate risks of material misstatement due to fraud;
- enquiring of management and in-house legal counsel concerning actual and potential litigation and claims, and instances of non-compliance with laws and regulations; and
- reading minutes of meetings of those charged with governance.

Report on other legal and regulatory requirements

Opinions on other matters prescribed by the Companies Act 2006

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the strategic report and the directors' report for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the strategic report and the directors' report have been prepared in accordance with applicable legal requirements.

In the light of the knowledge and understanding of the company and its environment obtained in the course of the audit, we have not identified any material misstatements in the strategic report or the directors' report.

Independent Auditor's Report to the Members of Air Products (BR) Limited (continued)

Matters on which we are required to report by exception

Under the Companies Act 2006 we are required to report in respect of the following matters if, in our opinion:

- adequate accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or
- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of directors' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit.

We have nothing to report in respect of these matters.

Use of our report

This report is made solely to the company's members, as a body, in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the company's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the company and the company's members as a body, for our audit work, for this report, or for the opinions we have formed.

[redacted]

Andrew Hornby FCA (Senior Statutory Auditor)
For and on behalf of Deloitte LLP, Statutory Auditor

Reading
United Kingdom

30th June 2022

Air Products (BR) Limited

Profit and Loss Account for the Year Ended 30 September 2021

	Note	2021 £000	2020 £000
Turnover	2	95,164	80,364
Cost of sales		(85,285)	(58,330)
Gross profit		9,879	22,034
Administrative expenses		(1,269)	(1,022)
Operating profit	3	8,610	21,012
Other interest receivable and similar income	6	1,594	2,864
Interest payable and similar expenses	7	(45)	(449)
Profit before tax		10,159	23,427
Taxation	8	(2,306)	(3,505)
Profit for the financial year		7,853	19,922

All results derive from continuing operations.

There are no recognised gains or losses in the current or prior year other than those charged to the profit and loss account, accordingly, no separate statement of other comprehensive income has been presented.

The notes on pages 16 to 30 form an integral part of these financial statements.

Air Products (BR) Limited

(Registration number: 02532156)
Balance Sheet as at 30 September 2021

	Note	2021 £ 000	2020 £ 000
Fixed assets			
Tangible assets	9	41,818	39,726
Investments	10	189,728	189,728
		231,546	229,454
Current assets			
Stocks	11	2,058	1,925
Debtors (including £23,394,000 (2020: £30,101,000) due after more than one year)	12	95,363	75,607
Cash at bank and in hand		84,783	76,127
		182,204	153,659
Creditors: Amounts falling due within one year	13	(146,627)	(123,816)
Net current assets		35,577	29,843
Total assets less current liabilities		267,123	259,297
Creditors: Amounts falling due after more than one year	13	(767)	(935)
Provisions for liabilities	15	(996)	(855)
Net assets		265,360	257,507
Capital and reserves			
Called up share capital	17	181,683	181,683
Share premium account		45,497	45,497
Profit and loss account		38,180	30,327
Total equity		265,360	257,507

Approved by the Board on 30th June 2022 and signed on its behalf by:

[redacted].........

J. Escorihuela
Director

Hersham Place Technology Park
Molesey Road
Walton-on-Thames
Surrey
KT12 4RZ

The notes on pages 16 to 30 form an integral part of these financial statements.

Air Products (BR) Limited

Statement of Changes in Equity for the Year Ended 30 September 2021

	Share capital £ 000	Share premium £ 000	Profit and loss account £ 000	Total £ 000
At 1 October 2019	181,683	45,497	10,405	237,585
Profit for the year	-	-	19,922	19,922
Total comprehensive income	-	-	19,922	19,922
At 30 September 2020	181,683	45,497	30,327	257,507

	Share capital £ 000	Share premium £ 000	Profit and loss account £ 000	Total £ 000
At 1 October 2020	181,683	45,497	30,327	257,507
Profit for the year	-	-	7,853	7,853
Total comprehensive income	-	-	7,853	7,853
At 30 September 2021	181,683	45,497	38,180	265,360

The notes on pages 16 to 30 form an integral part of these financial statements.

1 Accounting policies

Air Products (BR) Ltd (the "Company") is a private company limited by shares incorporated in the United Kingdom under the Companies Act 2006 and registered in England and Wales. The principal activities of the company are set out in the Strategic Report on page 2.

Summary of significant accounting policies and key accounting estimates
The principal accounting policies applied in the preparation of these financial statements are set out below. These policies have been consistently applied to all the years presented, unless otherwise stated.

Key estimates and judgements
In the application of the company's accounting policies, which are described in note 2, the directors are required to make judgements, estimates and assumptions about the carrying amounts of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods. No critical accounting judgements or sources of estimation uncertainty have been identified.

Statement of compliance
These financial statements were prepared in accordance with Financial Reporting Standard 102 The Financial Reporting Standard applicable in the UK and Republic of Ireland ("FRS 102").

Basis of preparation
These financial statements are prepared on a going concern basis, under the historical cost convention. The company is exempt by virtue of s400 of the Companies Act 2006 from the requirement to prepare group accounts. These financial statements present information about the company as an individual undertaking and not about its group. The ultimate parent undertaking and the smallest and largest group to consolidate these financial statements is Air Products and Chemicals, Inc. The address of the parent's registered office is Air Products and Chemicals, Inc, 7201 Hamilton Boulevard, Allentown, Pennsylvania 18195 - 1501.

These financial statements were prepared in accordance with Financial Reporting Standard 102 the Financial Reporting Standard applicable in the UK and Republic of Ireland ("FRS 102"). The functional and presentation currency of these financial statements is sterling as this is the currency of the primary economic environment in which the entity operates. All amounts in the financial statements have been rounded to the nearest £1,000.

Exemptions for qualifying entities FRS 102
Air Products (BR) Limited is a qualifying entity under FRS 102 on the basis of being included in the consolidated financial statements of Air Products and Chemicals Inc, which are available to the public from the company's registered office.

The company has, therefore, taken the below exemptions available under FRS 102:

1 Accounting policies (continued)

• The company has taken advantage of the exemption, under FRS 102 paragraph 1.12(b), from preparing a statement of cash flows, on the basis that it is a qualifying entity and its parent company, Air Products & Chemicals Inc, includes the company's cash flows in its own consolidated financial statements.

• The company has taken advantage of the exemption, under FRS 102 para 33.7 from disclosing total compensation of key management personnel.

• The company has taken advantage of the exemption for qualifying entities from certain financial instrument disclosures, on the basis that the equivalent disclosures are included in the consolidated financial statements of ultimate parent company.

• The company has taken advantage of the exemption, under FRS 33.1 (a), from disclosing related party transactions as they are all with other companies that are wholly owned by Air Products & Chemicals Inc.

Going concern

The company's business activities, together with the factors likely to affect its future development and position, are set out in the Business Review section of the Strategic Report on page 2.

At the time of signing of these financial statements no material uncertainties exist related to events or conditions that may give rise to significant doubt as to the company's ability to continue in operations for the foreseeable future. The entity, continues to generate positive cash flows from operations which provides the directors with reasonable expectation that the company will be able to meet its financial obligations as they fall due for at least 12 months from the date of the approval of the financial statements.

In making a judgement regarding going concern, the directors have also considered the long-term economic impact of the COVID-19 pandemic. The impact on the company's operations and financial position have been limited to date. The directors continue to monitor and assess the long-term effect of COVID-19 on the wider economy but do not anticipate any significant impact on operations or financial position in the coming financial year. As a result, they continue to adopt the going concern basis in preparation of these financial statements.

Fixed assets investments

Investments in subsidiary undertakings, associates and joint ventures are stated at cost less any provision for impairment.

Fixed assets and depreciation

Fixed assets are stated in the statement of financial position at cost, less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Depreciation is provided on a straight-line basis to write off the cost less the estimated residual value of tangible fixed assets by equal instalments over their estimated useful economic lives as follows:

Asset class	**Depreciation rate**
Freehold building	between 10 to 30 years
Plant and machinery	between 4 to 40 years

Assets under construction are not depreciated and recorded at cost.

1 Accounting policies (continued)

Impairment of fixed assets

The carrying amounts of the Company's assets are reviewed for impairment when events or changes in circumstances indicate that the carrying amount of the fixed asset may not be recoverable. If any such indication exists, the asset's recoverable amount is estimated.

An impairment loss is recognised whenever the carrying amount of an asset or its income-generating unit exceeds its recoverable amount. Impairment losses are recognised in the profit and loss account.

Calculation of recoverable amount

The recoverable amount of fixed assets is the greater of their net realisable value and value in use. In assessing value in use, the expected future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the rate of return expected on an equally risky investment. For an asset that does not generate largely independent income streams, the recoverable amount is determined for the income-generating unit to which the asset belongs.

Reversals of impairment

An impairment loss is reversed only to the extent that the asset's carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortisation, if no impairment loss had been recognised.

Foreign currency transactions and balances

Transactions in foreign currencies are recorded using the rate of exchange ruling at the date of the transaction. Monetary assets and liabilities denominated in foreign currencies are translated using the rate of exchange ruling at the balance sheet date, and the gains or losses on translation are included in the profit and loss account. If the transaction is hedged forward, the gains or losses arising on completion of this contract are recognised on the date of completion in the profit and loss account.

Non-monetary assets and liabilities that are measured in terms of historical cost in a foreign currency are translated using the exchange rate at the date of the transaction. Non-monetary assets and liabilities denominated in foreign currencies that are stated at fair value are retranslated to the functional currency at foreign exchange rates ruling at the dates the fair value was determined.

Provisions

Provisions are recognised when the company has an obligation at the reporting date as a result of a past event, it is probable that the company will be required to settle that obligation and a reliable estimate can be made of the amount of the obligation.

1 Accounting policies (continued)

Financial instruments

Classification

In accordance with FRS 102.22, financial instruments issued by the Company are treated as equity only to the extent that they meet the following two conditions:

(a) they include no contractual obligations upon the company to deliver cash or other financial assets or to exchange financial assets or financial liabilities with another party under conditions that are potentially unfavourable to the company; and

(b) where the instrument will or may be settled in the company's own equity instruments, it is either a non- derivative that includes no obligation to deliver a variable number of the company's own equity instruments or is a derivative that will be settled by the company's exchanging a fixed amount of cash or other financial assets for a fixed number of its own equity instruments.

To the extent that this definition is not met, the proceeds of issue are classified as a financial liability. Where the instrument so classified takes the legal form of the company's own shares, the amounts presented in these financial statements for called up share capital and share premium account exclude amounts in relation to those shares.

Basic financial instruments

Debtors / creditors

Other debtors are recognised initially at transaction price less attributable transaction costs. Other creditors are recognised initially at transaction price plus attributable transaction costs. Subsequent to initial recognition they are measured at amortised cost using the effective interest method. If the arrangement constitutes a financing transaction, for example if payment is deferred beyond normal business terms, then it is measured at the present value of future payments discounted at a market rate of instrument for a similar debt instrument.

Investments in subsidiaries, jointly controlled entities and associates

These are separate financial statements of the company. Investments in subsidiaries, jointly controlled entities and associates are carried at cost less impairment, with net revaluation gains recognised in OCI and net revaluation losses in profit or loss.

Other financial instruments

Financial instruments not considered to be Basic financial instruments (Other financial instruments)

Other financial instruments not meeting the definition of Basic Financial Instruments are recognised initially at fair value. Subsequent to initial recognition other financial instruments are measured at fair value with changes recognised in profit or loss except as follows:

• investments in equity instruments that are not publicly traded and whose fair value cannot otherwise be measured reliably shall be measured at cost less impairment; and

• hedging instruments in a designated hedging relationship shall be recognised as set out below.

Derivative financial instruments

Derivative financial instruments are recognised at fair value. The gain or loss on remeasurement to fair value is recognised immediately in profit or loss.

1 Accounting policies (continued)

Stocks

Stock is stated at the lower of cost and net realisable value. In determining the cost of raw materials, consumables and goods purchased for resale, the weighted average purchase price is used. For work in progress and finished goods cost is taken as production cost, which includes an appropriate proportion of attributable overheads.

Leases

Assets acquired under finance leases are capitalised and the outstanding future lease obligations are shown in creditors. Operating lease rentals are charged to the profit and loss account on a straight line basis over the period of the lease.

Operating lease
Payments (excluding costs for services and insurance) made under operating leases are recognised in the profit and loss account on a straight-line basis over the term of the lease unless the payments to the lessor are structured to increase in line with expected general inflation; in which case the payments related to the structured increases are recognised as incurred. Lease incentives received are recognised in profit and loss over the term of the lease as an integral part of the total lease expense.

Finance lease
Minimum lease payments are apportioned between the finance charge and the reduction of the outstanding liability using the rate implicit in the lease. The finance charge is allocated to each period during the lease term so as to produce a constant periodic rate of interest on the remaining balance of the liability. Contingent rents are charged as expenses in the periods in which they are incurred.

Finance lease – lessor

Amounts due from lessees under finance leases are recognised as receivables at the amount of the company's net investment in the leases. Finance lease income is allocated to accounting periods as to reflect a constant periodic rate of return on the company's net investment outstanding in respect of the lease.

Tax

Taxation expense for the period comprises current and deferred tax recognised in the reporting period. Tax is recognised in the profit and loss account, except to the extent that it relates to items recognised in other comprehensive income or directly in equity. In this case tax is also recognised in other comprehensive income or directly in equity respectively.

Current or deferred taxation assets and liabilities are not discounted. Current tax is the amount of income tax payable in respect of the taxable profit for the year or prior years. Tax is calculated on the basis of tax rates and laws that have been enacted or substantively enacted by the period end.

Deferred tax arises from timing differences that are differences between taxable profits and total comprehensive income as stated in the financial statements. These timing differences arise from the inclusion of income and expenses in tax assessments in periods different from those in which they are recognised in financial statements. Deferred tax is recognised on all timing differences at the reporting date except for certain exceptions. Unrelieved tax losses and other deferred tax assets are only recognised when it is probable that they will be recovered against the reversal of deferred tax liabilities or other future taxable profits.

Deferred tax is measured using tax rates and laws that have been enacted or substantively enacted by the period end and that are expected to apply to the reversal of the timing difference.

Dividend income

Dividend income is recognised in the profit and loss account on the date the company's right to receive payment is established.

1 Accounting policies (continued)

Interest Payable
Interest payable and similar income includes interest payable and third-party interest. Interest payable is recognised in profit and loss account as it accrues using the effective interest method.

Interest Receivable
Interest receivable and similar income includes interest receivable on intercompany loans, interest on bank deposits, gains on financial derivatives and income from finance lease receivables. Interest receivable is recognised in profit and loss account as it accrues using the effective interest method.

Contract revenue recognition
The amount of profit attributable to the stage of completion of a long-term contract is recognised when the outcome of the contract can be foreseen with reasonable certainty. Turnover for such contracts is stated at cost appropriate to their stage of completion plus attributable profits, less amounts recognised in previous years. Provision is made for any losses as soon as they are foreseen.

Contract work in progress is stated at costs incurred, less that transferred to the profit and loss account, after deducting foreseeable losses and payments on account not matched with turnover.

Amounts recoverable, within one year, on contracts are included in stocks and represent turnover recognised in excess of payments on account.

Amounts recoverable, over a year, on contracts are included in trade debtors and represent project revenue in excess of billing.

Interest costs incurred during the construction period on long-term contracts are included in work-in-progress.

Revenue recognition
Turnover represents the amounts (excluding value added tax, credit notes and returns) derived from the provision of goods and services to customers. Sales of industrial gases are recorded at the time of shipment.

2 Analysis of turnover

The turnover is attributable to the principal activity of the company which is sale of industrial gas.

	2021 £ 000	2020 £ 000
United Kingdom	95,164	80,364

3 Operating profit

Arrived at after charging:

	2021 £ 000	2020 £ 000
Depreciation expense	3,864	4,020
Foreign exchange losses/(gains)	541	(547)
Operating lease expense - plant and machinery	311	232
Operating lease expense - other	266	564
Loss on sale of fixed assets	21	9

The Auditor's remuneration in respect of the audit of these financial statements was £9,000 (2020: £7,000)

4 Directors' remuneration

The directors are directors of a number of group companies. Their services to this company are considered inconsequential and therefore they do not receive any emoluments for their qualifying services to this company (2020: £nil).

5 Staff costs

The company has no employees and staff costs as it relies on Air Products PLC a related company for the provision of operational, administrative and management services in both the current and prior year.

6 Other interest receivable and similar income

	2021 £ 000	2020 £000
Interest receivables from group undertakings	12	52
Interest from finance lease	1,468	1,730
Bank interest	83	1,082
Third party interest	31	-
	1,594	2,853

7 Interest payable and similar expenses

	2021 £ 000	2020 £000
Interest payable to group undertakings	45	438
Tax related interests	-	11
	45	449

8 Taxation

The tax on profit before tax for the year is lower than the standard rate of corporation tax in the UK (2020 - lower than the standard rate of corporation tax in the UK) of 19% (2020 - 19%).

Tax charged in the income statement

	2021 £ 000	2020 £000
UK Corporation tax		
Current tax on income for the period	-	2,189
Adjustment in respect of prior periods	798	(625)
Foreign tax	-	(151)
Total current income tax	798	1,413
Deferred taxation		
Origination / reversal of timing differences	2,321	1,707
Arising from changes in tax rates and laws	(862)	(539)
Adjustment in respect of prior periods	49	924
Tax expense in the income statement	2,306	3,505

8 Taxation (continued)

Tax rate changes

Finance Act No.2 2015 included provisions to reduce the UK corporation tax rate to 19% with effect from 01 April 2017. Subsequently, a reduction in the rate of corporation tax to 17% (effective 01 April 2020) was enacted in 2016. However, in his budget of 2020, the Chancellor of Exchequer proposed measures to hold the rate of corporation tax at 19%, effective 01 April 2020 and this change was substantively enacted on 17 March 2020. These rates have therefore been used to measure deferred tax assets and liabilities where applicable.

Legislation was introduced in Finance Bill 2021 to set the main rate of corporation tax at 25% for Financial Year 2023, which will apply to profits above £250,000; and introduce a small profits rate of 19% for profits below £50,000. Marginal relief provisions will be introduced so that, where a company's profits fall between the lower and upper limits, it will be able to claim an amount of marginal relief that bridges the gap between the lower and upper limits providing a gradual increase in the Corporation Tax rate.

	2021 £ 000	2020 £000
Profit before tax	10,159	23,427
Current tax at 19% (19% FY20)	1,930	4,451
Expenses not deductible/ Income not taxable for tax purposes	(166)	3
Adjustment in respect of prior periods	847	299
Group Relief	-	(558)
Foreign tax	-	(151)
Effect of change in tax rate	(862)	(539)
Other timing differences	557	-
Total tax charge	2,306	3,505

8 Taxation (continued)

Deferred tax

Deferred tax assets and liabilities

2021	**Asset £ 000**
Timing differences on fixed assets	2,891
Fixed asset impairment	-
Derivative financial instruments	(239)
Onerous contract	249
	2,901

2020	**Asset £ 000**
Timing differences on fixed assets	4,473
Fixed asset impairment	-
Derivative financial instruments	(227)
Onerous contract	162
	4,408

There is no expiry date on the timing difference, unused tax losses or tax credits.

9 Tangible assets

	Freehold property £ 000	Plant and Machinery £ 000	Assets under construction £ 000	Total £ 000
Cost or valuation				
At 1 October 2020	3,380	170,064	8,484	181,928
Additions	217	178	5,582	5,977
Disposals	(7)	(1,625)	-	(1,632)
Transfers	34	2,800	(2,834)	-
At 30 September 2021	3,624	171,417	11,232	186,273
Depreciation				
At 1 October 2020	2,223	139,979	-	142,202
Charge for the year	147	3,717	-	3,864
Eliminated on disposal	(1)	(1,610)	-	(1,611)
At 30 September 2021	2,369	142,086	-	144,455
Carrying amount				
At 30 September 2021	1,255	29,331	11,232	41,818
At 30 September 2020	1,157	30,085	8,484	39,726

10 Investments

Details of the investments (including principal place of business of unincorporated entities) in which the company holds 20% or more of the nominal value of any class of share capital are as follows:

Undertaking	Registered office	Holding	Proportion of voting rights and shares held 2021	2020
Subsidiary undertakings				
Air Products Ireland Limited	Unit 950, Western Industrial Estate Killeen Road Dublin 12 Ireland	Ordinary shares	100%	100%
Cryoservice Limited	Wardon Business Park Prescott Drive Worcester Worcestershire WR4 9RH Great Britain	Ordinary shares	85.14%	85.14%

10 Investments (continued)

Shares in group undertakings	**2021 £000**
Cost	
Investments at the beginning of the year	189,728
Additions	-
At 30 September 2021	189,728
Carrying amount	
At 30 September 2021	189,728

11 Stocks

	2021 £ 000	**2020 £ 000**
Raw materials and consumables	1,381	1,373
Finished goods and goods for resale	677	552
	2,058	1,925

12 Debtors

	Note	2021 £ 000	2020 £000
Trade debtors		19,311	6,929
Amounts owed by related parties		17,390	17,167
Other debtors (including £966,000 (2020: £596,000) due after more than one year)		12,942	5,668
Prepayments		18,288	11,999
Finance lease receivables (including £19,288,000 (2020: £24,199,000) due after more than one year)	14	24,205	28,848
Deferred tax asset (including £3,140,000 (2020: £5,305,000) due after more than one year)	8	2,901	4,408
Derivative Financial Instruments		326	588
		95,363	75,607

The long-term portion of deferred tax is greater than the overall asset value as this position includes the netting of both deferred tax asset and liability elements. The gross value of liability elements are considered not material for separate disclosure.

Related party transactions are at interest rates equivalent to market rate.

13 Creditors

	2021 £ 000	2020 £000
Due within one year		
Trade creditors	6,493	3,259
Amounts due to related parties	124,511	112,423
Other payables	153	77
Accruals	11,250	3,908
Derivative financial instruments	90	137
Payments on account	4,129	4,012
	146,626	123,816
Due after one year		
Provisions	996	855
Other long-term creditors	767	935
	1,763	1,790

Related party transactions are at interest rates equivalent to market rate.

14 Finance lease receivable

Finance lease are receivable as follows:

	2021 £ 000	2020 £ 000
Finance lease receivable		
Less than one year	4,911	4,649
Between one and five years	19,294	21,368
More than five years	-	2,831
	24,205	28,848

15 Provision

	Asset retirement obligation £ 000	Total £ 000
At 1 October 2020	(855)	(855)
Additional provisions	(141)	(141)
At 30 September 2021	(996)	(996)

Asset retirement obligation in relation to the demolition and removal of plant assets.

16 Financial instruments

The carrying amounts of the financial assets and liabilities measured at fair value are:

	2021 £ 000	2020 £ 000
Assets measured at fair value through profit or loss	326	588
Financial liabilities measured at fair value through profit or loss	(90)	(137)
	236	451

The fair value of derivative financial instruments is estimated by discounting the difference between the contractual forward price and the current forward price for the residual maturity of the contract using a risk-free interest rate (based on government bonds).

17 Share capital

Authorized, called up and fully paid shares

	2021		2020	
	No. 000	**£ 000**	**No. 000**	**£ 000**
Equity: 181,682,627 ordinary shares of £1 each of £1 each	181,683	181,683	181,683	181,683

18 Commitments

Capital commitments
The total amount contracted for but not provided in the financial statements was £29,514,000 (2020 - £2,666,000).

Non-cancellable operating leases

	2021 £ 000	2020 £ 000
Non-cancellable lease commitments - less than a year	927	624
Non-cancellable lease commitments - 2 to 5 years	3,242	2,445
Non-cancellable lease commitments - more than 5 years	15,702	9,121
	19,871	12,190

19 Parent and ultimate parent undertaking

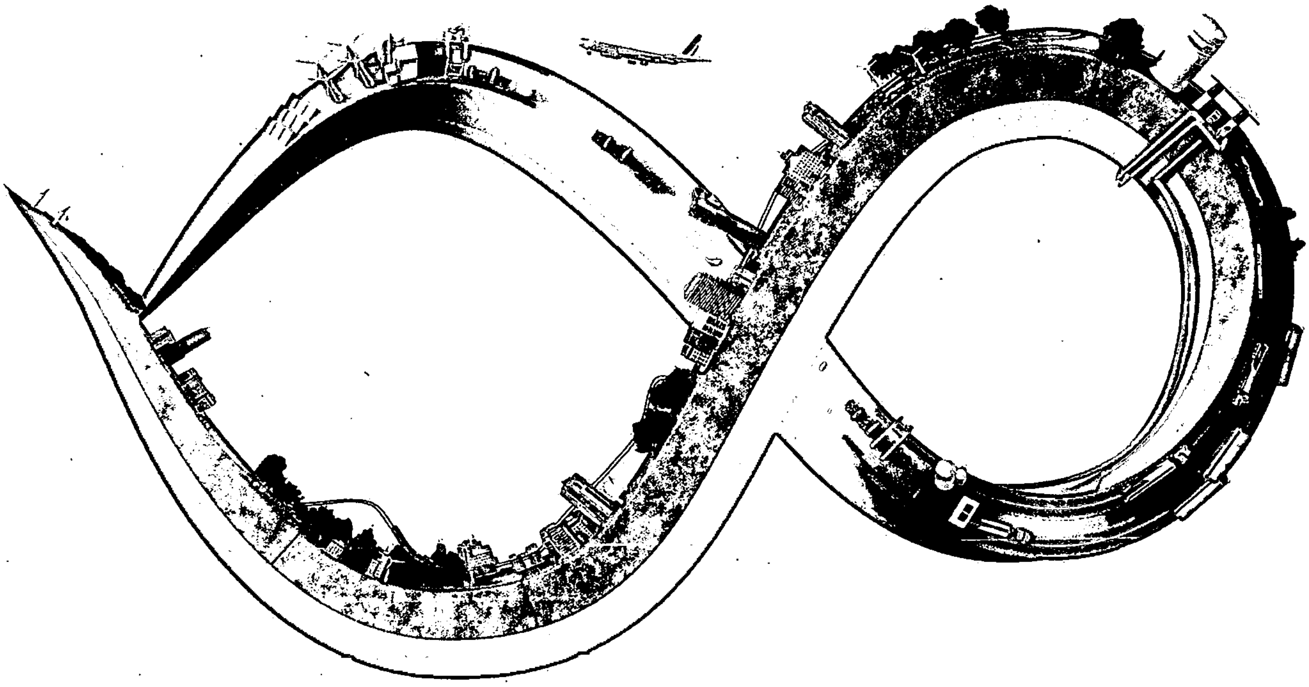
The company is a wholly owned subsidiary of Air Products Group Limited, a company incorporated in United Kingdom.

The smallest and largest group in which the results of the company are consolidated is that headed by Air Products and Chemicals Inc., the ultimate controlling party and a company incorporated in the State of Delaware, USA. The consolidated financial statements of this group are available to the public and may be obtained from:

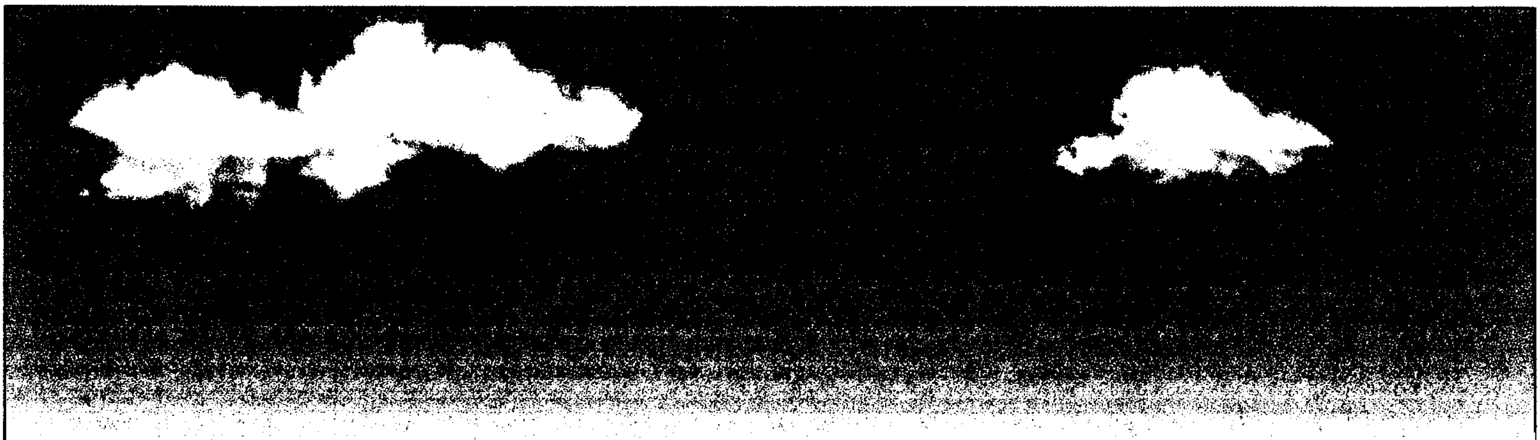
Corporate Secretary
Air Products and Chemicals, Inc
7201 Hamilton Boulevard
Allentown
Pennsylvania 18195 - 1501

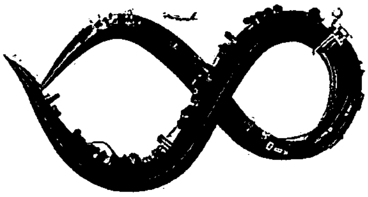
AIR PRODUCTS

2021 | Annual Report



Generating a Cleaner Future



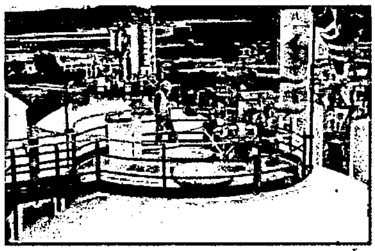


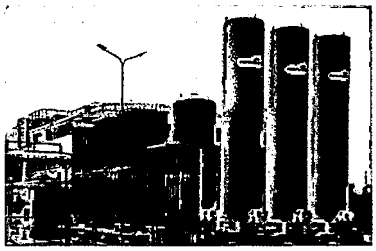
Air Products is the global hydrogen leader, with expertise and investment spanning the full supply chain—from production to transportation to consumer use at the final destination—and is a first mover in large-scale low-carbon and carbon-free hydrogen. Partnering with customers on their sustainability journey, we want to be the provider of choice for hydrogen solutions to address significant energy and environmental challenges in our world . . . moving us all toward a cleaner future.

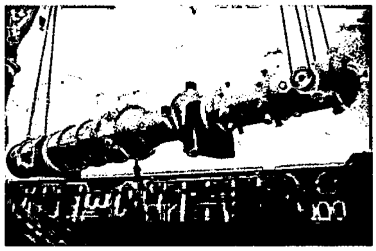
Our Businesses

Air Products reported fiscal year 2021 results under five segments:

- Industrial Gases – Americas
- Industrial Gases – EMEA (Europe, Middle East, and Africa)
- Industrial Gases – Asia
- Industrial Gases – Global
- Corporate and other







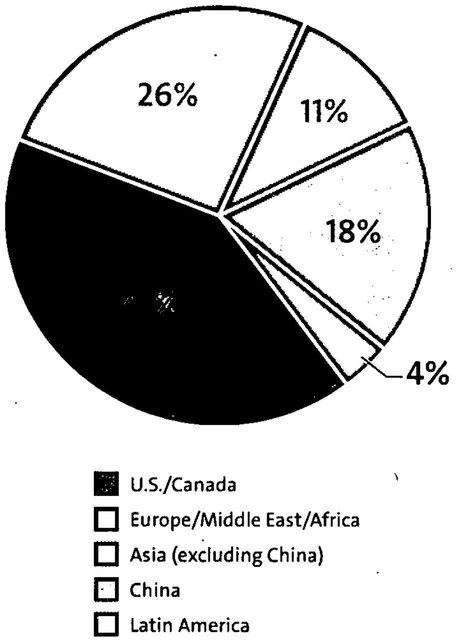
The **regional Industrial Gases segments** (Americas, EMEA, and Asia) produce and sell atmospheric gases, such as oxygen, nitrogen and argon; process gases, such as hydrogen, helium, carbon dioxide, carbon monoxide, and syngas (a mixture of hydrogen and carbon monoxide); and specialty gases. We serve customers in many industries, including refining, chemical, gasification, metals, electronics, manufacturing, and food and beverage. We distribute gases to customers through a variety of supply modes, including liquid or gaseous bulk supply delivered by tanker or tube trailer and, for smaller customers, packaged gases delivered in cylinders and dewars or small on-sites (cryogenic or non-cryogenic generators). For large-volume customers, we produce and supply gases via on-site plants on or near the customer's facility or deliver product from one of our pipelines.

The **Industrial Gases – Global** segment includes activity related to the sale of cryogenic and gas processing equipment for air separation. The equipment is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. The Industrial Gases – Global segment also includes centralized global costs associated with management of all the Industrial Gases segments.

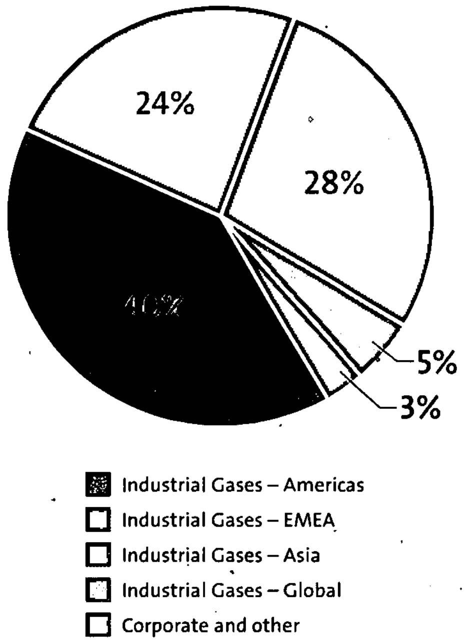
The **Corporate and other** segment includes our liquefied natural gas process technology and equipment, turbo machinery equipment and services, and distribution sale of equipment businesses, as well as corporate support functions that benefit all segments.

Financial Highlights

Consolidated sales by region



Consolidated sales by business segment



Millions of dollars, except for per share data	2021	2020	Change
FOR THE YEAR (all from continuing operations, unless otherwise indicated)			
GAAP			
Sales	**$10,323**	$8,856	17%
Net income margin[A]	**20.5%**	21.8%	(130) bp
Operating margin	**22.1%**	25.3%	(320) bp
Return on capital employed ("ROCE") (GAAP Basis)	**8.1%**	8.9%	(80) bp
Cash used for investing activities	**$2,733**	$3,560	(23)%
NON-GAAP			
Adjusted EBITDA margin[B]	**37.6%**	40.9%	(330) bp
Adjusted operating margin[B]	**22.0%**	24.9%	(290) bp
ROCE (Non-GAAP Basis)[B]	**10.1%**	11.7%	(160) bp
Capital expenditures[C]	**$2,551**	$2,717	(6)%
PER SHARE			
GAAP diluted earnings per share ("EPS")	**$9.12**	$8.55	7%
Adjusted diluted EPS[B]	**9.02**	8.38	8%
Dividends declared per common share	**5.84**	5.18	13%

(A) Includes the impact from discontinued operations.
(B) Amounts are non-GAAP financial measures. See pages III-VII for reconciliation to the comparable GAAP measures.
(C) Amounts are non-GAAP financial measures. See reconciliation to the comparable GAAP measure within Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations*, of the accompanying Annual Report on Form 10-K.

Reconciliations of Non-GAAP Financial Measures

(Millions of dollars unless otherwise indicated, except for per share data)

Adjusted EBITDA

We define adjusted EBITDA as net income less income (loss) from discontinued operations, net of tax, and excluding non-GAAP adjustments, which we do not believe to be indicative of underlying business trends, before interest expense, other non-operating income (expense), net, income tax provision, and depreciation and amortization expense. Adjusted EBITDA and adjusted EBITDA margin provide useful metrics for management to assess operating performance. Net income margin and adjusted EBITDA margin are calculated by dividing net income and adjusted EBITDA, respectively, by consolidated sales for each period. The tables below present consolidated sales and a reconciliation of net income on a GAAP basis to adjusted EBITDA and net income margin on a GAAP basis to adjusted EBITDA margin:

2021	Q1	Q2	Q3	Q4	Total
Sales	$2,375.2	$2,502.0	$2,604.7	$2,841.1	$10,323.0
Net income	486.7	477.1	532.3	618.8	2,114.9
Net income margin	20.5%	19.1%	20.4%	21.8%	20.5%
Reconciliation of GAAP to Non-GAAP:					
Net income	$486.7	$477.1	$532.3	$618.8	$2,114.9
Less: Income from discontinued operations, net of tax	10.3	—	8.2	51.8	70.3
Add: Interest expense	36.7	36.1	35.6	33.4	141.8
Less: Other non-operating income (expense), net	18.6	16.8	21.1	17.2	73.7
Add: Income tax provision	113.9	121.9	101.7	125.3	462.8
Add: Depreciation and amortization	323.7	329.3	335.7	332.6	1,321.3
Add: Facility closure	—	23.2	—	—	23.2
Less: Gain on exchange with joint venture partner	—	36.8	—	—	36.8
Adjusted EBITDA	$932.1	$934.0	$976.0	$1,041.1	$3,883.2
Adjusted EBITDA margin	39.2%	37.3%	37.5%	36.6%	37.6%

2020	Q1	Q2	Q3	Q4	Total
Sales	$2,254.7	$2,216.3	$2,065.2	$2,320.1	$8,856.3
Net income	488.9	490.4	457.1	494.7	1,931.1
Net income margin	21.7%	22.1%	22.1%	21.3%	21.8%
Reconciliation of GAAP to Non-GAAP:					
Net income	$488.9	$490.4	$457.1	$494.7	$1,931.1
Less: Loss from discontinued operations, net of tax	—	(14.3)	—	—	(14.3)
Add: Interest expense	18.7	19.3	32.1	39.2	109.3
Less: Other non-operating income (expense), net	9.1	7.1	8.1	6.4	30.7
Add: Income tax provision	120.7	148.5	109.3	99.9	478.4
Add: Depreciation and amortization	289.2	294.7	290.6	310.5	1,185.0
Less: Company headquarters relocation income (expense)	—	33.8	—	—	33.8
Less: India Finance Act 2020 – equity affiliate income impact	—	33.8	—	—	33.8
Adjusted EBITDA	$908.4	$892.5	$881.0	$937.9	$3,619.8
Adjusted EBITDA margin	40.3%	40.3%	42.7%	40.4%	40.9%

2019	Q1	Q2	Q3	Q4
Sales	$2,224.0	$2,187.7	$2,224.0	$2,283.2
Net income	357.0	433.5	500.2	518.7
Net income margin	16.0%	19.8%	22.5%	22.7%
Reconciliation of GAAP to Non-GAAP:				
Net income	$357.0	$433.5	$500.2	$518.7
Less: Income from discontinued operations, net of tax	—	—	—	—
Add: Interest expense	37.3	35.4	34.2	30.1
Less: Other non-operating income (expense), net	18.5	13.7	17.6	16.9
Add: Income tax provision	132.1	107.5	109.3	131.2
Add: Depreciation and amortization	258.0	262.1	269.1	293.6
Add: Facility closure	29.0	—	—	—
Add: Cost reduction actions	—	—	25.5	—
Less: Gain on exchange with joint venture partner	—	—	29.1	—
Adjusted EBITDA	$794.9	$824.8	$891.6	$956.7
Adjusted EBITDA margin	35.7%	37.7%	40.1%	41.9%

2018	Q1	Q2	Q3	Q4
Sales	$2,216.6	$2,155.7	$2,259.0	$2,298.9
Net income	161.7	423.6	487.9	459.7
Net income margin	7.3%	19.7%	21.6%	20.0%
Reconciliation of GAAP to Non-GAAP:				
Net income	$161.7	$423.6	$487.9	$459.7
Less: Income (loss) from discontinued operations, net of tax	(1.0)	—	43.2	—
Add: Interest expense	29.8	30.4	34.9	35.4
Less: Other non-operating income (expense), net	9.8	11.1	12.8	(28.6)
Add: Income tax provision	291.8	56.2	107.1	69.2
Add: Depreciation and amortization	227.9	240.0	245.6	257.2
Less: Change in inventory valuation method	—	—	—	24.1
Add: Tax reform repatriation - equity method investment	32.5	—	—	(4.0)
Adjusted EBITDA	$734.9	$739.1	$819.5	$822.0
Adjusted EBITDA margin	33.2%	34.3%	36.3%	35.8%

2017	Q1	Q2	Q3	Q4
Sales	$1,882.5	$1,980.1	$2,121.9	$2,203.1
Net income	306.4	2,135.7	104.1	475.0
Net income margin	16.3%	107.9%	4.9%	21.6%
Reconciliation of GAAP to Non-GAAP:				
Net income	$306.4	$2,135.7	$104.1	$475.0
Less: Income (loss) from discontinued operations, net of tax	48.2	1,825.6	(2.3)	(5.5)
Add: Interest expense	29.5	30.5	29.8	30.8
Less: Other non-operating income (expense), net	(0.2)	5.3	3.7	7.8
Add: Income tax provision (benefit)	78.4	94.5	89.3	(1.3)
Add: Depreciation and amortization	206.1	211.8	216.9	231.0
Add: Business separation costs	32.5	—	—	—
Add: Cost reduction and asset actions	50.0	10.3	42.7	48.4
Add: Goodwill and intangible asset impairment charge	—	—	162.1	—
Less: Gain on land sale	—	—	—	12.2
Add: Equity method investment impairment charge	—	—	79.5	—
Adjusted EBITDA	$654.9	$651.9	$723.0	$769.4
Adjusted EBITDA margin	34.8%	32.9%	34.1%	34.9%

2016	Q1	Q2	Q3	Q4
Sales	$1,866.3	$1,777.4	$1,914.5	$1,945.5
Net income	372.0	(465.5)	354.1	400.9
Net income margin	19.9%	(26.2)%	18.5%	20.6%
Reconciliation of GAAP to Non-GAAP:				
Net income	$372.0	($465.5)	$354.1	$400.9
Less: Income (loss) from discontinued operations, net of tax	84.8	(750.2)	98.4	106.5
Add: Interest expense	22.2	25.7	35.1	32.2
Add: Income tax provision	96.4	93.5	145.9	96.8
Add: Depreciation and amortization	214.7	213.9	213.5	212.5
Add: Business separation costs	12.0	7.4	9.5	21.7
Add: Cost reduction and asset actions	—	10.7	13.2	10.6
Add: Pension settlement loss	—	2.0	1.0	2.1
Add: Loss on extinguishment of debt	—	—	—	6.9
Adjusted EBITDA	$632.5	$637.9	$673.9	$677.2
Adjusted EBITDA margin	33.9%	35.9%	35.2%	34.8%

2015	Q1	Q2	Q3	Q4
Sales	$2,041.0	$1,885.3	$1,934.4	$1,963.6
Net income	337.5	296.9	333.2	350.0
Net income margin	16.5%	15.7%	17.2%	17.8%
Reconciliation of GAAP to Non-GAAP:				
Net income	$337.5	$296.9	$333.2	$350.0
Less: Income from discontinued operations, net of tax	76.7	103.4	99.4	72.2
Add: Interest expense	28.8	23.2	28.1	22.7
Add: Income tax provision	76.8	63.0	74.7	85.7
Add: Depreciation and amortization	215.3	213.9	214.2	215.1
Add: Business separation costs	—	—	—	7.5
Add: Business restructuring and cost reduction actions	24.3	52.9	49.6	53.3
Less: Gain on previously held equity interest	17.9	—	—	—
Less: Gain on land sales	—	—	—	33.6
Add: Pension settlement loss	—	11.9	1.4	6.0
Add: Loss on extinguishment of debt	—	—	—	16.6
Adjusted EBITDA	$588.1	$558.4	$601.8	$651.1
Adjusted EBITDA margin	28.8%	29.6%	31.1%	33.2%

2014(A)	Q1	Q2	Q3	Q4
Sales	$2,545.5	$2,581.9	$2,634.6	$2,677.0
Net income	299.0	291.6	323.4	79.1
Net income margin	11.7%	11.3%	12.3%	3.0%
Reconciliation of GAAP to Non-GAAP:				
Net income	$299.0	$291.6	$323.4	$79.1
Less: Income (loss) from discontinued operations, net of tax	1.3	(2.1)	(2.0)	(0.1)
Add: Interest expense	33.3	31.5	31.3	29.0
Add: Income tax provision	95.3	93.0	103.0	78.1
Add: Depreciation and amortization	234.2	229.1	239.0	254.6
Add: Business restructuring and cost reduction actions	—	—	—	12.7
Add: Goodwill and intangible asset impairment charge	—	—	—	310.1
Add: Pension settlement loss	—	—	—	5.5
Adjusted EBITDA	$660.5	$647.3	$698.7	$769.2
Adjusted EBITDA margin	25.9%	25.1%	26.5%	28.7%

(A) Fiscal year 2014 is presented as previously reported in our Annual Report on Form 10-K for the fiscal year ended September 30, 2016, which included the results of the former Materials Technologies segment.

Adjusted Operating Margin

The table below reconciles operating margin on a GAAP basis to adjusted operating margin. Operating margin and adjusted operating margin are calculated by dividing operating income and adjusted operating income, respectively, by consolidated sales for each period. The adjusted measures exclude the impact of certain disclosed items that we believe are not representative of underlying business performance.

Fiscal Year Ended 30 September	2021	2020	Change
Sales	**$10,323.0**	$8,856.3	
Operating income	**2,281.4**	2,237.6	
Operating margin	**22.1%**	25.3%	(320) bp
Reconciliation of GAAP to Non-GAAP:			
Operating income	**$2,281.4**	$2,237.6	
Facility closure	**23.2**	—	
Gain on exchange with joint venture partner	**(36.8)**	—	
Company headquarters relocation (income) expense	—	(33.8)	
Adjusted operating income	**$2,267.8**	$2,203.8	
Adjusted operating margin	**22.0%**	24.9%	(290) bp

Adjusted Diluted Earnings Per Share ("EPS")

Adjusted diluted EPS is calculated as net income from continuing operations attributable to Air Products, excluding the impact of certain disclosed items that we believe are not representative of underlying business performance, divided by the weighted average common shares reflecting the potential dilution that could occur if stock options or other share-based awards were exercised or converted into common stock. We believe it is important for the reader to understand the per share impact of our non-GAAP adjustments as management does not consider these impacts when evaluating underlying business performance. The per share impact of each non-GAAP adjustment was calculated independently and may not sum to total adjusted diluted EPS due to rounding.

Fiscal Year Ended 30 September	2021	2020	2019	2018	2017	2016	2015	2014
Diluted EPS	**$9.12**	$8.55	$7.94	$6.59	$5.16	$5.04	$4.29	$3.24
Change in inventory valuation method	—	—	—	(0.08)	—	—	—	—
Facility closure	**0.08**	—	0.10	—	—	—	—	—
Business separation costs	—	—	—	—	0.12	0.21	0.03	—
Tax (benefit) costs associated with business separation	—	—	—	—	(0.02)	0.24	—	—
Business restructuring, cost reduction, and asset actions	—	—	0.08	—	0.49	0.11	0.61	0.03
Goodwill and intangible asset impairment charge	—	—	—	—	0.70	—	—	1.27
Gain on exchange with joint venture partner	**(0.12)**	—	(0.13)	—	—	—	—	—
Gain on previously held equity interest	—	—	—	—	—	—	(0.05)	—
Company headquarters relocation (income) expense	—	(0.12)	—	—	—	—	—	—
Gain on land sales	—	—	—	—	(0.03)	—	(0.13)	—
India Finance Act 2020	—	(0.06)	—	—	—	—	—	—
Equity method investment impairment charge	—	—	—	—	0.36	—	—	—
Pension settlement loss	—	—	0.02	0.15	0.03	0.02	0.06	0.02
Loss on extinguishment of debt	—	—	—	—	—	0.02	0.07	—
Tax reform repatriation	—	—	(0.06)	2.16	—	—	—	—
Tax reform adjustment related to deemed foreign dividends	—	—	0.26	(0.25)	—	—	—	—
Tax reform rate change and other	—	—	—	(0.96)	—	—	—	—
Tax restructuring	—	—	—	(0.16)	—	—	—	—
Tax election benefit and other	**(0.05)**	—	—	—	(0.50)	—	—	(0.14)
Adjusted Diluted EPS	**$9.02**	$8.38	$8.21	$7.45	$6.31	$5.64	$4.88	$4.42
Change GAAP								
Diluted EPS $ change	**$0.57**	$0.61	$1.35	$1.43	$0.12	$0.75	$1.05	
Diluted EPS % change	**7%**	8%	20%	28%	2%	17%	32%	
Change Non-GAAP								
Adjusted diluted EPS $ change	**$0.64**	$0.17	$0.76	$1.14	$0.67	$0.76	$0.46	
Adjusted diluted EPS % change	**8%**	2%	10%	18%	12%	16%	10%	

Return on Capital Employed ("ROCE") (Non-GAAP Basis)

Return on capital employed ("ROCE") is calculated on a continuing operations basis. Management considers this measure to be useful in evaluating the Company's returns on capital.

	2021				2020				2019
ROCE (GAAP Basis):	Q4	Q3	Q2	Q1	Q4	Q3	Q2	Q1	Q4
Net income	$618.8	$532.3	$477.1	$486.7	$494.7	$457.1	$490.4	$488.9	
Total liabilities and equity	26,859.2	26,252.1	26,158.9	26,088.1	25,168.5	24,782.1	19,501.2	19,651.6	18,942.8
Four-Quarter Trailing Net Income	$2,114.9				$1,931.1				
÷ Five-Quarter Average Total Liabilities and Equity	26,105.4				21,609.2				
ROCE (GAAP Basis)	8.1%				8.9%				
Change vs. prior year	(80) bp								
ROCE (Non-GAAP Basis):									
Net income	$618.8	$532.3	$477.1	$486.7	$494.7	$457.1	$490.4	$488.9	
(Income) Loss from discontinued operations, net of tax	(51.8)	(8.2)	—	(10.3)	—	—	14.3	—	
Interest expense	33.4	35.6	36.1	36.7	39.2	32.1	19.3	18.7	
Facility closure	—	—	23.2	—	—	—	—	—	
Gain on exchange with joint venture partner	—	—	(36.8)	—	—	—	—	—	
Company headquarters relocation (income) expense	—	—	—	—	—	—	(33.8)	—	
India Finance Act 2020	—	—	—	—	—	—	(33.8)	—	
Tax election benefit and other	—	(12.2)	—	—	—	—	—	—	
Tax other[A]	(6.0)	(5.8)	(3.7)	(7.1)	(6.6)	(6.2)	24.1	(3.7)	
Return After-Tax (Non-GAAP Basis)	$594.4	$541.7	$495.9	$506.0	$527.3	$483.0	$480.5	$503.9	
Total liabilities and equity	$26,859.2	$26,252.1	$26,158.9	$26,088.1	$25,168.5	$24,782.1	$19,501.2	$19,651.6	$18,942.8
Less: Payables and accrued liabilities	2,218.3	2,118.4	2,042.2	1,962.2	1,833.2	1,668.5	1,649.1	1,630.0	1,635.7
Less: Accrued income taxes	93.9	78.8	86.7	108.4	105.8	83.6	90.4	113.4	86.6
Less: Other noncurrent liabilities	1,640.9	1,819.0	1,840.0	1,935.7	1,916.0	1,866.9	1,881.0	1,826.7	1,712.4
Less: Deferred income taxes	1,180.9	1,078.2	1,050.8	1,003.0	962.6	942.0	844.4	810.5	793.8
Capital Employed (Non-GAAP Basis)	$21,725.2	$21,157.7	$21,139.2	$21,078.8	$20,350.9	$20,221.1	$15,036.3	$15,271.0	$14,714.3
Four-Quarter Trailing Return After-Tax—Non-GAAP	$2,138.0				$1,994.7				
÷ Five-Quarter Average Capital Employed—Non-GAAP	21,090.4				17,118.7				
ROCE (Non-GAAP Basis)	10.1%				11.7%				
Change vs. prior year	(160) bp								

(A) Represents the tax impact on interest expense and our pre-tax non-GAAP adjustments.

To Our Shareholders

Seifi Ghasemi, Air Products' Chairman, President and Chief Executive Officer (left), addresses **Louisiana Governor John Bel Edwards** (far right) and attendees of the October 2021 press conference announcing Air Products' $4.5 billion investment in Ascension Parish, Louisiana. When operational in 2026, Air Products' world-scale clean energy complex will produce over 750 million standard cubic feet per day of blue hydrogen and capture and permanently sequester over five million metric tons of carbon dioxide (CO_2) annually.

My fellow shareholders:

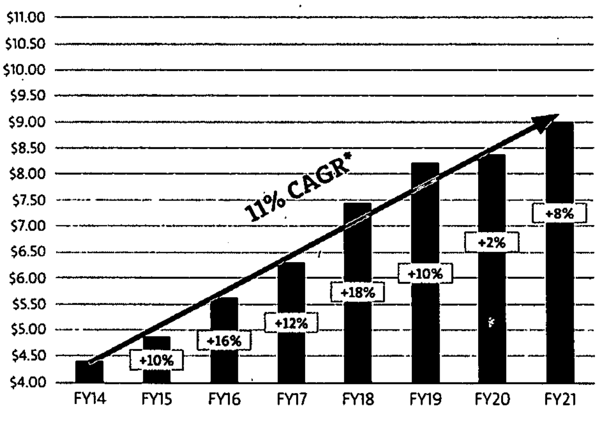
Despite the well-known global challenges in 2021, the talented, committed, and motivated people of Air Products demonstrated resilience and resolve, delivered excellent results, and continued to execute our growth strategy. I want to thank every one of our more than 20,000 employees for standing together, working hard, and delivering for our customers and shareholders.

In following Air Products, you know that our growth and sustainability strategy are one in the same, and we are investing significantly in products and projects that support cleaner energy and a cleaner environment.

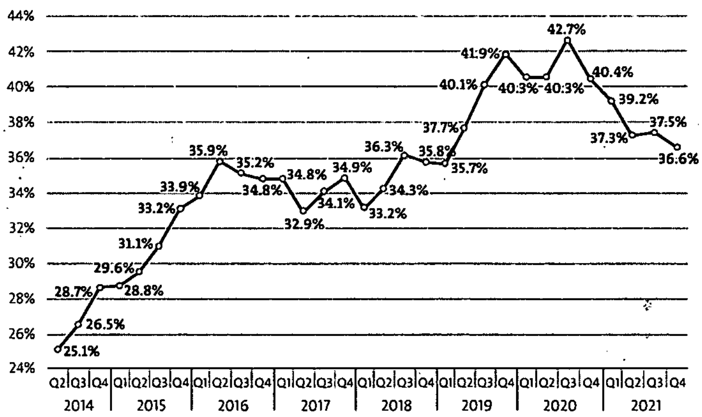
Through our base industrial gas business, customers are improving their efficiency and productivity and reducing emissions. Through our megaprojects in gasification, carbon capture and hydrogen, we are helping to address significant energy and environmental needs in our world. At the same time, we are also very focused on the social aspects of sustainability, driving our culture of diversity, inclusion and belonging. Finally, we devote substantial time and attention to our corporate governance to ensure we have sound practices in place to support our growth.

The people of Air Products are doing this while continuing to deliver strong financial results, as you can see below. Air Products realized strong adjusted earnings per share* ("EPS") this year, achieving 11 percent compounded annual growth since fiscal year 2014. Meanwhile, we returned more than $1.2 billion to our shareholders through our dividend, which we increased for the 39th consecutive year.

Adjusted EPS trend*



Adjusted EBITDA margin trend*
Up over 1,100 basis points



* Amounts are non-GAAP financial measures. See reconciliation to GAAP results on pages III-VII.

Fiscal 2021 Performance

Our fiscal year 2021 financial performance is detailed in the accompanying Annual Report on Form 10-K, and I would encourage you to also review the investor slides on our website, which highlight our achievements and plans for the future.

In particular, I want to comment on our highest priority, which is Safety. Overall, our safety performance improved in fiscal year 2021 versus last year, and notably, we have seen a 75 percent improvement in the employee lost-time injury rate and a 33 percent improvement in the employee recordable injury rate since fiscal year 2014. However, our goal, as always, remains zero accidents and zero incidents.

As our employees around the world continue to navigate COVID-19, they know it is vital to focus on the task at hand, work safely and follow our health and safety procedures and protocols. We have a moral responsibility to keep each other safe and to protect our environment and our hundreds of operating communities around the world.

Driving the Energy Transition

Creating a cleaner future requires experience, investment and innovation on a world-scale. At Air Products, we have the technology, the track record, the capital and the ambition and are acting as a first-mover. In keeping with our strategic Five-Point Plan, we are taking real action through real projects to accelerate the energy transition, making our dream a reality.

Making Our Dream a Reality

Air Products' goal is to be the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to our customers.

Our **dream of the future** is for Air Products to be the **leader** in providing solutions to the world's environmental challenges through:

- Gasification of hydrocarbons;
- Implementing solutions to capture CO_2 from gasifiers and hydrogen plants; and
- Further developing technologies and making Air Products the leader in providing hydrogen for transportation around the world.

Our **dream of the future** is to be a company that has a **higher purpose** beyond just creating value for shareholders through improved financial performance . . .

a company where people from all walks of life and nationalities come together, work together, and feel that they **belong** and that their contributions **matter** and are appreciated . . .

a company that is **focused on innovation** to solve the substantial environmental issues facing all humanity . . .

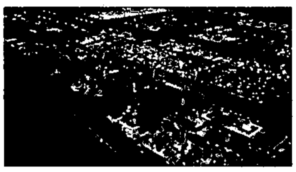
a company that is **compassionate and contributes** to the well-being of all the communities in which we operate around the globe . . .

a global company that **brings people from all over the world together**, to collaborate, improve understanding and prevent conflicts that arise from misunderstanding.

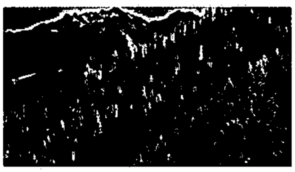
> I am proud to say that we have continued to create and win projects that help customers and countries meet their growing needs for cleaner energy and environmental solutions. In doing so, **we are making our dream a reality.**

Making Our Dream a Reality in Fiscal 2021

We continued to serve dozens of industries and enhance our customers' sustainability while developing and executing projects that meet growing needs for cleaner energy and environmental solutions:



We proudly completed the first phase of the asset acquisition and project financing transactions for the **$12 billion Jazan gasification and power joint venture** with Aramco, ACWA Power and Air Products Qudra.



In conjunction with the Government of Canada and the province of Alberta, we announced a new, **net-zero hydrogen energy complex in Edmonton**. This world-scale energy complex will begin with a transformative, $1.3 billion (Canadian) net-zero hydrogen production and liquefaction facility expected to be onstream in 2024.

Higher Purpose

Our higher purpose at Air Products is to bring people around the world together, so that they can, in an open environment, collaborate and innovate solutions to some of the most significant energy and environmental challenges we all face. Our growth strategy, which is focused on gasification, carbon capture and hydrogen, is designed to address these critical needs.

We know that our continued success depends on the expertise, dedication and commitment of our talented people around the world, and we have been adding resources to help us accelerate our progress in developing and executing these projects.

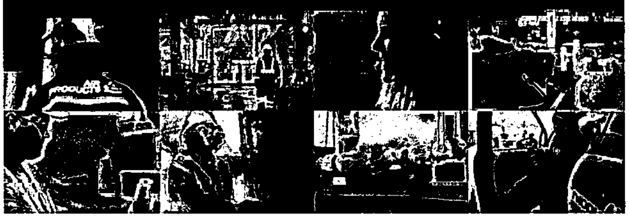
We announced the **$4.5 billion world-scale clean energy complex in Louisiana**. Air Products will build, own and operate this megaproject, which will produce over 750 million standard cubic feet per day of blue hydrogen for local and global markets in 2026. We will also capture and permanently sequester over 5 million metric tons per year of CO_2, making it the largest carbon capture for sequestration facility in the world.

In addition to our major projects, we continued to **make significant investments in small and mid-size on-site generators** in our regional industrial gases businesses, with fiscal year 2021 being a record year for investments in this category.

Air Products was again **recognized by prestigious raters and organizations for outstanding sustainability performance**, including EcoVadis, Barron's 100 Most Sustainable Companies, 100 Best Corporate Citizens, the Human Rights Campaign Foundation's 2021 Corporate Equality Index, and the Dow Jones Sustainability Index North America, among others. In addition, as a signatory to the CEO Action for Diversity & Inclusion™ and in keeping with Air Products' goal to be the most diverse industrial gas company in the world, we hosted a Day of Understanding/Week of Inclusion, further demonstrating our culture of diversity, inclusion and belonging.

Our Higher Purpose

Bringing people together to collaborate and innovate solutions to the world's most significant energy and environmental sustainability challenges.



Acknowledgments

As I do each year, in closing, I want to sincerely thank those who have supported us and helped us achieve our success.

To our customers ... In innovating alongside you, we serve our higher purpose – supplying products that benefit the environment and help you be more efficient and sustainable. Thank you for your continued confidence and trust in us.

To our employees ... Through your dedication and commitment, you continue to play a critical role and make a difference to the world every day, and especially during these challenging times.

To our shareholders ... As always, thank you for your confidence and trust in Air Products. Our priority remains creating superior value for you.

I believe Air Products is uniquely positioned to help the world transition to a cleaner and better future. It is a better future we believe in, and in which we are totally vested.

[redacted]

Seifi Ghasemi
Chairman, President and
Chief Executive Officer of Air Products

Board of Directors

Charles I. Cogut
Retired Partner, Simpson Thacher & Bartlett LLP.
Director of the Company since 2015.

Lisa A. Davis
Former Member of the Managing Board and CEO of Gas and Power for Siemens AG.
Director of the Company since 2020.

Chadwick C. (Chad) Deaton
Retired Chairman and Chief Executive Officer of Baker Hughes Incorporated.
Director of the Company since 2010.

Seifi Ghasemi
Chairman, President and Chief Executive Officer of Air Products.
Director of the Company since 2013.

David H. Y. Ho
Chairman and Founder of Kiina Investment Ltd.
Director of the Company since 2013.

Edward L. Monser
(Lead Director)
Retired President and Chief Operating Officer of Emerson Electric Co.
Director of the Company since 2013.

Matthew H. Paull
Retired Senior Executive Vice President and Chief Financial Officer of McDonald's Corporation.
Director of the Company since 2013.

Wayne T. Smith
Retired Chairman and Chief Executive Officer of BASF Corporation.
Director of the Company since 2021.

Executive Officers

Seifi Ghasemi
Chairman, President and Chief Executive Officer

Sean D. Major
Executive Vice President, General Counsel and Secretary

Melissa Schaeffer
Senior Vice President and Chief Financial Officer

Dr. Samir J. Serhan
Chief Operating Officer

For more information about corporate governance practices at Air Products, visit our Governance website at airproducts.com/company/governance.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended 30 September 2021

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from ____________________ to ____________________

Commission file number **001-04534**

AIR PRODUCTS AND CHEMICALS, INC.
(Exact name of registrant as specified in its charter)

Delaware	**23-1274455**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

1940 Air Products Boulevard
Allentown, Pennsylvania 18106-5500
(Address of principal executive offices) (Zip Code)
610-481-4911
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $1.00 per share	APD	New York Stock Exchange
1.000% Euro Notes due 2025	APD25	New York Stock Exchange
0.500% Euro Notes due 2028	APD28	New York Stock Exchange
0.800% Euro Notes due 2032	APD32	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C.7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the voting stock held by non-affiliates of the registrant on 31 March 2021 was approximately $62.1 billion. For purposes of the foregoing calculations, all directors and/or executive officers have been deemed to be affiliates, but the registrant disclaims that any such director and/or executive officer is an affiliate.

The number of shares of common stock outstanding as of 31 October 2021 was 221,460,382.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022 are incorporated by reference into Part III.

AIR PRODUCTS AND CHEMICALS, INC.
ANNUAL REPORT ON FORM 10-K
For the fiscal year ended 30 September 2021

TABLE OF CONTENTS

FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains "forward-looking statements" within the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements include all statements that do not relate solely to historical or current facts and can generally be identified by words such as "anticipate," "believe," "could," "estimate," "expect," "forecast," "future," "goal," "intend," "may," "outlook," "plan," "positioned," "possible," "potential," "project," "should," "target," "will," "would," and similar expressions or variations thereof, or the negative thereof, but these terms are not the exclusive means of identifying such statements. Forward-looking statements are based on management's expectations and assumptions as of the date of this report and are not guarantees of future performance. You are cautioned not to place undue reliance on our forward-looking statements.

Forward-looking statements may relate to a number of matters, including expectations regarding revenue, margins, expenses, earnings, tax provisions, cash flows, pension obligations, share repurchases or other statements regarding economic conditions or our business outlook; statements regarding plans, projects, strategies and objectives for our future operations, including our ability to win new projects and execute the projects in our backlog; and statements regarding our expectations with respect to pending legal claims or disputes. While forward-looking statements are made in good faith and based on assumptions, expectations and projections that management believes are reasonable based on currently available information, actual performance and financial results may differ materially from projections and estimates expressed in the forward-looking statements because of many factors, including, without limitation:

- the duration and impacts of the ongoing COVID-19 global pandemic and efforts to contain its transmission, including the effect of these factors on our business, our customers, economic conditions and markets generally;
- changes in global or regional economic conditions, inflation, and supply and demand dynamics in the market segments we serve, or in the financial markets that may affect the availability and terms on which we may obtain financing;
- the ability to implement price increases to offset cost increases;
- disruptions to our supply chain and related distribution delays and cost increases;
- risks associated with having extensive international operations, including political risks, risks associated with unanticipated government actions and risks of investing in developing markets;
- project delays, contract terminations, customer cancellations, or postponement of projects and sales;
- our ability to develop, operate, and manage costs of large-scale and technically complex projects, including gasification and hydrogen projects;
- the future financial and operating performance of major customers, joint ventures, and equity affiliates;
- our ability to develop, implement, and operate new technologies;
- our ability to execute the projects in our backlog and refresh our pipeline of new projects;
- tariffs, economic sanctions and regulatory activities in jurisdictions in which we and our affiliates and joint ventures operate;
- the impact of environmental, tax, or other legislation, as well as regulations and other public policy initiatives affecting our business and the business of our affiliates and related compliance requirements, including legislation, regulations, or policies intended to address global climate change;
- changes in tax rates and other changes in tax law;
- the timing, impact, and other uncertainties relating to acquisitions and divestitures, including our ability to integrate acquisitions and separate divested businesses, respectively;
- risks relating to cybersecurity incidents, including risks from the interruption, failure or compromise of our information systems;

- catastrophic events, such as natural disasters and extreme weather events, public health crises, acts of war, or terrorism;
- the impact on our business and customers of price fluctuations in oil and natural gas and disruptions in markets and the economy due to oil and natural gas price volatility;
- costs and outcomes of legal or regulatory proceedings and investigations;
- asset impairments due to economic conditions or specific events;
- significant fluctuations in inflation, interest rates and foreign currency exchange rates from those currently anticipated;
- damage to facilities, pipelines or delivery systems, including those we own or operate for third parties;
- availability and cost of electric power, natural gas, and other raw materials; and
- the success of productivity and operational improvement programs.

In addition to the foregoing factors, forward-looking statements contained herein are qualified with respect to the risks disclosed elsewhere in this document, including in Item 1A, *Risk Factors*, Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations*, and Item 7A, *Quantitative and Qualitative Disclosures About Market Risk.* Any of these factors, as well as those not currently anticipated by management, could cause our results of operations, financial condition or liquidity to differ materially from what is expressed or implied by any forward-looking statement. Except as required by law, we disclaim any obligation or undertaking to update or revise any forward-looking statements contained herein to reflect any change in assumptions, beliefs, or expectations or any change in events, conditions, or circumstances upon which any such forward-looking statements are based.

PART I

Item 1. Business.

Air Products and Chemicals, Inc., a Delaware corporation originally founded in 1940, serves customers globally with a unique portfolio of products, services, and solutions that include atmospheric gases, process and specialty gases, equipment, and services. Focused on serving energy, environment and emerging markets, we provide essential industrial gases, related equipment, and applications expertise to customers in dozens of industries, including refining, chemicals, metals, electronics, manufacturing, and food and beverage. We are the world's largest supplier of hydrogen and have built leading positions in growth markets such as helium and liquefied natural gas ("LNG") process technology and equipment. We develop, engineer, build, own, and operate some of the world's largest industrial gas projects, including gasification projects that sustainably convert abundant natural resources into syngas for the production of high-value power, fuels, and chemicals and are developing carbon capture projects and world-scale low carbon and carbon-free hydrogen projects that will support global transportation and energy transition away from fossil fuels.

As used in this report, unless the context indicates otherwise, the terms "we," "our," "us," the "Company," "Air Products," or "registrant" include controlled subsidiaries, affiliates, and predecessors of Air Products and our controlled subsidiaries and affiliates.

Except as otherwise noted, the description of our business below reflects our continuing operations. Refer to Note 5, *Discontinued Operations*, to the consolidated financial statements for activity associated with discontinued operations.

During the fiscal year ended 30 September 2021 ("fiscal year 2021"), we reported our continuing operations in five reporting segments under which we managed our operations, assessed performance, and reported earnings: Industrial Gases – Americas; Industrial Gases – EMEA (Europe, Middle East, and Africa); Industrial Gases – Asia; Industrial Gases – Global; and Corporate and other. The discussion that follows is based on those operations. Refer to Note 23, *Business Segment and Geographic Information*, to the consolidated financial statements for additional details on our reportable business segments.

On 4 November 2021, we announced the reorganization of our industrial gases segments effective 1 October 2021. Refer to Note 24, *Subsequent Events*, for additional information.

<u>Industrial Gases Business</u>

Our Industrial Gases business produces atmospheric gases, such as oxygen, nitrogen, and argon; process gases, such as hydrogen, helium, carbon dioxide (CO_2), carbon monoxide, and syngas; and specialty gases. Atmospheric gases are produced through various air separation processes, of which cryogenic is the most prevalent. Process gases are produced by methods other than air separation. For example, hydrogen, carbon monoxide, and syngas are produced by steam methane reforming of natural gas and by the gasification of liquid and solid hydrocarbons. Hydrogen is produced by purifying byproduct sources obtained from the chemical and petrochemical industries. Helium is produced as a byproduct of gases extracted from underground reservoirs, primarily natural gas, but also CO_2 purified before resale. The Industrial Gases business also develops, builds, and operates equipment for the production or processing of gases, such as air separation units and non-cryogenic generators.

Our Industrial Gases business is organized and operated regionally. The regional Industrial Gases segments supply gases, related equipment, and applications in the relevant region to diversified customers in many industries, including those in refining, chemicals, metals, electronics, manufacturing, and food and beverage. Hydrogen is used by refiners to facilitate the conversion of heavy crude feedstock and lower the sulfur content of gasoline and diesel fuels, as well as in the developing hydrogen-for-mobility markets. We have hydrogen fueling stations that support commercial markets in California and Japan as well as demonstration projects in Europe, Saudi Arabia, and other parts of Asia. The chemicals industry uses hydrogen, oxygen, nitrogen, carbon monoxide, and syngas as feedstocks in the production of many basic chemicals. The energy production industry uses nitrogen injection for enhanced recovery of oil and natural gas and oxygen for gasification. Oxygen is used in combustion and industrial heating applications, including in the steel, certain nonferrous metals, glass, and cement industries. Nitrogen applications are used in food processing for freezing and preserving flavor, and nitrogen is used for inerting in various fields, including the metals, chemical, and semiconductor industries. Helium is used in laboratories and healthcare for cooling and in other industries for pressurizing, purging, and lifting. Argon is used in the metals and other industries for its unique inerting, thermal conductivity, and other properties. Industrial gases are also used in welding and providing healthcare and are utilized in various manufacturing processes to make them more efficient and to optimize performance.

Industrial gases are generally produced at or near the point of use given the complexity and inefficiency with storing molecules at low temperatures. Helium, however, is generally sourced globally, at long distances from point of sale. As a result, we maintain an inventory of helium stored in our fleet of ISO containers as well as at the U.S. Bureau of Land Management underground storage facility in Amarillo, Texas.

We distribute gases to our sale of gas customers through different supply modes depending on various factors including the customer's volume requirements and location. Our supply modes are as follows:

- *Liquid Bulk*—Product is delivered in bulk (in liquid or gaseous form) by tanker or tube trailer and stored, usually in its liquid state, in equipment that we typically design and install at the customer's site for vaporizing into a gaseous state as needed. Liquid bulk sales are usually governed by three- to five-year contracts.
- *Packaged Gases*—Small quantities of product are delivered in either cylinders or dewars. We operate packaged gas businesses in Europe, Asia, and Latin America. In the United States, our packaged gas business sells products (principally helium) only for the electronics and magnetic resonance imaging industries.
- *On-Site Gases*—Large quantities of hydrogen, nitrogen, oxygen, carbon monoxide, and syngas (a mixture of hydrogen and carbon monoxide) are provided to customers, principally in the energy production and refining, chemical, and metals industries worldwide, that require large volumes of gases and have relatively constant demand. Gases are produced and supplied by large facilities we construct or acquire on or near the customers' facilities or by pipeline systems from centrally located production facilities. These sale of gas contracts are generally governed by 15- to 20-year contracts. We also deliver smaller quantities of product through small on-site plants (cryogenic or non-cryogenic generators), typically via a 10- to 15-year sale of gas contract.

Electricity is the largest cost component in the production of atmospheric gases. Steam methane reformers utilize natural gas as the primary raw material and gasifiers use liquid and solid hydrocarbons as the principal raw material for the production of hydrogen, carbon monoxide, and syngas. We mitigate electricity, natural gas, and hydrocarbon price fluctuations contractually through pricing formulas, surcharges, and cost pass-through and tolling arrangements. During fiscal year 2021, no significant difficulties were encountered in obtaining adequate supplies of power and natural gas.

We obtain helium from a number of sources globally, including crude helium for purification from the U.S. Bureau of Land Management's helium reserve.

The regional Industrial Gases segments also include our share of the results of several joint ventures accounted for by the equity method, which we report in our financial statements as income from equity affiliates. The largest of these joint ventures operate in China, India, Italy, Mexico, Saudi Arabia, South Africa, and Thailand.

Each of the regional Industrial Gases segments competes against three global industrial gas companies: Air Liquide S.A., Messer, and Linde plc, as well as regional competitors. Competition in Industrial Gases is based primarily on price, reliability of supply, and the development of industrial gas applications. We derive a competitive advantage in locations where we have pipeline networks, which enable us to provide reliable and economic supply of products to our larger customers.

Overall regional industrial gases sales constituted approximately 92%, 94%, and 96% of consolidated sales in fiscal years 2021, 2020, and 2019, respectively. Sales of atmospheric gases constituted approximately 47%, 47%, and 46% of consolidated sales in fiscal years 2021, 2020, and 2019, respectively, while sales of tonnage hydrogen, syngas, and related products constituted approximately 22%, 22%, and 26% of consolidated sales in fiscal years 2021, 2020, and 2019, respectively.

Industrial Gases Equipment

We design and manufacture equipment for air separation, hydrocarbon recovery and purification, natural gas liquefaction, and liquid helium and liquid hydrogen transport and storage. The Industrial Gases – Global segment includes activity primarily related to the sale of cryogenic and gas processing equipment for air separation. The equipment is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. The Corporate and other segment includes: our LNG equipment business, our Gardner Cryogenics business fabricating helium and hydrogen transport and storage containers, and our Rotoflow business, which manufactures turboexpanders and other precision rotating equipment. Steel, aluminum, and capital equipment subcomponents (compressors, etc.) are the principal raw materials in the manufacturing of equipment. Raw materials for individual projects typically are acquired under firm purchase agreements. Equipment is produced at our manufacturing sites with certain components being procured from subcontractors and vendors. Competition in the equipment business is based primarily on plant efficiency, service, technical know-how and price, as well as schedule and plant performance guarantees. Sale of equipment constituted approximately 8%, 6%, and 4% of consolidated sales in fiscal years 2021, 2020, and 2019, respectively.

Our backlog of equipment orders was approximately $1.3 billion on 30 September 2021 (as compared to a total backlog of approximately $1.6 billion on 30 September 2020). We estimate that approximately half of the total equipment sales backlog as of 30 September 2021 will be recognized as revenue during fiscal year 2022, dependent on execution schedules of the relevant projects.

International Operations

Through our subsidiaries, affiliates, and joint ventures accounted for using the equity method, we conduct business in 53 countries outside the United States. Our international businesses are subject to risks customarily encountered in foreign operations, including fluctuations in foreign currency exchange rates and controls, tariffs, trade sanctions, and import and export controls, and other economic, political, and regulatory policies of local governments described in Item 1A, *Risk Factors*, below.

We have majority or wholly owned foreign subsidiaries that operate in Canada; 18 European countries (including the Netherlands, Spain, and the United Kingdom); 11 Asian countries (including China, South Korea, and Taiwan); seven Latin American countries (including Brazil and Chile); six countries in the Middle East (including Saudi Arabia), and three African countries. We also own less-than-controlling interests in entities operating in Europe, Asia, Latin America, the Middle East, and Africa (including China, India, Italy, Mexico, Oman, Saudi Arabia, South Africa, and Thailand).

Financial information about our foreign operations and investments is included in Note 7, *Summarized Financial Information of Equity Affiliates*; Note 21, *Income Taxes*; and Note 23, *Business Segment and Geographic Information*, to the consolidated financial statements included under Item 8, below. Information about foreign currency translation is included under "Foreign Currency" in Note 1, *Major Accounting Policies*, and information on our exposure to currency fluctuations is included in Note 12, *Financial Instruments*, to the consolidated financial statements, included under Item 8, below, and in "Foreign Currency Exchange Rate Risk," included under Item 7A, below.

Technology Development

We pursue a market-oriented approach to technology development through research and development, engineering, and commercial development processes. We conduct research and development principally in our laboratories located in the United States (Trexlertown, Pennsylvania), the United Kingdom (Basingstoke and Carrington), Spain (Barcelona), China (Shanghai), and Saudi Arabia (Dhahran). We also fund and cooperate in research and development programs conducted by a number of major universities and undertake research work funded by others, including the United States government.

Development of technology for use within the Industrial Gases business focuses primarily on new and improved processes and equipment for the production and delivery of industrial gases and new or improved applications for industrial gas products.

During fiscal year 2021, we owned approximately 780 United States patents, approximately 3,480 foreign patents, and were a licensee under certain patents owned by others. While the patents and licenses are considered important, we do not consider our business as a whole to be materially dependent upon any particular patent, patent license, or group of patents or licenses.

Environmental Regulation

We are subject to various environmental laws, regulations, and public policies in the countries in which we have operations. Compliance with these measures often results in higher capital expenditures and costs. In the normal course of business, we are involved in legal proceedings under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA," the federal Superfund law); Resource Conservation and Recovery Act ("RCRA"); and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Our accounting policy for environmental expenditures is discussed in Note 1, *Major Accounting Policies*, and environmental loss contingencies are discussed in Note 16, *Commitments and Contingencies*, to the consolidated financial statements, included under Item 8, below.

Some of our operations are within jurisdictions that have or are developing regulatory regimes governing emissions of greenhouse gases ("GHG"), including CO_2. These include existing coverage under the European Union Emission Trading System, the California Cap-and-Trade Program, China's Emission Trading Scheme and its nation-wide expansion, and South Korea's Emission Trading Scheme. In the Netherlands, a CO_2 emissions tax was enacted on 1 January 2021. In Canada, Alberta's Technology Innovation and Emission Reduction System went into effect 1 January 2020. In Ontario, Environment & Climate Change Canada's Output Based Pricing System ("OBPS") is currently in effect, however, effective 1 January 2022, Ontario's GHG Emissions Performance Standards program will be used in lieu of adherence to the OBPS. In addition, the U.S. Environmental Protection Agency ("EPA") requires mandatory reporting of GHG emissions and is regulating GHG emissions for new construction and major modifications to existing facilities. Some jurisdictions have various mechanisms to target the power sector to achieve emission reductions, which often result in higher power costs.

Increased public concern may result in more international, U.S. federal, and/or regional requirements to reduce or mitigate the effects of GHG emissions. Although uncertain, these developments could increase our costs related to consumption of electric power, hydrogen production and application of our gasification technology. We believe we will be able to mitigate some of the increased costs through contractual terms, but the lack of definitive legislation or regulatory requirements prevents an accurate estimate of the long-term impact these measures will have on our operations. Any legislation that limits or taxes GHG emissions could negatively impact our growth, increase our operating costs, or reduce demand for certain of our products.

Regulation of GHG may also produce new opportunities for us. We continue to develop technologies to help our facilities and our customers lower energy consumption, improve efficiency and lower emissions. We see significant opportunities for gasification, carbon capture technologies and hydrogen for mobility and energy transition.

We estimate that we spent approximately $8 million, $4 million, and $5 million in fiscal years 2021, 2020, and 2019, respectively, on capital projects reflected in continuing operations to control pollution. Capital expenditures to control pollution are estimated to be approximately $8 million in both fiscal years 2022 and 2023.

For additional information regarding environmental matters, refer to Note 16, *Commitments and Contingencies*, to the consolidated financial statements.

Employees

We believe our employees are our most valuable asset and are critical to our success as an organization. Our goal is to be the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to our customers. Integral to our success is the continued development of our 4S culture (Safety, Speed, Simplicity and Self-Confidence) and creating a work environment where our employees feel that they belong and matter. Our talent related initiatives, including employee recruitment and development, diversity and inclusion and compensation and benefit programs, are focused on building and retaining the world-class and talented staff that is needed to meet our goals.

On 30 September 2021, we had approximately 20,875 employees, of whom approximately 20,625 were full-time and approximately 15,575 were located outside the United States. We have collective bargaining agreements with unions and works councils at certain locations that expire on various dates over the next four years. We consider relations with our employees to be good.

Our 2021 Sustainability Report details our growth strategy and the role our most valuable asset and our competitive advantage, our employees, play in achieving our goals. Rooted in our framework of Grow- Conserve- Care, our higher purpose is to bring people together to collaborate and innovate solutions to the world's most significant energy and environmental sustainability challenges. Our 2021 Sustainability Report details how we care for our employees.

Safety

Safety is fundamental to who we are as a company. Safety is a shared value, and our employees' commitment to safety is demonstrated in many ways every day. Safety is a critical component of everything we do, everywhere in the world. Our goal is to be the safest industrial gas company in the world.

Diversity, Inclusion, and Belonging

Our 2021 Sustainability Report sets forth our announced goals to further increase the percentage of women and U.S. minorities in professional and managerial roles and the recruitment and talent development strategies we have in place to ensure we meet these goals. Since the publication of our 2021 Sustainability Report, we have announced goals to further increase the percentage of women and U.S. minorities in professional and managerial roles. By 2025, we aim to achieve at least 28 percent female representation in the professional and managerial population globally. Due to significant increase of our U.S. minority representation, our new 2025 diversity goal is to achieve at least 30 percent U.S. minority representation in professional and managerial roles. We established these targets following analysis of our global employee representation metrics and future talent needs, as well as assessing industry benchmarks and peer companies.

Compensation

As detailed in our 2021 Sustainability Report, in order to create a diverse workplace, individuals must be compensated fairly and equitably. A work environment where employees know they belong and matter includes fair and equitable pay. Our pay practices apply equally to all employees irrespective of gender, race, religion, disability, age, or any other form of personal difference. We strive to pay competitively in local markets where we do business and compete for talent. We benchmark our compensation to ensure that we are keeping pace with the market to provide competitive pay and benefits. A gender pay equity analysis completed by a third-party in 2020 resulted in no significant adverse findings for minorities in the U.S. and for females globally.

We value the contributions of our employees, particularly in the face of the challenges posed by the COVID-19 pandemic. Many of our employees are on the front line during the pandemic, keeping our plants running and delivering to our customers the products they need. When possible, employees have been working from home to help maintain their health and safety as well as business continuity. We have not laid off any of our employees or reduced their salaries due to COVID-19.

Seasonality

Our businesses are not subject to seasonal fluctuations to any material extent.

Inventories

We maintain limited inventory where required to facilitate the supply of products to customers on a reasonable delivery schedule. Inventory consists primarily of crude helium, industrial gas, and specialty gas inventories supplied to customers through liquid bulk and packaged gases supply modes.

Customers

We do not have a homogeneous customer base or end market, and no single customer accounts for more than 10% of our consolidated revenues. We do have concentrations of customers in specific industries, primarily refining, chemicals, and electronics. Within each of these industries, we have several large-volume customers with long-term contracts. A negative trend affecting one of these industries, or the loss of one of these major customers, although not material to our consolidated revenue, could have an adverse impact on our financial results.

Governmental Contracts

Our business is not subject to a government entity's renegotiation of profits or termination of contracts that would be material to our business as a whole.

Available Information

All periodic and current reports, registration statements, proxy statements, and other filings that we are required to file with the Securities and Exchange Commission ("SEC"), including our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) of the Securities Exchange Act of 1934 (the "Exchange Act"), are available free of charge through our website at www.airproducts.com. Such documents are available as soon as reasonably practicable after electronic filing of the material with the SEC. All such reports filed during the period covered by this report were available on our website on the same day as filing. In addition, our filings with the SEC are available free of charge on the SEC's website, www.sec.gov.

Our Executive Officers

Our executive officers and their respective positions and ages on 18 November 2021 follow. Information with respect to offices held is stated in fiscal years.

Name	Age	Office
Seifi Ghasemi	77	Chairman, President, and Chief Executive Officer (became Chairman, President and Chief Executive Officer in 2014 and previously served as Chairman and Chief Executive Officer of Rockwood Holdings, Inc. from 2001 to 2014). Mr. Ghasemi is a member and Chairman of the Board of Directors and the Chairman of the Executive Committee of the Board of Directors.
Sean D. Major	57	Executive Vice President, General Counsel and Secretary (Executive Vice President and General Counsel since May 2017 and Secretary since December 2017). Previously, Mr. Major served as Executive Vice President, General Counsel and Secretary for Joy Global Inc. from 2007 to 2017.
Melissa N. Schaeffer	42	Senior Vice President and Chief Financial Officer (became Senior Vice President and Chief Financial Officer in August 2021). Ms. Schaeffer joined the Company in 2016 and most recently served as Vice President, Finance – GEMTE, Americas, Middle East, and India from 2020 to 2021 and previously served as Vice President, Chief Audit Executive from 2016 to 2020.
Dr. Samir J. Serhan	60	Chief Operating Officer (Executive Vice President since December 2016 and Chief Operating Officer since May 2020). Dr. Serhan served as President, Global HyCO, from 2014 to 2016 for Praxair Inc. From 2000-2014, he worked in leadership positions in the U.S. and Germany for The Linde Group, including as Managing Director of Linde Engineering from 2008-2014.

Item 1A. Risk Factors.

Our operations are affected by various risks, many of which are beyond our control. In evaluating investment in the Company and the forward-looking information contained in this Annual Report on Form 10-K or presented elsewhere from time to time, you should carefully consider the risk factors discussed below. Any of these risks could have a material adverse effect on our business, operating results, financial condition, and the actual outcome of matters as to which forward-looking statements are made and could adversely affect the value of an investment in our securities. The risks described below are not all inclusive but are designed to highlight what we believe are important factors to consider when evaluating our expectations. In addition to such risks, there may be additional risks and uncertainties that adversely affect our business, performance, or financial condition in the future that are not presently known, are not currently believed to be significant, or are not identified below because they are common to all businesses.

Risks Related to Economic Conditions

<u>The COVID-19 global pandemic may materially and adversely impact our business, financial condition and results of operations.</u>

The COVID-19 global pandemic, including resurgences and variants of the virus that causes COVID-19, and efforts to reduce its spread have led, and may continue to lead to, significant changes in levels of economic activity and significant disruption and volatility in global markets. These factors have led, and may continue to lead, to reduced demand for industrial gas products, particularly in our merchant business. In addition, COVID-19 may result in reduced sales in our other businesses, lower returns for certain of our projects, and the potential delay or cancellation of certain projects in our pipeline.

In addition, we are monitoring the health of our employees and many of our employees, including those based at our headquarters, are working remotely in accordance with health safety guidance and applicable governmental orders. Action by health or other governmental authorities requiring the closure of our facilities, recommending other physical distancing measures, or mandating vaccination against COVID-19 could negatively impact our business and those of our service providers and customers. Although we have business continuity and other safeguards in place, we cannot be certain that they will be fully effective for extended periods of time.

As the pandemic and responses to it continue to evolve we may experience further adverse impacts on our operations, and our ability to access capital on favorable terms, or at all, may be impaired. In addition, we may face unpredictable increases in demand for certain of our products when restrictions on business and travel end. If demand for our products exceeds our capacity, it could adversely affect our financial results and customer relationships. Although the duration and ultimate impact of these factors is unknown at this time, the decline in economic conditions due to COVID-19, or another disease-causing similar impacts, may adversely affect our business, financial condition and results of operations and such impact may be material.

Further, to the extent COVID-19 adversely affects our business, financial condition, and results of operations and global economic conditions more generally, it may also have the effect of heightening many of the other risks described herein.

Changes in global and regional economic conditions, the markets we serve, or the financial markets may adversely affect our results of operations and cash flows.

Unfavorable conditions in the global economy or regional economies, the markets we serve or financial markets may decrease the demand for our goods and services and adversely impact our revenues, operating results, and cash flows.

Demand for our products and services depends in part on the general economic conditions affecting the countries and markets in which we do business. Weak economic conditions in certain geographies and changing supply and demand balances in the markets we serve have negatively impacted demand for our products and services in the past, including most recently due to COVID-19, and may do so in the future. Reduced demand for our products and services would have a negative impact on our revenues and earnings. In addition, reduced demand could depress sales, reduce our margins, constrain our operating flexibility or reduce efficient utilization of our manufacturing capacity, or result in charges which are unusual or nonrecurring. Excess capacity in our manufacturing facilities or those of our competitors could decrease our ability to maintain pricing and generate profits.

In addition, our operating results in one or more segments may be affected by uncertain or deteriorating economic conditions for particular customer markets within a segment. A decline in the industries served by our customers or adverse events or circumstances affecting individual customers can reduce demand for our products and services and impair the ability of such customers to satisfy their obligations to us, resulting in uncollected receivables, unanticipated contract terminations, project delays or the inability to recover plant investments, any of which may negatively impact our financial results.

Weak overall demand or specific customer conditions may also cause customer shutdowns or defaults or otherwise make us unable to operate facilities profitably and may force sale or abandonment of facilities and equipment or prevent projects from coming on-stream when expected. These or other events associated with weak economic conditions or specific market, product, or customer events may require us to record an impairment on tangible assets, such as facilities and equipment, or intangible assets, such as intellectual property or goodwill, which would have a negative impact on our financial results.

Our extensive international operations can be adversely impacted by operational, economic, political, security, legal, and currency translation risks that could decrease profitability.

In fiscal year 2021, over 60% of our sales were derived from customers outside the United States and many of our operations, suppliers, and employees are located outside the United States. Our operations in foreign jurisdictions may be subject to risks including exchange control regulations, import and trade restrictions, trade policy and other potentially detrimental domestic and foreign governmental practices or policies affecting U.S. companies doing business abroad. Changing economic and political conditions within foreign jurisdictions, strained relations between countries, or the imposition of tariffs or international sanctions can cause fluctuations in demand, price volatility, supply disruptions, or loss of property. The occurrence of any of these risks could have a material adverse impact on our financial condition, results of operation, and cash flows.

Our growth strategies depend in part on our ability to further penetrate markets outside the United States, particularly in markets such as China, India, Indonesia, and the Middle East, and involve significantly larger and more complex projects, including gasification and large-scale hydrogen projects, some in regions where there is the potential for significant economic and political disruptions. We are actively investing large amounts of capital and other resources, in some cases through joint ventures, in developing markets, which we believe to have high growth potential. Our operations in these markets may be subject to greater risks than those faced by our operations in mature economies, including political and economic instability, project delay or abandonment due to unanticipated government actions, inadequate investment in infrastructure, undeveloped property rights and legal systems, unfamiliar regulatory environments, relationships with local partners, language and cultural differences and increased difficulty recruiting, training and retaining qualified employees. In addition, our properties and contracts in these locations may be subject to seizure and cancellation, respectively, without full compensation for loss. Successful operation of particular facilities or execution of projects may be disrupted by civil unrest, acts of war, sabotage or terrorism, and other local security concerns. Such concerns may require us to incur greater costs for security or require us to shut down operations for a period of time.

Furthermore, because the majority of our revenue is generated from sales outside the United States, we are exposed to fluctuations in foreign currency exchange rates. Our business is primarily exposed to translational currency risk as the results of our foreign operations are translated into U.S. dollars at current exchange rates throughout the fiscal period. Our policy is to minimize cash flow volatility from changes in currency exchange rates. We choose not to hedge the translation of our foreign subsidiaries' earnings into dollars. Accordingly, reported sales, net earnings, cash flows, and fair values have been, and in the future will be, affected by changes in foreign exchange rates. For a more detailed discussion of currency exposure, see Item 7A, *Quantitative and Qualitative Disclosures About Market Risk*, below.

Risks Related to Our Business

<u>Operational and project execution risks, particularly with respect to our largest projects, may adversely affect our operations or financial results.</u>

A significant and growing portion of our business involves gasification and other large-scale projects that involve challenging engineering, procurement and construction phases that may last up to several years and involve the investment of billions of dollars. These projects are technically complex, often reliant on significant interaction with government authorities and face significant financing, development, operational and reputational risks. We may encounter difficulties in engineering, delays in designs or materials provided by the customer or a third party, equipment and materials delivery delays, schedule changes, customer scope changes, delays related to obtaining regulatory permits and rights-of-way, inability to find adequate sources of labor in the locations where we are building new plants, weather-related delays, delays by customers' contractors in completing their portion of a project, technical or transportation difficulties, cost overruns, supply difficulties, geopolitical risks and other factors, many of which are beyond our control, that may impact our ability to complete a project within the original delivery schedule. In some cases, delays and additional costs may be substantial, and we may be required to cancel a project and/or compensate the customer for the delay. We may not be able to recover any of these costs. In addition, in some cases we seek financing for large projects and face market risk associated with the availability and terms of such financing. These financing arrangements may require that we comply with certain performance requirements which, if not met, could result in default and restructuring costs or other losses. All of these factors could also negatively impact our reputation or relationships with our customers, suppliers and other third parties, any of which could adversely affect our ability to secure new projects in the future.

The operation of our facilities, pipelines, and delivery systems inherently entails hazards that require continuous oversight and control, such as pipeline leaks and ruptures, fire, explosions, toxic releases, mechanical failures, vehicle accidents, or cyber incidents. If operational risks materialize, they could result in loss of life, damage to the environment, or loss of production, all of which could negatively impact our ongoing operations, reputation, financial results, and cash flows. In addition, our operating results are dependent on the continued operation of our production facilities and our ability to meet customer requirements, which depend, in part, on our ability to properly maintain and replace aging assets.

We are subject to extensive government regulation in the jurisdictions in which we do business. Regulations addressing, among other things, import/export restrictions, anti-bribery and corruption, and taxes, can negatively impact our financial condition, results of operation, and cash flows.

We are subject to government regulation in the United States and in the foreign jurisdictions where we conduct business. The application of laws and regulations to our business is sometimes unclear. Compliance with laws and regulations may involve significant costs or require changes in business practices that could result in reduced profitability. If there is a determination that we have failed to comply with applicable laws or regulations, we may be subject to penalties or sanctions that could adversely impact our reputation and financial results. Compliance with changes in laws or regulations can result in increased operating costs and require additional, unplanned capital expenditures. Export controls or other regulatory restrictions could prevent us from shipping our products to and from some markets or increase the cost of doing so. Changes in tax laws and regulations and international tax treaties could affect the financial results of our businesses. Increasingly aggressive enforcement of anti-bribery and anti-corruption requirements, including the U.S. Foreign Corrupt Practices Act, the United Kingdom Bribery Act and the China Anti-Unfair Competition Law, could subject us to criminal or civil sanctions if a violation is deemed to have occurred. In addition, we are subject to laws and sanctions imposed by the U.S. and other jurisdictions where we do business that may prohibit us, or certain of our affiliates, from doing business in certain countries, or restricting the kind of business that we may conduct. Such restrictions may provide a competitive advantage to competitors who are not subject to comparable restrictions or prevent us from taking advantage of growth opportunities.

Further, we cannot guarantee that our internal controls and compliance systems will always protect us from acts committed by employees, agents, business partners or that businesses that we acquire would not violate U.S. and/ or non-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, export and import compliance, money laundering, and data privacy. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the U.S. and in other jurisdictions and related shareholder lawsuits, could lead to substantial civil and criminal, monetary and non-monetary penalties, and could cause us to incur significant legal and investigatory fees. In addition, the government may seek to hold us liable as a successor for violations committed by companies in which we invest or that we acquire.

We may be unable to successfully identify, execute or effectively integrate acquisitions, or effectively disentangle divested businesses.

Our ability to grow revenue, earnings, and cash flow at anticipated rates depends in part on our ability to identify, successfully acquire and integrate businesses and assets at appropriate prices, and realize expected growth, synergies, and operating efficiencies. We may not be able to complete transactions on favorable terms, on a timely basis or at all. In addition, our results of operations and cash flows may be adversely impacted by the failure of acquired businesses or assets to meet expected returns, the failure to integrate acquired businesses, the inability to dispose of non-core assets and businesses on satisfactory terms and conditions, and the discovery of unanticipated liabilities or other problems in acquired businesses or assets for which we lack adequate contractual protections or insurance. In addition, we may incur asset impairment charges related to acquisitions that do not meet expectations.

We continually assess the strategic fit of our existing businesses and may divest businesses that are deemed not to fit with our strategic plan or are not achieving the desired return on investment. These transactions pose risks and challenges that could negatively impact our business and financial statements. For example, when we decide to sell or otherwise dispose of a business or assets, we may be unable to do so on satisfactory terms within our anticipated time frame or at all. In addition, divestitures or other dispositions may dilute our earnings per share, have other adverse financial and accounting impacts, distract management, and give rise to disputes with buyers. In addition, we have agreed, and may in the future agree, to indemnify buyers against known and unknown contingent liabilities. Our financial results could be impacted adversely by claims under these indemnification provisions.

The security of our information technology systems could be compromised, which could adversely affect our ability to operate.

We depend on information technology to enable us to operate safely and efficiently and interface with our customers as well as to maintain our internal control environment and financial reporting accuracy and efficiency. Our information technology capabilities are delivered through a combination of internal and external services and service providers. If we do not allocate and effectively manage the resources necessary to build and sustain the proper technology infrastructure, we could be subject to transaction errors, processing inefficiencies, the loss of customers, business disruptions, property damage, or the loss of or damage to our confidential business information due to a security breach. In addition, our information technology systems may be damaged, disrupted or shut down due to attacks by computer hackers, computer viruses, employee error or malfeasance, power outages, hardware failures, telecommunication or utility failures, catastrophes or other unforeseen events, and in any such circumstances our system redundancy and other disaster recovery planning may be ineffective or inadequate. Security breaches of our systems (or the systems of our customers, suppliers or other business partners) could result in the misappropriation, destruction or unauthorized disclosure of confidential information or personal data belonging to us or to our employees, partners, customers or suppliers, and may subject us to legal liability.

As with most large systems, our information technology systems have in the past been, and in the future likely will be subject to computer viruses, malicious codes, unauthorized access and other cyber-attacks, and we expect the sophistication and frequency of such attacks to continue to increase. To date, we are not aware of any significant impact on our operations or financial results from such attempts; however, unauthorized access could disrupt our business operations, result in the loss of assets, and have a material adverse effect on our business, financial condition, or results of operations. Any of the attacks, breaches or other disruptions or damage described above could: interrupt our operations at one or more sites; delay production and shipments; result in the theft of our and our customers' intellectual property and trade secrets; damage customer and business partner relationships and our reputation; result in defective products or services, physical damage to facilities, pipelines or delivery systems, including those we own or operate for third parties, legal claims and proceedings, liability and penalties under privacy laws, or increased costs for security and remediation; or raise concerns regarding our internal control environment and internal control over financial reporting. Each of these consequences could adversely affect our business, reputation and our financial statements.

Our business involves the use, storage, and transmission of information about our employees, vendors, and customers. The protection of such information, as well as our proprietary information, is critical to us. The regulatory environment surrounding information security and privacy is increasingly demanding, with the frequent imposition of new and constantly changing requirements. We have established policies and procedures to help protect the security and privacy of this information. We also, from time to time, export sensitive customer data and technical information to recipients outside the United States. Breaches of our security measures or the accidental loss, inadvertent disclosure, or unapproved dissemination of proprietary information or sensitive or confidential data about us or our customers, including the potential loss or disclosure of such information or data as a result of fraud, trickery, or other forms of deception, could expose us, our customers, or the individuals affected to a risk of loss or misuse of this information, which could ultimately result in litigation and potential legal and financial liability. These events could also damage our reputation or otherwise harm our business.

Interruption in ordinary sources of raw material or energy supply or an inability to recover increases in energy and raw material costs from customers could result in lost sales or reduced profitability.

Hydrocarbons, including natural gas, are the primary feedstock for the production of hydrogen, carbon monoxide, and syngas. Energy, including electricity, natural gas, and diesel fuel for delivery trucks, is the largest cost component of our business. Because our industrial gas facilities use substantial amounts of electricity, inflation and energy price fluctuations could materially impact our revenues and earnings. A disruption in the supply of energy, components, or raw materials, whether due to market conditions, legislative or regulatory actions, the COVID-19 pandemic, natural events, or other disruption,, could prevent us from meeting our contractual commitments and harm our business and financial results.

Our supply of crude helium for purification and resale is largely dependent upon natural gas production by crude helium suppliers. Lower natural gas production resulting from natural gas pricing dynamics, supplier operating or transportation issues, or other interruptions in sales from crude helium suppliers, can reduce our supplies of crude helium available for processing and resale to customers.

We typically contract to pass-through cost increases in energy and raw materials to customers, but such cost pass-through results in declining margins, and cost variability can negatively impact our other operating results. For example, we may be unable to raise prices as quickly as costs rise, or competitive pressures may prevent full recovery of such costs. In addition, increases in energy or raw material costs that cannot be passed on to customers for competitive or other reasons may negatively impact our revenues and earnings. Even where costs are passed through, price increases can cause lower sales volume.

New technologies create performance risks that could impact our financial results or reputation.

We are continually developing and implementing new technologies and product offerings. Existing technologies are being implemented in products and designs or at scales beyond our experience base. These technological expansions can create nontraditional performance risks to our operations. Failure of the technologies to work as predicted, or unintended consequences of new designs or uses, could lead to cost overruns, project delays, financial penalties, or damage to our reputation. In addition, gasification and other large-scale projects may contain processes or technologies that we have not operated at the same scale or in the same combination, and although such projects generally include technologies and processes that have been demonstrated previously by others, such technologies or processes may be new to us and may introduce new risks to our operations. Additionally, there is also a risk that our new technologies may become obsolete and replaced by other market alternatives. Performance difficulties on these larger projects may have a material adverse effect on our operations and financial results. In addition, performance challenges may adversely affect our reputation and our ability to obtain future contracts for gasification projects.

Protecting our intellectual property is critical to our technological development and we may suffer competitive harm from infringement on such rights.

As we develop new technologies, it is critical that we protect our intellectual property assets against third-party infringement. We own a number of patents and other forms of intellectual property related to our products and services. As we develop new technologies there is a risk that our patent applications may not be granted, or we may not receive sufficient protection of our proprietary interests. We may also expend considerable resources in defending our patents against third-party infringement. It is critical that we protect our proprietary interests to prevent competitive harm.

Legal and Regulatory Risks

Legislative, regulatory, and societal responses to global climate change create financial risk.

We are the world's leading supplier of hydrogen, the primary use of which is the production of ultra-low sulfur transportation fuels that have significantly reduced transportation emissions and helped improve human health. To make the high volumes of hydrogen needed by our customers, we use steam methane reforming, which produces carbon dioxide. In addition, gasification enables the conversion of lower value feedstocks into cleaner energy and value-added products; however, our gasification projects also produce carbon dioxide. Some of our operations are within jurisdictions that have or are developing regulatory regimes governing GHG emissions, including CO_2, which may lead to direct and indirect costs on our operations. Furthermore, some jurisdictions have various mechanisms to target the power sector to achieve emission reductions, which often result in higher power costs.

Increased public concern and governmental action may result in more international, U.S. federal and/or regional requirements to reduce or mitigate the effects of GHG emissions. Although uncertain, these developments could increase our costs related to consumption of electric power, hydrogen production and application of our gasification technology. We believe we will be able to mitigate some of the increased costs through contractual terms, but the lack of definitive legislation or regulatory requirements prevents an accurate estimate of the long-term impact these measures will have on our operations. Any legislation or governmental action that limits or taxes GHG emissions could negatively impact our growth, increase our operating costs, or reduce demand for certain of our products.

Our financial results may be affected by various legal and regulatory proceedings, including antitrust, tax, environmental, or other matters.

We are subject to litigation and regulatory investigations and proceedings in the normal course of business and could become subject to additional claims in the future, some of which could be material. While we seek to limit our liability in our commercial contractual arrangements, there are no guarantees that each contract will contain suitable limitations of liability or that limitations of liability will be enforceable. Also, the outcome of existing legal proceedings may differ from our expectations because the outcomes of litigation, including regulatory matters, are often difficult to predict reliably. Various factors or developments can lead us to change current estimates of liabilities and related insurance receivables, where applicable, or make such estimates for matters previously not susceptible to reasonable estimates, such as a significant judicial ruling or judgment, a significant settlement, significant regulatory developments, or changes in applicable law. A future adverse ruling, settlement, or unfavorable development could result in charges that could have a material adverse effect on our financial condition, results of operations, and cash flows in any particular period.

Costs and expenses resulting from compliance with environmental regulations may negatively impact our operations and financial results.

We are subject to extensive federal, state, local, and foreign environmental and safety laws and regulations concerning, among other things, emissions in the air; discharges to land and water; and the generation, handling, treatment, and disposal of hazardous waste and other materials. We take our environmental responsibilities very seriously, but there is a risk of adverse environmental impact inherent in our manufacturing operations and in the transportation of our products. Future developments and more stringent environmental regulations may require us to make additional unforeseen environmental expenditures. In addition, laws and regulations may require significant expenditures for environmental protection equipment, compliance, and remediation. These additional costs may adversely affect our financial results. For a more detailed description of these matters, see Item 1, *Business–Environmental Regulation*, above.

A change of tax law in key jurisdictions could result in a material increase in our tax expense.

The multinational nature of our business subjects us to taxation in the United States and numerous foreign jurisdictions. Due to economic and political conditions, tax rates in various jurisdictions may be subject to significant change. Our future effective tax rates could be affected by changes in the mix of earnings in countries with differing statutory tax rates, changes in the valuation of deferred tax assets and liabilities, or changes in tax laws or their interpretation.

Changes to income tax laws and regulations in any of the jurisdictions in which we operate, or in the interpretation of such laws, could significantly increase our effective tax rate and adversely impact our financial condition, results of operations, or cash flows. Various levels of government, including the U.S. federal government, are increasingly focused on tax reform and other legislative action to increase tax revenue. Further changes in tax laws in the U.S. or foreign jurisdictions where we operate could have a material adverse effect on our business, results of operations, or financial condition.

General Risk Factors

Catastrophic events could disrupt our operations or the operations of our suppliers or customers, having a negative impact on our business, financial results, and cash flows.

Our operations could be impacted by catastrophic events outside our control, including severe weather conditions such as hurricanes, floods, earthquakes, storms, epidemics, pandemics, acts of war, and terrorism. Any such event could cause a serious business disruption that could affect our ability to produce and distribute products and possibly expose us to third-party liability claims. Additionally, such events could impact our suppliers, customers, and partners, which could cause energy and raw materials to be unavailable to us, or our customers to be unable to purchase or accept our products and services. Any such occurrence could have a negative impact on our operations and financial results.

The United Kingdom's ("UK") exit from European Union ("EU") membership could adversely affect our European Operations.

Although the UK's exit from EU membership on 31 January 2021 ("Brexit") did not result in material disruptions to customer demand, our relationships with customers and suppliers, or our European business, the ultimate effects of Brexit on us are still difficult to predict. Adverse consequences from Brexit may include greater restrictions on imports and exports between the UK and EU members and increased regulatory complexities. Any of these factors could adversely affect customer demand, our relationships with customers and suppliers, and our European business overall.

Inability to compete effectively in a segment could adversely impact sales and financial performance.

We face strong competition from large global competitors and many smaller regional competitors in many of our business segments. Introduction by competitors of new technologies, competing products, or additional capacity could weaken demand for, or impact pricing of our products, negatively impacting financial results. In addition, competitors' pricing policies could affect our profitability or market share.

Item 1B. Unresolved Staff Comments.

We have not received any written comments from the Commission staff that remain unresolved.

Item 2. Properties.

Air Products and Chemicals, Inc. owns its principal administrative offices in Trexlertown, Pennsylvania, and the Company's new global headquarters and co-located research and development facility in Allentown, Pennsylvania, as well as regional offices in Hersham, England; Medellin, Colombia; and Santiago, Chile. We lease the principal administrative offices in Shanghai, China; Pune, India; Vadodara, India; and Dhahran, Saudi Arabia. We lease administrative offices in the United States, Canada, Spain, Malaysia, and China for our Global Business Support organization.

Descriptions of the properties used by our five business segments are provided below. We believe that our facilities are suitable and adequate for our current and anticipated future levels of operation.

Industrial Gases – Americas

This business segment currently operates from over 425 production and distribution facilities in North and South America. Approximately 25% of these facilities are located on owned property and 10% are integrated sites that serve dedicated customers as well as merchant customers. We have sufficient property rights and permits for the ongoing operation of our pipeline systems in the Gulf Coast, California, and Arizona in the United States and Alberta and Ontario in Canada. Management and sales support is based in our Trexlertown, Medellin, and Santiago offices referred to above, and at 12 leased properties located throughout North and South America.

Industrial Gases – EMEA

This business segment currently operates from over 200 production and distribution facilities in Europe, the Middle East, India, and Africa, approximately one-third of which are on owned property. We have sufficient property rights and permits for the ongoing operation of our pipeline systems in the Netherlands, the United Kingdom, Belgium, France, and Germany. Management and sales support for this business segment is based in Hersham, England, referred to above; Barcelona, Spain; and at 16 leased regional office sites and 15 leased local office sites, located throughout the region.

Industrial Gases – Asia

This business segment currently operates from over 200 production and distribution facilities within Asia, approximately 25% of which are on owned property or long-duration term grants. We have sufficient property rights and permits for the ongoing operation of our pipeline systems in China, South Korea, Taiwan, Malaysia, Singapore, and Indonesia. Management and sales support for this business segment is based in Shanghai, China, and Kuala Lumpur, Malaysia, and in 30 leased office locations throughout the region.

Industrial Gases – Global

Management, sales, and engineering support for this business segment is based in our principal administrative offices noted above.

Equipment is manufactured in Missouri in the United States and Shanghai, China.

Research and development activities are primarily conducted at owned locations in the United States, the United Kingdom, and Saudi Arabia.

Helium is processed at multiple sites in the United States and then distributed to and from transfill sites globally.

Corporate and other

Corporate administrative functions are based in our administrative offices referred to above.

The LNG business operates a manufacturing facility in Florida in the United States with management, engineering, and sales support based in the Trexlertown offices referred to above.

The Gardner Cryogenic business operates at facilities in Pennsylvania and Kansas in the United States.

The Rotoflow business operates manufacturing and service facilities in Texas and Pennsylvania in the United States with management, engineering, and sales support based in the Trexlertown offices referred to above and a nearby leased office.

Item 3. Legal Proceedings.

In the normal course of business, we and our subsidiaries are involved in various legal proceedings, including commercial, competition, environmental, intellectual property, regulatory, product liability, and insurance matters. Although litigation with respect to these matters is routine and incidental to the conduct of our business, such litigation could result in large monetary awards, especially if compensatory and/or punitive damages are awarded. However, we believe that litigation currently pending to which we are a party will be resolved without any material adverse effect on our financial position, earnings, or cash flows.

From time to time, we are also involved in proceedings, investigations, and audits involving governmental authorities in connection with environmental, health, safety, competition, and tax matters.

We are a party to proceedings under CERCLA, RCRA, and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Presently there are 31 sites on which a final settlement has not been reached where we, along with others, have been designated a potentially responsible party by the Environmental Protection Agency or is otherwise engaged in investigation or remediation, including cleanup activity at certain of its current and former manufacturing sites. We do not expect that any sums we may have to pay in connection with these environmental matters would have a material adverse impact on our consolidated financial position. Additional information on our environmental exposure is included under Item 1, Business–Environmental Regulation, and Note 16, Commitments and Contingencies, to the consolidated financial statements.

In September 2010, the Brazilian Administrative Council for Economic Defense ("CADE") issued a decision against our Brazilian subsidiary, Air Products Brasil Ltda., and several other Brazilian industrial gas companies for alleged anticompetitive activities. CADE imposed a civil fine of R$179.2 million (approximately $33 million at 30 September 2021) on Air Products Brasil Ltda. This fine was based on a recommendation by a unit of the Brazilian Ministry of Justice, following an investigation beginning in 2003, which alleged violation of competition laws with respect to the sale of industrial and medical gases. The fines are based on a percentage of our total revenue in Brazil in 2003.

We have denied the allegations made by the authorities and filed an appeal in October 2010 with the Brazilian courts. On 6 May 2014, our appeal was granted and the fine against Air Products Brasil Ltda. was dismissed. CADE has appealed that ruling and the matter remains pending. We, with advice of our outside legal counsel, have assessed the status of this matter and have concluded that, although an adverse final judgment after exhausting all appeals is possible, such a judgment is not probable. As a result, no provision has been made in the consolidated financial statements. In the event of an adverse final judgment, we estimate the maximum possible loss to be the full amount of the fine of R$179.2 million (approximately $33 million at 30 September 2021) plus interest accrued thereon until final disposition of the proceedings.

Additionally, Winter Storm Uri, a severe winter weather storm in the U.S. Gulf Coast in February 2021, disrupted our operations and caused power and natural gas prices to spike significantly in Texas. We are currently in the early stages of litigation of a dispute regarding energy management services related to the impact of this unusual event, and other disputes may arise from such power price increases. In addition, legislative action may affect power supply and energy management charges. While it is reasonably possible that we could incur additional costs related to power supply and energy management services in Texas related to the winter storm, it is too early to estimate potential losses, if any, given significant unknowns resulting from the unusual nature of this event.

Other than the matters discussed above, we do not currently believe there are any legal proceedings, individually or in the aggregate, that are reasonably possible to have a material impact on our financial condition, results of operations, or cash flows. However, a future charge for regulatory fines or damage awards could have a significant impact on our net income in the period in which it is recorded.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters, and Issuer Purchases of Equity Securities.

Our common stock is listed on the New York Stock Exchange under the symbol "APD." As of 31 October 2021, there were 4,722 record holders of our common stock.

Cash dividends on our common stock are paid quarterly. It is our expectation that we will continue to pay cash dividends in the future at comparable or increased levels. The Board of Directors determines whether to declare dividends and the timing and amount based on financial condition and other factors it deems relevant. Dividend information for each quarter of fiscal years 2021 and 2020 is summarized below:

	2021	2020
Fourth quarter	**$1.50**	$1.34
Third quarter	**$1.50**	$1.34
Second quarter	**$1.50**	$1.34
First quarter	**$1.34**	$1.16
Total	**$5.84**	$5.18

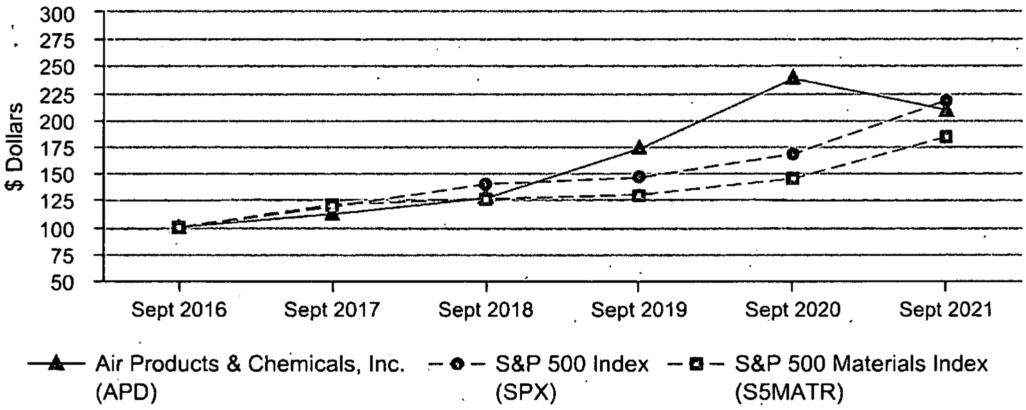
Purchases of Equity Securities by the Issuer

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1.0 billion of our outstanding common stock. This program does not have a stated expiration date. We repurchase shares pursuant to Rules 10b5-1 and 10b-18 under the Exchange Act through repurchase agreements established with one or more brokers. There were no purchases of stock during fiscal year 2021. At 30 September 2021, $485.3 million in share repurchase authorization remained. Additional purchases will be completed at our discretion while maintaining sufficient funds for investing in our business and pursuing growth opportunities.

Performance Graph

The performance graph below compares the five-year cumulative returns of our common stock with those of the Standard & Poor's 500 Index ("S&P 500 Index") and the Standard & Poor's 500 Materials Index ("S&P 500 Materials Index"). The figures assume an initial investment of $100 and the reinvestment of all dividends.

COMPARISON OF FIVE YEAR CUMULATIVE SHAREHOLDER RETURN
Air Products & Chemicals, Inc., S&P 500 Index, and S&P 500 Materials Index
Comparative Growth of a $100 Investment
(Assumes Reinvestment of All Dividends)



	Sept 2016	Sept 2017	Sept 2018	Sept 2019	Sept 2020	Sept 2021
Air Products & Chemicals, Inc.	100	112	127	173	238	209
S&P 500 Index	100	119	140	146	168	218
S&P 500 Materials Index	100	121	126	130	145	184

Item 6. [Reserved]

Not applicable.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

This Management's Discussion and Analysis contains "forward-looking statements" within the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, including statements about business outlook. These forward-looking statements are based on management's expectations and assumptions as of the date of this Annual Report on Form 10-K and are not guarantees of future performance. Actual performance and financial results may differ materially from projections and estimates expressed in the forward-looking statements because of many factors not anticipated by management, including, without limitation, those described in *Forward-Looking Statements* and Item 1A, *Risk Factors*, of this Annual Report.

The following discussion should be read in conjunction with the consolidated financial statements and the accompanying notes contained in this Annual Report. Unless otherwise stated, financial information is presented in millions of dollars, except for per share data. Except for net income, which includes the results of discontinued operations, financial information is presented on a continuing operations basis.

The content of our Management's Discussion and Analysis has been updated pursuant to SEC disclosure modernization rules that are effective as of the date of this Annual Report. Comparisons of our results of operations and liquidity and capital resources are for fiscal years 2021 and 2020. For a discussion of changes from fiscal year 2019 to fiscal year 2020 and other financial information related to fiscal year 2019, refer to Part II, *Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations*, of our Annual Report on Form 10-K for the fiscal year ended 30 September 2020. This document was filed with the SEC on 19 November 2020.

The financial measures discussed below are presented in accordance with U.S. generally accepted accounting principles ("GAAP"), except as noted. We present certain financial measures on an "adjusted," or "non-GAAP," basis because we believe such measures, when viewed together with financial results computed in accordance with GAAP, provide a more complete understanding of the factors and trends affecting our historical financial performance. For each non-GAAP financial measure, including adjusted diluted earnings per share ("EPS"), adjusted EBITDA, adjusted EBITDA margin, adjusted effective tax rate, and capital expenditures, we present a reconciliation to the most directly comparable financial measure calculated in accordance with GAAP. These reconciliations and explanations regarding the use of non-GAAP measures are presented under "Reconciliations of Non-GAAP Financial Measures" beginning on page 31.

For information concerning activity with our related parties, refer to Note 22, *Supplemental Information*, to the consolidated financial statements.

BUSINESS OVERVIEW

Air Products and Chemicals, Inc., a Delaware corporation originally founded in 1940, serves customers globally with a unique portfolio of products, services, and solutions that include atmospheric gases, process and specialty gases, equipment, and services. Focused on serving energy, environment and emerging markets, we provide essential industrial gases, related equipment, and applications expertise to customers in dozens of industries, including refining, chemicals, metals, electronics, manufacturing, and food and beverage. We are the world's largest supplier of hydrogen and have built leading positions in growth markets such as helium and liquefied natural gas ("LNG") process technology and equipment. We develop, engineer, build, own, and operate some of the world's largest industrial gas projects, including gasification projects that sustainably convert abundant natural resources into syngas for the production of high-value power, fuels, and chemicals and are developing carbon capture projects and world-scale low carbon and carbon-free hydrogen projects that will support global transportation and the energy transition away from fossil fuels.

With operations in over 50 countries, in fiscal year 2021 we had sales of $10.3 billion and assets of $26.9 billion. Approximately 20,875 passionate, talented, and committed employees from diverse backgrounds are driven by our higher purpose to create innovative solutions that benefit the environment, enhance sustainability, and address the challenges facing customers, communities, and the world.

As of 30 September 2021, our operations were organized into five reportable business segments under which we managed our operations, assessed performance, and reported earnings:

- Industrial Gases – Americas;
- Industrial Gases – EMEA (Europe, Middle East, and Africa);
- Industrial Gases – Asia;
- Industrial Gases – Global; and
- Corporate and other

This Management's Discussion and Analysis discusses our results based on these operations. Refer to Note 23, *Business Segment and Geographic Information*, to the consolidated financial statements for additional details on our reportable business segments.

On 4 November 2021, we announced the reorganization of our industrial gases segments effective 1 October 2021. Refer to Note 24, *Subsequent Events*, for additional information.

2021 IN SUMMARY

In fiscal year 2021, we continued to execute our growth strategy, including announcement of several new gasification, carbon capture, and hydrogen projects that will drive the world's energy transition from fossil fuels. At the same time, we remained focused on our base business, delivering consistent results despite external challenges globally and absorbing costs for additional resources needed to support growth. In the second half of the year, demand for most merchant products returned to pre-pandemic levels. Additionally, we continued to create shareholder value by increasing the quarterly dividend on our common stock to $1.50 per share, representing a 12% increase from the previous dividend. This is the 39th consecutive year that we have increased our quarterly dividend payment.

Fiscal year 2021 results are summarized below:

- Sales of $10.3 billion increased 17%, or $1.5 billion, due to higher energy and natural gas cost pass-through to customers, higher volumes, favorable currency impacts, and positive pricing that more than offset power cost increases in the second half of the year.
- Operating income of $2,281.4 increased 2%, or $43.8, and operating margin of 22.1% decreased 320 basis points ("bp").
- Net income of $2,114.9 increased 10%, or $183.8, and net income margin of 20.5% decreased 130 bp.
- Adjusted EBITDA of $3,883.2 increased 7%, or $263.4, and adjusted EBITDA margin of 37.6% decreased 330 bp.
- Diluted EPS of $9.12 increased 7%, or $0.57 per share, and adjusted diluted EPS of $9.02 increased 8%, or $0.64 per share. A summary table of changes in diluted EPS is presented below.

Changes in Diluted EPS Attributable to Air Products

The per share impacts presented in the table below were calculated independently and may not sum to the total change in diluted EPS due to rounding.

Fiscal Year Ended 30 September	2021	2020	Increase (Decrease)
Total Diluted EPS	**$9.43**	$8.49	$0.94
Less: Diluted EPS from income (loss) from discontinued operations	**0.32**	(0.06)	0.38
Diluted EPS From Continuing Operations	**$9.12**	$8.55	$0.57
Operating Impacts			
Underlying business			
Volume[(A)]			$—
Price, net of variable costs			0.34
Other costs			(0.46)
Currency			0.35
Facility closure			(0.08)
Company headquarters relocation income			(0.12)
Gain on exchange with joint venture partner			0.12
Total Operating Impacts			$0.15
Other Impacts			
Equity affiliates' income			$0.23
Interest expense			(0.12)
Other non-operating income (expense), net			0.16
Change in effective tax rate, excluding discrete items below			0.02
India Finance Act 2020			(0.06)
Tax election benefit and other			0.05
Noncontrolling interests[(A)]			0.13
Weighted average diluted shares			(0.01)
Total Other Impacts			$0.40
Total Change in Diluted EPS From Continuing Operations			$0.57

(A) Despite higher sales volumes, the volume impact on diluted EPS was flat due to reduced contributions from our 60%-owned joint venture with Lu'An Clean Energy Company that we consolidate within our Industrial Gases – Asia segment. Refer to the sales discussion below for additional detail. The volume impact from the Lu'An facility is partially offset by the positive impact of lower net income being attributed to our joint venture partner within "Noncontrolling interests."

Fiscal Year Ended 30 September	2021	2020	Increase (Decrease)
Diluted EPS From Continuing Operations	**$9.12**	$8.55	$0.57
Facility closure	**0.08**	—	0.08
Gain on exchange with joint venture partner	**(0.12)**	—	(0.12)
Company headquarters relocation income	**—**	(0.12)	0.12
India Finance Act 2020	**—**	(0.06)	0.06
Tax election benefit and other	**(0.05)**	—	(0.05)
Adjusted Diluted EPS From Continuing Operations	**$9.02**	$8.38	$0.64

2022 OUTLOOK

The guidance below should be read in conjunction with the *Forward-Looking Statements* of this Annual Report on Form 10-K.

We believe our achievements in 2021 are just the beginning of our journey providing gasification, carbon capture, and hydrogen for mobility solutions to address the world's most significant energy and environmental sustainability challenges. For example, we expect our world-scale Jazan gasification project with Aramco, ACWA Power, and Air Products Qudra to begin contributing to our results in the first quarter of fiscal year 2022. We expect to continue to pursue new, high-return opportunities that are aligned with our growth strategy and to add the resources necessary for project development and execution. We remain committed to creating shareholder value through capital deployment and delivering increased dividends, as we have done for the past 39 consecutive years.

The duration and extent of ongoing global challenges, such as rising energy costs, energy consumption curtailment, and supply chain disruptions, remain uncertain. For our merchant business, we plan to continue pricing actions to recover higher energy costs. We expect to add new projects to our onsite business model, which has contractual protection from energy cost fluctuations and generates stable cash flow. We expect higher costs from planned maintenance activities on our facilities in fiscal year 2022 and higher pension expense resulting from lower expected returns on assets.

Additionally, we expect the Lu'An facility to continue operating under the interim agreement discussed below through fiscal year 2022.

In fiscal year 2022, we will also continue to focus on our other sustainability goals, including our commitment to reduce our carbon dioxide emissions intensity and advance diversity and inclusion.

On 4 November 2021, we announced the reorganization of our industrial gases segments, including the separation of our Industrial Gases – EMEA segment into two separate reporting segments: Industrial Gases – Europe and Industrial Gases – Middle East. The results of an affiliate formerly reflected in the Industrial Gases – Asia segment will now be reported in the Industrial Gases – Middle East segment. Additionally, the results of our Industrial Gases – Global operating segment will be reflected in the Corporate and other segment. Beginning with our Quarterly Report on Form 10-Q for the first quarter of fiscal year 2022, segment results will be presented on a retrospective basis to reflect the reorganization.

RESULTS OF OPERATIONS

Discussion of Consolidated Results

Fiscal Year Ended 30 September	**2021**	2020	$ Change	Change
GAAP Measures				
Sales	**$10,323.0**	$8,856.3	$1,466.7	17%
Operating income	**2,281.4**	2,237.6	43.8	2%
Operating margin	**22.1%**	25.3%		(320) bp
Equity affiliates' income	**$294.1**	$264.8	29.3	11%
Net income	**2,114.9**	1,931.1	183.8	10%
Net income margin	**20.5%**	21.8%		(130) bp
Non-GAAP Measures				
Adjusted EBITDA	**$3,883.2**	$3,619.8	263.4	7%
Adjusted EBITDA margin	**37.6%**	40.9%		(330) bp

Sales % Change from Prior Year	
Volume	5%
Price	2%
Energy and natural gas cost pass-through	6%
Currency	4%
Total Consolidated Sales Change	**17%**

Sales of $10,323.0 increased 17%, or $1,466.7, due to higher energy and natural gas cost pass-through to customers of 6%, higher volumes of 5%, favorable currency impacts of 4%, and positive pricing of 2%. We experienced significantly higher energy and natural gas costs in the second half of fiscal year 2021, particularly in North America and Europe. Contractual provisions associated with our on-site business, which represents approximately half our total company sales, allow us to pass these costs to our customers. Positive volumes from new assets, our sale of equipment businesses, and merchant demand recovery from COVID-19 were partially offset by reduced contributions from the Lu'An gasification project discussed below. Favorable currency was primarily driven by the appreciation of the British Pound Sterling, Chinese Renminbi, Euro, and South Korean Won against the U.S. Dollar. Continued focus on pricing actions, including energy cost recovery, in our merchant businesses resulted in price improvement in each of our three regional segments.

Lu'An Clean Energy Company ("Lu'An"), a long-term onsite customer in Asia with which we have a consolidated joint venture, restarted its facility in the third quarter of fiscal year 2021 following successful completion of major maintenance work in September 2020. Our facility resumed operations, and the joint venture is supplying product at reduced charges as agreed upon with Lu'An under a short-term agreement reached in the first quarter of fiscal year 2021. As a result of this agreement, we recognized lower revenue in our Industrial Gases – Asia segment in each quarter of fiscal year 2021. We expect this short-term reduction in charges to extend through fiscal year 2022.

Cost of Sales and Gross Margin

Total cost of sales of $7,209.3, including the facility closure discussed below, increased 23%, or $1,351.2. The increase from the prior year was primarily due to higher energy and natural gas cost pass-through to customers of $479, higher costs associated with sales volumes of $433, unfavorable currency impacts of $233, and higher costs, including power and other cost inflation, of $183. Gross margin of 30.2% decreased 370 bp from 33.9% in the prior year, primarily due to higher energy and natural gas cost pass-through to customers, higher costs, and the reduced Lu'An contribution, partially offset by the positive impact of our pricing actions.

Facility Closure

In the second quarter of fiscal year 2021, we recorded a charge of $23.2 ($17.4 after-tax, or $0.08 per share) primarily for a noncash write-down of assets associated with a contract termination in the Industrial Gases – Americas segment. This charge is reflected as "Facility closure" on our consolidated income statements for the fiscal year ended 30 September 2021 and was not recorded in segment results.

Selling and Administrative

Selling and administrative expense of $828.4 increased 7%, or $52.5, primarily driven by higher spending for business development resources to support our growth strategy and unfavorable currency impacts. Selling and administrative expense as a percentage of sales decreased to 8.0% from 8.8% in the prior year.

Research and Development

Research and development expense of $93.5 increased 11%, or $9.6, primarily due to higher product development costs in our Industrial Gases – Global segment. Research and development expense as a percentage of sales of 0.9% was flat versus the prior year.

Gain on Exchange with Joint Venture Partner

In the second quarter of fiscal year 2021, we recognized a gain of $36.8 ($27.3 after-tax, or $0.12 per share) on an exchange with the Tyczka Group, a former joint venture partner in our Industrial Gases – EMEA segment. As part of the exchange, we separated our 50/50 joint venture in Germany into two separate businesses so each party could acquire a portion of the business on a 100% basis. The gain included $12.7 from the revaluation of our previously held equity interest in the portion of the business that we retained and $24.1 from the sale of our equity interest in the remaining business. The gain is reflected as "Gain on exchange with joint venture partner" on our consolidated income statements for the fiscal year ended 30 September 2021 and was not recorded in segment results. Refer to Note 3, *Acquisitions*, to the consolidated financial statements for additional information.

Company Headquarters Relocation Income (Expense)

In anticipation of relocating our U.S. headquarters, we sold property at our corporate headquarters located in Trexlertown, Pennsylvania, in the second quarter of fiscal year 2020. We received net proceeds of $44.1 and recorded a gain of $33.8 ($25.6 after-tax, or $0.12 per share), which is reflected on our consolidated income statements as "Company headquarters relocation income (expense)" for the fiscal year ended 30 September 2020. The gain was not recorded in the results of the Corporate and other segment.

Other Income (Expense), Net

Other income of $52.8 decreased 19%, or $12.6. The prior year was favorably impacted by an adjustment for a benefit plan liability due to a change in plan terms. This impact was partially offset by the settlement of a supply contract in the current year.

Operating Income and Margin

Operating income of $2,281.4 increased 2%, or $43.8, as favorable currency of $96, positive pricing, net of power and fuel costs, of $95, and a gain on an exchange with a joint venture partner of $37 were partially offset by higher operating costs of $127, prior year income associated with the company headquarters relocation of $34, and a facility closure of $23. Despite higher sales volumes, the volume impact on operating income was minimal due to reduced contributions from Lu'An. Unfavorable operating costs were driven by the addition of resources to support our growth strategy and higher planned maintenance activities.

Operating margin of 22.1% decreased 320 bp from 25.3% in the prior year, primarily due to the higher operating costs, higher energy and natural gas cost pass-through to customers, which contributed to sales but not operating income, and reduced contributions from Lu'An, partially offset by positive pricing. The positive impact from a gain on an exchange with a joint venture partner in the current year was offset by prior year income associated with the company headquarters relocation.

Equity Affiliates' Income

Equity affiliates' income of $294.1 increased 11%, or $29.3. Higher income from affiliates in the regional segments was partially offset by a prior year benefit of $33.8 from the enactment of the India Finance Act 2020. Refer to Note 21, *Income Taxes*, to the consolidated financial statements for additional information.

We expect our equity affiliates' income to grow in future periods due to our investment in the Jazan Integrated Gasification and Power Company joint venture.

Interest Expense

Fiscal Year Ended 30 September	**2021**	2020
Interest incurred	**$170.1**	$125.2
Less: Capitalized interest	**28.3**	15.9
Interest expense	**$141.8**	$109.3

Interest incurred increased 36%, or $44.9, primarily driven by a higher debt balance due to the issuance of U.S. Dollar- and Euro-denominated fixed-rate notes in the third quarter of fiscal year 2020. Capitalized interest increased $12.4 due to a higher carrying value of projects under construction.

Other Non-Operating Income (Expense), Net

Other non-operating income of $73.7 increased $43.0. We recorded higher non-service pension income in 2021 due to lower interest costs and higher total assets, primarily for our U.S. pension plans. The current year also included favorable currency impacts. These factors were partially offset by lower interest income on cash and cash items due to lower interest rates.

Discontinued Operations

Income from discontinued operations, net of tax, was $70.3 ($0.32 per share) for the fiscal year ended 30 September 2021. This included net tax benefits of $60.0 recorded for the release of tax reserves for uncertain tax positions, of which $51.8 ($0.23 per share) was recorded in the fourth quarter for liabilities associated with the 2017 sale of our former Performance Materials Division ("PMD") and $8.2 was recorded in the third quarter for liabilities associated with our former Energy-from-Waste business. Additionally, we recorded a tax benefit from discontinued operations of $10.3 in the first quarter, primarily from the settlement of a state tax appeal related to the gain on the sale of PMD.

In fiscal year 2020, loss from discontinued operations, net of tax, was $14.3 ($0.06 per share). This resulted from a pre-tax loss of $19.0 recorded in the second quarter to increase our existing liability for retained environmental obligations associated with the sale of our former Amines business in September 2006. Refer to the Pace discussion within Note 16, *Commitments and Contingencies*, for additional information.

Net Income and Net Income Margin

Net income of $2,114.9, including income from discontinued operations discussed above, increased 10%, or $183.8. On a continuing operations basis, the increase was primarily driven by positive pricing, net of power and fuel costs, favorable currency impacts, higher equity affiliates' income, and a gain on an exchange with a joint venture partner, partially offset by unfavorable operating costs and a loss from a facility closure. In addition, less net income was attributable to noncontrolling interests, including our Lu'An joint venture partner, in the current year. The prior year included income associated with the company headquarters relocation and a net benefit from the India Finance Act 2020.

Net income margin of 20.5% decreased 130 bp from 21.8% in the prior year, primarily due to higher energy and natural gas cost pass-through to customers, which decreased margin by approximately 100 bp, and unfavorable net operating costs, partially offset by the impact from our pricing actions.

Adjusted EBITDA and Adjusted EBITDA Margin

Adjusted EBITDA of $3,883.2 increased 7%, or $263.4, primarily due to favorable currency impacts, positive pricing, net of power and fuel costs, and higher equity affiliates' income, partially offset by unfavorable operating costs. Adjusted EBITDA margin of 37.6% decreased 330 bp from 40.9% in the prior year, primarily due to higher energy and natural gas cost pass-through to customers, which decreased margin by approximately 200 bp, and the unfavorable net operating costs.

Effective Tax Rate

Our effective tax rate was 18.5% and 19.7% for the fiscal years ended 30 September 2021 and 2020, respectively. The current year rate was lower primarily due to income tax benefits of $21.5 recorded upon expiration of the statute of limitations for tax reserves previously established for uncertain tax positions taken in prior years. This included a benefit of $12.2 ($0.05 per share) for release of reserves established in 2017 for a tax election related to a non-U.S. subsidiary and other previously disclosed items ("tax election benefit and other"). Refer to Note 21 *Income Taxes*, to the consolidated financial statements for additional information.

Additionally, the fiscal year 2020 effective tax rate reflected the unfavorable impact of India Finance Act 2020, which resulted in additional net income of $13.5 ($0.06 per share). This included an increase to equity affiliates' income of $33.8, partially offset by an increase to our income tax provision of $20.3 for changes in the future tax costs of repatriated earnings.

The adjusted effective tax rate was 18.9% and 19.1% for the fiscal years ended 30 September 2021 and 2020, respectively.

Segment Analysis

Industrial Gases – Americas

Fiscal Year Ended 30 September	**2021**	2020	$ Change	Change
Sales	**$4,167.6**	$3,630.7	$536.9	15%
Operating income	**1,065.5**	1,012.4	53.1	5%
Operating margin	**25.6%**	27.9%		(230) bp
Equity affiliates' income	**$112.5**	$84.3	28.2	33%
Adjusted EBITDA	**1,789.9**	1,656.2	133.7	8%
Adjusted EBITDA margin	**42.9%**	45.6%		(270) bp

Sales % Change from Prior Year	
Volume	—%
Price	4%
Energy and natural gas cost pass-through	11%
Currency	—%
Total Industrial Gases – Americas Sales Change	**15%**

Sales of $4,167.6 increased 15%, or $536.9, due to higher energy and natural gas cost pass-through to customers of 11% and positive pricing of 4%, as volumes and currency were flat versus the prior year. Energy and natural gas cost pass through to customers was higher in fiscal year 2021 primarily due to natural gas prices, which rose significantly in the second quarter and remained elevated throughout the year. The pricing improvement was attributable to continued focus on pricing actions in our merchant business. Volumes were flat as positive contributions from new assets, including hydrogen assets we acquired in April 2020, were offset by lower hydrogen and merchant demand. Demand for most merchant products returned to pre-pandemic levels in the second half of 2021.

Operating income of $1,065.5 increased 5%, or $53.1, due to higher pricing, net of power and fuel costs, of $79 and favorable currency of $10, partially offset by higher operating costs, including planned maintenance, of $36. Operating margin of 25.6% decreased 230 bp from 27.9% in the prior year primarily due to higher energy and natural gas cost pass-through to customers, which negatively impacted margin by approximately 250 bp, and higher operating costs, partially offset by the impact of our pricing actions.

Equity affiliates' income of $112.5 increased 33%, or $28.2, primarily driven by higher income from affiliates in Mexico.

Industrial Gases – EMEA

Fiscal Year Ended 30 September	**2021**	2020	$ Change	Change
Sales	**$2,444.9**	$1,926.3	$518.6	27%
Operating income	**557.4**	473.3	84.1	18%
Operating margin	**22.8%**	24.6%		(180) bp
Equity affiliates' income	**$93.7**	$74.8	18.9	25%
Adjusted EBITDA	**880.9**	744.0	136.9	18%
Adjusted EBITDA margin	**36.0%**	38.6%		(260) bp

Sales % Change from Prior Year	
Volume	12%
Price	3%
Energy and natural gas cost pass-through	5%
Currency	7%
Total Industrial Gases – EMEA Sales Change	**27%**

Sales of $2,444.9 increased 27%, or $518.6, due to higher volumes of 12%, favorable currency impacts of 7%, higher energy and natural gas cost pass-through to customers of 5%, and positive pricing of 3%. The volume improvement was primarily driven by our base merchant business and new assets, including those from a business in Israel that we acquired in the fourth quarter of 2020. While our liquid bulk business has largely recovered from COVID-19, demand for packaged gases and hydrogen continues to be lower than pre-pandemic levels. Favorable currency impacts were primarily driven by the appreciation of the British Pound Sterling and Euro against the U.S. Dollar. Energy and natural gas cost pass-through to customers was higher primarily in the second half of the year as we experienced significantly higher natural gas and electricity costs in Europe. The pricing improvement was primarily attributable to our merchant business.

Operating income of $557.4 increased 18%, or $84.1, due to higher volumes of $59, favorable currency impacts of $31, and positive pricing, net of power and fuel costs, of $11, partially offset by unfavorable costs of $17. Operating margin of 22.8% decreased 180 bp from 24.6% in the prior year, primarily due to impacts from higher energy and natural gas cost pass-through to customers, which negatively impacted margin by approximately 100 bp, and unfavorable operating costs.

Equity affiliates' income of $93.7 increased 25%, or $18.9, primarily due to higher income from affiliates in Italy, Saudi Arabia, and South Africa.

Industrial Gases – Asia

Fiscal Year Ended 30 September	2021	2020	$ Change	Change
Sales	**$2,920.8**	$2,716.5	$204.3	8%
Operating income	**838.3**	870.3	(32.0)	(4%)
Operating margin	**28.7%**	32.0%		(330) bp
Equity affiliates' income	**$81.4**	$61.0	20.4	33%
Adjusted EBITDA	**1,364.1**	1,330.7	33.4	3%
Adjusted EBITDA margin	**46.7%**	49.0%		(230) bp

Sales % Change from Prior Year	
Volume	—%
Price	1%
Energy and natural gas cost pass-through	—%
Currency	7%
Total Industrial Gases – Asia Sales Change	**8%**

Sales of $2,920.8 increased 8%, or $204.3, due to favorable currency of 7% and positive pricing of 1%, as both volumes and energy and natural gas cost pass-through to customers were flat. Positive volume contributions from our base merchant business and new plants were offset by reduced contributions from Lu'An. The favorable currency impact was primarily attributable to the appreciation of the Chinese Renminbi and South Korean Won against the U.S. Dollar.

Operating income of $838.3 decreased 4%, or $32.0, primarily due to unfavorable volume mix of $62 and higher operating costs, including inflation and product sourcing costs, of $32, partially offset by favorable currency of $59. Operating margin of 28.7% decreased 330 bp from 32.0% in the prior year primarily due to reduced contributions from Lu'An.

Equity affiliates' income of $81.4 increased 33%, or $20.4, primarily due to higher income from an affiliate in India.

Industrial Gases – Global

The Industrial Gases – Global segment includes sales of cryogenic and gas processing equipment for air separation and centralized global costs associated with management of all the Industrial Gases segments.

Fiscal Year Ended 30 September	2021	2020	$ Change	% Change
Sales	**$511.0**	$364.9	$146.1	40%
Operating loss	**(60.6)**	(40.0)	(20.6)	(52%)
Adjusted EBITDA	**(43.2)**	(19.5)	(23.7)	(122%)

Sales of $511.0 increased 40%, or $146.1, due to higher sale of equipment project activity. Despite higher sales, operating loss of $60.6 increased 52%, or $20.6, as higher project costs and product development spending were partially offset by income from the settlement of a supply contract.

Corporate and other

The Corporate and other segment includes our LNG, turbo machinery equipment and services, and distribution sale of equipment businesses as well as corporate support functions that benefit all segments. The results of the Corporate and other segment also include income and expense that is not directly associated with the other segments, such as foreign exchange gains and losses.

Fiscal Year Ended 30 September	2021	2020	$ Change	% Change
Sales	**$278.7**	$217.9	$60.8	28%
Operating loss	**(132.8)**	(112.2)	(20.6)	(18%)
Adjusted EBITDA	**(108.5)**	(91.6)	(16.9)	(18%)

Sales of $278.7 increased 28%, or $60.8, primarily due to higher project activity in our distribution sale of equipment and turbo machinery equipment and services businesses. Despite higher sales, operating loss of $132.8 increased 18%, or $20.6, as higher business development and corporate support costs were only partially offset by higher sale of equipment activity.

RECONCILIATIONS OF NON-GAAP FINANCIAL MEASURES

(Millions of dollars unless otherwise indicated, except for per share data)

We present certain financial measures, other than in accordance with U.S. generally accepted accounting principles ("GAAP"), on an "adjusted" or "non-GAAP" basis. On a consolidated basis, these measures include adjusted diluted earnings per share ("EPS"), adjusted EBITDA, adjusted EBITDA margin, adjusted effective tax rate, and capital expenditures. On a segment basis, these measures include adjusted EBITDA and adjusted EBITDA margin. In addition to these measures, we also present certain supplemental non-GAAP financial measures to help the reader understand the impact that certain disclosed items, or "non-GAAP adjustments," have on the calculation of our adjusted diluted EPS. For each non-GAAP financial measure, we present a reconciliation to the most directly comparable financial measure calculated in accordance with GAAP.

Our non-GAAP financial measures are not meant to be considered in isolation or as a substitute for the most directly comparable measure calculated in accordance with GAAP. We believe these non-GAAP financial measures provide investors, potential investors, securities analysts, and others with useful information to evaluate the performance of our business because such measures, when viewed together with financial results computed in accordance with GAAP, provide a more complete understanding of the factors and trends affecting our historical financial performance and projected future results.

In many cases, non-GAAP financial measures are determined by adjusting the most directly comparable GAAP measure to exclude non-GAAP adjustments that we believe are not representative of our underlying business performance. For example, we previously excluded certain expenses associated with cost reduction actions, impairment charges, and gains on disclosed transactions. The reader should be aware that we may recognize similar losses or gains in the future. Readers should also consider the limitations associated with these non-GAAP financial measures, including the potential lack of comparability of these measures from one company to another.

When applicable, the tax impact of our pre-tax non-GAAP adjustments reflects the expected current and deferred income tax impact of our non-GAAP adjustments. These tax impacts are primarily driven by the statutory tax rate of the various relevant jurisdictions and the taxability of the adjustments in those jurisdictions.

Adjusted Diluted EPS

The table below provides a reconciliation to the most directly comparable GAAP measure for each of the major components used to calculate adjusted diluted EPS from continuing operations, which we view as a key performance metric. In periods that we have non-GAAP adjustments, we believe it is important for the reader to understand the per share impact of each such adjustment because management does not consider these impacts when evaluating underlying business performance. The per share impact for each non-GAAP adjustment was calculated independently and may not sum to total adjusted diluted EPS due to rounding.

Fiscal Year Ended 30 September	Operating Income	Equity Affiliates' Income	Income Tax Provision	Net Income Attributable to Air Products	Diluted EPS
2021 GAAP	**$2,281.4**	**$294.1**	**$462.8**	**$2,028.8**	**$9.12**
2020 GAAP	**2,237.6**	**264.8**	**478.4**	**1,901.0**	**8.55**
Change GAAP					$0.57
% Change GAAP					7%
2021 GAAP	$2,281.4	$294.1	$462.8	$2,028.8	$9.12
Facility closure	23.2	—	5.8	17.4	0.08
Gain on exchange with joint venture partner	(36.8)	—	(9.5)	(27.3)	(0.12)
Tax election benefit and other	—	—	12.2	(12.2)	(0.05)
2021 Non-GAAP ("Adjusted")	**$2,267.8**	**$294.1**	**$471.3**	**$2,006.7**	**$9.02**
2020 GAAP	$2,237.6	$264.8	$478.4	$1,901.0	$8.55
Company headquarters relocation (income) expense	(33.8)	—	(8.2)	(25.6)	(0.12)
India Finance Act 2020	—	(33.8)	(20.3)	(13.5)	(0.06)
2020 Non-GAAP ("Adjusted")	**$2,203.8**	**$231.0**	**$449.9**	**$1,861.9**	**$8.38**
Change Non-GAAP ("Adjusted")					$0.64
% Change Non-GAAP ("Adjusted")					8%

Adjusted EBITDA and Adjusted EBITDA Margin

We define adjusted EBITDA as net income less income (loss) from discontinued operations, net of tax, and excluding non-GAAP adjustments, which we do not believe to be indicative of underlying business trends, before interest expense, other non-operating income (expense), net, income tax provision, and depreciation and amortization expense. Adjusted EBITDA and adjusted EBITDA margin provide useful metrics for management to assess operating performance. Margins are calculated independently for each period by dividing each line item by consolidated sales for the respective period and may not sum to total margin due to rounding.

The tables below present consolidated sales and a reconciliation of net income on a GAAP basis to adjusted EBITDA and net income margin on a GAAP basis to adjusted EBITDA margin:

Fiscal Year Ended 30 September	**2021**		2020	
	$	**Margin**	$	Margin
Sales	**$10,323.0**		$8,856.3	
Net income and net income margin	**$2,114.9**	**20.5%**	$1,931.1	21.8%
Less: Income (Loss) from discontinued operations, net of tax	**70.3**	**0.7%**	(14.3)	(0.2%)
Add: Interest expense	**141.8**	**1.4%**	109.3	1.2%
Less: Other non-operating income (expense), net	**73.7**	**0.7%**	30.7	0.3%
Add: Income tax provision	**462.8**	**4.5%**	478.4	5.4%
Add: Depreciation and amortization	**1,321.3**	**12.8%**	1,185.0	13.4%
Add: Facility closure	**23.2**	**0.2%**	—	—%
Less: Gain on exchange with joint venture partner	**36.8**	**0.4%**	—	—%
Less: Company headquarters relocation income (expense)	**—**	**—%**	33.8	0.4%
Less: India Finance Act 2020 – equity affiliate income impact	**—**	**—%**	33.8	0.4%
Adjusted EBITDA and adjusted EBITDA margin	**$3,883.2**	**37.6%**	$3,619.8	40.9%

Fiscal Year Ended 30 September	**2021 vs. 2020**
Change GAAP	
Net income $ change	**$183.8**
Net income % change	**10%**
Net income margin change	**(130) bp**
Change Non-GAAP	
Adjusted EBITDA $ change	**$263.4**
Adjusted EBITDA % change	**7%**
Adjusted EBITDA margin change	**(330) bp**

The tables below present sales and a reconciliation of operating income and operating margin to adjusted EBITDA and adjusted EBITDA margin for each of our reporting segments for the fiscal years ended 30 September:

Sales	Industrial Gases–Americas	Industrial Gases–EMEA	Industrial Gases–Asia	Industrial Gases–Global	Corporate and other	Total
2021	$4,167.6	$2,444.9	$2,920.8	$511.0	$278.7	$10,323.0
2020	3,630.7	1,926.3	2,716.5	364.9	217.9	8,856.3

	Industrial Gases–Americas	Industrial Gases–EMEA	Industrial Gases–Asia	Industrial Gases–Global	Corporate and other	Total
2021 GAAP						
Operating income (loss)	$1,065.5	$557.4	$838.3	($60.6)	($132.8)	$2,267.8 [(A)]
Operating margin	25.6%	22.8%	28.7%			
2020 GAAP						
Operating income (loss)	$1,012.4	$473.3	$870.3	($40.0)	($112.2)	$2,203.8 [(A)]
Operating margin	27.9%	24.6%	32.0%			
2021 vs. 2020 Change GAAP						
Operating income/loss $ change	$53.1	$84.1	($32.0)	($20.6)	($20.6)	
Operating income/loss % change	5%	18%	(4%)	(52%)	(18%)	
Operating margin change	(230) bp	(180) bp	(330) bp			
2021 Non-GAAP						
Operating income (loss)	$1,065.5	$557.4	$838.3	($60.6)	($132.8)	$2,267.8 [(A)]
Add: Depreciation and amortization	611.9	229.8	444.4	10.9	24.3	1,321.3
Add: Equity affiliates' income	112.5	93.7	81.4	6.5	—	294.1 [(A)]
Adjusted EBITDA	$1,789.9	$880.9	$1,364.1	($43.2)	($108.5)	$3,883.2
Adjusted EBITDA margin	42.9%	36.0%	46.7%			
2020 Non-GAAP						
Operating income (loss)	$1,012.4	$473.3	$870.3	($40.0)	($112.2)	$2,203.8 [(A)]
Add: Depreciation and amortization	559.5	195.9	399.4	9.6	20.6	1,185.0
Add: Equity affiliates' income	84.3	74.8	61.0	10.9	—	231.0 [(A)]
Adjusted EBITDA	$1,656.2	$744.0	$1,330.7	($19.5)	($91.6)	$3,619.8
Adjusted EBITDA margin	45.6%	38.6%	49.0%			
2021 vs. 2020 Change Non-GAAP						
Adjusted EBITDA $ change	$133.7	$136.9	$33.4	($23.7)	($16.9)	
Adjusted EBITDA % change	8%	18%	3%	(122%)	(18%)	
Adjusted EBITDA margin change	(270) bp	(260) bp	(230) bp			

[(A)] Refer to the *Reconciliations to Consolidated Results* section below.

Reconciliations to Consolidated Results

The table below reconciles consolidated operating income as reflected on our consolidated income statements to total operating income in the table above for the fiscal years ended 30 September:

Operating Income	**2021**	2020
Consolidated operating income	**$2,281.4**	$2,237.6
Facility closure	**23.2**	—
Gain on exchange with joint venture partner	**(36.8)**	—
Company headquarters relocation (income) expense	**—**	(33.8)
Total	**$2,267.8**	$2,203.8

The table below reconciles consolidated equity affiliates' income as reflected on our consolidated income statements to total equity affiliates' income in the table above for the fiscal years ended 30 September:

Equity Affiliates' Income	**2021**	2020
Consolidated equity affiliates' income	**$294.1**	$264.8
India Finance Act 2020	**—**	(33.8)
Total	**$294.1**	$231.0

Adjusted Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes.

When applicable, the tax impact of our pre-tax non-GAAP adjustments reflects the expected current and deferred income tax impact of our non-GAAP adjustments. These tax impacts are primarily driven by the statutory tax rate of the various relevant jurisdictions and the taxability of the adjustments in those jurisdictions.

Fiscal Year Ended 30 September	**2021**	2020
Income tax provision	**$462.8**	**$478.4**
Income from continuing operations before taxes	**$2,507.4**	**$2,423.8**
Effective tax rate	**18.5%**	**19.7%**
Income tax provision	$462.8	$478.4
Facility closure	5.8	—
Gain on exchange with joint venture partner	(9.5)	—
Company headquarters relocation	—	(8.2)
India Finance Act 2020	—	(20.3)
Tax election benefit and other	12.2	—
Adjusted income tax provision	**$471.3**	**$449.9**
Income from continuing operations before taxes	$2,507.4	$2,423.8
Facility closure	23.2	—
Gain on exchange with joint venture partner	(36.8)	—
Company headquarters relocation (income) expense	—	(33.8)
India Finance Act 2020 – equity affiliate income impact	—	(33.8)
Adjusted income from continuing operations before taxes	**$2,493.8**	**$2,356.2**
Adjusted effective tax rate	**18.9%**	**19.1%**

Capital Expenditures

We define capital expenditures as cash flows for additions to plant and equipment, acquisitions (less cash acquired), and investment in and advances to unconsolidated affiliates. A reconciliation of cash used for investing activities to our reported capital expenditures is provided below:

Fiscal Year Ended 30 September	2021	2020
Cash used for investing activities	**$2,732.9**	$3,560.0
Proceeds from sale of assets and investments	**37.5**	80.3
Purchases of investments	**(2,100.7)**	(2,865.5)
Proceeds from investments	**1,875.2**	1,938.0
Other investing activities	**5.8**	3.9
Capital expenditures	**$2,550.7**	$2,716.7

LIQUIDITY AND CAPITAL RESOURCES

Our cash balance and cash flows from operations are our primary sources of liquidity and are generally sufficient to meet our liquidity needs. In addition, we have the flexibility to access capital through a variety of financing activities, including accessing the capital markets, drawing upon our credit facility, or alternatively, accessing the commercial paper markets. At this time, we have not utilized, nor do we expect to access, our credit facility for additional liquidity. In addition, we have considered the impacts of COVID-19 on our liquidity and capital resources and do not expect it to impact our ability to meet future liquidity needs.

As of 30 September 2021, we had $1,590.4 of foreign cash and cash items compared to total cash and cash items of $4,468.9. We do not expect that a significant portion of the earnings of our foreign subsidiaries and affiliates will be subject to U.S. income tax upon repatriation to the U.S. Depending on the country in which the subsidiaries and affiliates reside, the repatriation of these earnings may be subject to foreign withholding and other taxes. However, since we have significant current investment plans outside the U.S., it is our intent to permanently reinvest the majority of our foreign cash and cash items that would be subject to additional taxes outside the U.S.

Cash Flows From Operations

Fiscal Year Ended 30 September	2021	2020
Income from continuing operations attributable to Air Products	**$2,028.8**	$1,901.0
Adjustments to reconcile income to cash provided by operating activities:		
Depreciation and amortization	**1,321.3**	1,185.0
Deferred income taxes	**94.0**	165.0
Facility closure	**23.2**	—
Undistributed earnings of equity method investments	**(138.2)**	(161.9)
Gain on sale of assets and investments	**(37.2)**	(45.8)
Share-based compensation	**44.5**	53.5
Noncurrent lease receivables	**98.8**	91.6
Other adjustments	**(116.7)**	116.4
Changes in working capital accounts	**16.7**	(40.1)
Cash Provided by Operating Activities	**$3,335.2**	$3,264.7

For the fiscal year ended 30 September 2021, cash provided by operating activities was $3,335.2. Other adjustments of $116.7 included pension plan contributions of $44.6 and pension income of $38.9 that did not have a cash impact. The working capital accounts were a source of cash of $16.7, primarily driven by a $187.9 source of cash from payables and accrued liabilities, partially offset by a $130.5 use of cash from trade receivables, less allowances. The source of cash within payables and accrued liabilities primarily resulted from higher natural gas costs, which also drove the use of cash within trade receivables as we contractually passed through these higher costs to customers.

For the fiscal year ended 30 September 2020, cash provided by operating activities was $3,264.7. We recorded a net benefit of $13.5 on our consolidated income statements related to a recently enacted tax law in India during the second quarter. This net benefit, which is further discussed in Note 21, *Income Taxes*, to the consolidated financial statements, increased "Undistributed earnings of unconsolidated affiliates" by $33.8 and increased "Deferred income taxes" by $20.3. The "Gain on sale of assets and investments" of $45.8 includes a gain of $33.8 related to the sale of property at our current corporate headquarters. Refer to Note 22, *Supplemental Information*, to the consolidated financial statements for additional information. The working capital accounts were a use of cash of $40.1, primarily driven by other working capital uses of $130.6, partially offset by a source of $84.4 from other receivables. The use of cash within "Other working capital" was primarily due to timing of tax payments and a tax benefit as a result of the assets acquired in April 2020 from PBF Energy Inc. The source of cash within "Other receivables" was primarily driven by maturities of forward exchange contracts.

Cash Flows From Investing Activities

Fiscal Year Ended 30 September	**2021**	2020
Additions to plant and equipment, including long-term deposits	**($2,464.2)**	($2,509.0)
Acquisitions, less cash acquired	**(10.5)**	(183.3)
Investment in and advances to unconsolidated affiliates	**(76.0)**	(24.4)
Proceeds from sale of assets and investments	**37.5**	80.3
Purchases of investments	**(2,100.7)**	(2,865.5)
Proceeds from investments	**1,875.2**	1,938.0
Other investing activities	**5.8**	3.9
Cash Used for Investing Activities	**($2,732.9)**	($3,560.0)

For the fiscal year ended 30 September 2021, cash used for investing activities was $2,732.9. Capital expenditures for plant and equipment, including long-term deposits, were $2,464.2. Purchases of investments with terms greater than three months but less than one year of $2,100.7 exceeded proceeds from investments of $1,875.2, which resulted from maturities of time deposits and treasury securities.

For the fiscal year ended 30 September 2020, cash used for investing activities was $3,560.0. Payments for additions to plant and equipment, including long-term deposits, were $2,509.0. This includes the acquisition of five operating hydrogen production plants from PBF Energy Inc. in Delaware and California for approximately $580. Additionally, acquisitions, less cash acquired, includes $183.3 for three businesses we acquired on 1 July 2020, the largest of which was a business in Israel that primarily offers merchant gas products. Refer to Note 3, *Acquisitions*, to the consolidated financial statements for additional information. Purchases of investments of $2,865.5 related to time deposits and treasury securities with terms greater than three months and less than one year and exceeded proceeds from investments of $1,938.0. Proceeds from sale of assets and investments of $80.3 included net proceeds of $44.1 related to the sale of property at our current corporate headquarters.

Capital Expenditures

Capital expenditures is a non-GAAP financial measure that we define as cash flows for additions to plant and equipment, including long-term deposits, acquisitions (less cash acquired), and investment in and advances to unconsolidated affiliates. The components of our capital expenditures are detailed in the table below. We present a reconciliation of our capital expenditures to cash used for investing activities on page 36.

Fiscal Year Ended 30 September	**2021**	2020
Additions to plant and equipment, including long-term deposits	**$2,464.2**	$2,509.0
Acquisitions, less cash acquired	**10.5**	183.3
Investment in and advances to unconsolidated affiliates	**76.0**	24.4
Capital Expenditures	**$2,550.7**	$2,716.7

Capital expenditures in fiscal year 2021 totaled $2,550.7 compared to $2,716.7 in fiscal year 2020. The decrease of $166.0 was primarily driven by the prior year acquisition of five operating hydrogen production plants from PBF, partially offset by lower spending for acquisitions. Additions to plant and equipment also included support capital of a routine, ongoing nature, including expenditures for distribution equipment and facility improvements.

Outlook for Investing Activities

We expect capital expenditures for fiscal year 2022 to be approximately $4.5 to $5 billion. In the first quarter of fiscal year 2022, we paid $1.6 billion, including approximately $130 from a non-controlling partner in one of our subsidiaries, for the initial investment in the Jazan gasification and power project. We expect to make an additional investment of approximately $1 billion, which includes contribution from our non-controlling partner, for phase II of the project in 2023. Refer to Note 24, *Subsequent Events*, to the consolidated financial statements for additional information.

It is not possible, without unreasonable efforts, to reconcile our forecasted capital expenditures to future cash used for investing activities because we are unable to identify the timing or occurrence of our future investment activity, which is driven by our assessment of competing opportunities at the time we enter into transactions. These decisions, either individually or in the aggregate, could have a significant effect on our cash used for investing activities.

We anticipate capital expenditures to be funded principally with our current cash balance and cash generated from continuing operations. In addition, we intend to continue to evaluate (1) acquisitions of small- and medium-sized industrial gas companies or assets from other industrial gas companies; (2) purchases of existing industrial gas facilities from our customers to create long-term contracts under which we own and operate the plant and sell industrial gases to the customer based on a fixed fee; and (3) investment in large industrial gas projects driven by demand for more energy, cleaner energy, and emerging market growth.

Cash Flows From Financing Activities

Fiscal Year Ended 30 September	**2021**	2020
Long-term debt proceeds	**$178.9**	$4,895.8
Payments on long-term debt	**(462.9)**	(406.6)
Net increase (decrease) in commercial paper and short-term borrowings	**1.0**	(54.9)
Dividends paid to shareholders	**(1,256.7)**	(1,103.6)
Proceeds from stock option exercises	**10.6**	34.1
Investments by noncontrolling interests	**136.6**	17.1
Other financing activities	**(28.4)**	(97.2)
Cash (Used for) Provided by Financing Activities	**($1,420.9)**	$3,284.7

In fiscal year 2021, cash used for financing activities was $1,420.9 and primarily included dividend payments to shareholders of $1,256.7 and payments on long-term debt of $462.9, partially offset by long-term debt proceeds of $178.9 and investments by noncontrolling interests of $136.6. The payments on long-term debt included the repayment of a €350.0 million Eurobond ($428) in June 2021.

In November 2021, we repaid our 3.0% Senior Note of $400, plus interest, on its maturity date.

In fiscal year 2020, cash provided by financing activities was $3,284.7 as we successfully accessed the debt markets in April 2020 to support opportunities for growth projects and repay upcoming debt maturities. Long-term debt proceeds of $4,895.8 were partially offset by dividend payments to shareholders of $1,103.6 and payments on long-term debt of $406.6 primarily related to the repayment of a 2.0% Eurobond of €300.0 million ($353.9) that matured on 7 August 2020. Other financing activities were a use of cash of $97.2 and included financing charges associated with the third quarter debt issuance.

Financing and Capital Structure

Capital needs in fiscal year 2021 were satisfied with cash from operations. Total debt decreased from $7,907.8 as of 30 September 2020 to $7,637.2 as of 30 September 2021, primarily due to repayment of the €350 million Eurobond, partially offset by proceeds from long-term borrowings on our foreign commitments. Total debt includes related party debt of $358.4 and $338.5 as of 30 September 2021 and 30 September 2020, respectively, primarily associated with the Lu'An joint venture. For additional detail, refer to Note 14, *Debt*, to the consolidated financial statements.

On 31 March 2021, we entered into a five-year $2,500 revolving credit agreement with a syndicate of banks (the "2021 Credit Agreement"), under which senior unsecured debt is available to us and certain of our subsidiaries. The 2021 Credit Agreement provides a source of liquidity and supports our commercial paper program. The only financial covenant in the 2021 Credit Agreement is a maximum ratio of total debt to capitalization (equal to total debt plus total equity) not to exceed 70%. Total debt as of 30 September 2021 and 30 September 2020, expressed as a percentage of total capitalization, was 35.2% and 38.9%, respectively. No borrowings were outstanding under the 2021 Credit Agreement as of 30 September 2021.

The 2021 Credit Agreement replaced our previous five-year $2,300.0 revolving credit agreement, which was to have matured on 31 March 2022. No borrowings were outstanding under the previous agreement as of 30 September 2020 or at the time of its termination. No early termination penalties were incurred.

Commitments of $296.7 are maintained by our foreign subsidiaries, $176.2 of which was borrowed and outstanding as of 30 September 2021.

As of 30 September 2021, we are in compliance with all of the financial and other covenants under our debt agreements.

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1,000 of our outstanding common stock. We did not purchase any of our outstanding shares in fiscal years 2021 or 2020. As of 30 September 2021, $485.3 in share repurchase authorization remains.

Dividends

Cash dividends on our common stock are paid quarterly, usually during the sixth week after the close of the fiscal quarter. We expect to continue to pay cash dividends in the future at comparable or increased levels.

The Board of Directors determines whether to declare dividends and the timing and amount based on financial condition and other factors it deems relevant. In 2021, the Board of Directors increased the quarterly dividend on our common stock to $1.50 per share, representing a 12% increase from the previous dividend of $1.34 per share. This is the 39th consecutive year that we have increased our quarterly dividend payment.

On 18 November 2021, the Board of Directors declared the first quarter 2022 dividend of $1.50 per share. The dividend is payable on 14 February 2022 to shareholders of record as of 3 January 2022.

Discontinued Operations

In fiscal year 2021, cash provided by operating activities of discontinued operations of $6.7 resulted from cash received as part of a state tax settlement related to the sale of PMD in fiscal year 2017.

PENSION BENEFITS

We and certain of our subsidiaries sponsor defined benefit pension plans and defined contribution plans that cover a substantial portion of our worldwide employees. The principal defined benefit pension plans are the U.S. salaried pension plan and the U.K. pension plan. These plans were closed to new participants in 2005, after which defined contribution plans were offered to new employees. The shift to defined contribution plans is expected to continue to reduce volatility of both plan expense and contributions.

The fair market value of plan assets for our defined benefit pension plans as of the 30 September 2021 measurement date increased to $5,248.7 from $4,775.1 at the end of fiscal year 2020. The projected benefit obligation for these plans was $5,304.9 and $5,373.5 at the end of fiscal years 2021 and 2020, respectively. The net unfunded liability decreased $542.2 from $598.4 to $56.2, primarily due to favorable asset experience. Refer to Note 15, *Retirement Benefits*, to the consolidated financial statements for additional disclosures on our postretirement benefits.

Pension Expense

	2021	2020
Pension (income)/expense, including special items noted below	**($37.3)**	$7.0
Settlements, termination benefits, and curtailments ("special items")	**1.8**	5.2
Weighted average discount rate – Service cost	**2.3%**	2.4%
Weighted average discount rate – Interest cost	**1.8%**	2.3%
Weighted average expected rate of return on plan assets	**6.0%**	6.3%
Weighted average expected rate of compensation increase	**3.4%**	3.4%

We recognized pension income of $37.3 in fiscal year 2021 versus expense of $7.0 in fiscal year 2020, primarily due to lower interest cost and higher total assets. Special items decreased from the prior year primarily due to lower pension settlement losses.

2022 Outlook

In fiscal year 2022, we expect pension impacts to range from $5 million of income to $5 million of expense, which includes potential settlement losses of $5 to $10 million, depending on the timing of retirements. This forecast reflects a lower expected estimated return on assets due to the increased percentage of fixed income investments within the plan asset portfolios and higher interest cost, partially offset by lower forecasted actuarial loss amortization. In fiscal year 2022, our expected range of pension impacts includes approximately $80 for amortization of actuarial losses.

In fiscal year 2021, pension expense included amortization of actuarial losses of $97.8. Net actuarial gains of $360.8 were recognized in accumulated other comprehensive income in fiscal year 2021. Actuarial gains and losses are amortized into pension expense over prospective periods to the extent they are not offset by future gains or losses. Future changes in the discount rate and actual returns on plan assets could impact the actuarial gain or loss and resulting amortization in years beyond fiscal year 2022.

Pension Funding

Pension funding includes both contributions to funded plans and benefit payments for unfunded plans, which are primarily non-qualified plans. With respect to funded plans, our funding policy is that contributions, combined with appreciation and earnings, will be sufficient to pay benefits without creating unnecessary surpluses.

In addition, we make contributions to satisfy all legal funding requirements while managing our capacity to benefit from tax deductions attributable to plan contributions. With the assistance of third-party actuaries, we analyze the liabilities and demographics of each plan, which help guide the level of contributions. During 2021 and 2020, our cash contributions to funded plans and benefit payments for unfunded plans were $44.6 and $37.5, respectively.

For fiscal year 2022, cash contributions to defined benefit plans are estimated to be $40 to $50. The estimate is based on expected contributions to certain international plans and anticipated benefit payments for unfunded plans, which are dependent upon the timing of retirements. Actual future contributions will depend on future funding legislation, discount rates, investment performance, plan design, and various other factors. We do not expect COVID-19 to impact our contribution forecast for fiscal year 2022.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Refer to Note 1, *Major Accounting Policies*, and Note 2, *New Accounting Guidance*, to the consolidated financial statements for a description of our major accounting policies and information concerning implementation and impact of new accounting guidance.

The accounting policies discussed below are those policies that we consider to be the most critical to understanding our financial statements because they require management's most difficult, subjective, or complex judgments, often as the result of the need to make estimates about the effects of matters that are inherently uncertain. These estimates reflect our best judgment about current and/or future economic and market conditions and their effect based on information available as of the date of our consolidated financial statements. If conditions change, actual results may differ materially from these estimates. Our management has reviewed these critical accounting policies and estimates and related disclosures with the Audit and Finance Committee of our Board of Directors.

Depreciable Lives of Plant and Equipment

Plant and equipment, net at 30 September 2021 totaled $13,254.6, and depreciation expense totaled $1,284.1 during fiscal year 2021. Plant and equipment is recorded at cost and depreciated using the straight-line method, which deducts equal amounts of the cost of each asset from earnings every year over its estimated economic useful life.

Economic useful life is the duration of time an asset is expected to be productively employed by us, which may be less than its physical life. Assumptions on the following factors, among others, affect the determination of estimated economic useful life: wear and tear, obsolescence, technical standards, contract life, market demand, competitive position, raw material availability, and geographic location.

The estimated economic useful life of an asset is monitored to determine its appropriateness, especially when business circumstances change. For example, changes in technology, changes in the estimated future demand for products, excessive wear and tear, or unanticipated government actions may result in a shorter estimated useful life than originally anticipated. In these cases, we would depreciate the remaining net book value over the new estimated remaining life, thereby increasing depreciation expense per year on a prospective basis. Likewise, if the estimated useful life is increased, the adjustment to the useful life decreases depreciation expense per year on a prospective basis.

The regional Industrial Gases segments have numerous long-term customer supply contracts for which we construct an on-site plant adjacent to or near the customer's facility. These contracts typically have initial contract terms of 10 to 20 years. Depreciable lives of the production assets related to long-term supply contracts are generally matched to the contract lives. Extensions to the contract term of supply frequently occur prior to the expiration of the initial term. As contract terms are extended, the depreciable life of the associated production assets is adjusted to match the new contract term, as long as it does not exceed the remaining physical life of the asset.

Our regional Industrial Gases segments also have contracts for liquid or gaseous bulk supply and, for smaller customers, packaged gases. The depreciable lives of production facilities associated with these contracts are generally 15 years. These depreciable lives have been determined based on historical experience combined with judgment on future assumptions such as technological advances, potential obsolescence, competitors' actions, etc.

In addition, we may purchase assets through transactions accounted for as either an asset acquisition or a business combination. Depreciable lives are assigned to acquired assets based on the age and condition of the assets, the remaining duration of long-term supply contracts served by the assets, and our historical experience with similar assets. Management monitors its assumptions and may potentially need to adjust depreciable life as circumstances change.

Impairment of Assets

As discussed below, there were no triggering events in fiscal year 2021 that would require impairment testing for any of our asset groups, reporting units that contain goodwill, indefinite-lived intangibles assets, or equity method investments. We completed our annual impairment tests for goodwill and other indefinite-lived intangible assets and concluded there were no indications of impairment.

Impairment of Assets – Plant and Equipment

Plant and equipment meeting the held for sale criteria are reported at the lower of carrying amount or fair value less cost to sell. Plant and equipment to be disposed of other than by sale may be reviewed for impairment upon the occurrence of certain triggering events, such as unexpected contract terminations or unexpected foreign government-imposed restrictions or expropriations. Plant and equipment held for use is grouped for impairment testing at the lowest level for which there is identifiable cash flows. Impairment testing of the asset group occurs whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. Such circumstances would include: (1) a significant decrease in the market value of a long-lived asset grouping; (2) a significant adverse change in the manner in which the asset grouping is being used or in its physical condition; (3) an accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of the long-lived asset; (4) a reduction in revenues that is other than temporary; (5) a history of operating or cash flow losses associated with the use of the asset grouping; or (6) changes in the expected useful life of the long-lived assets.

If such circumstances are determined to exist, an estimate of undiscounted future cash flows produced by that asset group is compared to the carrying value to determine whether impairment exists. If an asset group is determined to be impaired, the loss is measured based on the difference between the asset group's fair value and its carrying value. An estimate of the asset group's fair value is based on the discounted value of its estimated cash flows.

The assumptions underlying the undiscounted future cash flow projections require significant management judgment. Factors that management must estimate include industry and market conditions, sales volume and prices, costs to produce, inflation, etc. The assumptions underlying the cash flow projections represent management's best estimates at the time of the impairment review and could include probability weighting of cash flow projections associated with multiple potential future scenarios. Changes in key assumptions or actual conditions that differ from estimates could result in an impairment charge. We use reasonable and supportable assumptions when performing impairment reviews and cannot predict the occurrence of future events and circumstances that could result in impairment charges.

In fiscal year 2021, there was no need to test for impairment on any of our asset groupings as no events or changes in circumstances indicated that the carrying amount of our asset groupings may not be recoverable.

Impairment of Assets – Goodwill

The acquisition method of accounting for business combinations requires us to make use of estimates and judgments to allocate the purchase price paid for acquisitions to the fair value of the net tangible and identifiable intangible assets. Goodwill represents the excess of the aggregate purchase price (plus the fair value of any noncontrolling interest and previously held equity interest in the acquiree) over the fair value of identifiable net assets of an acquired entity. Goodwill was $911.5 as of 30 September 2021. Disclosures related to goodwill are included in Note 9, *Goodwill*, to the consolidated financial statements.

We review goodwill for impairment annually in the fourth quarter of the fiscal year and whenever events or changes in circumstances indicate that the carrying value of goodwill might not be recoverable. The tests are done at the reporting unit level, which is defined as being equal to or one level below the operating segment for which discrete financial information is available and whose operating results are reviewed by segment managers regularly. We have five reportable business segments, seven operating segments and ten reporting units, seven of which include a goodwill balance. Refer to Note 23, *Business Segment and Geographic Information*, for additional information. Reporting units are primarily based on products and subregions within each reportable segment. The majority of our goodwill is assigned to reporting units within our regional Industrial Gases segments.

As part of the goodwill impairment testing, we have the option to first assess qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying value. However, we choose to bypass the qualitative assessment and conduct quantitative testing to determine if the carrying value of the reporting unit exceeds its fair value. An impairment loss will be recognized for the amount by which the carrying value of the reporting unit exceeds its fair value, not to exceed the total amount of goodwill allocated to that reporting unit.

To determine the fair value of a reporting unit, we initially use an income approach valuation model, representing the present value of estimated future cash flows. Our valuation model uses a discrete growth period and an estimated exit trading multiple. The income approach is an appropriate valuation method due to our capital-intensive nature, the long-term contractual nature of our business, and the relatively consistent cash flows generated by our reporting units. The principal assumptions utilized in our income approach valuation model include revenue growth rates, operating profit and/or adjusted EBITDA margins, discount rate, and exit multiple. Projected revenue growth rates and operating profit and/or adjusted EBITDA assumptions are consistent with those utilized in our operating plan and/or revised forecasts and long-term financial planning process. The discount rate assumption is calculated based on an estimated market-participant risk-adjusted weighted-average cost of capital, which includes factors such as the risk-free rate of return, cost of debt, and expected equity premiums. The exit multiple is determined from comparable industry transactions and where appropriate, reflects expected long-term growth rates.

If our initial review under the income approach indicates there may be impairment, we incorporate results under the market approach to further evaluate the existence of impairment. When the market approach is utilized, fair value is estimated based on market multiples of revenue and earnings derived from comparable publicly-traded industrial gases companies and/or regional manufacturing companies engaged in the same or similar lines of business as the reporting unit, adjusted to reflect differences in size and growth prospects. When both the income and market approach are utilized, we review relevant facts and circumstances and make a qualitative assessment to determine the proper weighting. Management judgment is required in the determination of each assumption utilized in the valuation model, and actual results could differ from the estimates.

During the fourth quarter of fiscal year 2021, we conducted our annual goodwill impairment test, noting no indications of impairment. The fair value of all of our reporting units substantially exceeded their carrying value.

Due to the reorganization of our business effective as of 1 October 2021, we conducted an additional impairment test on our existing reporting units as of 30 September 2021. The fair value of all of our reporting units substantially exceeded their carrying value at 30 September 2021.

Future events that could have a negative impact on the level of excess fair value over carrying value of the reporting units include, but are not limited to: long-term economic weakness, decline in market share, pricing pressures, inability to successfully implement cost improvement measures, increases to our cost of capital, changes in the strategy of the reporting unit, and changes to the structure of our business as a result of future reorganizations or divestitures of assets or businesses. Negative changes in one or more of these factors, among others, could result in impairment charges.

Impairment of Assets – Intangible Assets

Intangible assets, net with determinable lives at 30 September 2021 totaled $380.4 and consisted primarily of customer relationships, purchased patents and technology, and land use rights. These intangible assets are tested for impairment as part of the long-lived asset grouping impairment tests. Impairment testing of the asset group occurs whenever events or changes in circumstances indicate that the carrying value of the assets may not be recoverable. See the impairment discussion above under "*Impairment of Assets – Plant and Equipment*" for a description of how impairment losses are determined.

Indefinite-lived intangible assets at 30 September 2021 totaled $40.3 and consisted of trade names and trademarks. Indefinite-lived intangibles are subject to impairment testing at least annually or more frequently if events or changes in circumstances indicate that potential impairment exists. The impairment test for indefinite-lived intangible assets involves calculating the fair value of the indefinite-lived intangible assets and comparing the fair value to their carrying value. If the fair value is less than the carrying value, the difference is recorded as an impairment loss. To determine fair value, we utilize the royalty savings method, a form of the income approach. This method values an intangible asset by estimating the royalties avoided through ownership of the asset.

Disclosures related to intangible assets other than goodwill are included in Note 10, *Intangible Assets*, to the consolidated financial statements.

In the fourth quarter of 2021, we conducted our annual impairment test of indefinite-lived intangibles which resulted in no impairment.

Impairment of Assets – Equity Method Investments

Investments in and advances to equity affiliates totaled $1,649.3 at 30 September 2021. The majority of our investments are non-publicly traded ventures with other companies in the industrial gas business. Summarized financial information of equity affiliates is included in Note 7, *Summarized Financial Information of Equity Affiliates*, to the consolidated financial statements. Equity investments are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment may not be recoverable.

An impairment loss is recognized in the event that an other-than-temporary decline in fair value below the carrying value of an investment occurs. Management's estimate of fair value of an investment is based on the income approach and/or market approach. We utilize estimated discounted future cash flows expected to be generated by the investee under the income approach. For the market approach, we utilize market multiples of revenue and earnings derived from comparable publicly-traded industrial gases companies. Changes in key assumptions about the financial condition of an investee or actual conditions that differ from estimates could result in an impairment charge.

In fiscal year 2021, there was no need to test any of our equity affiliate investments for impairment, as no events or changes in circumstances indicated that the carrying amount of the investments may not be recoverable.

Revenue Recognition – Cost Incurred Input Method

Revenue from equipment sale contracts is generally recognized over time as we have an enforceable right to payment for performance completed to date and our performance under the contract terms does not create an asset with alternative use. We use a cost incurred input method to recognize revenue by which costs incurred to date relative to total estimated costs at completion are used to measure progress toward satisfying performance obligations. Costs incurred include material, labor, and overhead costs and represent work contributing and proportionate to the transfer of control to the customer.

Accounting for contracts using the cost incurred input method requires management judgment relative to assessing risks and their impact on the estimates of revenues and costs. Our estimates are impacted by factors such as the potential for incentives or penalties on performance, schedule delays, technical issues, labor productivity, the complexity of work performed, the cost and availability of materials, and performance of subcontractors. When adjustments in estimated total contract revenues or estimated total costs are required, any changes in the estimated profit from prior estimates are recognized in the current period for the inception-to-date effect of such change. When estimates of total costs to be incurred on a contract exceed estimates of total revenues to be earned, a provision for the entire estimated loss on the contract is recorded in the period in which the loss is determined.

In addition to the typical risks associated with underlying performance of project procurement and construction activities, our sale of equipment projects within our Industrial Gases – Global segment require monitoring of risks associated with schedule, geography, and other aspects of the contract and their effects on our estimates of total revenues and total costs to complete the contract.

Changes in estimates on projects accounted for under the cost incurred input method unfavorably impacted operating income by approximately $19 in fiscal year 2021 as compared to a favorable impact of $7 in fiscal year 2020. Our changes in estimates would not have significantly impacted amounts recorded in prior years.

We assess the performance of our sale of equipment projects as they progress. Our earnings could be positively or negatively impacted by changes to our forecast of revenues and costs on these projects.

Revenue Recognition – *On-site Customer Contracts*

For customers who require large volumes of gases on a long-term basis, we produce and supply gases under long-term contracts from large facilities that we build, own and operate on or near the customer's facilities. Certain of these on-site contracts contain complex terms and provisions such as tolling arrangements, minimum payment requirements, variable components and pricing provisions that require significant judgment to determine the amount and timing of revenue recognition.

Income Taxes

We account for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities measured using enacted tax rates in effect for the year in which the differences are expected to be recovered or settled. As of 30 September 2021, accrued income taxes, including the amount recorded as noncurrent, was $251.0, and net deferred tax liabilities were $1,080.7. Tax liabilities related to uncertain tax positions as of 30 September 2021 were $140.3, excluding interest and penalties. Income tax expense for the fiscal year ended 30 September 2021 was $462.8. Disclosures related to income taxes are included in Note 21, *Income Taxes*, to the consolidated financial statements.

Management judgment is required concerning the ultimate outcome of tax contingencies and the realization of deferred tax assets.

Actual income taxes paid may vary from estimates, depending upon changes in income tax laws, actual results of operations, and the final audit of tax returns by taxing authorities. Tax assessments may arise several years after tax returns have been filed. We believe that our recorded tax liabilities adequately provide for these assessments.

Deferred tax assets are recorded for operating losses and tax credit carryforwards. However, when we do not expect sufficient sources of future taxable income to realize the benefit of the operating losses or tax credit carryforwards, these deferred tax assets are reduced by a valuation allowance. A valuation allowance is recognized if, based on the weight of available evidence, it is considered more likely than not that some portion or all of the deferred tax asset will not be realized. The factors used to assess the likelihood of realization include forecasted future taxable income and available tax planning strategies that could be implemented to realize or renew net deferred tax assets in order to avoid the potential loss of future tax benefits. The effect of a change in the valuation allowance is reported in the income tax expense.

A 1% increase or decrease in our effective tax rate may result in a decrease or increase to net income, respectively, of approximately $25.

Pension and Other Postretirement Benefits

The amounts recognized in the consolidated financial statements for pension and other postretirement benefits are determined on an actuarial basis utilizing numerous assumptions. The discussion that follows provides information on the significant assumptions, expense, and obligations associated with the defined benefit plans.

Actuarial models are used in calculating the expense and liability related to the various defined benefit plans. These models have an underlying assumption that the employees render service over their service lives on a relatively consistent basis; therefore, the expense of benefits earned should follow a similar pattern.

Several assumptions and statistical variables are used in the models to calculate the expense and liability related to the plans. We determine assumptions about the discount rate, the expected rate of return on plan assets, and the rate of compensation increase. Note 15, *Retirement Benefits*, to the consolidated financial statements includes disclosure of these rates on a weighted-average basis for both the U.S. and international plans. The actuarial models also use assumptions about demographic factors such as retirement age, mortality, and turnover rates. Mortality rates are based on the most recent U.S. and international mortality tables. We believe the actuarial assumptions are reasonable. However, actual results could vary materially from these actuarial assumptions due to economic events and differences in rates of retirement, mortality, and turnover.

One of the assumptions used in the actuarial models is the discount rate used to measure benefit obligations. This rate reflects the prevailing market rate for high-quality, fixed-income debt instruments with maturities corresponding to the expected timing of benefit payments as of the annual measurement date for each of the various plans. We measure the service cost and interest cost components of pension expense by applying spot rates along the yield curve to the relevant projected cash flows. The rates along the yield curve are used to discount the future cash flows of benefit obligations back to the measurement date. These rates change from year to year based on market conditions that affect corporate bond yields. A higher discount rate decreases the present value of the benefit obligations and results in lower pension expense. A 50 bp increase or decrease in the discount rate may result in a decrease or increase to pension expense, respectively, of approximately $20 per year.

The expected rate of return on plan assets represents an estimate of the long-term average rate of return to be earned by plan assets reflecting current asset allocations. In determining estimated asset class returns, we take into account historical and future expected long-term returns and the value of active management, as well as the interest rate environment. Asset allocation is determined based on long-term return, volatility and correlation characteristics of the asset classes, the profiles of the plans' liabilities, and acceptable levels of risk. Lower returns on the plan assets result in higher pension expense. A 50 bp increase or decrease in the estimated rate of return on plan assets may result in a decrease or increase to pension expense, respectively, of approximately $23 per year.

We use a market-related valuation method for recognizing certain investment gains or losses for our significant pension plans. Investment gains or losses are the difference between the expected return and actual return on plan assets. The expected return on plan assets is determined based on a market-related value of plan assets. This is a calculated value that recognizes investment gains and losses on equities over a five-year period from the year in which they occur and reduces year-to-year volatility. The market-related value for non-equity investments equals the actual fair value. Expense in future periods will be impacted as gains or losses are recognized in the market-related value of assets.

The expected rate of compensation increase is another key assumption. We determine this rate based on review of the underlying long-term salary increase trend characteristic of labor markets and historical experience, as well as comparison to peer companies. A 50 bp increase or decrease in the expected rate of compensation may result in an increase or decrease to pension expense, respectively, of approximately $7 per year.

Loss Contingencies

In the normal course of business, we encounter contingencies, or situations involving varying degrees of uncertainty as to the outcome and effect on our company. We accrue a liability for loss contingencies when it is considered probable that a liability has been incurred and the amount of loss can be reasonably estimated. When only a range of possible loss can be established, the most probable amount in the range is accrued. If no amount within this range is a better estimate than any other amount within the range, the minimum amount in the range is accrued.

Contingencies include those associated with litigation and environmental matters, for which our accounting policy is discussed in Note 1, *Major Accounting Policies*, to the consolidated financial statements, and details are provided in Note 16, *Commitments and Contingencies*, to the consolidated financial statements. Significant judgment is required to determine both the probability and whether the amount of loss associated with a contingency can be reasonably estimated. These determinations are made based on the best available information at the time. As additional information becomes available, we reassess probability and estimates of loss contingencies. Revisions to the estimates associated with loss contingencies could have a significant impact on our results of operations in the period in which an accrual for loss contingencies is recorded or adjusted. For example, due to the inherent uncertainties related to environmental exposures, a significant increase to environmental liabilities could occur if a new site is designated, the scope of remediation is increased, a different remediation alternative is identified, or our proportionate share of the liability increases. Similarly, a future charge for regulatory fines or damage awards associated with litigation could have a significant impact on our net income in the period in which it is recorded.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Our earnings, cash flows, and financial position are exposed to market risks arising from fluctuations in interest rates and foreign currency exchange rates. It is our policy to minimize our cash flow exposure to adverse changes in currency exchange rates and to manage the financial risks inherent in funding with debt capital.

We address these financial exposures through a controlled program of risk management that includes the use of derivative financial instruments. We have established counterparty credit guidelines and generally enter into transactions with financial institutions of investment grade or better, thereby minimizing the risk of credit loss. All instruments are entered into for other than trading purposes. For details on the types and use of these derivative instruments and related major accounting policies, refer to Note 1, *Major Accounting Policies*, and Note 12, *Financial Instruments*, to the consolidated financial statements. Additionally, we mitigate adverse energy price impacts through our cost pass-through contracts with customers and price increases.

Our derivative and other financial instruments consist of long-term debt, including the current portion and amounts owed to related parties; interest rate swaps; cross currency interest rate swaps; and foreign exchange-forward contracts. The net market value of these financial instruments combined is referred to below as the "net financial instrument position" and is disclosed in Note 13, *Fair Value Measurements*, to the consolidated financial statements.

Our net financial instrument position decreased from a liability of $8,220.7 at 30 September 2020 to a liability of $7,850.3 at 30 September 2021. The decrease was primarily due to the repayment of a €350.0 million Eurobond ($428) on its maturity date in June 2021.

The analysis below presents the sensitivity of the market value of our financial instruments to selected changes in market rates and prices. Market values are the present values of projected future cash flows based on the market rates and prices chosen. The market values for interest rate risk and foreign currency risk are calculated by us using a third-party software model that utilizes standard pricing models to determine the present value of the instruments based on market conditions as of the valuation date, such as interest rates, spot and forward exchange rates, and implied volatilities.

Interest Rate Risk

Our debt portfolio as of 30 September 2021 and 2020, including the effect of currency and interest rate swap agreements, was composed of 89% fixed-rate debt and 11% variable-rate debt.

The sensitivity analysis related to the interest rate risk on the fixed portion of our debt portfolio assumes an instantaneous 100 bp parallel move in interest rates from the level at 30 September 2021, with all other variables held constant. A 100 bp increase in market interest rates would result in a decrease of $587 and $711 in the net liability position of financial instruments at 30 September 2021 and 2020, respectively. A 100 bp decrease in market interest rates would result in an increase of $692 and $846 in the net liability position of financial instruments at 30 September 2021 and 2020, respectively.

Based on the variable-rate debt included in our debt portfolio, including the interest rate swap agreements, a 100 bp increase in interest rates would result in an additional $8 of interest incurred per year at 30 September 2021 and 2020. A 100 bp decline in interest rates would lower interest incurred by $8 per year at 30 September 2021 and 2020.

Foreign Currency Exchange Rate Risk

The sensitivity analysis related to foreign currency exchange rates assumes an instantaneous 10% change in the foreign currency exchange rates from their levels at 30 September 2021 and 2020, with all other variables held constant. A 10% strengthening or weakening of the functional currency of an entity versus all other currencies would result in a decrease or increase, respectively, of $343 and $360 in the net liability position of financial instruments at 30 September 2021 and 2020, respectively.

The primary currency pairs for which we have exchange rate exposure are the Euro and U.S. Dollar and Chinese Renminbi and U.S. Dollar. Foreign currency debt, cross currency interest rate swaps, and foreign exchange-forward contracts are used in countries where we do business, thereby reducing our net asset exposure. Foreign exchange-forward contracts and cross currency interest rate swaps are also used to hedge our firm and highly anticipated foreign currency cash flows. Thus, there is either an asset or liability or cash flow exposure related to all of the financial instruments in the above sensitivity analysis for which the impact of a movement in exchange rates would be in the opposite direction and materially equal to the impact on the instruments in the analysis.

The majority of our sales are denominated in foreign currencies as they are derived outside the United States. Therefore, financial results will be affected by changes in foreign currency rates. The Chinese Renminbi and the Euro represent the largest exposures in terms of our foreign earnings. We estimate that a 10% reduction in either the Chinese Renminbi or the Euro versus the U.S. Dollar would lower our annual operating income by approximately $45 and $25, respectively.

Item 8. Financial Statements and Supplementary Data.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Air Products' management is responsible for establishing and maintaining adequate internal control over financial reporting. Our internal control over financial reporting, which is defined in the following sentences, is a process designed to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with U.S. generally accepted accounting principles and includes those policies and procedures that:

(i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company;

(ii) provide reasonable assurance that the transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and

(iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Because of inherent limitations, internal control over financial reporting can only provide reasonable assurance and may not prevent or detect misstatements. Further, because of changes in conditions, the effectiveness of our internal control over financial reporting may vary over time. Our processes contain self-monitoring mechanisms, and actions are taken to correct deficiencies as they are identified.

Management has evaluated the effectiveness of its internal control over financial reporting based on criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this evaluation, management concluded that, as of 30 September 2021, the Company's internal control over financial reporting was effective.

Deloitte & Touche LLP, an independent registered public accounting firm, has issued its opinion on the Company's internal control over financial reporting as of 30 September 2021 as stated in its report which appears herein.

/s/ Seifi Ghasemi
Seifi Ghasemi
Chairman, President, and
Chief Executive Officer
18 November 2021

/s/ Melissa N. Schaeffer
Melissa N. Schaeffer
Senior Vice President and
Chief Financial Officer
18 November 2021

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Air Products and Chemicals, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Air Products and Chemicals, Inc. and subsidiaries (the "Company") as of September 30, 2021 and 2020, the related consolidated income statements, comprehensive income statements, statements of equity, and statements of cash flows, for each of the three years in the period ended September 30, 2021, and the related notes (collectively referred to as the "financial statements"). We also have audited the Company's internal control over financial reporting as of September 30, 2021, based on criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Company as of September 30, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended September 30, 2021, in conformity with accounting principles generally accepted in the United States of America. Also, in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of September 30, 2021, based on criteria established in Internal Control — Integrated Framework (2013) issued by COSO.

Basis for Opinions

The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on these financial statements and an opinion on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the financial statements included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures to respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current-period audit of the financial statements that were communicated or required to be communicated to the audit committee and that (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing a separate opinion on the critical audit matters or on the accounts or disclosures to which they relate.

Revenue Recognition – On-site Customer Contracts – Refer to Notes 1 and 4 to the Financial Statements

Critical Audit Matter Description

On-site industrial gas customer contracts involve large capital investments to serve customers who require large volumes of gases and have relatively constant demand. The Company builds, owns and operates facilities on or near the customer's facilities to produce and supply the customer with gases under a long-term arrangement. Typically, these contracts have 15- to 20-year terms and contain fixed monthly charges and/or minimum purchase requirements. Revenue associated with these contracts is generally recognized over time during the period in which the Company delivers or makes available the agreed upon quantity of gases. In addition, certain on-site industrial gas contracts contain complex terms and provisions such as tolling arrangements, minimum payment requirements, pricing provisions, and variable components that are specific to a customer arrangement, including certain contracts with related parties. These arrangements may require greater judgment in determining when contractual requirements have been met, impacting the timing and amount of revenue to be recorded.

We identified revenue recognition for certain on-site industrial gas customer contracts with complex terms and provisions as a critical audit matter because of the judgments necessary for management to evaluate these contract terms, including amendments, when determining the amount of revenue to be recognized. This required a high degree of auditor judgment when performing procedures to audit management's identification and assessment of contract terms when determining the amount and timing of revenue recognition and evaluating the results of those procedures.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to revenue recognition for certain on-site industrial gas customer contracts with complex terms and provisions included the following procedures, among others:

- We tested the effectiveness of the Company's controls related to the amount and timing of revenue recognition, including controls over the evaluation of complex terms and provisions in certain on-site industrial gas customer contracts.
- We evaluated the terms included within original customer contracts and related amendments to assess the accounting for provisions such as minimum payment requirements, pricing provisions, settlement terms, and variable components that require management to apply judgment in determining revenue recognition associated with the contract.
- We tested the probability of collection of variable components, including penalties, which impacts the amount and timing of revenue which the Company expects to collect.
- We inquired of personnel who oversee operations, customer relations, and revenue recognition as to the presence of contract amendments, and interpretation of contract terms.
- We considered the nature of transactions with related parties and any potential impact on revenue recognition.
- We evaluated customer transactions and agreed the amount of revenue recognized to underlying contracts, customer invoices, and cash receipts.
- We considered customer payment history, subsequent events, write-offs of customer receivables, collectability, modification of contract terms, and other factors that could impact the amount and timing of revenue recognition.

Revenue Recognition – Cost Incurred Input Method – Refer to Notes 1 and 4 to the Financial Statements

Critical Audit Matter Description

The Company enters into sale of equipment contracts with customers for which the promised goods or services contained within the contracts are integrated with or dependent upon other goods or services for a single output to the customer. Revenue from the sale of equipment contracts is generally recognized over time as the Company has an enforceable right to payment for performance, as completed, and performance under the contract terms does not create an asset with an alternative use. The Company uses a cost incurred input method to recognize revenue by which costs incurred to date relative to total estimated costs at completion are used to measure progress toward satisfying performance obligations.

Accounting for contracts using the cost incurred input method requires a high degree of judgment to estimate total costs used to recognize revenue. Changes in estimated costs could have a significant impact on the timing of revenue recognition. Auditing these estimates requires extensive audit effort due to the complexity around the cost estimation process which involves multiple inputs and variables for sale of equipment contracts and a high degree of auditor judgment when evaluating the results of those procedures.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to complex contracts with customers for sales of equipment included the following, among others:

- We tested the effectiveness of the Company's controls related to the amount and timing of revenue recognition for sale of equipment contracts, including controls over developing the estimated costs at completion and the evaluation of changes in estimated total costs for sale of equipment contracts.
- We evaluated the appropriateness and consistency of the methods and assumptions used by management to evaluate estimated total costs and changes in estimated costs to determine if the estimated total costs at completion for sale of equipment contracts were reasonable.
- With the assistance of our professionals having expertise in accounting for sale of equipment contracts, we performed the following:
    - Evaluated management's ability to estimate total costs at completion for each selected contract by performing corroborating inquiries with the Company's project managers and personnel involved with the selected contracts, including inquiries related to the timeline for completion and estimates of future costs to complete the contract.
    - Selected a sample of estimates of future costs to complete and evaluated management's estimates of total costs at completion by performing one of the following:
        - Comparing management's estimates to documents such as work plans, customer purchase orders, third-party supplier invoices, and subcontractor agreements, or
        - Developing independent estimates of total costs to completion and comparing our estimates to management's estimates. Our independent estimates were based on information such as work plans, customer purchase orders, third-party supplier invoices, subcontractor agreements, and similar historical project experience.
    - We compared the gross margin on sale of equipment contracts to that of historical periods in order to evaluate the Company's ability to accurately estimate costs at completion.

/s/ Deloitte & Touche LLP
Philadelphia, Pennsylvania
November 18, 2021

We have served as the Company's auditor since 2018.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED INCOME STATEMENTS
(Millions of dollars, except for share and per share data)

Fiscal Year Ended 30 September	**2021**	2020	2019
Sales	**$10,323.0**	$8,856.3	$8,918.9
Cost of sales	**7,186.1**	5,858.1	5,975.5
Facility closure	**23.2**	—	29.0
Selling and administrative	**828.4**	775.9	750.0
Research and development	**93.5**	83.9	72.9
Cost reduction actions	**—**	—	25.5
Gain on exchange with joint venture partner	**36.8**	—	29.1
Company headquarters relocation income (expense)	**—**	33.8	—
Other income (expense), net	**52.8**	65.4	49.3
Operating Income	**2,281.4**	2,237.6	2,144.4
Equity affiliates' income	**294.1**	264.8	215.4
Interest expense	**141.8**	109.3	137.0
Other non-operating income (expense), net	**73.7**	30.7	66.7
Income From Continuing Operations Before Taxes	**2,507.4**	2,423.8	2,289.5
Income tax provision	**462.8**	478.4	480.1
Income From Continuing Operations	**2,044.6**	1,945.4	1,809.4
Income (Loss) from discontinued operations, net of tax	**70.3**	(14.3)	—
Net Income	**2,114.9**	1,931.1	1,809.4
Net income attributable to noncontrolling interests of continuing operations	**15.8**	44.4	49.4
Net Income Attributable to Air Products	**$2,099.1**	$1,886.7	$1,760.0
Net Income Attributable to Air Products			
Net income from continuing operations	**$2,028.8**	$1,901.0	$1,760.0
Net income (loss) from discontinued operations	**70.3**	(14.3)	—
Net Income Attributable to Air Products	**$2,099.1**	$1,886.7	$1,760.0
Per Share Data*			
Basic EPS from continuing operations	**$9.16**	$8.59	$7.99
Basic EPS from discontinued operations	**0.32**	(0.06)	—
Basic EPS Attributable to Air Products	**$9.47**	$8.53	$7.99
Diluted EPS from continuing operations	**$9.12**	$8.55	$7.94
Diluted EPS from discontinued operations	**0.32**	(0.06)	—
Diluted EPS Attributable to Air Products	**$9.43**	$8.49	$7.94
Weighted Average Common Shares (in millions)			
Basic	**221.6**	221.2	220.3
Diluted	**222.5**	222.3	221.6

*Earnings per share ("EPS") is calculated independently for each component and may not sum to total EPS due to rounding.

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED COMPREHENSIVE INCOME STATEMENTS
(Millions of dollars)

Fiscal Year Ended 30 September	2021	2020	2019
Net Income	**$2,114.9**	$1,931.1	$1,809.4
Other Comprehensive Income (Loss), net of tax:			
Translation adjustments, net of tax of $2.8, ($29.4), and $25.1	**267.3**	233.4	(356.2)
Net gain (loss) on derivatives, net of tax of ($9.0), $23.7, and ($1.5)	**3.3**	43.5	(44.1)
Pension and postretirement benefits, net of tax of $91.4, ($15.6), and ($97.9)	**274.3**	(68.2)	(326.2)
Reclassification adjustments:			
Currency translation adjustment	**—**	—	(2.6)
Derivatives, net of tax of $13.9, ($17.7), and $4.5	**43.5**	(57.7)	12.3
Pension and postretirement benefits, net of tax of $24.4, $27.1, and $20.5	**74.6**	82.5	63.2
Total Other Comprehensive Income (Loss)	**663.0**	233.5	(653.6)
Comprehensive Income	**2,777.9**	2,164.6	1,155.8
Net Income Attributable to Noncontrolling Interests	**15.8**	44.4	49.4
Other Comprehensive Income (Loss) Attributable to Noncontrolling Interests	**38.8**	(2.0)	(19.9)
Comprehensive Income Attributable to Air Products	**$2,723.3**	$2,122.2	$1,126.3

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED BALANCE SHEETS
(Millions of dollars, except for share and per share data)

30 September	2021	2020
Assets		
Current Assets		
Cash and cash items	**$4,468.9**	$5,253.0
Short-term investments	**1,331.9**	1,104.9
Trade receivables, net	**1,451.3**	1,274.8
Inventories	**453.9**	404.8
Prepaid expenses	**119.4**	164.5
Other receivables and current assets	**550.9**	482.9
Total Current Assets	**8,376.3**	8,684.9
Investment in net assets of and advances to equity affiliates	**1,649.3**	1,432.2
Plant and equipment, net	**13,254.6**	11,964.7
Goodwill, net	**911.5**	891.5
Intangible assets, net	**420.7**	435.8
Noncurrent lease receivables	**740.3**	816.3
Other noncurrent assets	**1,506.5**	943.1
Total Noncurrent Assets	**18,482.9**	16,483.6
Total Assets	**$26,859.2**	$25,168.5
Liabilities and Equity		
Current Liabilities		
Payables and accrued liabilities	**$2,218.3**	$1,833.2
Accrued income taxes	**93.9**	105.8
Short-term borrowings	**2.4**	7.7
Current portion of long-term debt	**484.5**	470.0
Total Current Liabilities	**2,799.1**	2,416.7
Long-term debt	**6,875.7**	7,132.9
Long-term debt – related party	**274.6**	297.2
Other noncurrent liabilities	**1,640.9**	1,916.0
Deferred income taxes	**1,180.9**	962.6
Total Noncurrent Liabilities	**9,972.1**	10,308.7
Total Liabilities	**12,771.2**	12,725.4
Commitments and Contingencies - See Note 16		
Air Products Shareholders' Equity		
Common stock (par value $1 per share; issued 2021 and 2020 - 249,455,584 shares)	**249.4**	249.4
Capital in excess of par value	**1,115.8**	1,094.8
Retained earnings	**15,678.3**	14,875.7
Accumulated other comprehensive loss	**(1,515.9)**	(2,140.1)
Treasury stock, at cost (2021 - 28,058,829 shares; 2020 - 28,438,125 shares)	**(1,987.9)**	(2,000.0)
Total Air Products Shareholders' Equity	**13,539.7**	12,079.8
Noncontrolling Interests	**548.3**	363.3
Total Equity	**14,088.0**	12,443.1
Total Liabilities and Equity	**$26,859.2**	$25,168.5

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Millions of dollars)

Fiscal Year Ended 30 September	2021	2020	2019
Operating Activities			
Net income	**$2,114.9**	$1,931.1	$1,809.4
Less: Net income attributable to noncontrolling interests of continuing operations	**15.8**	44.4	49.4
Net income attributable to Air Products	**2,099.1**	1,886.7	1,760.0
(Income) Loss from discontinued operations	**(70.3)**	14.3	—
Income from continuing operations attributable to Air Products	**2,028.8**	1,901.0	1,760.0
Adjustments to reconcile income to cash provided by operating activities:			
Depreciation and amortization	**1,321.3**	1,185.0	1,082.8
Deferred income taxes	**94.0**	165.0	57.6
Tax reform repatriation	**—**	—	49.4
Facility closure	**23.2**	—	29.0
Undistributed earnings of equity method investments	**(138.2)**	(161.9)	(75.8)
Gain on sale of assets and investments	**(37.2)**	(45.8)	(24.2)
Share-based compensation	**44.5**	53.5	41.2
Noncurrent lease receivables	**98.8**	91.6	94.6
Other adjustments	**(116.7)**	116.4	(19.4)
Working capital changes that provided (used) cash, excluding effects of acquisitions:			
Trade receivables	**(130.5)**	43.2	(69.0)
Inventories	**(47.2)**	(5.2)	(3.0)
Other receivables	**75.5**	84.4	79.8
Payables and accrued liabilities	**187.9**	(31.9)	(41.8)
Other working capital	**(69.0)**	(130.6)	8.7
Cash Provided by Operating Activities	**3,335.2**	3,264.7	2,969.9
Investing Activities			
Additions to plant and equipment, including long-term deposits	**(2,464.2)**	(2,509.0)	(1,989.7)
Acquisitions, less cash acquired	**(10.5)**	(183.3)	(123.2)
Investment in and advances to unconsolidated affiliates	**(76.0)**	(24.4)	(15.7)
Proceeds from sale of assets and investments	**37.5**	80.3	11.1
Purchases of investments	**(2,100.7)**	(2,865.5)	(172.1)
Proceeds from investments	**1,875.2**	1,938.0	190.5
Other investing activities	**5.8**	3.9	(14.3)
Cash Used for Investing Activities	**(2,732.9)**	(3,560.0)	(2,113.4)
Financing Activities			
Long-term debt proceeds	**178.9**	4,895.8	—
Payments on long-term debt	**(462.9)**	(406.6)	(428.6)
Net increase (decrease) in commercial paper and short-term borrowings	**1.0**	(54.9)	3.9
Dividends paid to shareholders	**(1,256.7)**	(1,103.6)	(994.0)
Proceeds from stock option exercises	**10.6**	34.1	68.1
Investments by noncontrolling interests	**136.6**	17.1	—
Other financing activities	**(28.4)**	(97.2)	(19.9)
Cash Provided by (Used for) Financing Activities	**(1,420.9)**	3,284.7	(1,370.5)
Discontinued Operations			
Cash provided by operating activities	6.7	—	—
Cash provided by investing activities	—	—	—
Cash provided by financing activities	—	—	—
Cash Provided by Discontinued Operations	6.7	—	—
Effect of Exchange Rate Changes on Cash	**27.8**	14.9	(28.6)
Increase (Decrease) in cash and cash items	**(784.1)**	3,004.3	(542.6)
Cash and Cash items – Beginning of Year	**5,253.0**	2,248.7	2,791.3
Cash and Cash Items – End of Period	**$4,468.9**	$5,253.0	$2,248.7

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED STATEMENTS OF EQUITY
(Millions of dollars, except for per share data)

Fiscal Year Ended 30 September	Common Stock	Capital in Excess of Par Value	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Treasury Stock	Air Products Shareholders' Equity	Non-controlling Interests	Total Equity
Balance 30 September 2018	**$249.4**	**$1,029.3**	**$13,409.9**	**($1,741.9)**	**($2,089.2)**	**$10,857.5**	**$318.8**	**$11,176.3**
Net income	—	—	1,760.0	—	—	1,760.0	49.4	1,809.4
Other comprehensive income (loss)	—	—	—	(633.7)	—	(633.7)	(19.9)	(653.6)
Dividends on common stock (per share $4.58)	—	—	(1,008.3)	—	—	(1,008.3)	—	(1,008.3)
Dividends to noncontrolling interests	—	—	—	—	—	—	(12.2)	(12.2)
Share-based compensation	—	40.7	—	—	—	40.7	—	40.7
Issuance of treasury shares for stock option and award plans	—	2.2	—	—	59.7	61.9	—	61.9
Cumulative change in accounting principle	—	—	(17.1)	—	—	(17.1)	—	(17.1)
Other equity transactions	—	(1.3)	(6.1)	—	—	(7.4)	(1.4)	(8.8)
Balance 30 September 2019	**$249.4**	**$1,070.9**	**$14,138.4**	**($2,375.6)**	**($2,029.5)**	**$11,053.6**	**$334.7**	**$11,388.3**
Net income	—	—	1,886.7	—	—	1,886.7	44.4	1,931.1
Other comprehensive income (loss)	—	—	—	235.5	—	235.5	(2.0)	233.5
Dividends on common stock (per share $5.18)	—	—	(1,144.1)	—	—	(1,144.1)	—	(1,144.1)
Dividends to noncontrolling interests	—	—	—	—	—	—	(31.8)	(31.8)
Share-based compensation	—	44.2	—	—	—	44.2	—	44.2
Issuance of treasury shares for stock option and award plans	—	(14.1)	—	—	29.5	15.4	—	15.4
Investments by noncontrolling interests	—	—	—	—	—	—	17.1	17.1
Other equity transactions	—	(6.2)	(5.3)	—	—	(11.5)	0.9	(10.6)
Balance 30 September 2020	**$249.4**	**$1,094.8**	**$14,875.7**	**($2,140.1)**	**($2,000.0)**	**$12,079.8**	**$363.3**	**$12,443.1**
Net income	—	—	2,099.1	—	—	2,099.1	15.8	2,114.9
Other comprehensive income (loss)	—	—	—	624.2	—	624.2	38.8	663.0
Dividends on common stock (per share $5.84)	—	—	(1,292.6)	—	—	(1,292.6)	—	(1,292.6)
Dividends to noncontrolling interests	—	—	—	—	—	—	(5.3)	(5.3)
Share-based compensation	—	43.5	—	—	—	43.5	—	43.5
Issuance of treasury shares for stock option and award plans	—	(21.5)	—	—	12.1	(9.4)	—	(9.4)
Investments by noncontrolling interests	—	—	—	—	—	—	139.8	139.8
Purchase of noncontrolling interests	—	(1.2)	—	—	—	(1.2)	(4.1)	(5.3)
Other equity transactions	—	0.2	(3.9)	—	—	(3.7)	—	(3.7)
Balance 30 September 2021	**$249.4**	**$1,115.8**	**$15,678.3**	**($1,515.9)**	**($1,987.9)**	**$13,539.7**	**$548.3**	**$14,088.0**

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(Millions of dollars unless otherwise indicated, except for share and per share data)

1. MAJOR ACCOUNTING POLICIES

Basis of Presentation and Consolidation Principles

The accompanying consolidated financial statements of Air Products and Chemicals, Inc. were prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP") and include the accounts of Air Products and Chemicals, Inc. and those of its controlled subsidiaries ("we," "our," "us," the "Company," "Air Products," or "registrant"), which are generally majority owned. Intercompany transactions and balances are eliminated in consolidation.

We consolidate all entities that we control. The general condition for control is ownership of a majority of the voting interests of an entity. Control may also exist in arrangements where we are the primary beneficiary of a variable interest entity ("VIE"). An entity that has both the power to direct the activities that most significantly impact the economic performance of a VIE and the obligation to absorb losses or receive benefits significant to the VIE is considered the primary beneficiary of that entity. We have determined that we are not a primary beneficiary of any material VIE.

The notes to the consolidated financial statements, unless otherwise indicated, are on a continuing operations basis. The results of operations and cash flows for our discontinued operations have been segregated from the results of continuing operations and segment results. The comprehensive income related to discontinued operations has not been segregated and is included in the consolidated comprehensive income statements. There were no assets and liabilities presented as discontinued operations on the consolidated balance sheets. Refer to Note 5, *Discontinued Operations*, for additional information.

Certain prior year information has been reclassified to conform to the fiscal year 2021 presentation.

Estimates and Assumptions

The preparation of the financial statements in conformity with GAAP requires management to make estimates and assumptions that affect amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

COVID-19 Risks and Uncertainties

COVID-19, which was declared a global pandemic by the World Health Organization in March 2020, continues to impact our business operations and results. There continue to be many unknowns regarding the pandemic, including the ongoing spread and severity of the virus and the pace of vaccine rollouts globally. Given the dynamic nature of these circumstances, uncertainty remains related to how the pandemic may affect our business, results of operations, and overall financial performance.

Revenue Recognition

We recognize revenue when or as performance obligations are satisfied, which occurs when control is transferred to the customer.

We determine the transaction price of our contracts based on the amount of consideration to which we expect to be entitled to receive in exchange for the goods or services provided. Our contracts within the scope of revenue guidance do not contain payment terms that include a significant financing component.

Sales returns and allowances are not a business practice in the industry.

Our sale of gas contracts are either accounted for over time during the period in which we deliver or make available the agreed upon quantity of goods or at a point in time when the customer receives and obtains control of the product, which generally occurs upon delivery. We generally recognize revenue from our sale of gas contracts based on the right to invoice practical expedient.

Our sale of equipment contracts are generally comprised of a single performance obligation as the individual promised goods or services contained within the contracts are integrated with or dependent upon other goods or services in the contract for a single output to the customer. Revenue from our sale of equipment contracts is generally recognized over time as we have an enforceable right to payment for performance completed to date and our performance under the contract terms does not create an asset with alternative use. We recognize these contracts using a cost incurred input method by which costs incurred to date relative to total estimated costs at completion are used to measure progress toward satisfying performance obligations.

Amounts billed for shipping and handling fees are classified as sales in the consolidated income statements. Shipping and handling activities for our sale of equipment contracts may be performed after the customer obtains control of the promised goods. In these cases, we have elected to apply the practical expedient to account for shipping and handling as activities to fulfill the promise to transfer the goods. For our sale of gas contracts, control generally transfers to the customer upon delivery.

Amounts billed for sales and use taxes, value-added taxes, and certain excise and other specific transactional taxes imposed on revenue-producing transactions are presented on a net basis and excluded from sales in the consolidated income statements.

For additional information, refer to Note 4, *Revenue Recognition.*

Cost of Sales

Cost of sales predominantly represents the cost of tangible products sold. These costs include labor, raw materials, plant engineering, power, depreciation, production supplies and materials packaging costs, and maintenance costs. Costs incurred for shipping and handling are also included in cost of sales.

Depreciation

Depreciation is recorded using the straight-line method, which deducts equal amounts of the cost of each asset from earnings every year over its expected economic useful life. The principal lives for major classes of plant and equipment are summarized in Note 8, *Plant and Equipment, net.*

Selling and Administrative

The principal components of selling and administrative expenses are compensation, advertising, and promotional costs.

Postemployment Benefits

We provide termination benefits to employees as part of ongoing benefit arrangements and record a liability for termination benefits when probable and estimable. These criteria are met when management, with the appropriate level of authority, approves and commits to its plan of action for termination; the plan identifies the employees to be terminated and their related benefits; and the plan is to be completed within one year. We do not provide material one-time benefit arrangements.

Fair Value Measurements

We are required to measure certain assets and liabilities at fair value, either upon initial measurement or for subsequent accounting or reporting. For example, fair value is used in the initial measurement of assets and liabilities acquired in a business combination; on a recurring basis in the measurement of derivative financial instruments; and on a nonrecurring basis when long-lived assets are written down to fair value when held for sale or determined to be impaired. Refer to Note 13, *Fair Value Measurements*, and Note 15, *Retirement Benefits*, for information on the methods and assumptions used in our fair value measurements.

Financial Instruments

We address certain financial exposures through a controlled program of risk management that includes the use of derivative financial instruments. The types of derivative financial instruments permitted for such risk management programs are specified in policies set by management. Refer to Note 12, *Financial Instruments*, for further detail on the types and use of derivative instruments into which we enter.

Major financial institutions are counterparties to all of these derivative contracts. We have established counterparty credit guidelines and generally enter into transactions with financial institutions of investment grade or better. Management believes the risk of incurring losses related to credit risk is remote, and any losses would be immaterial to the consolidated financial results, financial condition, or liquidity.

We recognize derivatives on the balance sheet at fair value. On the date the derivative instrument is entered into, we generally designate the derivative as either (1) a hedge of a forecasted transaction or of the variability of cash flows to be received or paid related to a recognized asset or liability (cash flow hedge), (2) a hedge of a net investment in a foreign operation (net investment hedge), or (3) a hedge of the fair value of a recognized asset or liability (fair value hedge).

The following details the accounting treatment of our cash flow, fair value, net investment, and non-designated hedges:

- Changes in the fair value of a derivative that is designated as and meets the cash flow hedge criteria are recorded in accumulated other comprehensive loss ("AOCL") to the extent effective and then recognized in earnings when the hedged items affect earnings.
- Changes in the fair value of a derivative that is designated as and meets all the required criteria for a fair value hedge, along with the gain or loss on the hedged asset or liability that is attributable to the hedged risk, are recorded in current period earnings.
- Changes in the fair value of a derivative and foreign currency debt that are designated as and meet all the required criteria for a hedge of a net investment are recorded as translation adjustments in AOCL.
- Changes in the fair value of a derivative that is not designated as a hedge are recorded immediately in earnings.

We formally document the relationships between hedging instruments and hedged items, as well as our risk management objective and strategy for undertaking various hedge transactions. This process includes relating derivatives that are designated as fair value or cash flow hedges to specific assets and liabilities on the balance sheet or to specific firm commitments or forecasted transactions. We also formally assess, at the inception of the hedge and on an ongoing basis, whether derivatives are highly effective in offsetting changes in fair values or cash flows of the hedged item. If it is determined that a derivative is not highly effective as a hedge, or if a derivative ceases to be a highly effective hedge, we will discontinue hedge accounting with respect to that derivative prospectively.

Foreign Currency

Since we do business in many foreign countries, fluctuations in currency exchange rates affect our financial position and results of operations.

In most of our foreign operations, the local currency is considered the functional currency. Foreign subsidiaries translate their assets and liabilities into U.S. dollars at current exchange rates in effect as of the balance sheet date. The gains or losses that result from this process are shown as translation adjustments in AOCL in the equity section of the balance sheet.

The revenue and expense accounts of foreign subsidiaries are translated into U.S. dollars at the average exchange rates that prevail during the period. Therefore, the U.S. dollar value of these items on the consolidated income statements fluctuates from period to period, depending on the value of the U.S. dollar against foreign currencies. Some transactions are made in currencies different from an entity's functional currency. Gains and losses from these foreign currency transactions, and the impact of related hedges, are generally reflected in "Other income (expense), net" on our consolidated income statements as they occur and were not material for the periods presented.

Foreign exchange gains and losses from the foreign currency remeasurement of balances associated with intercompany and third-party financing transactions, related income tax assets and liabilities, and the impact of related hedges are reflected within "Other non-operating income (expense), net" and were not material for the periods presented.

In addition, foreign currency forward points and currency swap basis differences that are excluded from the assessment of hedge effectiveness of our cash flow hedges of intercompany loans ("excluded components") are recorded within "Other non-operating income (expense), net" on a straight-line basis. Excluded components were expenses of $31.0, $33.5, and $33.3 in fiscal years 2021, 2020, and 2019, respectively. In 2019, excluded components were recorded in "Interest expense" and were not restated upon adoption of accounting guidance in fiscal year 2020 on hedging activities.

Environmental Expenditures

Accruals for environmental loss contingencies are recorded when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. Remediation costs are capitalized if the costs improve our property as compared with the condition of the property when originally constructed or acquired, or if the costs prevent environmental contamination from future operations. We expense environmental costs related to existing conditions resulting from past or current operations and from which no current or future benefit is discernible. The amounts charged to income from continuing operations related to environmental matters totaled $18.6, $18.3, and $14.2 in fiscal years 2021, 2020, and 2019, respectively. In addition, we recorded a pre-tax expense of $19.0 in results from discontinued operations to increase our environmental accrual for the Pace facility in the second quarter of fiscal year 2020. Refer to the Pace discussion within Note 16, *Commitments and Contingencies*, for additional information.

The measurement of environmental liabilities is based on an evaluation of currently available information with respect to each individual site and considers factors such as existing technology, presently enacted laws and regulations, and prior experience in remediation of contaminated sites. An environmental liability related to cleanup of a contaminated site might include, for example, a provision for one or more of the following types of costs: site investigation and testing costs, remediation costs, post-remediation monitoring costs, natural resource damages, and outside legal fees. These liabilities include costs related to other potentially responsible parties to the extent that we have reason to believe such parties will not fully pay their proportionate share. They do not consider any claims for recoveries from insurance or other parties and are not discounted.

As assessments and remediation progress at individual sites, the amount of projected cost is reviewed and the liability is adjusted to reflect additional technical and legal information that becomes available. Management has an established process in place to identify and monitor our environmental exposures. An environmental accrual analysis is prepared and maintained that lists all environmental loss contingencies, even where an accrual has not been established. This analysis assists in monitoring our overall environmental exposure and serves as a tool to facilitate ongoing communication among our technical experts, environmental managers, environmental lawyers, and financial management to ensure that required accruals are recorded and potential exposures disclosed.

Given inherent uncertainties in evaluating environmental exposures, actual costs to be incurred at identified sites in future periods may vary from the estimates. Refer to Note 16, *Commitments and Contingencies*, for additional information on our environmental loss contingencies.

The accruals for environmental liabilities are reflected in the consolidated balance sheets, primarily as part of other noncurrent liabilities.

Litigation

In the normal course of business, we are involved in legal proceedings. We accrue a liability for such matters when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. When only a range of possible loss can be established, the most probable amount in the range is accrued. If no amount within this range is a better estimate than any other amount within the range, the minimum amount in the range is accrued. The accrual for a litigation loss contingency includes estimates of potential damages and other directly related costs expected to be incurred. Refer to Note 16, *Commitments and Contingencies*, for additional information on our current legal proceedings.

Share-Based Compensation

We expense the grant-date fair value of our share-based awards over the vesting period during which employees perform related services. Expense recognition is accelerated for retirement-eligible individuals who would meet the requirements for vesting of awards upon their retirement. Refer to Note 18, *Share-Based Compensation*, for additional information regarding these awards and the models and assumptions used to determine the grant-date fair value of our awards.

Income Taxes

We account for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to be recovered or settled. A principal temporary difference results from the excess of tax depreciation over book depreciation because accelerated methods of depreciation and shorter useful lives are used for income tax purposes. The cumulative impact of a change in tax rates or regulations is included in income tax expense in the period that includes the enactment date. We recognize deferred tax assets net of existing valuation allowances to the extent we believe that these assets are more likely than not to be realized considering all available evidence.

A tax benefit for an uncertain tax position is recognized when it is more likely than not that the position will be sustained upon examination based on its technical merits. This position is measured as the largest amount of tax benefit that is greater than 50% likely of being realized. Interest and penalties related to unrecognized tax benefits are recognized as a component of income tax expense. For additional information regarding our income taxes, refer to Note 21, *Income Taxes*.

Other Non-Operating Income (Expense), net

Other non-operating income (expense), net includes interest income associated with our cash and cash items and short-term investments, certain foreign currency remeasurements and impacts from the related hedging activities discussed in the *Foreign Currency* section above, and non-service cost components of net periodic pension and postretirement benefit cost. Our non-service costs primarily include interest cost, expected return on plan assets, amortization of actuarial gains and losses, and settlements.

Cash and Cash Items

Cash and cash items include cash, time deposits, and treasury securities acquired with an original maturity of three months or less.

Short-term Investments

Short-term investments include time deposits and treasury securities with original maturities greater than three months and less than one year.

Credit Losses

We are exposed to credit losses through sales of products and services. When extending credit, we evaluate customer creditworthiness based on a combination of qualitative and quantitative factors that include, but are not limited to, the customer's credit score from external providers, financial condition, and past payment experience.

We assess allowances for credit losses on our trade receivables and lease receivable portfolios. Allowances are evaluated by portfolio on a collective basis where similar characteristics exist. A provision for customer defaults is made on a general formula basis as the risk of some default is expected but cannot yet be associated with specific customers. The assessment of the likelihood of default is based on various factors, including the length of time the receivables are past due, historical experience, existing economic conditions, and forward-looking information. When we identify specific customers with known collectability issues, the assessment for credit losses is performed on an individual basis, considering current and forward-looking information of the customer.

The use of forward-looking information considers economic conditions that may affect the customers' ability to pay. Although we historically have not experienced significant credit losses, our exposure to credit losses may increase if our customers are adversely affected by economic pressures or uncertainty associated with local or global economic recessions, disruption associated with the ongoing COVID-19 pandemic, or other customer-specific factors. We review our reserves for credit losses on a quarterly basis.

Trade receivables comprise amounts owed to us through our operating activities and are presented net of allowances for credit losses. Changes to the carrying amount of the allowance for credit losses on trade receivables are summarized below:

Balance at 30 September 2018	$26.4
Provision for credit losses	7.7
Write-offs charged against the allowance	(6.8)
Currency translation and other	(2.5)
Balance at 30 September 2019	$24.8
Provision for credit losses	7.7
Write-offs charged against the allowance	(8.3)
Currency translation and other	(0.3)
Balance at 30 September 2020	$23.9
Adoption of new credit losses standard	0.5
Provision for credit losses	2.7
Write-offs charged against the allowance	(3.8)
Currency translation and other	1.8
Balance at 30 September 2021	**$25.1**

In addition, our lease receivables are presented net of allowances for credit losses. As of 30 September 2021 and 2020, the credit quality of lease receivables did not require a material allowance for credit losses. For additional information on our lease arrangements, refer to Note 11, *Leases*.

Inventories

We carry inventory that is comprised of finished goods, work-in-process, raw materials and supplies. Refer to Note 6, *Inventories*, for further detail.

Inventories on our consolidated balance sheets are stated at the lower of cost or net realizable value. We determine the cost of all our inventories on a first-in, first-out basis ("FIFO"). We write down our inventories for estimated obsolescence or unmarketable inventory based upon assumptions about future demand and market conditions.

Equity Method Investments

The equity method of accounting is used when we exercise significant influence but do not have operating control, generally assumed to be 20% – 50% ownership. Under the equity method, original investments are recorded at cost and adjusted by our share of undistributed earnings or losses of these companies. We use the cumulative earnings approach for determining cash flow presentation of cash distributions received from equity method investees. Equity investments are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment may not be recoverable.

Plant and Equipment, net

Plant and equipment, net is stated at cost less accumulated depreciation. Construction costs, labor, and applicable overhead related to installations are capitalized. Expenditures for additions and improvements that extend the lives or increase the capacity of plant assets are capitalized. The costs of maintenance and repairs of plant and equipment are charged to expense as incurred.

Fully depreciated assets are retained in the gross plant and equipment and accumulated depreciation accounts until they are removed from service. In the case of disposals, assets and related depreciation are removed from the accounts, and the net amounts, less proceeds from disposal, are included in income. Refer to Note 8, *Plant and Equipment, net*, for further detail.

Computer Software

We capitalize costs incurred to purchase or develop software for internal use. Capitalized costs include purchased computer software packages, payments to vendors/consultants for development and implementation or modification to a purchased package to meet our requirements, payroll and related costs for employees directly involved in development, and interest incurred while software is being developed. Capitalized costs are reflected in "Plant and equipment, net" on the consolidated balance sheets and are depreciated over the estimated useful life of the software, generally a period of three to five years.

We capitalize costs incurred with the implementation of a cloud computing arrangement that is a service contract, consistent with our policy for software developed or obtained for internal use. However, the capitalized costs are reflected in "Other noncurrent assets" on our consolidated balance sheets and expensed over the term of the related hosting arrangement.

Capitalized Interest

As we build new plant and equipment, we include in the cost of these assets a portion of the interest payments we make during the year. The amount of capitalized interest was $28.3, $15.9, and $13.5 in fiscal years 2021, 2020, and 2019, respectively.

Leases

As lessee, we recognize a right-of-use ("ROU") asset and lease liability on the balance sheet for all leases with a term in excess of 12 months. We determine if an arrangement contains a lease at inception. The arrangement contains a lease when there is an identifiable asset, we obtain substantially all of the economic benefits from that asset, and we direct how and for what purpose the asset is used during the term of the arrangement. If the initial term of an arrangement is 12 months or less, we have made an accounting election to not assess if these arrangements contain a lease for inclusion on our balance sheet.

ROU assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. ROU assets and lease liabilities are recognized at the commencement date based on the present value of lease payments over the lease term. Since our leases generally do not provide an implicit discount rate, we use our incremental borrowing rates based on the information available at the commencement date in determining the present value of lease payments. To determine the incremental borrowing rate, we consider our unsecured borrowings and published market rates, and then adjust those rates to assume full collateralization and to factor in the individual lease term, geography, and payment structure.

Our lease term includes periods covered by options to extend or terminate the lease when it is reasonably certain that we will exercise an option to extend or not exercise an option to terminate. Lease payments consider our practical expedient to combine amounts for lease and related non-lease components for all classes of underlying assets in which we are lessee. Fixed payments and payments associated with escalation clauses based on an index are included in the ROU asset and lease liability at commencement. Variable lease payments are excluded from the ROU assets and lease liabilities and are recognized in the period in which the obligation for those payments is incurred. Our variable lease payments primarily include the impact from escalation clauses that are not fixed or based on an index. Prepaid lease payments are included in the recognition of ROU assets. Our lease agreements do not contain any material lease incentives, residual value guarantees or restrictions or covenants.

Impairment of Long-Lived Assets

Long-lived assets are grouped for impairment testing at the lowest level for which there are identifiable cash flows that are largely independent of the cash flows of other assets and liabilities and are evaluated for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset group may not be recoverable. We assess recoverability by comparing the carrying amount of the asset group to estimated undiscounted future cash flows expected to be generated by the asset group. If an asset group is considered impaired, the impairment loss to be recognized is measured as the amount by which the asset group's carrying amount exceeds its fair value. Long-lived assets meeting the held for sale criteria are reported at the lower of carrying amount or fair value less cost to sell.

Asset Retirement Obligations

The fair value of a liability for an asset retirement obligation is recognized in the period in which it is incurred. The fair value of the liability is measured using discounted estimated cash flows and is adjusted to its present value in subsequent periods as accretion expense is recorded. The corresponding asset retirement costs are capitalized as part of the carrying amount of the related long-lived asset and depreciated over the asset's useful life. Our asset retirement obligations are primarily associated with on-site long-term supply contracts under which we have built a facility on land owned by the customer and are obligated to remove the facility at the end of the contract term. Our asset retirement obligations totaled $269.6 and $241.4 at 30 September 2021 and 2020, respectively. Refer to Note 16, *Commitments and Contingencies*, for further detail.

Goodwill

Business combinations are accounted for using the acquisition method. The purchase price is allocated to the assets acquired and liabilities assumed based on their estimated fair values. Any excess purchase price (plus the fair value of any noncontrolling interest and previously held equity interest in the acquiree) over the fair market value of the net assets acquired, including identified intangibles, is recorded as goodwill. Preliminary purchase price allocations are made at the date of acquisition and finalized when information about facts and circumstances that existed as of the acquisition date needed to finalize underlying estimates is obtained or when we determine that such information is not obtainable, within a maximum measurement period of one year.

Goodwill is subject to impairment testing at least annually. In addition, goodwill is tested more frequently if a change in circumstances or the occurrence of events indicates that potential impairment exists. Refer to Note 9, *Goodwill*, for further detail.

Intangible Assets

Intangible assets with determinable lives primarily consist of customer relationships, purchased patents and technology, and certain land use rights. The cost of intangible assets with determinable lives is amortized on a straight-line basis over the estimated period of economic benefit. No residual value is estimated for these intangible assets. Indefinite-lived intangible assets consist of trade names and trademarks. Indefinite-lived intangibles are subject to impairment testing at least annually. In addition, intangible assets are tested more frequently if a change in circumstances or the occurrence of events indicates that potential impairment exists.

Customer relationships are generally amortized over periods of five to twenty-five years. Purchased patents and technology and other finite-lived intangibles are generally amortized over periods of five to fifteen years. Other intangibles includes certain land use rights, which are generally amortized over a period of fifty years. Amortizable lives are adjusted whenever there is a change in the estimated period of economic benefit. Refer to Note 10, *Intangible Assets*, for further detail.

Retirement Benefits

Our retirement benefit plans are discussed in Note 15, *Retirement Benefits*. The cost of benefits we contribute to defined contribution plans is recognized in the year earned. The cost of benefits under our defined benefit and other post-retirement plans is generally recognized over the employees' service period. We use actuarial methods and assumptions in the valuation of defined benefit obligations and the determination of expense. Differences between actual and expected results or changes in the value of obligations and plan assets are recognized systematically over subsequent periods.

2. NEW ACCOUNTING GUIDANCE

Accounting Guidance Implemented in Fiscal Year 2021

<u>Credit Losses on Financial Instruments</u>

In June 2016, the FASB issued guidance on the measurement of credit losses, which requires measurement and recognition of expected credit losses for financial assets, including trade receivables and lease receivables, held at the reporting date based on historical experience, current conditions, and reasonable and supportable forecasts. The method to determine a loss is different from the previous guidance, which delayed recognition of a credit loss until it was probable that a loss had been incurred. We adopted this guidance on 1 October 2020 using a modified retrospective approach with an after-tax cumulative-effect adjustment of $1.3 to retained earnings. Refer to the "Major Accounting Polices – Credit Losses" section of Note 1, *Major Accounting Policies*, for a description of our accounting policy on credit losses.

Cloud Computing Implementation Costs

In August 2018, the FASB issued guidance which aligns the capitalization requirements for implementation costs incurred in a hosting arrangement that is a service contract with the existing capitalization requirements for implementation costs incurred to develop or obtain internal-use software. We adopted this guidance prospectively at the beginning of fiscal year 2021. Eligible implementation costs previously capitalized in "Plant and equipment, net" were reclassified to "Other noncurrent assets" on our consolidated balance sheets beginning in fiscal year 2021. This guidance did not have a material impact on our consolidated financial statements upon adoption.

Simplifying the Accounting for Income Taxes

In December 2019, the FASB issued an update to simplify the accounting for income taxes and improve consistent application by clarifying or amending existing guidance. We adopted this guidance at the beginning of fiscal year 2021. This guidance did not have a material impact on our consolidated financial statements upon adoption.

New Accounting Guidance to be Implemented

Reference Rate Reform

In March 2020, the FASB issued an update to provide practical expedients and exceptions for applying GAAP to contracts, hedging relationships and other transactions affected by reference rate reform if certain criteria are met. This update is primarily applicable to our contracts and hedging relationships that reference LIBOR. The amendments may be applied to impacted contracts and hedges prospectively through 31 December 2022. We had no impacts on our hedging relationships related to reference rate reform in fiscal year 2021. We will continue to evaluate the impact this guidance could have on our consolidated financial statements.

3. ACQUISITIONS

Fiscal Year 2021

Gain on Exchange With Joint Venture Partner

As of 30 September 2020, we held a 50% ownership interest in Tyczka Industrie-Gases GmbH ("TIG"), a joint venture in Germany with the Tyczka Group that is primarily a merchant gases business. We accounted for this arrangement as an equity method investment in our Industrial Gases – EMEA segment.

Effective 23 February 2021 (the "acquisition date"), we agreed with our joint venture partner to separate TIG into two separate businesses. On the acquisition date, we acquired a portion of the business on a 100% basis, and our partner paid us $10.8 to acquire the rest of the business. The exchange resulted in a gain of $36.8 ($27.3 after-tax), which is reflected as "Gain on exchange with joint venture partner" on our consolidated income statements for the fiscal year ended 30 September 2021. The gain included $12.7 from the revaluation of our previously held equity interest in the portion of the business that we retained and $24.1 from the sale of our equity interest in the remaining business. The gain was not recorded in segment results.

We estimated an acquisition date fair value of $15.4 for our previously held equity interest in the acquired portion of the business using a market approach, which considered historical earnings and the application of a market-based multiple derived from comparable transactions.

We accounted for the acquisition as a business combination within our Industrial Gases – EMEA segment. As a result of the acquisition, we recognized intangible assets of $16.7 for customer relationships, goodwill of $14.5, and plant and equipment of $10.3. The customer relationships have a weighted-average useful life of approximately 15 years.

The acquired assets were recorded at their estimated fair values based primarily on a preliminary purchase price allocation. We may record adjustments to these assets during the preliminary purchase price allocation period, which could be up to one year from the acquisition date.

We expect the acquisition to allow us to have more control over the business we retained and to serve customers more effectively. The results of this business did not materially impact our consolidated income statements for the periods presented.

Fiscal Year 2020

Asset Acquisition

On 17 April 2020, we acquired five operating hydrogen production plants from PBF Energy Inc. ("PBF") and commenced contractual long-term supply of hydrogen from those plants to PBF's refineries. We accounted for the transaction as an asset acquisition and recorded the aggregate purchase price of $580 to plant and equipment on our consolidated balance sheets.

Business Combinations

We completed three acquisitions on 1 July 2020 that were accounted for as business combinations. These acquisitions had an aggregate purchase price, net of cash acquired, of $185.4. The largest of these acquisitions was the purchase of Oxygen & Argon Works Ltd., the leading manufacturer and marketer of industrial gases in Israel, primarily offering merchant gas products. The results of this business are consolidated within our Industrial Gases – EMEA segment.

Fiscal Year 2019

As further discussed below, we completed three business combinations in fiscal year 2019.

Exchange of Equity Affiliate Investments

We previously held 50% ownership interests in High-Tech Gases (Beijing) Co., Ltd. ("High-Tech Gases") and WuXi Hi-Tech Gas Co., Ltd. ("WuXi"), both of which were joint ventures with another industrial gas company in China. We accounted for these arrangements as equity method investments in our Industrial Gases – Asia segment through 30 April 2019.

On 1 May 2019, we acquired our partner's 50% interest in WuXi in exchange for our 50% interest in High-Tech Gases. The exchange resulted in a net gain of $29.1, of which $15.0 resulted from the revaluation of our previously held equity interest in WuXi to its acquisition date fair value and $14.1 resulted from the disposition of our interest in High-Tech Gases. The net gain is reflected as "Gain on exchange with joint venture partner" on our consolidated income statements in fiscal year 2019 and was not recorded in results of the Industrial Gases – Asia segment.

We revalued our previously held 50% equity interest in WuXi based on an estimated acquisition date fair value of $27.0. We calculated this fair value using a discounted cash flow analysis under the income approach, which required estimates and assumptions regarding projected revenue growth, customer attrition rates, profit margin, and discount rate.

The acquisition of the remaining interest in WuXi was accounted for as a business combination. The results of this business are consolidated within our Industrial Gases – Asia segment.

Other Fiscal Year 2019 Business Combinations

The remaining business combinations completed in fiscal year 2019 had total consideration, net of cash acquired, of $126.6. The largest of these business combinations was the acquisition of ACP Europe SA ("ACP"), the largest independent carbon dioxide business in Continental Europe. The results of this business are consolidated within our Industrial Gases – EMEA segment.

4. REVENUE RECOGNITION

Nature of Goods and Services

The principal activities from which we generate sales from our contracts with customers, separated between our regional industrial gases businesses and industrial gases equipment businesses, are described below with their respective revenue recognition policies. For an overall summary of these policies and discussion on payment terms and presentation, refer to Note 1, *Major Accounting Policies.*

Industrial Gases – Regional

Our regional industrial gases businesses produce and sell atmospheric gases such as oxygen, nitrogen, and argon (primarily recovered by the cryogenic distillation of air) and process gases such as hydrogen, helium, carbon dioxide, carbon monoxide, syngas, and specialty gases. We distribute gases to our sale of gas customers through different supply modes depending on various factors including the customer's volume requirements and location. Our supply modes are as follows:

- *On-site Gases*—Supply mode associated with customers who require large volumes of gases and have relatively constant demand. Gases are produced and supplied by large facilities on or near the customers' facilities or by pipeline systems from centrally located production facilities. These sale of gas contracts generally have 15- to 20- year terms. We also deliver smaller quantities of product through small on-site plants (cryogenic or non-cryogenic generators), typically via 10- to 15- year sale of gas contracts. The contracts within this supply mode generally contain fixed monthly charges and/or minimum purchase requirements with price escalation provisions that are generally based on external indices. Revenue associated with this supply mode is generally recognized over time during the period in which we deliver or make available the agreed upon quantity of goods.
- *Merchant Gases*—Supply mode associated with liquid bulk and packaged gases customers. Liquid bulk customers receive delivery of product in liquid or gaseous form by tanker or tube trailer. The product is stored, usually in its liquid state, in equipment we typically design and install at the customer's site for vaporizing into a gaseous state as needed. Packaged gases customers receive small quantities of product delivered in either cylinders or dewars. Both liquid bulk and packaged gases sales do not contain minimum purchase requirements as they are governed by contracts and/or purchase orders based on the customer's requirements. These contracts contain stated terms that are generally 5 years or less. Performance obligations associated with this supply mode are satisfied at a point in time when the customer receives and obtains control of the product, which generally occurs upon delivery.

The timing of revenue recognition for our regional industrial gases businesses is generally consistent with our right to invoice the customer. Variable components of consideration that may not be resolved within the month, such as the ability to earn an annual bonus or incur a penalty, are more relevant to on-site contracts and are considered constrained as they can be impacted by a single significant event such as a plant outage, which could occur at the end of a contract period. We consider contract modifications on an individual basis to determine appropriate accounting treatment. However, contract modifications are generally accounted for prospectively as they relate to distinct goods or services associated with future periods of performance.

We mitigate energy and natural gas price risk contractually through pricing formulas, surcharges, and cost pass-through arrangements.

Industrial Gases – Equipment

We design and manufacture equipment for air separation, hydrocarbon recovery and purification, natural gas liquefaction, and liquid helium and liquid hydrogen transport and storage. The Industrial Gases – Global and the Corporate and other segments serve our sale of equipment customers.

Our sale of equipment contracts are generally comprised of a single performance obligation as the individual promised goods or services contained within the contracts are integrated with or dependent upon other goods or services in the contract for a single output to the customer.

Revenue from our sale of equipment contracts is generally recognized over time as we have an enforceable right to payment for performance completed to date and our performance under the contract terms does not create an asset with alternative use. Otherwise, sale of equipment contracts are satisfied at the point in time the customer obtains control of the equipment, which is generally determined based on the shipping terms of the contract. For contracts recognized over time, we primarily recognize revenue using a cost incurred input method by which costs incurred to date relative to total estimated costs at completion are used to measure progress toward satisfying performance obligations. Costs incurred include material, labor, and overhead costs and represent work contributing and proportionate to the transfer of control to the customer.

Since our contracts are generally comprised of a single performance obligation, contract modifications are typically accounted for as part of the existing contract and are recognized as a cumulative adjustment for the inception-to-date effect of such change. In addition, changes in estimates on projects accounted for under the cost incurred input method are recognized as a cumulative adjustment for the inception-to-date effect of such change. Changes in estimates unfavorably impacted operating income by approximately $19 in fiscal year 2021. Changes in estimates favorably impacted operating income by approximately $7 and $37 in fiscal years 2020 and 2019, respectively. Our changes in estimates would not have significantly impacted amounts recorded in prior years.

Disaggregation of Revenue

The table below presents our consolidated sales disaggregated by supply mode for each of our reporting segments. We believe this presentation best depicts the nature, timing, type of customer, and contract terms for our sales.

	Industrial Gases–Americas	Industrial Gases–EMEA	Industrial Gases–Asia	Industrial Gases–Global	Corporate and other	Total	%
2021							
On-site	$2,469.5	$873.1	$1,718.8	$—	$—	$5,061.4	49%
Merchant	1,698.1	1,571.8	1,202.0	—	—	4,471.9	43%
Sale of Equipment	—	—	—	511.0	278.7	789.7	8%
Total	**$4,167.6**	**$2,444.9**	**$2,920.8**	**$511.0**	**$278.7**	**$10,323.0**	**100%**
2020							
On-site	$2,040.2	$629.3	$1,652.8	$—	$—	$4,322.3	49%
Merchant	1,590.5	1,297.0	1,063.7	—	—	3,951.2	45%
Sale of Equipment	—	—	—	364.9	217.9	582.8	6%
Total	**$3,630.7**	**$1,926.3**	**$2,716.5**	**$364.9**	**$217.9**	**$8,856.3**	**100%**
2019							
On-site	$2,230.6	$728.4	$1,622.6	$—	$—	$4,581.6	52%
Merchant	1,642.9	1,274.1	1,041.0	—	—	3,958.0	44%
Sale of Equipment	—	—	—	261.0	118.3	379.3	4%
Total	**$3,873.5**	**$2,002.5**	**$2,663.6**	**$261.0**	**$118.3**	**$8,918.9**	**100%**

Remaining Performance Obligations

As of 30 September 2021, the transaction price allocated to remaining performance obligations is estimated to be approximately $24 billion. This amount includes fixed-charge contract provisions associated with our on-site and sale of equipment supply modes. We estimate that approximately half of this revenue will be recognized over approximately the next five years and the balance thereafter.

Expected revenue associated with new on-site plants that are not yet on stream is excluded from this amount. In addition, this amount excludes consideration associated with contracts having an expected duration of less than one year, and variable consideration for which we recognize revenue at the amount to which we have the right to invoice, including pass-through costs related to energy and natural gas.

In the future, actual amounts will differ due to events outside of our control, including, but not limited to, inflationary price escalations; currency exchange rates; and amended, terminated, or renewed contracts.

Contract Balances

The table below details balances arising from contracts with customers:

30 September	Balance Sheet Location	2021	2020
Assets			
Contract assets – current	Other receivables and current assets	**$119.4**	$55.9
Contract fulfillment costs – current	Other receivables and current assets	**125.5**	109.9
Liabilities			
Contract liabilities – current	Payables and accrued liabilities	**366.8**	313.8
Contract liabilities – noncurrent	Other noncurrent liabilities	**58.4**	57.9

Contract assets and liabilities result from differences in timing of revenue recognition and customer invoicing. These balances are reported on the consolidated balance sheets on a contract-by-contract basis at the end of each reporting period.

Contract assets primarily relate to our sale of equipment contracts for which revenue is recognized over time. These balances represent unbilled revenue, which occurs when revenue recognized under the measure of progress exceeds the amount invoiced to our customers. Our ability to invoice the customer for contract asset balances is not only based on the passage of time, but also the achievement of certain contractual milestones.

Contract fulfillment costs primarily include deferred costs related to sale of equipment projects that cannot be inventoried and for which we expect to recognize revenue upon transfer of control at project completion or costs related to fulfilling a specific anticipated contract.

Costs to obtain a contract, or contract acquisition costs, are capitalized only after we have established a contract with the customer. We elected to apply the practical expedient to expense these costs as they are incurred if the amortization period of the asset that would have otherwise been recognized is one year or less. Our contract acquisition costs capitalized as of 30 September 2021 and 2020 were not material.

Contract liabilities include advance payments or right to consideration prior to performance under the contract. Contract liabilities are recognized as revenue when or as we perform under the contract. The increase in our contract liabilities – current balance primarily relates to new sale of equipment projects as balances associated with our sale of gas contracts are generally related to fixed charges and are relatively consistent period over period. During the fiscal year ended 30 September 2021, we recognized approximately $240 in revenue associated with sale of equipment contracts that was included within our contract liabilities as of 30 September 2020. Advanced payments from our customers do not represent a significant financing component as these payments are intended for purposes other than financing, such as to meet working capital demands or to protect us from our customer failing to meet its obligations under the terms of the contract.

Changes in contract asset and liability balances during the fiscal year ended 30 September 2021 were not materially impacted by any other factors.

5. DISCONTINUED OPERATIONS

In fiscal year 2021, income from discontinued operations, net of tax, was $70.3. This included net tax benefits of $60.0 recorded upon release of tax liabilities related to uncertain tax positions for which the statute of limitations expired. Of this benefit, we recorded $51.8 in the fourth quarter for liabilities associated with our former Performance Materials Division ("PMD") and $8.2 in the third quarter for liabilities associated with our former Energy-from-Waste ("EfW") business. Additionally, we recorded a tax benefit of $10.3 in the first quarter of fiscal year 2021 primarily from the settlement of a state tax appeal related to the gain on the sale of PMD in fiscal year 2017. Our consolidated statement of cash flows for the fiscal year ended 30 September 2021 includes $6.7 received as part of the settlement.

In fiscal year 2020, loss from discontinued operations, net of tax, was $14.3. This resulted from a pre-tax loss of $19.0 recorded in the second quarter to increase our existing liability for retained environmental obligations associated with the sale of our former Amines business in September 2006. Refer to the Pace discussion within Note 16, *Commitments and Contingencies*, for additional information. The loss did not have an impact on our cash flows for the fiscal year ended 30 September 2020.

6. INVENTORIES

The components of inventories are as follows:

30 September	2021	2020
Finished goods	**$150.7**	$134.5
Work in process	**24.0**	21.3
Raw materials, supplies and other	**279.2**	249.0
Inventories	**$453.9**	$404.8

7. SUMMARIZED FINANCIAL INFORMATION OF EQUITY AFFILIATES

The summarized financial information below is on a combined 100% basis and has been compiled based on financial statements of the companies accounted for by the equity method. The amounts presented include the accounts of the following equity affiliates:

Abdullah Hashim Industrial Gases & Equipment Co., Ltd. (25%);
Air Products South Africa (Proprietary) Limited (50%);
Bangkok Cogeneration Company Limited (49%);
Bangkok Industrial Gases Co., Ltd. (49%);
Chengdu Air & Gas Products Ltd. (50%);
Helios S.p.A. (49%);
INFRA Group (40%);
INOX Air Products Private Limited (50%);
Jazan Gas Projects Company (26%);
Kulim Industrial Gases Sdn. Bhd. (50%);
Sapio Produzione Idrogeno Ossigeno S.r.l. (49%);
and principally, other industrial gas producers.

30 September	2021	2020
Current assets	**$2,244.6**	$1,943.5
Noncurrent assets	**4,630.7**	4,529.2
Current liabilities	**774.0**	765.3
Noncurrent liabilities	**2,852.5**	2,958.8

Fiscal Year Ended 30 September	2021	2020	2019
Net sales	**$3,338.1**	$2,809.1	$2,885.6
Gross profit	**1,492.9**	1,212.5	1,193.4
Operating income	**962.2**	748.6	763.4
Net income	**646.0**	567.8	492.4

Dividends received from equity affiliates were $157.3, $107.0, and $144.3 in fiscal years 2021, 2020, and 2019, respectively.

The investment in net assets of and advances to equity affiliates as of 30 September 2021 and 2020 included investment in foreign affiliates of $1,648.0 and $1,431.3, respectively.

As of 30 September 2021 and 2020, the amount of investment in companies accounted for by the equity method included equity method goodwill of $55.3 and $50.0, respectively.

India Finance Act 2020

Our consolidated income statements in fiscal year 2020 include a benefit of $33.8 reflected in equity affiliates' income for our share of accumulated dividend distribution taxes released with respect to INOX Air Products Private Limited, an equity affiliate investment in our Industrial Gases – Asia segment. This benefit, which related to tax legislation passed by the Indian government, was not recorded in segment results. Refer to Note 21, *Income Taxes*, for additional information. The benefit is included in fiscal year 2020 net income in the table above on a 100% basis.

Jazan Gas Project Company

On 19 April 2015, Jazan Gas Project Company, a joint venture between Air Products and ACWA Holding, entered into a 20-year oxygen and nitrogen supply agreement to supply Aramco's oil refinery and power plant being built in Jazan, Saudi Arabia. We own 26% of the joint venture and guarantee repayment of our share of an equity bridge loan. ACWA also guarantees their share of the loan. We determined that the joint venture is a variable interest entity for which we are not the primary beneficiary. As of 30 September 2021, our consolidated balance sheets included $94.4 reflected within "Payables and accrued liabilities" for our obligation to make equity contributions based on our proportionate share of the advances received by the joint venture under the loan.

Subsequent Event

As part of the Jazan Integrated Gasification and Power Company transaction discussed in Note 24, *Subsequent Events*, Jazan Gas Project Company sold its air separation units to Aramco in October 2021 and repaid its outstanding debt, including the equity bridge loan.

8. PLANT AND EQUIPMENT, NET

The major classes of plant and equipment are as follows:

30 September	Useful Life in years	**2021**	2020
Land		**$312.1**	$296.8
Buildings	30	**1,083.1**	997.8
Production facilities(A)	10 to 20	**18,236.9**	17,289.7
Distribution and other machinery and equipment(B)	5 to 25	**5,111.6**	4,807.7
Construction in progress		**2,745.1**	1,784.2
Plant and equipment, at cost		**27,488.8**	25,176.2
Less: Accumulated depreciation		**14,234.2**	13,211.5
Plant and equipment, net		**$13,254.6**	$11,964.7

(A) Depreciable lives of production facilities related to long-term customer supply contracts are generally matched to the contract lives.

(B) The depreciable lives for various types of distribution equipment are: 10 to 25 years for cylinders, depending on the nature and properties of the product; 20 years for tanks; generally 7.5 years for customer stations; and 5 to 15 years for tractors and trailers.

Depreciation expense was $1,284.1, $1,150.5, and $1,049.7 in fiscal years 2021, 2020, and 2019, respectively.

9. GOODWILL

Changes to the carrying amount of consolidated goodwill by segment are as follows:

	Industrial Gases–Americas	Industrial Gases–EMEA	Industrial Gases–Asia	Industrial Gases–Global	Corporate and other	Total
Goodwill, net at 30 September 2019	$156.3	$432.3	$178.5	$19.6	$10.4	$797.1
Acquisitions	—	66.6	—	—	4.5	71.1
Currency translation and other	(3.7)	25.2	1.9	(0.1)	—	23.3
Goodwill, net at 30 September 2020	$152.6	$524.1	$180.4	$19.5	$14.9	$891.5
Acquisitions	—	21.0	—	—	—	21.0
Currency translation and other	(1.6)	(3.6)	3.9	0.3	—	(1.0)
Goodwill, net at 30 September 2021	**$151.0**	**$541.5**	**$184.3**	**$19.8**	**$14.9**	**$911.5**

In fiscal year 2021, goodwill acquired is primarily attributable to expected cost synergies and growth opportunities related to a business combination completed in the second quarter. This goodwill is not deductible for tax purposes. Refer to Note 3, *Acquisitions*, for additional information.

30 September	**2021**	2020	2019
Goodwill, gross	**$1,239.2**	$1,230.2	$1,162.2
Accumulated impairment losses[(A)]	**(327.7)**	(338.7)	(365.1)
Goodwill, net	**$911.5**	$891.5	$797.1

(A) Accumulated impairment losses include the impacts of currency translation. These losses are attributable to our Latin America reporting unit ("LASA") within the Industrial Gases – Americas segment.

We review goodwill for impairment annually in the fourth quarter of the fiscal year and whenever events or changes in circumstances indicate that the carrying value of goodwill might not be recoverable. The impairment test for goodwill involves calculating the fair value of each reporting unit and comparing that value to the carrying value. If the fair value of the reporting unit is less than its carrying value, the difference is recorded as a goodwill impairment charge, not to exceed the total amount of goodwill allocated to that reporting unit. During the fourth quarter of fiscal year 2021, we conducted our annual goodwill impairment test and determined that the fair value of all our reporting units exceeded their carrying value.

10. INTANGIBLE ASSETS

The table below summarizes the major classes of our intangible assets:

	2021			2020		
30 September	**Gross**	**Accumulated Amortization/ Impairment**	**Net**	Gross	Accumulated Amortization/ Impairment	Net
Finite-lived:						
Customer relationships	**$552.0**	**($234.7)**	**$317.3**	$538.0	($209.9)	$328.1
Patents and technology	**36.8**	**(16.9)**	**19.9**	39.1	(16.3)	22.8
Other	**80.5**	**(37.3)**	**43.2**	77.6	(33.7)	43.9
Total finite-lived intangible assets	**669.3**	**(288.9)**	**380.4**	654.7	(259.9)	394.8
Indefinite-lived:						
Trade names and trademarks	**51.2**	**(10.9)**	**40.3**	52.2	(11.2)	41.0
Total Intangible Assets	**$720.5**	**($299.8)**	**$420.7**	$706.9	($271.1)	$435.8

The decrease in net intangible assets in fiscal year 2021 was primarily attributable to amortization, partially offset by intangible assets acquired through business combinations.

Amortization expense for intangible assets was $37.2, $34.5, and $33.1 in fiscal years 2021, 2020, and 2019, respectively. Refer to Note 1, *Major Accounting Policies*, for the amortization periods for each major class of intangible assets.

The table below details the amount of amortization expense expected to be recorded for our finite-lived intangible assets in each of the next five years and thereafter:

2022	$34.7
2023	33.2
2024	32.1
2025	30.8
2026	29.2
Thereafter	220.4
Total	$380.4

Indefinite-lived intangible assets are subject to impairment testing at least annually or more frequently if events or changes in circumstances indicate that potential impairment exists. The impairment test for indefinite-lived intangible assets involves calculating the fair value of the indefinite-lived intangible assets and comparing the fair value to their carrying value. If the fair value is less than the carrying value, the difference is recorded as an impairment loss. During the fourth quarter of fiscal year 2021, we conducted our annual impairment test of indefinite-lived intangible assets and determined that the fair value of all our intangible assets exceeded their carrying value.

11. LEASES

Lessee Accounting

We are the lessee under various agreements for real estate, vehicles, aircraft, and other equipment that are accounted for as operating leases. Our finance leases principally relate to the right to use machinery and equipment and are not material.

Operating lease expense was $89.5 and $80.1 for fiscal years 2021 and 2020, respectively. These amounts exclude short-term and variable lease expenses, which were not material.

Amounts associated with operating leases and their presentation on our consolidated balance sheets are as follows:

30 September	2021	2020
Operating lease right-of-use assets		
Other noncurrent assets	**$566.2**	$376.8
Operating lease liabilities		
Payables and accrued liabilities	**78.6**	70.7
Other noncurrent liabilities	**503.4**	335.8
Total operating lease liabilities	**$582.0**	$406.5

30 September	2021	2020
Weighted-average remaining lease term in years[(A)]	**17.2**	15.7
Weighted-average discount rate[(B)]	**1.9%**	2.1%

(A) Calculated on the basis of the remaining lease term and the lease liability balance for each lease as of the reporting date.

(B) Calculated on the basis of the discount rate used to calculate the lease liability for each lease and the remaining balance of the lease payments for each lease as of the reporting date.

The following maturity analysis of our operating lease liabilities as of 30 September 2021 presents the undiscounted cash flows for each of the next five years and thereafter with a reconciliation to the lease liability recognized on our balance sheet:

	Operating Leases
2022	$88.4
2023	71.3
2024	60.4
2025	51.1
2026	40.4
Thereafter	361.5
Total undiscounted lease payments	673.1
Imputed interest	(91.1)
Present value of lease liability recognized on balance sheet	$582.0

The impacts associated with our operating leases on the consolidated statements of cash flows are reflected within "Other adjustments" within operating activities. This includes non-cash operating lease expense of $89.5 and $80.1, as well as a use of cash of $98.8 and $90.0 for payments on amounts included in the measurement of the lease liability for fiscal years 2021 and 2020, respectively.

We recorded $259 and $442 of noncash right-of-use asset additions during fiscal years 2021 and 2020, respectively.

We have additional operating leases that have not yet commenced as of 30 September 2021 having lease payments totaling approximately $195.

Lessor Accounting

Certain contracts associated with facilities that are built to provide product to a specific customer have been accounted for as leases. As we generally control the operations and maintenance of the assets that provide the supply of gas to our customers, there have been no new arrangements that qualified as a lease in fiscal year 2021.

In cases where operating lease treatment is appropriate, there is no difference in revenue recognition over the life of the contract as compared to accounting for the contract under a sale of gas agreement. These contracts qualify for a practical expedient available to lessors to combine the lease and non-lease components and account for the combined component in accordance with the accounting treatment for the predominant component. We elected to apply this practical expedient and have accounted for the combined component as product sales under the revenue standard as we control the operations and maintenance of the assets that provide the supply of gas to our customers.

In cases where sales-type lease treatment is appropriate, revenue and expense are recognized up front for the sale of equipment component of the contract as compared to revenue recognition over the life of the arrangement under contracts not qualifying as sales-type leases. Additionally, a portion of the revenue representing interest income from the financing component of the lease receivable is reflected as sales over the life of the contract. During fiscal years 2021 and 2020, we recognized interest income of $67.4 and $71.2 on our lease receivables, respectively.

Our contracts generally do not have the option to extend or terminate the lease or provide the customer the right to purchase the asset at the end of the contract term. Instead, renewal of such contracts requires negotiation of mutually agreed terms by both parties. Unless the customer terminates within the required notice period, the contract will go into evergreen. Given the long-term duration of our contracts, there is no assumed residual value for the assets at the end of the lease term.

Lease receivables, net, primarily relate to sales-type leases on certain on-site assets which are collected over the contract term. As of 30 September 2021 and 2020, our lease receivables, net were $824.7 and $903.0, respectively. Lease receivables, net are primarily included within "Noncurrent lease receivables" on our consolidated balance sheets, with the remaining balance in "Other receivables and current assets." The majority of our leases are of high credit quality and were originated prior to fiscal year 2017. As of 30 September 2021 and 2020, the credit quality of lease receivables did not require a material allowance for credit losses.

Lease payments collected in fiscal years 2021, 2020, and 2019 were $166.2, $162.8, and $171.6, respectively. These payments reduced the lease receivable balance by $98.8, $91.6, and $94.6 in fiscal years 2021, 2020, and 2019, respectively.

As of 30 September 2021, minimum lease payments expected to be collected, which reconciles to lease receivables, net, were as follows:

2022	$146.8
2023	143.1
2024	137.0
2025	131.4
2026	120.6
Thereafter	508.7
Total	1,187.6
Unearned interest income	(362.9)
Lease Receivables, net	$824.7

12. FINANCIAL INSTRUMENTS

Currency Price Risk Management

Our earnings, cash flows, and financial position are exposed to foreign currency risk from foreign currency-denominated transactions and net investments in foreign operations. It is our policy to seek to minimize our cash flow volatility from changes in currency exchange rates. This is accomplished by identifying and evaluating the risk that our cash flows will change in value due to changes in exchange rates and by executing strategies necessary to manage such exposures. Our objective is to maintain economically balanced currency risk management strategies that provide adequate downside protection.

Forward Exchange Contracts

We enter into forward exchange contracts to reduce the cash flow exposure to foreign currency fluctuations associated with highly anticipated cash flows and certain firm commitments, such as the purchase of plant and equipment. We also enter into forward exchange contracts to hedge the cash flow exposure on intercompany loans and third-party debt. This portfolio of forward exchange contracts consists primarily of Euros and U.S. Dollars. The maximum remaining term of any forward exchange contract currently outstanding and designated as a cash flow hedge at 30 September 2021 is 3.2 years.

Forward exchange contracts are also used to hedge the value of investments in certain foreign subsidiaries and affiliates by creating a liability in a currency in which we have a net equity position. The primary currency pair in this portfolio of forward exchange contracts is Euros and U.S. Dollars.

We also utilize forward exchange contracts that are not designated as hedges. These contracts are used to economically hedge foreign currency-denominated monetary assets and liabilities, primarily working capital. The primary objective of these forward exchange contracts is to protect the value of foreign currency-denominated monetary assets and liabilities from the effects of volatility in foreign exchange rates that might occur prior to their receipt or settlement. This portfolio of forward exchange contracts consists of many different foreign currency pairs, with a profile that changes from time to time depending on our business activity and sourcing decisions.

The table below summarizes our outstanding currency price risk management instruments:

	2021		2020	
30 September	**US$ Notional**	**Years Average Maturity**	US$ Notional	Years Average Maturity
Forward Exchange Contracts				
Cash flow hedges	**$3,465.2**	**0.6**	$2,842.1	0.5
Net investment hedges	**638.0**	**3.0**	636.6	3.8
Not designated	**692.6**	**0.1**	1,685.2	0.3
Total Forward Exchange Contracts	**$4,795.8**	**0.8**	$5,163.9	0.8

The decrease in the notional value of forward exchange contracts that are not designated is primarily due to maturities.

We also use foreign currency-denominated debt to hedge the foreign currency exposures of our net investment in certain foreign subsidiaries. The designated foreign currency-denominated debt and related accrued interest was €1,297.5 million ($1,502.6) at 30 September 2021 and €1,288.7 million ($1,510.8) at 30 September 2020. The designated foreign currency-denominated debt is presented within "Long-term debt" on the consolidated balance sheets.

Debt Portfolio Management

It is our policy to identify, on a continuing basis, the need for debt capital and to evaluate the financial risks inherent in funding the Company with debt capital. Reflecting the result of this ongoing review, our debt portfolio and hedging program are managed with the intent to (1) reduce funding risk with respect to borrowings made by us to preserve our access to debt capital and provide debt capital as required for funding and liquidity purposes, and (2) manage the aggregate interest rate risk and the debt portfolio in accordance with certain debt management parameters.

Interest Rate Management Contracts

We enter into interest rate swaps to change the fixed/variable interest rate mix of our debt portfolio in order to maintain the percentage of fixed- and variable-rate debt within the parameters set by management. In accordance with these parameters, the agreements are used to manage interest rate risks and costs inherent in our debt portfolio. Our interest rate management portfolio generally consists of fixed-to-floating interest rate swaps (which are designated as fair value hedges), pre-issuance interest rate swaps and treasury locks (which hedge the interest rate risk associated with anticipated fixed-rate debt issuances and are designated as cash flow hedges), and floating-to-fixed interest rate swaps (which are designated as cash flow hedges). As of 30 September 2021, the outstanding interest rate swaps were denominated in U.S. Dollars. The notional amount of the interest rate swap agreements is equal to or less than the designated debt being hedged. When interest rate swaps are used to hedge variable-rate debt, the indices of the swaps and the debt to which they are designated are the same. It is our policy not to enter into any interest rate management contracts which lever a move in interest rates on a greater than one-to-one basis.

Cross Currency Interest Rate Swap Contracts

We enter into cross currency interest rate swap contracts when our risk management function deems necessary. These contracts may entail both the exchange of fixed- and floating-rate interest payments periodically over the life of the agreement and the exchange of one currency for another currency at inception and at a specified future date. The contracts are used to hedge either certain net investments in foreign operations or non-functional currency cash flows related to intercompany loans. The current cross currency interest rate swap portfolio consists of fixed-to-fixed swaps primarily between U.S. Dollars and Chinese Renminbi, U.S. Dollars and Indian Rupee, and U.S. Dollars and Chilean Pesos.

The table below summarizes our outstanding interest rate management contracts and cross currency interest rate swaps:

	2021				2020			
30 September	**US$ Notional**	**Average Pay %**	**Average Receive %**	**Years Average Maturity**	US$ Notional	Average Pay %	Average Receive %	Years Average Maturity
Interest rate swaps (fair value hedge)	**$200.0**	**LIBOR**	**2.76%**	**0.1**	$200.0	LIBOR	2.76%	1.1
Cross currency interest rate swaps (net investment hedge)	**$210.2**	**4.32%**	**3.14%**	**2.2**	$201.6	4.27%	3.12%	3.2
Cross currency interest rate swaps (cash flow hedge)	**$1,005.7**	**4.98%**	**2.93%**	**2.7**	$1,057.9	4.83%	2.98%	2.5
Cross currency interest rate swaps (not designated)	**$4.2**	**5.39%**	**3.54%**	**2.2**	$12.8	5.39%	3.54%	3.2

The table below provides the amounts recorded on the consolidated balance sheet related to cumulative basis adjustments for fair value hedges:

	Carrying amounts of hedged item		Cumulative hedging adjustment, included in carrying amount	
30 September	**2021**	2020	**2021**	2020
Current portion of long-term debt	**$400.5**	$—	**$0.5**	$—
Long-term debt	**—**	405.4	**—**	5.7

The table below summarizes the fair value and balance sheet location of our outstanding derivatives. Refer to Note 13, *Fair Value Measurements*, which defines fair value, describes the method for measuring fair value, and provides additional disclosures regarding fair value measurements.

30 September	Balance Sheet Location	2021	2020	Balance Sheet Location	2021	2020
Derivatives Designated as Hedging Instruments:						
Forward exchange contracts	Other receivables and current assets	**$35.1**	$51.1	Payables and accrued liabilities	**$57.2**	$22.5
Interest rate management contracts	Other receivables and current assets	**16.0**	14.7	Payables and accrued liabilities	**5.2**	0.4
Forward exchange contracts	Other noncurrent assets	**5.5**	0.8	Other noncurrent liabilities	**25.2**	33.0
Interest rate management contracts	Other noncurrent assets	**18.1**	44.3	Other noncurrent liabilities	**27.5**	1.7
Total Derivatives Designated as Hedging Instruments		**$74.7**	$110.9		**$115.1**	$57.6
Derivatives Not Designated as Hedging Instruments:						
Forward exchange contracts	Other receivables and current assets	**$8.7**	$31.7	Payables and accrued liabilities	**$6.4**	$28.0
Interest rate management contracts	Other noncurrent assets	**—**	0.7	Other noncurrent liabilities	**—**	—
Total Derivatives Not Designated as Hedging Instruments		**$8.7**	$32.4		**$6.4**	$28.0
Total Derivatives		**$83.4**	$143.3		**$121.5**	$85.6

The table below summarizes gains (losses) recognized in other comprehensive income during the period related to our net investment and cash flow hedging relationships:

	2021	2020
Net Investment Hedging Relationships		
Forward exchange contracts	**$11.4**	($15.9)
Foreign currency debt	**18.1**	(100.2)
Cross currency interest rate swaps	**(7.9)**	1.9
Total Amount Recognized in OCI	**21.6**	(114.2)
Tax effects	**(5.5)**	28.2
Net Amount Recognized in OCI	**$16.1**	($86.0)
Derivatives in Cash Flow Hedging Relationships		
Forward exchange contracts	**$12.7**	$116.6
Forward exchange contracts, excluded components	**(11.7)**	(15.2)
Other[A]	**(6.7)**	(34.2)
Total Amount Recognized in OCI	**(5.7)**	67.2
Tax effects	**9.0**	(23.7)
Net Amount Recognized in OCI	**$3.3**	$43.5

[A] Other primarily includes interest rate and cross currency interest rate swaps for which excluded components are recognized in "Payables and accrued liabilities" and "Other receivables and current assets" as a component of accrued interest payable and accrued interest receivable, respectively. These excluded components are recorded in "Other non-operating income (expense), net" over the life of the cross currency interest rate swap. Other also includes the recognition of our share of gains and losses, net of tax, related to interest rate swaps held by our equity affiliates.

The table below summarizes the location and amounts recognized in income related to our cash flow and fair value hedging relationships by contract type:

	Sales		Cost of Sales		Interest Expense		Other Non-Operating Income (Expense), Net	
	2021	2020	**2021**	2020	**2021**	2020	**2021**	2020
Total presented in consolidated income statements that includes effects of hedging below	**$10,323.0**	$8,856.3	**$7,186.1**	$5,858.1	**$141.8**	$109.3	**$73.7**	$30.7
(Gain) Loss Effects of Cash Flow Hedging:								
Forward Exchange Contracts:								
Amount reclassified from OCI into income	**($0.8)**	($0.2)	**($0.8)**	($1.0)	**$—**	$—	**$5.2**	($117.9)
Amount excluded from effectiveness testing recognized in earnings based on amortization approach	**—**	—	**—**	—	**—**	—	**9.1**	17.0
Other:								
Amount reclassified from OCI into income	**—**	—	**—**	—	**5.6**	4.2	**39.1**	22.5
Total (Gain) Loss Reclassified from OCI to Income	**(0.8)**	(0.2)	**(0.8)**	(1.0)	**5.6**	4.2	**53.4**	(78.4)
Tax effects	**0.2**	—	**0.5**	0.2	**(2.1)**	(1.4)	**(12.5)**	18.9
Net (Gain) Loss Reclassified from OCI to Income	**($0.6)**	($0.2)	**($0.3)**	($0.8)	**$3.5**	$2.8	**$40.9**	($59.5)
(Gain) Loss Effects of Fair Value Hedging:								
Other:								
Hedged items	**$—**	$—	**$—**	$—	**($5.2)**	$0.5	**$—**	$—
Derivatives designated as hedging instruments	**—**	—	**—**	—	**5.2**	(0.5)	**—**	—
Total (Gain) Loss Recognized in Income	**$—**	$—	**$—**	$—	**$—**	$—	**$—**	$—

The table below summarizes the location and amounts recognized in income related to our derivatives not designated as hedging instruments by contract type:

	Other Income (Expense), Net		Other Non-Operating Income (Expense), Net	
	2021	2020	**2021**	2020
The Effects of Derivatives Not Designated as Hedging Instruments:				
Forward Exchange Contracts	**$2.8**	($1.5)	**($2.7)**	$1.1
Other	**—**	—	**0.5**	0.7
Total (Gain) Loss Recognized in Income	**$2.8**	($1.5)	**($2.2)**	$1.8

The amount of unrealized gains and losses related to cash flow hedges as of 30 September 2021 that are expected to be reclassified to earnings in the next twelve months is not material.

The cash flows related to all derivative contracts are reported in the operating activities section of the consolidated statements of cash flows.

Credit Risk-Related Contingent Features

Certain derivative instruments are executed under agreements that require us to maintain a minimum credit rating with both Standard & Poor's and Moody's. If our credit rating falls below this threshold, the counterparty to the derivative instruments has the right to request full collateralization on the derivatives' net liability position. The net liability position of derivatives with credit risk-related contingent features was $53.4 and $30.0 as of 30 September 2021 and 2020, respectively. Because our current credit rating is above the various pre-established thresholds, no collateral has been posted on these liability positions.

Counterparty Credit Risk Management

We execute financial derivative transactions with counterparties that are highly rated financial institutions, all of which are investment grade at this time. Some of our underlying derivative agreements give us the right to require the institution to post collateral if its credit rating falls below the pre-established thresholds with Standard & Poor's or Moody's. The collateral that the counterparties would be required to post was $38.1 and $76.5 as of 30 September 2021 and 2020, respectively. No financial institution is required to post collateral at this time, as all have credit ratings at or above threshold.

13. FAIR VALUE MEASUREMENTS

Fair value is defined as an exit price, or the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The fair value hierarchy prioritizes the inputs to valuation techniques used to measure fair value into three broad levels as follows:

- *Level 1*—Quoted prices (unadjusted) in active markets for identical assets or liabilities.
- *Level 2*—Inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the asset or liability.
- *Level 3*—Inputs that are unobservable for the asset or liability based on our own assumptions about the assumptions market participants would use in pricing the asset or liability.

The methods and assumptions used to measure the fair value of financial instruments are as follows:

Short-term Investments

Short-term investments primarily include time deposits with original maturities greater than three months and less than one year. We estimated the fair value of our short-term investments, which approximates carrying value as of the balance sheet date, using Level 2 inputs within the fair value hierarchy. Level 2 measurements were based on current interest rates for similar investments with comparable credit risk and time to maturity.

Derivatives

The fair value of our interest rate management contracts and forward exchange contracts are quantified using the income approach and are based on estimates using standard pricing models. These models consider the value of future cash flows as of the balance sheet date, discounted to a present value using discount factors that match both the time to maturity and currency of the underlying instruments. These standard pricing models utilize inputs that are derived from or corroborated by observable market data such as interest rate yield curves as well as currency spot and forward rates; therefore, the fair value of our derivatives is classified as a Level 2 measurement. On an ongoing basis, we randomly test a subset of our valuations against valuations received from the transaction's counterparty to validate the accuracy of our standard pricing models. Counterparties to these derivative contracts are highly rated financial institutions.

Refer to Note 12, *Financial Instruments*, for a description of derivative instruments, including details related to the balance sheet line classifications.

Long-term Debt, Including Related Party

The fair value of our debt is based on estimates using standard pricing models that consider the value of future cash flows as of the balance sheet date, discounted to a present value using discount factors that match both the time to maturity and currency of the underlying instruments. These standard valuation models utilize observable market data such as interest rate yield curves and currency spot rates; therefore, the fair value of our debt is classified as a Level 2 measurement. We generally perform the computation of the fair value of these instruments.

The carrying values and fair values of financial instruments were as follows:

	2021		2020	
30 September	**Carrying Value**	**Fair Value**	Carrying Value	Fair Value
Assets				
Derivatives				
Forward exchange contracts	**$49.3**	**$49.3**	$83.6	$83.6
Interest rate management contracts	**34.1**	**34.1**	59.7	59.7
Liabilities				
Derivatives				
Forward exchange contracts	**$88.8**	**$88.8**	$83.5	$83.5
Interest rate management contracts	**32.7**	**32.7**	2.1	2.1
Long-term debt, including current portion and related party	**7,634.8**	**7,812.2**	7,900.1	8,278.4

The carrying amounts reported on the consolidated balance sheets for cash and cash items, short-term investments, trade receivables, payables and accrued liabilities, accrued income taxes, and short-term borrowings approximate fair value due to the short-term nature of these instruments. Accordingly, these items have been excluded from the above table.

The following table summarizes assets and liabilities on the consolidated balance sheets that are measured at fair value on a recurring basis:

	2021				2020			
30 September	**Total**	**Level 1**	**Level 2**	**Level 3**	Total	Level 1	Level 2	Level 3
Assets at Fair Value								
Derivatives								
Forward exchange contracts	**$49.3**	**$—**	**$49.3**	**$—**	$83.6	$—	$83.6	$—
Interest rate management contracts	**34.1**	**—**	**34.1**	**—**	59.7	—	59.7	—
Total Assets at Fair Value	**$83.4**	**$—**	**$83.4**	**$—**	$143.3	$—	$143.3	$—
Liabilities at Fair Value								
Derivatives								
Forward exchange contracts	**$88.8**	**$—**	**$88.8**	**$—**	$83.5	$—	$83.5	$—
Interest rate management contracts	**32.7**	**—**	**32.7**	**—**	2.1	—	2.1	—
Total Liabilities at Fair Value	**$121.5**	**$—**	**$121.5**	**$—**	$85.6	$—	$85.6	$—

14. DEBT

The table below summarizes our total outstanding debt as reflected on our consolidated balance sheets:

30 September	2021	2020
Short-term borrowings[(A)]	**$2.4**	$7.7
Current portion of long-term debt[(B)]	**484.5**	470.0
Long-term debt	**6,875.7**	7,132.9
Long-term debt – related party	**274.6**	297.2
Total Debt	**$7,637.2**	$7,907.8

(A) Includes bank obligations with weighted average interest rates of 0.6% and 1.6% as of 30 September 2021 and 2020, respectively.

(B) Includes current portion of long-term debt owed to a related party of $83.8 and $41.3 as of 30 September 2021 and 2020, respectively.

Total related party debt, including the current portion, was $358.4 and $338.5 as of 30 September 2021 and 30 September 2020, respectively. This debt primarily relates to a loan with our joint venture partner, Lu'An Clean Energy Company, which partially funded the acquisition of their assets by a consolidated joint venture in 2018.

The table below summarizes the coupon interest rates, fiscal year maturities, and carrying amounts of our long-term debt, including current portion and amounts owed to related parties:

30 September	Maturities	2021	2020
Payable in U.S. Dollars			
Debentures			
8.75%	2021	**$—**	$18.4
Medium-term Notes (weighted average rate)			
Series E 7.6%	2026	**17.2**	17.2
Senior Notes			
Note 3.0%	2022	**400.0**	400.0
Note 2.75%	2023	**400.0**	400.0
Note 3.35%	2024	**400.0**	400.0
Note 1.50%	2026	**550.0**	550.0
Note 1.85%	2027	**650.0**	650.0
Note 2.05%	2030	**900.0**	900.0
Note 2.70%	2040	**750.0**	750.0
Note 2.80%	2050	**950.0**	950.0
Other (weighted average rate)			
Variable-rate industrial revenue bonds 0.02%	2035 to 2050	**618.9**	631.9
Other 1.57%	2024 to 2032	**14.4**	—
Payable in Other Currencies			
Eurobonds 0.375%	2021	**—**	410.3
Eurobonds 1.0%	2025	**347.4**	351.7
Eurobonds 0.50%	2028	**579.1**	586.2
Eurobonds 0.80%	2032	**579.1**	586.2
New Taiwan Dollar 1.86%	2023 to 2028	**161.8**	—
Other	2023	**0.3**	0.6
Related Party			
Chinese Renminbi 5.5%	2022 to 2027	**355.0**	338.5
Chinese Renminbi 5.7%	2033	**3.4**	—
Capital Lease Obligations *(weighted average rate)*			
Foreign 11.6%	2022 to 2036	**8.1**	9.2
Total Principal Amount		**7,684.7**	7,950.2
Less: Unamortized discount and debt issuance costs		**(50.4)**	(55.8)
Less: Fair value hedge accounting adjustments[(A)]		**0.5**	5.7
Total Long-term Debt		**7,634.8**	7,900.1
Less: Current portion of long-term debt		**(484.5)**	(470.0)
Less: Long-term debt – related party		**(274.6)**	(297.2)
Long-term Debt		**$6,875.7**	$7,132.9

(A) We entered into LIBOR-based interest rate swaps with various financial institutions to hedge a portion of the 3.0% Senior Note maturing in fiscal year 2022. These interest rate swaps have been designated as fair value hedges of the Note. Refer to Note 12, *Financial Instruments*, for additional information.

Principal maturities of long-term debt, including current portion and amounts owed to related parties, in each of the next five years and thereafter are as follows:

2022	$484.0
2023	475.8
2024	492.5
2025	449.2
2026	662.7
Thereafter	5,120.5
Total	**$7,684.7**

Cash paid for interest, net of amounts capitalized, was $150.4, $67.2, and $155.9 in fiscal years 2021, 2020, and 2019, respectively.

Subsequent Event

In November 2021, we repaid the 3.0% Senior Note of $400, plus interest, on its maturity date.

Debt Covenants

Various debt agreements to which we are a party include financial covenants and other restrictions, including restrictions pertaining to the ability to create property liens and enter into certain sale and leaseback transactions. As of 30 September 2021, we are in compliance with all the financial and other covenants under our debt agreements.

Credit Facilities

On 31 March 2021, we entered into a five-year $2,500 revolving credit agreement with a syndicate of banks (the "2021 Credit Agreement"), under which senior unsecured debt is available to us and certain of our subsidiaries. The 2021 Credit Agreement provides a source of liquidity and supports our commercial paper program. The only financial covenant in the 2021 Credit Agreement is a maximum ratio of total debt to capitalization (equal to total debt plus total equity) not to exceed 70%. No borrowings were outstanding under the 2021 Credit Agreement as of 30 September 2021.

The 2021 Credit Agreement replaced our previous five-year $2,300 revolving credit agreement, which was to have matured on 31 March 2022. No borrowings were outstanding under the previous agreement as of 30 September 2020 or at the time of its termination. No early termination penalties were incurred.

We have credit facilities available to certain of our foreign subsidiaries totaling $296.7, of which $176.2 was borrowed and outstanding as of 30 September 2021.

2020 Debt Issuance

In fiscal year 2020, we issued U.S. Dollar- and Euro-denominated fixed-rate notes with aggregate principal amounts of $3.8 billion and €1.0 billion, respectively. Our consolidated statement of cash flows for the fiscal year ended 30 September 2020 includes long-term debt proceeds of $4,895.8 from these issuances.

15. RETIREMENT BENEFITS

We and certain of our subsidiaries sponsor defined benefit pension plans and defined contribution plans that cover a substantial portion of our worldwide employees. The principal defined benefit pension plans are the U.S. salaried pension plan and the U.K. pension plan. These plans were closed to new participants in 2005, after which defined contribution plans were offered to new employees. The principal defined contribution plan is the Retirement Savings Plan, in which a substantial portion of the U.S. employees participate. A similar plan is offered to U.K. employees. We also provide other postretirement benefits consisting primarily of healthcare benefits to U.S. retirees who meet age and service requirements.

Defined Benefit Pension Plans

Pension benefits earned are generally based on years of service and compensation during active employment. The components of net periodic (benefit) cost for our defined benefit pension plans for fiscal years 2021, 2020, and 2019 were as follows:

	2021		2020		2019	
Fiscal Year Ended 30 September	**U.S.**	**International**	U.S.	International	U.S.	International
Service cost	**$21.3**	**$23.4**	$23.4	$23.3	$21.4	$19.3
Interest cost	**68.9**	**25.2**	91.2	24.8	113.4	35.8
Expected return on plan assets	**(194.5)**	**(83.4)**	(188.7)	(77.4)	(172.5)	(75.1)
Prior service cost amortization	**1.2**	**—**	1.2	—	1.1	—
Actuarial loss amortization	**78.5**	**19.3**	83.7	19.5	65.3	10.9
Settlements	**1.3**	**0.5**	5.0	0.2	6.2	0.2
Special termination benefits	**—**	**—**	—	—	0.7	0.1
Other	**—**	**1.0**	—	0.8	—	0.8
Net Periodic (Benefit) Cost	**($23.3)**	**($14.0)**	$15.8	($8.8)	$35.6	($8.0)

Our service costs are primarily included within "Cost of sales" and "Selling and administrative" on our consolidated income statements. The amount of service costs capitalized in fiscal years 2021, 2020 and 2019 were not material. The non-service related costs, including pension settlement losses, are presented outside operating income within "Other non-operating income (expense), net."

Certain of our pension plans provide for a lump sum benefit payment option at the time of retirement, or for corporate officers, six months after their retirement date. A participant's vested benefit is considered settled upon cash payment of the lump sum. We recognize pension settlement losses when cash payments exceed the sum of the service and interest cost components of net periodic benefit cost of the plan for the fiscal year. We recognized pension settlement losses of $1.3, $5.0 and $6.2 in fiscal years 2021, 2020 and 2019, respectively, to accelerate recognition of a portion of actuarial losses deferred in accumulated other comprehensive loss associated with the U.S. supplementary pension plan.

We calculate net periodic benefit cost for a given fiscal year based on assumptions developed at the end of the previous fiscal year. The following table sets forth the weighted average assumptions used in the calculation of net periodic benefit cost:

	2021		2020		2019	
	U.S.	**International**	U.S.	International	U.S.	International
Discount rate – Service cost	**3.0%**	**1.6%**	3.3%	1.5%	4.3%	2.5%
Discount rate – Interest cost	**2.1%**	**1.2%**	2.9%	1.3%	4.0%	2.2%
Expected return on plan assets	**6.8%**	**4.7%**	7.0%	5.0%	7.0%	5.3%
Rate of compensation increase	**3.5%**	**3.3%**	3.5%	3.3%	3.5%	3.5%

The projected benefit obligation ("PBO") is the actuarial present value of benefits attributable to employee service rendered to date, including the effects of estimated future salary increases. The following table sets forth the weighted average assumptions used in the calculation of the PBO:

	2021		2020	
	U.S.	**International**	U.S.	International
Discount rate	**2.9%**	**1.8%**	2.7%	1.5%
Rate of compensation increase	**3.5%**	**3.3%**	3.5%	3.3%

The following tables reflect the change in the PBO and the change in the fair value of plan assets based on the plan year measurement date, as well as the amounts recognized in the consolidated balance sheets:

	2021		2020	
	U.S.	**International**	U.S.	International
Change in Projected Benefit Obligation				
Obligation at beginning of year	**$3,423.8**	**$1,949.7**	$3,281.6	$1,864.0
Service cost	**21.3**	**23.4**	23.4	23.3
Interest cost	**68.9**	**25.2**	91.2	24.8
Amendments	**0.5**	**—**	1.6	—
Actuarial (gain) loss	**(17.7)**	**(30.9)**	190.5	(11.6)
Settlements	**(3.0)**	**(1.8)**	(11.7)	(0.9)
Special termination benefits	**—**	**—**	—	—
Participant contributions	**—**	**1.3**	—	1.2
Benefits paid	**(158.5)**	**(52.8)**	(152.5)	(49.8)
Currency translation and other	**—**	**55.5**	(0.3)	98.7
Obligation at End of Year	**$3,335.3**	**$1,969.6**	$3,423.8	$1,949.7

	2021		2020	
	U.S.	**International**	U.S.	International
Change in Plan Assets				
Fair value at beginning of year	**$3,048.3**	**$1,726.8**	$2,832.4	$1,672.4
Actual return on plan assets	**450.0**	**140.1**	364.6	(3.1)
Company contributions	**6.9**	**37.7**	15.5	22.0
Participant contributions	**—**	**1.3**	—	1.2
Benefits paid	**(158.5)**	**(52.8)**	(152.5)	(49.8)
Settlements	**(3.0)**	**(1.8)**	(11.7)	(0.9)
Currency translation and other	**—**	**53.7**	—	85.0
Fair Value at End of Year	**$3,343.7**	**$1,905.0**	$3,048.3	$1,726.8
Funded Status at End of Year	**$8.4**	**($64.6)**	($375.5)	($222.9)

	2021		2020	
	U.S.	**International**	U.S.	International
Amounts Recognized				
Noncurrent assets	**$90.5**	**$128.7**	$26.5	$—
Accrued liabilities	**19.6**	**0.5**	10.5	0.2
Noncurrent liabilities	**62.5**	**192.8**	391.5	222.7
Net Asset (Liability) Recognized	**$8.4**	**($64.6)**	($375.5)	($222.9)

The changes in plan assets and benefit obligation that have been recognized in other comprehensive income on a pretax basis during fiscal years 2021 and 2020 consist of the following:

	2021		2020	
	U.S.	**International**	U.S.	International
Net actuarial (gain)/loss arising during the period	**($273.2)**	**($87.6)**	$14.6	$68.9
Amortization of net actuarial loss	**(79.8)**	**(19.8)**	(88.7)	(19.7)
Prior service cost arising during the period	**0.5**	**—**	1.6	—
Amortization of prior service cost	**(1.2)**	**—**	(1.2)	—
Total	**($353.7)**	**($107.4)**	($73.7)	$49.2

The net actuarial gains and losses represent the actual changes in the estimated obligation and plan assets that have not yet been recognized in the consolidated income statements and are included in accumulated other comprehensive loss. Actuarial gains arising during fiscal year 2021 are primarily attributable to higher than expected return on plan assets and higher discount rates. Accumulated actuarial gains and losses that exceed a corridor are amortized over the average remaining service period of active U.S. participants, which was approximately seven years as of 30 September 2021. For U.K. participants, accumulated actuarial gains and losses that exceed a corridor are amortized over the average remaining life expectancy, which was approximately twenty-four years as of 30 September 2021.

The components recognized in accumulated other comprehensive loss on a pretax basis at 30 September consisted of the following:

	2021		2020	
	U.S.	**International**	U.S.	International
Net actuarial loss	**$444.7**	**$535.8**	$797.7	$643.2
Prior service cost	**6.3**	**3.6**	7.0	3.6
Net transition liability	**—**	**0.4**	—	0.4
Total	**$451.0**	**$539.8**	$804.7	$647.2

The accumulated benefit obligation ("ABO") is the actuarial present value of benefits attributed to employee service rendered to a particular date, based on current salaries. The ABO for all defined benefit pension plans was $5,140.0 and $5,166.5 as of 30 September 2021 and 2020, respectively.

The following table provides information on pension plans where the benefit liability exceeds the value of plan assets:

	2021		2020	
30 September	**U.S.**	**International**	U.S.	International
Pension Plans with PBO in Excess of Plan Assets:				
PBO	**$82.1**	**$456.6**	$3,202.2	$1,949.7
Fair value of plan assets	**—**	**263.4**	2,800.3	1,726.7
PBO in excess of plan assets	**$82.1**	**$193.2**	$401.9	$223.0
Pension Plans with ABO in Excess of Plan Assets:				
ABO	**$79.2**	**$416.8**	$3,081.4	$475.8
Fair value of plan assets	**—**	**263.4**	2,800.3	324.4
ABO in excess of plan assets	**$79.2**	**$153.4**	$281.1	$151.4

The tables above include several pension arrangements that are not funded because of jurisdictional practice. The ABO and PBO related to these plans as of 30 September 2021 were $86.2 and $91.7, respectively. As of 30 September 2021, the U.S. salaried and U.K. pension plans had plan assets in excess of both PBO and ABO resulting in a decrease to the U.S. and International balances presented above. As of 30 September 2020, the PBO of these plans exceeded the fair value of plan assets.

Pension Plan Assets

Our pension plan investment strategy is to invest in diversified portfolios to earn a long-term return consistent with acceptable risk in order to pay retirement benefits and meet regulatory funding requirements while minimizing company cash contributions over time. De-risking strategies are also employed for closed plans as funding improves, generally resulting in higher allocations to long duration bonds. The plans invest primarily in passive and actively managed equity and debt securities. Equity investments are diversified geographically and by investment style and market capitalization. Fixed income investments include sovereign, corporate and asset-backed securities generally denominated in the currency of the plan.

Asset allocation targets are established based on the long-term return, volatility and correlation characteristics of the asset classes, the profiles of the plans' liabilities, and acceptable levels of risk. Assets are routinely rebalanced through contributions, benefit payments, and otherwise as deemed appropriate. The actual and target allocations at the measurement date are as follows:

	2021 Target Allocation		**2021 Actual Allocation**		2020 Actual Allocation	
	U.S.	**International**	**U.S.**	**International**	U.S.	International
Asset Category						
Equity securities	**20 - 35%**	**29 - 38%**	**30%**	**36%**	51%	43%
Debt securities	**61 - 76%**	**62 - 71%**	**64%**	**63%**	43%	56%
Real estate and other	**— - 10%**	**—%**	**6%**	**—%**	5%	—%
Cash	**—%**	**2%**	**—%**	**1%**	1%	1%
Total			**100%**	**100%**	100%	100%

In fiscal year 2021, the 6.75% expected return for U.S. plan assets was based on a weighted average of estimated long-term returns of major asset classes and the historical performance of plan assets. In determining asset class returns, we take into account historical long-term returns and the value of active management, as well as other economic and market factors.

In fiscal year 2021, the 4.73% expected rate of return for international plan assets was based on a weighted average return for plans outside the U.S., which vary significantly in size, asset structure and expected returns. The expected asset return for the U.K. plan, which represents over 80% of the assets of our International plans, is 5.30% and was derived from expected equity and debt security returns.

The table below summarizes pension plan assets measured at fair value by asset class (see Note 13, *Fair Value Measurements*, for definition of the levels):

	2021				2020			
30 September	**Total**	**Level 1**	**Level 2**	**Level 3**	Total	Level 1	Level 2	Level 3
U.S. Qualified Pension Plans								
Cash and cash equivalents	**$14.8**	**$14.8**	**$—**	**$—**	$16.9	$16.9	$—	$—
Equity securities	**325.3**	**325.3**	**—**	**—**	573.9	573.9	—	—
Equity mutual funds	**243.4**	**243.4**	**—**	**—**	213.1	213.1	—	—
Equity pooled funds	**448.7**	**—**	**448.7**	**—**	762.0	—	762.0	—
Fixed income:								
Bonds (government and corporate)	**2,125.6**	**—**	**2,125.6**	**—**	1,312.7	—	1,312.7	—
Total U.S. Qualified Pension Plans at Fair Value	**$3,157.8**	**$583.5**	**$2,574.3**	**$—**	$2,878.6	$803.9	$2,074.7	$—
Real estate pooled funds(A)	**185.9**				169.7			
Total U.S. Qualified Pension Plans	**$3,343.7**				$3,048.3			
International Pension Plans								
Cash and cash equivalents	**$16.8**	**$16.8**	**$—**	**$—**	$13.9	$13.9	$—	$—
Equity pooled funds	**676.4**	**—**	**676.4**	**—**	746.8	—	746.8	—
Fixed income pooled funds	**948.5**	**—**	**948.5**	**—**	694.1	—	694.1	—
Other pooled funds	**16.7**	**—**	**16.7**	**—**	15.5	—	15.5	—
Insurance contracts	**246.6**	**—**	**—**	**246.6**	256.5	—	—	256.5
Total International Pension Plans	**$1,905.0**	**$16.8**	**$1,641.6**	**$246.6**	$1,726.8	$13.9	$1,456.4	$256.5

(A) Real estate pooled funds consist of funds that invest in properties. These funds generally allow for quarterly redemption with 30 days' notice. Timing for redemption could be delayed based on the priority of our request and the availability of funds. Interests in these funds are valued using the net asset value ("NAV") per share practical expedient and are not classified in the fair value hierarchy.

The table below summarizes changes in fair value of the pension plan assets classified as Level 3, which is comprised of investments in insurance contracts:

Balance at 30 September 2019	$254.1
Actual return on plan assets:	
Assets held at end of year	2.4
Balance at 30 September 2020	$256.5
Actual return on plan assets:	
Assets held at end of year	(7.9)
Purchases, sales, and settlements, net	(2.0)
Balance at 30 September 2021	**$246.6**

The descriptions and fair value methodologies for the U.S. and International pension plan assets are as follows:

Cash and Cash Equivalents

The carrying amounts of cash and cash equivalents approximate fair value due to the short-term maturity.

Equity Securities

Equity securities are valued at the closing market price reported on a U.S. or international exchange where the security is actively traded and are therefore classified as Level 1 assets.

Equity Mutual and Pooled Funds

Shares of mutual funds are valued at the daily closing price as reported by the fund. The mutual funds are required to publish their daily NAV and to transact at that price. The mutual funds are deemed to be actively traded and are classified as Level 1 assets. Units of pooled funds are valued at the per unit NAV determined by the fund manager based on the value of the underlying traded holdings and are classified as Level 2 assets.

Corporate and Government Bonds

Corporate and government bonds are classified as Level 2 assets, as they are either valued at quoted market prices from observable pricing sources at the reporting date or valued based upon comparable securities with similar yields and credit ratings.

Fixed Income Pooled Funds

Fixed income pooled funds are classified as Level 2 assets, as they are valued at the NAV of the shares held at year end, which is determined by the fund manager based on quoted market pricing from observable pricing sources at the reporting date or valued based upon comparable securities with similar yields, credit ratings, or factors. Fixed income pooled funds may hold government bonds, index linked bonds, corporate bonds, cash and derivative instruments.

Other Pooled Funds

Other pooled funds are classified as Level 2 assets, as they are valued at the NAV of the shares held at year end, which is based on the fair value of the underlying investments.

Insurance Contracts

Insurance contracts are classified as Level 3 assets, as they are carried at contract value, which approximates the estimated fair value. The estimated fair value is based on the fair value of the underlying investment of the insurance company and discount rates that require inputs with limited observability.

Contributions and Projected Benefit Payments

Pension contributions to funded plans and benefit payments for unfunded plans for fiscal year 2021 were $44.6. Contributions for funded plans resulted primarily from contractual and regulatory requirements. Benefit payments to unfunded plans were due primarily to the timing of retirements. We anticipate contributing $40 to $50 to the defined benefit pension plans in fiscal year 2022. These contributions are anticipated to be driven primarily by contractual and regulatory requirements for funded plans and benefit payments for unfunded plans, which are dependent upon timing of retirements.

Projected benefit payments, which reflect expected future service, are as follows:

	U.S.	International
2022	$179.3	$56.8
2023	170.4	60.2
2024	174.3	64.0
2025	178.1	64.6
2026	180.7	68.3
2027-2031	936.5	375.9

These estimated benefit payments are based on assumptions about future events. Actual benefit payments may vary significantly from these estimates.

Defined Contribution Plans

We maintain a non-leveraged employee stock ownership plan ("ESOP") which forms part of the Air Products and Chemicals, Inc. Retirement Savings Plan ("RSP"). The ESOP was established in May of 2002. The balance of the RSP is a qualified defined contribution plan including a 401(k) elective deferral component. A substantial portion of U.S. employees are eligible and participate.

We treat dividends paid on ESOP shares as ordinary dividends. Under existing tax law, we may deduct dividends which are paid with respect to shares held by the plan. Shares of our common stock in the ESOP totaled 1,941,938 as of 30 September 2021.

Our contributions to the RSP include a Company core contribution for certain eligible employees who do not receive their primary retirement benefit from the defined benefit pension plans, with the core contribution based on a percentage of pay that is dependent on years of service. For the RSP, we also make matching contributions on overall employee contributions as a percentage of the employee contribution and include an enhanced contribution for certain eligible employees that do not participate in the defined benefit pension plans. Worldwide contributions expensed to income in fiscal years 2021, 2020, and 2019 were \$53.3, \$45.6, and \$40.6, respectively.

Other Postretirement Benefits

We provide other postretirement benefits consisting primarily of healthcare benefits to certain U.S. retirees who meet age and service requirements. The healthcare benefit is a continued medical benefit until the retiree reaches age 65. Healthcare benefits are contributory, with contributions adjusted periodically. The retiree medical costs are capped at a specified dollar amount, with the retiree contributing the remainder. The cost of these benefits was not material in fiscal years 2021, 2020, and 2019. Accumulated postretirement benefit obligations as of the end of fiscal years 2021 and 2020 were \$27.4 and \$38.6, respectively, of which \$5.5 and \$7.2 were current obligations, respectively.

We recognize changes in other postretirement benefit plan obligations in other comprehensive income on a pretax basis. In fiscal years 2021 and 2020, we recognized gains that arose during the period of \$5.4 and \$1.3, respectively. There was \$1.8 net actuarial gain amortization in fiscal year 2021 and no actuarial gain amortization in 2020 as the corridor for the plan was not exceeded.

The net actuarial gain recognized in accumulated other comprehensive loss on a pretax basis was \$6.6 and \$3.0 as of 30 September 2021 and 2020, respectively.

16. COMMITMENTS AND CONTINGENCIES

Litigation

We are involved in various legal proceedings, including commercial, competition, environmental, intellectual property, regulatory, product liability, and insurance matters. We do not currently believe there are any legal proceedings, individually or in the aggregate, that are reasonably possible to have a material impact on our financial condition, results of operations, or cash flows.

In September 2010, the Brazilian Administrative Council for Economic Defense ("CADE") issued a decision against our Brazilian subsidiary, Air Products Brasil Ltda., and several other Brazilian industrial gas companies for alleged anticompetitive activities. CADE imposed a civil fine of R\$179.2 million (approximately \$33 at 30 September 2021) on Air Products Brasil Ltda. This fine was based on a recommendation by a unit of the Brazilian Ministry of Justice, following an investigation beginning in 2003, which alleged violation of competition laws with respect to the sale of industrial and medical gases. The fines are based on a percentage of our total revenue in Brazil in 2003.

We have denied the allegations made by the authorities and filed an appeal in October 2010 with the Brazilian courts. On 6 May 2014, our appeal was granted and the fine against Air Products Brasil Ltda. was dismissed. CADE has appealed that ruling and the matter remains pending. We, with advice of our outside legal counsel, have assessed the status of this matter and have concluded that, although an adverse final judgment after exhausting all appeals is possible, such a judgment is not probable. As a result, no provision has been made in the consolidated financial statements. In the event of an adverse final judgment, we estimate the maximum possible loss to be the full amount of the fine of R\$179.2 million (approximately \$33 at 30 September 2021) plus interest accrued thereon until final disposition of the proceedings.

Additionally, Winter Storm Uri, a severe winter weather storm in the U.S. Gulf Coast in February 2021, disrupted our operations and caused power and natural gas prices to spike significantly in Texas. We are currently in the early stages of litigation of a dispute regarding energy management services related to the impact of this unusual event, and other disputes may arise from such power price increases. In addition, legislative action may affect power supply and energy management charges. While it is reasonably possible that we could incur additional costs related to power supply and energy management services in Texas related to the winter storm, it is too early to estimate potential losses, if any, given significant unknowns resulting from the unusual nature of this event.

Environmental

In the normal course of business, we are involved in legal proceedings under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA," the federal Superfund law), Resource Conservation and Recovery Act ("RCRA"), and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Presently, there are 31 sites on which a final settlement has not been reached where we, along with others, have been designated a potentially responsible party by environmental authorities or are otherwise engaged in investigation or remediation, including cleanup activity at certain of our current and former manufacturing sites. We continually monitor these sites for which we have environmental exposure.

Accruals for environmental loss contingencies are recorded when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. The consolidated balance sheets at 30 September 2021 and 2020 included an accrual of $76.7 and $84.7, respectively, primarily as part of other noncurrent liabilities. The environmental liabilities will be paid over a period of up to 30 years. We estimate the exposure for environmental loss contingencies to range from $76 to a reasonably possible upper exposure of $90 as of 30 September 2021.

Actual costs to be incurred at identified sites in future periods may vary from the estimates, given inherent uncertainties in evaluating environmental exposures. Using reasonably possible alternative assumptions of the exposure level could result in an increase to the environmental accrual. Due to the inherent uncertainties related to environmental exposures, a significant increase to the reasonably possible upper exposure level could occur if a new site is designated, the scope of remediation is increased, a different remediation alternative is identified, or a significant increase in our proportionate share occurs. We do not expect that any sum we may have to pay in connection with environmental matters in excess of the amounts recorded or disclosed above would have a material adverse impact on our financial position or results of operations in any one year.

<u>Pace</u>

At 30 September 2021, $39.8 of the environmental accrual was related to the Pace facility.

In 2006, we sold our Amines business, which included operations at Pace, Florida, and recognized a liability for retained environmental obligations associated with remediation activities at Pace. We are required by the Florida Department of Environmental Protection ("FDEP") and the United States Environmental Protection Agency ("USEPA") to continue our remediation efforts. We recognized a before-tax expense of $42 in fiscal year 2006 in results from discontinued operations and recorded an environmental accrual of $42 in continuing operations on the consolidated balance sheets.

During the second quarter of fiscal year 2020, we completed an updated cost review of the environmental remediation status at the Pace facility. The review was completed in conjunction with requirements to maintain financial assurance per the Consent Order issued by the FDEP discussed below. Based on our review, we expect ongoing activities to continue for 30 years. Additionally, we will require near-term spending to install new groundwater recovery wells and ancillary equipment, in addition to future capital to consider the extended time horizon for remediation at the site. As a result of these changes, we increased our environmental accrual for this site by $19 in continuing operations on the consolidated balance sheets and recognized a before-tax expense of $19 in results from discontinued operations in the second quarter of fiscal year 2020. There has been no change to the estimated exposure range related to the Pace facility in fiscal year 2021.

We have implemented many of the remedial corrective measures at the Pace facility required under 1995 Consent Orders issued by the FDEP and the USEPA. Contaminated soils have been bioremediated, and the treated soils have been secured in a lined on-site corrective action management unit. Several groundwater recovery systems have been installed to contain and remove contamination from groundwater. We completed an extensive assessment of the site to determine the efficacy of existing measures, what additional corrective measures may be needed, and whether newer remediation technologies that were not available in the 1990s might be suitable to more quickly and effectively remediate groundwater. Based on assessment results, we completed a focused feasibility study that has identified alternative approaches that may more effectively remove contaminants. We continue to review alternative remedial approaches with the FDEP and have started additional field work to support the design of an improved groundwater recovery network with the objective of targeting areas of higher contaminant concentration and avoiding areas of high groundwater iron which has proven to be a significant operability issue for the project. In the first quarter of 2015, we entered into a new Consent Order with the FDEP requiring us to continue our remediation efforts at the Pace facility, along with the completion of a cost review every 5 years. In the second quarter of fiscal year 2020, we completed an updated cost review which resulted in a change in assumptions regarding future operating costs as discussed above.

Piedmont

At 30 September 2021, $9.5 of the environmental accrual was related to the Piedmont site.

On 30 June 2008, we sold our Elkton, Maryland, and Piedmont, South Carolina, production facilities and the related North American atmospheric emulsions and global pressure sensitive adhesives businesses. In connection with the sale, we recognized a liability for retained environmental obligations associated with remediation activities at the Piedmont site. This site is under active remediation for contamination caused by an insolvent prior owner.

We are required by the South Carolina Department of Health and Environmental Control ("SCDHEC") to address both contaminated soil and groundwater. Numerous areas of soil contamination have been addressed, and contaminated groundwater is being recovered and treated. The SCDHEC issued its final approval to the site-wide feasibility study on 13 June 2017 and the Record of Decision for the site on 27 June 2018, after which we signed a Consent Agreement Amendment memorializing our obligations to complete the cleanup of the site. Remediation has started in accordance with the design, which includes in-situ chemical oxidation treatment, as well as the installation of a soil vapor extraction system to remove volatile organic compounds from the unsaturated soils beneath the impacted areas of the plant. We estimate that source area remediation and groundwater recovery and treatment will continue through 2029. Thereafter, we expect this site to go into a state of monitored natural attenuation through 2047.

We recognized a before-tax expense of $24 in 2008 as a component of income from discontinued operations and recorded an environmental liability of $24 in continuing operations on the consolidated balance sheets. There have been no significant changes to the estimated exposure.

Pasadena

At 30 September 2021, $11.2 of the environmental accrual was related to the Pasadena site.

During the fourth quarter of 2012, management committed to permanently shutting down our polyurethane intermediates ("PUI") production facility in Pasadena, Texas. In shutting down and dismantling the facility, we have undertaken certain obligations related to soil and groundwater contaminants. We have been pumping and treating groundwater to control off-site contaminant migration in compliance with regulatory requirements and under the approval of the Texas Commission on Environmental Quality ("TCEQ"). We estimate that the pump and treat system will continue to operate until 2042.

We plan to perform additional work to address other environmental obligations at the site. This additional work includes remediating, as required, impacted soils, investigating groundwater west of the former PUI facility, performing post closure care for two closed RCRA surface impoundment units, establishing engineering controls, and performing a pilot study to treat impacted soils. In 2012, we estimated the total exposure at this site to be $13. There have been no significant changes to the estimated exposure.

Asset Retirement Obligations

Our asset retirement obligations are primarily associated with long-term on-site supply contracts under which we have built a facility on land owned by the customer and are obligated to remove the facility at the end of the contract term. The retirement of assets includes the contractually required removal of a long-lived asset from service and encompasses the sale, removal, abandonment, recycling, or disposal of the assets as required at the end of the contract term. These obligations are primarily reflected within "Other noncurrent liabilities" on the consolidated balance sheets. The timing and/or method of settlement of these obligations are conditional on a future event that may or may not be within our control.

Changes to the carrying amount of our asset retirement obligations were as follows:

Balance at 30 September 2019	$208.2
Additional accruals	22.0
Liabilities settled	(2.8)
Accretion expense	9.5
Currency translation adjustment	4.5
Balance at 30 September 2020	$241.4
Additional accruals	16.5
Liabilities settled	(4.1)
Accretion expense	10.5
Currency translation adjustment	5.3
Balance at 30 September 2021	**$269.6**

Warranties and Guarantees

We do not expect that any sum we may have to pay in connection with warranties and guarantees will have a material adverse effect on our consolidated financial condition, liquidity, or results of operations.

Warranties

We, in the normal course of business operations, have issued product warranties related to equipment sales. Also, contracts often contain standard terms and conditions which typically include a warranty and indemnification to the buyer that the goods and services purchased do not infringe on third-party intellectual property rights. The provision for estimated future costs relating to warranties is not material to the consolidated financial statements.

Guarantees

To date, no equity contributions or payments have been made since the inception of the guarantees discussed below. The fair value of these guarantees is not material.

We are party to an equity support agreement and operations guarantee related to an air separation facility constructed in Trinidad for a venture in which we own 50%. At 30 September 2021, maximum potential payments under joint and several guarantees were $24.0. Exposures under the guarantees decline over time and will be completely extinguished by 2024.

We guaranteed the repayment of our 25% share of an equity bridge loan that has been provided to fund equity commitments to the Jazan Gas Project Company joint venture with ACWA Holding in Saudi Arabia. ACWA also guarantees their share of the loan. As of 30 September 2021, our maximum exposure under the guarantee was approximately $100, and payables and accrued liabilities on our consolidated balance sheets included $94.4 for our obligation to make equity contributions.

We also have a long-term sale of equipment contract with the joint venture to engineer, procure, and construct the industrial gas facilities that will supply gases to Aramco. We provided bank guarantees to the joint venture to support our performance under the contract. As of 30 September 2021, our maximum potential payments were $247.

Subsequent Event

As part of the Jazan Integrated Gasification and Power Company transaction discussed in Note 24, *Subsequent Events*, Jazan Gas Project Company sold its air separation units to Aramco in October 2021 and repaid its outstanding debt, including the equity bridge loan. Our bank guarantees that support performance under the sale of equipment contract remain in place.

Unconditional Purchase Obligations

We are obligated to make future payments under unconditional purchase obligations as summarized below:

2022	$1,656
2023	540
2024	543
2025	563
2026	545
Thereafter	6,135
Total	**$9,982**

Approximately $8.3 billion of our unconditional purchase obligations relate to helium and rare gases. The majority of these obligations occur after fiscal year 2026. Helium purchases include crude feedstock supply to helium refining plants in North America as well as refined helium purchases from sources around the world. As a rare byproduct of natural gas production in the energy sector, these helium sourcing agreements are medium- to long-term and contain take-if-tendered provisions. The refined helium is distributed globally and sold as a merchant gas, primarily under medium-term requirements contracts. While contract terms in our helium sourcing contracts are generally longer than our customer sales contracts, helium is a rare gas used in applications with few or no substitutions because of its unique physical and chemical properties.

We estimate our maximum obligation for future purchases of plant and equipment to be approximately $1.0 billion based on open purchase orders as of 30 September 2021. Although open purchase orders are considered enforceable and legally binding, the terms generally allow us the option to reschedule, cancel, or otherwise modify based on our business needs. We have disclosed this obligation in fiscal year 2022; however, timing of actual satisfaction of the obligation may vary.

Our unconditional purchase obligations also include commitments for power and natural gas supply as well as feedstock supply for numerous HyCO (hydrogen, carbon monoxide, and syngas) facilities. Our long-term sales contracts to customers are generally matched to the term of these obligations and provide recovery of price increases. As a result, we do not believe these purchase obligations would have a material effect on our financial condition or results of operations.

17. CAPITAL STOCK

Common Stock

Authorized common stock consists of 300 million shares with a par value of $1 per share. As of 30 September 2021, 249 million shares were issued, with 221 million outstanding.

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1.0 billion of our outstanding common stock. We repurchase shares pursuant to Rules 10b5-1 and 10b-18 under the Securities Exchange Act of 1934, as amended, through repurchase agreements established with several brokers. We did not purchase any of our outstanding shares during fiscal year 2021. At 30 September 2021, $485.3 in share repurchase authorization remains.

A summary of the changes in common shares in fiscal year 2021 is presented below:

Fiscal Year Ended 30 September	**2021**	2020	2019
Number of common shares outstanding, beginning of year	**221,017,459**	220,415,262	219,515,245
Issuance of treasury shares for stock option and award plans	**379,296**	602,197	900,017
Number of common shares outstanding, end of year	**221,396,755**	221,017,459	220,415,262

Preferred Stock

Authorized preferred stock consisted of 25 million shares with a par value of $1 per share, of which 2.5 million were designated as Series A Junior Participating Preferred Stock. There were no preferred shares issued or outstanding as of 30 September 2021 and 2020.

18. SHARE-BASED COMPENSATION

Our outstanding share-based compensation programs include deferred stock units and stock options. During the fiscal year ended 30 September 2021, we granted market-based and time-based deferred stock units. We have not issued stock option awards since fiscal year 2015. The terms of our share-based awards are fixed at the grant date. We issue shares from treasury stock upon payout of deferred stock units and exercise of stock options.

At the annual shareholders meeting held on 28 January 2021, the shareholders approved a new Long-Term Incentive Plan ("LTIP"), which has an authorized pool of 1,500,000 shares available for future grant, plus additional shares underlying awards outstanding on the date the LTIP was adopted but that are not issued. As of 30 September 2021, there were 1,566,433 shares available for future grant under our LTIP.

Share-based compensation cost recognized on the consolidated income statements is summarized below:

	2021	2020	2019
Before-tax share-based compensation cost	**$44.5**	$55.8	$41.2
Income tax benefit	**(11.0)**	(13.0)	(9.7)
After-tax share-based compensation cost	**$33.5**	$42.8	$31.5

Before-tax share-based compensation cost relates to deferred stock units and is primarily included in "Selling and administrative" on our consolidated income statements. The amount of share-based compensation cost capitalized in fiscal years 2021, 2020, and 2019 was not material.

Deferred Stock Units

We have granted deferred stock units to executives, selected employees, and outside directors. These deferred stock units entitle the recipient to one share of common stock upon vesting, which is conditioned, for employee recipients, on continued employment during the deferral period and may be conditioned on achieving certain performance targets. We grant deferred stock unit awards with a two- to five-year deferral period that is subject to payout upon death, disability, or retirement. Deferred stock units issued to outside directors are paid after service on the Board of Directors ends at the time elected by the director (not to exceed 10 years after service ends). We generally expense the grant-date fair value of these awards on a straight-line basis over the vesting period; however, expense recognition is accelerated for retirement eligible individuals who meet the requirements for vesting upon retirement. We have elected to account for forfeitures as they occur, rather than to estimate them. Forfeitures have not been significant historically.

Market-based deferred stock units vest as long as the employee continues to be employed by the Company and upon the achievement of the performance target. The performance target, which is approved by the Compensation Committee, is our share price appreciation and dividends paid, or "total shareholder return," in relation to a defined peer group over a three-year performance period beginning 1 October of the fiscal year of grant. We granted 77,251, 80,215, and 114,929 market-based deferred stock units in fiscal years 2021, 2020, and 2019, respectively.

The fair value of market-based deferred stock units was estimated using a Monte Carlo simulation model as these equity awards are tied to a market condition. The model utilizes multiple input variables that determine the probability of satisfying the market condition stipulated in the grant and calculates the fair value of the awards. We generally expense the grant-date fair value of these awards on a straight-line basis over the vesting period. The estimated grant-date fair value of market-based deferred stock units was $235.48, $275.19, and $229.61 per unit in fiscal years 2021, 2020, and 2019, respectively. The calculation of the fair value of these market-based deferred stock units used the following assumptions:

	2021	2020	2019
Expected volatility	**29.9%**	17.8%	17.5%
Risk-free interest rate	**0.2%**	1.6%	2.8%
Expected dividend yield	**2.1%**	2.4%	2.6%

In addition, we granted 110,555 time-based deferred stock units at a weighted average grant-date fair value of $282.48. In fiscal years 2020 and 2019, we granted 123,448 and 169,666 time-based deferred stock units at a weighted average grant-date fair value of $230.92 and $168.68, respectively.

A summary of deferred stock unit activity in fiscal year 2021 is presented below:

	Shares (000)	Weighted Average Grant-Date Fair Value
Deferred stock units outstanding at 30 September 2020	926	$181.14
Granted	188	261.95
Paid out	(330)	185.33
Forfeited	(17)	241.55
Adjusted	87	161.64
Deferred stock units outstanding at 30 September 2021	**854**	**$194.12**

Cash payments made for deferred stock units totaled $5.2, $4.8, and $1.9 in fiscal years 2021, 2020, and 2019, respectively. As of 30 September 2021, there was $47.0 of unrecognized compensation cost related to deferred stock units. This cost is expected to be recognized over a weighted average period of 1.5 years. The total fair value of deferred stock units paid out during fiscal years 2021, 2020, and 2019, including shares vested in prior periods, was $88.0, $65.4, and $19.2, respectively.

Stock Options

We have granted awards of options to purchase common stock to executives and selected employees. The exercise price of stock options equals the market price of our stock on the date of the grant. Options generally vest incrementally over three years and remain exercisable for ten years from the date of grant. As of 30 September 2021, there was no unrecognized compensation cost as all stock option awards were fully vested.

A summary of stock option activity in fiscal year 2021 is presented below:

	Shares (000)	Weighted Average Exercise Price
Stock options outstanding and exercisable at 30 September 2020	941	$96.95
Exercised	(140)	80.63
Stock options outstanding and exercisable at 30 September 2021	**801**	**$99.79**

The weighted average remaining contractual term of stock options outstanding and exercisable at 30 September 2021 was 1.9 years. The aggregate intrinsic value of these stock options was $125, which represents the amount by which our closing stock price of $256.11 as of 30 September 2021 exceeds the exercise price multiplied by the number of in-the-money options outstanding or exercisable. The intrinsic value of stock options exercised during fiscal years 2021, 2020, and 2019 was $29.0, $65.7, and $87.2, respectively.

Compensation cost is generally recognized over the stated vesting period consistent with the terms of the arrangement, which is either on a straight-line or graded-vesting basis. Expense recognition is accelerated for retirement-eligible individuals who would meet the requirements for vesting of awards upon their retirement.

Cash received from option exercises during fiscal year 2021 was $10.6. The total tax benefit realized from stock option exercises in fiscal year 2021 was $6.8, of which $6.5 was the excess tax benefit.

19. ACCUMULATED OTHER COMPREHENSIVE LOSS

The table below summarizes changes in accumulated other comprehensive loss ("AOCL"), net of tax, attributable to Air Products:

	Derivatives qualifying as hedges	Foreign currency translation adjustments	Pension and postretirement benefits	Total
Balance at 30 September 2018	**($37.6)**	**($1,009.8)**	**($694.5)**	**($1,741.9)**
Other comprehensive loss before reclassifications	(44.1)	(356.2)	(326.2)	(726.5)
Amounts reclassified from AOCL	12.3	(2.6)	63.2	72.9
Net current period other comprehensive loss	($31.8)	($358.8)	($263.0)	($653.6)
Amount attributable to noncontrolling interests	(8.0)	(11.7)	(0.2)	(19.9)
Balance at 30 September 2019	**($61.4)**	**($1,356.9)**	**($957.3)**	**($2,375.6)**
Other comprehensive income (loss) before reclassifications	43.5	233.4	(68.2)	208.7
Amounts reclassified from AOCL	(57.7)	—	82.5	24.8
Net current period other comprehensive income (loss)	($14.2)	$233.4	$14.3	$233.5
Amount attributable to noncontrolling interest	(21.1)	19.3	(0.2)	(2.0)
Balance at 30 September 2020	**($54.5)**	**($1,142.8)**	**($942.8)**	**($2,140.1)**
Other comprehensive income before reclassifications	3.3	267.3	274.3	544.9
Amounts reclassified from AOCL	43.5	—	74.6	118.1
Net current period other comprehensive income	$46.8	$267.3	$348.9	$663.0
Amount attributable to noncontrolling interest	20.6	18.3	(0.1)	38.8
Balance at 30 September 2021	**($28.3)**	**($893.8)**	**($593.8)**	**($1,515.9)**

The table below summarizes the reclassifications out of AOCL and the affected line item on the consolidated income statements:

Fiscal Year Ended 30 September	2021	2020	2019
(Gain) Loss on Cash Flow Hedges, net of tax			
Sales	**($0.6)**	($0.2)	$0.4
Cost of sales	**(0.3)**	(0.8)	0.2
Other income (expense), net	**—**	—	(3.0)
Interest expense	**3.5**	2.8	14.7
Other non-operating income (expense), net(A)	**40.9**	(59.5)	—
Total (Gain) Loss on Cash Flow Hedges, net of tax	**$43.5**	($57.7)	$12.3
Currency Translation Adjustment(B)	**$—**	$—	($2.6)
Pension and Postretirement Benefits, net of tax(C)	**$74.6**	$82.5	$63.2

(A) The fiscal years 2021 and 2020 impacts include amortization of the excluded component and the effective portion of the related hedges.

(B) The fiscal year 2019 impact relates to a net gain on the exchange of two equity affiliates with a joint venture partner. Refer to Note 3, *Acquisitions*, for additional information.

(C) The components of net periodic benefit cost reclassified out of AOCL include items such as prior service cost amortization, actuarial loss amortization, and settlements and are included in "Other non-operating income (expense), net" on the consolidated income statements. Refer to Note 15, *Retirement Benefits*, for additional information.

20. EARNINGS PER SHARE

The table below details the computation of basic and diluted earnings per share ("EPS"):

Fiscal Year Ended 30 September	2021	2020	2019
Numerator			
Net income from continuing operations	**$2,028.8**	$1,901.0	$1,760.0
Net income (loss) from discontinued operations	**70.3**	(14.3)	—
Net Income Attributable to Air Products	**$2,099.1**	$1,886.7	$1,760.0
Denominator (in millions)			
Weighted average common shares — Basic	**221.6**	221.2	220.3
Effect of dilutive securities			
Employee stock option and other award plans	**0.9**	1.1	1.3
Weighted average common shares — Diluted	**222.5**	**222.3**	**221.6**
Per Share Data*			
Basic EPS from continuing operations	**$9.16**	$8.59	$7.99
Basic EPS from discontinued operations	**0.32**	(0.06)	—
Basic EPS Attributable to Air Products	**$9.47**	$8.53	$7.99
Diluted EPS from continuing operations	**$9.12**	$8.55	$7.94
Diluted EPS from discontinued operations	**0.32**	(0.06)	—
Diluted EPS Attributable to Air Products	**$9.43**	$8.49	$7.94

*EPS is calculated independently for each component and may not sum to total EPS due to rounding.

Diluted EPS attributable to Air Products reflects the potential dilution that could occur if stock options or other share-based awards were exercised or converted into common stock. The dilutive effect is computed using the treasury stock method, which assumes all share-based awards are exercised, and the hypothetical proceeds from exercise are used by the Company to purchase common stock at the average market price during the period. To the extent they would have been dilutive, the incremental shares, or the difference between shares assumed to be issued versus purchased, are included in the denominator of the diluted EPS calculation. There were no antidilutive outstanding share-based awards in fiscal years 2021, 2020 and 2019.

21. INCOME TAXES

The table below summarizes income from U.S. and foreign operations before taxes:

	2021	2020	2019
United States income	**$924.6**	$943.7	$723.3
Foreign income	**1,288.7**	1,215.3	1,350.8
Equity affiliates' income	**294.1**	264.8	215.4
Income from continuing operations before taxes	**$2,507.4**	$2,423.8	$2,289.5

The table below details the components of our income tax provision:

	2021	2020	2019
Current Tax Provision			
Federal	**$85.6**	$26.9	$163.7
State	**28.4**	23.8	23.3
Foreign	**254.8**	262.7	235.5
Total current tax provision	**368.8**	313.4	422.5
Deferred Tax Provision			
Federal	**54.7**	108.8	9.7
State	**(0.1)**	(3.6)	2.4
Foreign	**39.4**	59.8	45.5
Total deferred tax provision	**94.0**	165.0	57.6
Total income tax provision	**$462.8**	$478.4	$480.1

Cash Paid for Taxes (Net of Cash Refunds)

Income tax payments, net of refunds, were $383.8, $379.9, and $324.3 in fiscal years 2021, 2020, and 2019, respectively. Fiscal year 2021 reflects an income tax refund of $6.7 that is related to cash provided by discontinued operations.

India Finance Act 2020

On 27 March 2020, the Indian government passed Finance Act 2020 (the "India Finance Act"), which amended rules regarding the taxation of dividends declared and distributed by Indian companies. Under the India Finance Act, future dividends declared or distributed by an Indian company are no longer subject to dividend distribution tax. Instead, any non-resident recipient is subject to a withholding tax. Our income tax provision for the fiscal year ended 30 September 2020 reflected an expense of $20.3 for estimated withholding taxes that we may incur on future dividends related to INOX Air Products Private Limited ("INOX"), an equity affiliate investment in our Industrial Gases – Asia segment. Additionally, we recorded a benefit of $33.8 within "Equity affiliates' income" for our share of accumulated dividend distribution taxes released with respect to INOX.

U.S. Tax Cuts and Jobs Act

On 22 December 2017, the United States enacted the U.S. Tax Cuts and Jobs Act (the "Tax Act" or "Tax Reform"), which significantly changed existing U.S. tax laws, including a reduction in the federal corporate income tax rate to 21%, a deemed repatriation tax on unremitted foreign earnings, as well as other changes. Our consolidated income statements reflect a discrete net income tax expense of $43.8 in fiscal year 2019 related to impacts of the Tax Act. The net expense included the reversal of a non-recurring $56.2 benefit initially recorded in fiscal year 2018 related to the U.S. taxation of deemed foreign dividends, which was eliminated by regulations issued in fiscal year 2019. The reversal in 2019 was partially offset by a benefit of $12.4 to reduce the total expected costs of the deemed repatriation tax.

As of 30 September 2021, the remaining liability for the deemed repatriation tax is $177.7, $157.1 of which is presented within noncurrent liabilities on our consolidated balance sheets. We are paying this obligation in installments over five remaining years.

Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes. A reconciliation of the differences between the United States federal statutory tax rate and the effective tax rate is provided below:

(Percent of income before taxes)	**2021**	2020	2019
U.S. federal statutory tax rate	**21.0%**	21.0%	21.0%
State taxes, net of federal benefit	**0.9**	0.6	1.0
Income from equity affiliates	**(2.5)**	(2.3)	(2.0)
Foreign tax differentials	**0.5**	0.1	1.0
Tax on foreign repatriated earnings	**0.7**	0.9	0.1
Share-based compensation	**(0.7)**	(0.8)	(0.6)
Tax reform repatriation	**—**	—	1.9
Other	**(1.4)**	0.2	(1.4)
Effective Tax Rate	**18.5%**	19.7%	21.0%

Foreign tax differentials represent the differences between foreign earnings subject to foreign tax rates that are different than the U.S. federal statutory rate and include tax holidays and incentives. Our income tax holidays relate to operations in jurisdictions that provide reduced income tax rates for certain qualifying activities and are conditional upon us meeting certain operating thresholds. The impact of these tax holidays decreased income tax expense by $26.9 ($0.12 per share) in fiscal year 2020, primarily related to a preferential tax rate in China that is effective until 31 December 2030. This includes the impact of remeasurement of the deferred tax assets and liabilities in 2020 due to an extension of the holiday period in China. The impact of tax holidays in fiscal years 2021 and 2019 was not material.

Tax on foreign repatriated earnings includes benefits and costs related to U.S. and foreign taxation on the current and future repatriation of foreign earnings and a U.S. benefit for related foreign tax credits. The effective tax rate in 2020 reflects impacts from the India Finance Act 2020 discussed above. In addition, the Tax Act included new provisions related to the taxation of foreign operations, known as Global Intangible Low Tax Income ("GILTI"). We have elected as an accounting policy to account for GILTI as a period cost when incurred.

Share-based compensation reflects the impact from recognition of $17.0, $20.0, and $14.6 of excess tax benefits in our provision for income taxes during fiscal years 2021, 2020, and 2019, respectively.

In fiscal year 2021, other includes net tax benefits of $21.5, including interest, resulting from the release of U.S. unrecognized tax benefits upon expiration of the statute of limitations on uncertain tax positions taken in prior years.

Deferred Tax Assets and Liabilities

The significant components of deferred tax assets and liabilities are as follows:

30 September	2021	2020
Gross Deferred Tax Assets		
Retirement benefits and compensation accruals	**$69.4**	$209.0
Tax loss carryforwards	**120.9**	112.6
Tax credits and other tax carryforwards	**27.3**	40.3
Reserves and accruals	**74.5**	67.0
Currency losses	**30.4**	30.4
Other	**44.0**	64.6
Valuation allowance	**(97.6)**	(95.0)
Deferred Tax Assets	**268.9**	428.9
Gross Deferred Tax Liabilities		
Plant and equipment	**1,171.8**	1,110.9
Unremitted earnings of foreign entities	**69.1**	58.7
Partnership and other investments	**15.3**	19.3
Intangible assets	**86.2**	83.6
Other	**7.2**	3.9
Deferred Tax Liabilities	**1,349.6**	1,276.4
Net Deferred Income Tax Liability	**$1,080.7**	$847.5

Deferred tax assets and liabilities are included within the consolidated balance sheets as follows:

	2021	2020
Deferred Tax Assets		
Other noncurrent assets	**$100.2**	$115.1
Deferred Tax Liabilities		
Deferred income taxes	**1,180.9**	962.6
Net Deferred Income Tax Liability	**$1,080.7**	$847.5

Deferred tax liabilities related to plant and equipment increased due to the impact of accelerated tax depreciation deductions in excess of book depreciation primarily in the United States. Deferred tax assets related to retirement benefits and compensation accruals are impacted by changes in plan assets and benefit obligations that have been recognized in other comprehensive income. This balance decreased primarily due to higher than expected asset returns and higher discount rates. Deferred tax assets related to tax credits and other tax carryforwards decreased primarily due to the utilization of tax credits against our income tax liabilities.

As of 30 September 2021, we had the following deferred tax assets for certain tax credits:

Jurisdiction	Gross Tax Asset	Expiration Period
U.S. State	$2.2	2022 - 2035
U.S. Federal	2.1	2027 - 2031
Foreign	27.5	2022 - 2041; Indefinite

Of the $27.5 foreign tax credits, $14.2 have indefinite carryforward periods.

As of 30 September 2021, we had the following loss carryforwards:

Jurisdiction	Gross Loss Carryforward	Expiration Period
U.S. State Net Operating Loss	$318.8	2022 - 2040
U.S. Federal Capital Loss	26.5	2025
Foreign Net Operating Loss	258.8	2022 - 2036; Indefinite
Foreign Capital Loss	221.6	Indefinite

Of the $258.8 of foreign net operating loss carryforwards, $111.5 have indefinite carryforward periods.

The valuation allowance was $97.6 and $95.0 as of 30 September 2021 and 2020, respectively. As of 30 September 2021, the balance primarily related to $35.1 of foreign credits and loss carryforwards as well as $55.4 related to foreign capital losses that were generated from the loss recorded on the exit from the Energy-from-Waste project in 2016. If events warrant the reversal of the valuation allowance, it would result in a reduction of tax expense. We believe it is more likely than not that future earnings and reversal of deferred tax liabilities will be sufficient to utilize our deferred tax assets, net of existing valuation allowance, as of 30 September 2021.

We record income taxes on the undistributed earnings of our foreign subsidiaries and corporate joint ventures unless those earnings are indefinitely reinvested. Such earnings may be subject to foreign withholding and other taxes. The cumulative undistributed earnings that are considered to be indefinitely reinvested in foreign subsidiaries and corporate joint ventures are included in retained earnings on the consolidated balance sheets and amounted to $5.9 billion as of 30 September 2021. An estimated $540.4 in additional foreign withholding and other income taxes would be due if these earnings were remitted as dividends.

Unrecognized Tax Benefits

A reconciliation of the beginning and ending amount of the unrecognized tax benefits, which excludes interest and penalties, is as follows:

	2021	2020	2019
Unrecognized tax benefits balance at beginning of year	**$237.0**	$231.7	$233.6
Additions for tax positions of the current year	**14.5**	7.6	7.8
Additions for tax positions of prior years	**3.5**	17.7	14.2
Reductions for tax positions of prior years	**(8.2)**	(4.1)	(14.7)
Settlements	**(3.1)**	(1.2)	(1.5)
Statute of limitations expiration	**(104.6)**	(14.0)	(3.9)
Foreign currency translation	**1.2**	(0.7)	(3.8)
Unrecognized tax benefits balance at end of year	**$140.3**	$237.0	$231.7

Of our unrecognized tax benefits as of 30 September 2021, $73.7 would impact the effective tax rate from continuing operations if recognized.

In fiscal year 2021, reserves for unrecognized tax benefits decreased $104.6 due to statute of limitation expirations. We released reserves of $65.6 related to the sale of our former Performance Materials Division ("PMD"), $8.2 associated with our former Energy-from-Waste business ("EfW"), and $27.5 for other reserves, including those associated with a tax election benefit related to a non-U.S. subsidiary in 2017. Upon release of the reserves related to PMD and EfW, we recorded income tax benefits of $51.8 and $8.2, respectively, as a component of discontinued operations. The PMD reserve was net of related deferred tax assets of $13.8. The release of other reserves of $27.5 was net of related deferred tax assets of $8.4 and resulted in an income tax benefit, including interest, of $21.5.

Interest and penalties related to unrecognized tax benefits are recorded as a component of income tax expense and totaled ($0.2), $6.1, and $12.0 in fiscal years 2021, 2020, and 2019, respectively. Our 2021 expense reflects a benefit from the reversal of accrued interest on reserves released during the period. Our accrued balance for interest and penalties was $24.9 and $25.2 as of 30 September 2021 and 2020, respectively.

Income Tax Examinations

We are currently under examination in a number of tax jurisdictions. It is reasonably possible that a change in our unrecognized tax benefits may occur in fiscal year 2022 if any of these examinations are resolved during the next twelve months. However, quantification of an estimated range cannot be made as of the date of this report.

We generally remain subject to examination in the following major tax jurisdictions for the years indicated below:

Major Tax Jurisdiction	Open Tax Years
North America	
United States – Federal	2018 - 2021
United States – State	2012 - 2021
Canada	2015 - 2021
Europe	
France	2018 - 2021
Germany	2017 - 2021
Netherlands	2016 - 2021
Spain	2015 - 2021
United Kingdom	2018 - 2021
Asia	
China	2011 - 2021
South Korea	2010 - 2021
Taiwan	2016 - 2021
Latin America	
Chile	2018 - 2021

22. SUPPLEMENTAL INFORMATION

Other Receivables and Current Assets

30 September	2021	2020
Contract assets	**$119.4**	$55.9
Contract fulfillment costs	**125.5**	109.9
Derivative instruments	**59.8**	97.5
Current lease receivables	**84.4**	86.7
Other	**161.8**	132.9
Other receivables and current assets	**$550.9**	$482.9

Other Noncurrent Assets

30 September	2021	2020
Operating lease right-of-use assets	**$566.2**	$376.8
Pension benefits	**219.2**	26.5
Long-term deposits on plant and equipment	**200.0**	100.0
Deferred tax assets	**100.2**	115.1
Prepaid tax	**75.0**	19.3
Investments other than equity method	**66.9**	17.0
Derivative instruments	**23.6**	45.8
Other	**255.4**	242.6
Other noncurrent assets	**$1,506.5**	$943.1

Payables and Accrued Liabilities

30 September	2021	2020
Trade creditors	**$736.8**	$546.2
Contract liabilities	**366.8**	313.8
Dividends payable	**332.1**	296.2
Accrued payroll and employee benefits	**221.2**	196.8
Obligation for future contribution to an equity affiliate	**150.0**	94.4
Current lease obligations	**78.6**	70.7
Derivative instruments	**68.8**	50.9
Pension and postretirement benefits	**25.6**	17.9
Other	**238.4**	246.3
Payables and accrued liabilities	**$2,218.3**	$1,833.2

Other Noncurrent Liabilities

30 September	2021	2020
Operating lease liabilities	**$503.4**	$335.8
Asset retirement obligations	**258.0**	236.2
Pension benefits	**255.3**	614.2
Postretirement benefits	**22.1**	31.4
Long-term accrued income taxes related to U.S. tax reform	**157.1**	190.9
Contingencies related to uncertain tax positions	**111.8**	138.6
Environmental liabilities	**68.5**	73.6
Contract liabilities	**58.4**	57.9
Derivative instruments	**52.7**	34.7
Other	**153.6**	202.7
Other noncurrent liabilities	**$1,640.9**	$1,916.0

Related Party Transactions

Our consolidated income statements include sales to some of our equity affiliates and joint venture partners as well as other income primarily from fees charged for use of Air Products' patents and technology. Sales to and other income from related parties totaled approximately $225, $335, and $410 for the fiscal years ended 30 September 2021, 2020, and 2019, respectively. Sales agreements with related parties include terms that are consistent with those that we believe would have been negotiated at an arm's length with an independent party. As of 30 September 2021 and 2020, our consolidated balance sheets included related party trade receivables of approximately $90 and $95, respectively.

In addition, refer to Note 14, *Debt*, for information concerning debt owed to related parties.

Facility Closures

During the second quarter of fiscal year 2021, we recorded a charge of $23.2 primarily for a noncash write-down of assets associated with a contract termination in the Industrial Gases – Americas segment. This charge is reflected as "Facility closure" on our consolidated income statements for the fiscal year ended 30 September 2021 and was not recorded in segment results.

In December 2018, one of our customers was subject to a government enforced shutdown due to environmental reasons. As a result, we recognized a charge of $29.0 during the first quarter of fiscal year 2019 primarily related to the write-off of onsite assets. This charge was reflected as "Facility closure" on our consolidated income statements for the fiscal year ended 30 September 2019 and was not recorded in segment results.

Company Headquarters Relocation Income (Expense)

During the second quarter of fiscal year 2020, we sold property at our former corporate headquarters located in Trexlertown, Pennsylvania, in anticipation of relocating our U.S. headquarters. We received net proceeds of $44.1 and recorded a gain of $33.8, which is reflected on our consolidated income statements as "Company headquarters relocation income (expense)" for the fiscal year ended 30 September 2020. The gain was not recorded in the results of the Corporate and other segment.

Cost Reduction Actions

In fiscal year 2019, we recognized an expense of $25.5 for severance and other benefits associated with position eliminations. These actions were taken to drive cost synergies primarily within the Industrial Gases – EMEA and the Industrial Gases – Americas segments. The charge is reflected on our consolidated income statements as "Cost reduction actions" for the fiscal year ended 30 September 2019 and was not recorded in segment results.

23. BUSINESS SEGMENT AND GEOGRAPHIC INFORMATION

Our reporting segments reflect the manner in which our chief operating decision maker reviews results and allocates resources. Except in the Industrial Gases – EMEA and Corporate and other segments, each reporting segment meets the definition of an operating segment and does not include the aggregation of multiple operating segments. Our Industrial Gases – EMEA and Corporate and other segments each include the aggregation of two operating segments that meet the aggregation criteria under GAAP.

As of 30 September 2021, our reporting segments are:

- Industrial Gases – Americas;
- Industrial Gases – EMEA (Europe, Middle East, and Africa);
- Industrial Gases – Asia;
- Industrial Gases – Global; and
- Corporate and other

On 4 November 2021, we announced the reorganization of our industrial gases segments effective 1 October 2021. Refer to Note 24, *Subsequent Events*, for additional information.

Industrial Gases – Regional

The regional Industrial Gases segments (Americas, EMEA, and Asia) include the results of our regional industrial gas businesses, which produce and sell atmospheric gases, such as oxygen, nitrogen, and argon; process gases, such as hydrogen, helium, carbon dioxide (CO_2), carbon monoxide, and syngas (a mixture of hydrogen and carbon monoxide); and specialty gases. The industrial gases business also develops, builds, and operates equipment for the production or processing of gases, such as air separation units and non-cryogenic generators.

We supply gases to diversified customers in many industries, including those in refining, chemical, gasification, metals, electronics, manufacturing, and food and beverage, through a variety of supply modes. For additional information, refer to Note 4, *Revenue Recognition*.

Electricity is the largest cost component in the production of atmospheric gases. Steam methane reformers utilize natural gas as the primary raw material, and gasifiers use liquid and solid hydrocarbons as the principal raw material for the production of hydrogen, carbon monoxide, and syngas. We mitigate energy, natural gas, and hydrocarbon price fluctuations contractually through pricing formulas, surcharges, and cost pass-through and tolling arrangements.

The regional Industrial Gases segments also include our share of the results of several joint ventures accounted for by the equity method. The largest of these joint ventures operate in China, India, Italy, Mexico, Saudi Arabia, South Africa, and Thailand.

Each of the regional Industrial Gases segments competes against global industrial gas companies as well as regional competitors. Competition is based primarily on price, reliability of supply, and the development of industrial gas applications. We derive a competitive advantage in locations where we have pipeline networks, which enable us to provide reliable and economic supply of products to larger customers.

Industrial Gases – Global

The Industrial Gases – Global segment includes activity related to the sale of cryogenic and gas processing equipment for air separation. The equipment is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. The Industrial Gases – Global segment also includes centralized global costs associated with management of all the Industrial Gases segments. These costs include Industrial Gases global administrative costs, product development costs, and research and development costs. We compete with a large number of firms for all the offerings included in the Industrial Gases – Global segment. Competition in the equipment business is based primarily on technological performance, service, technical know-how, price, and performance guarantees.

Corporate and other

The Corporate and other segment includes our liquefied natural gas, turbo machinery equipment and services, and distribution sale of equipment businesses as well as our corporate support functions that benefit all segments. Competition for the sale of equipment businesses is based primarily on technological performance, service, technical know-how, price, and performance guarantees.

The results of the Corporate and other segment also include income and expense that is not directly associated with the other segments, such as foreign exchange gains and losses.

In addition to assets of the global businesses included in this segment, other assets include cash and cash items, short-term investments, deferred tax assets, and financial instruments.

Customers

We do not have a homogeneous customer base or end market, and no single customer accounts for more than 10% of our consolidated revenues.

Accounting Policies

The accounting policies of the segments are the same as those described in Note 1, *Major Accounting Policies*. We evaluate the performance of segments based upon reported segment operating income.

Business Segment Information

	Industrial Gases–Americas	Industrial Gases–EMEA	Industrial Gases–Asia	Industrial Gases–Global	Corporate and other	Total	
2021							
Sales	$4,167.6	$2,444.9	$2,920.8	$511.0	$278.7	$10,323.0	(A)
Operating income (loss)	1,065.5	557.4	838.3	(60.6)	(132.8)	2,267.8	(B)
Depreciation and amortization	611.9	229.8	444.4	10.9	24.3	1,321.3	
Equity affiliates' income	112.5	93.7	81.4	6.5	—	294.1	(B)
Expenditures for long-lived assets	909.6	371.3	792.3	112.6	278.4	2,464.2	
Investments in net assets of and advances to equity affiliates	383.8	587.4	608.1	70.0	—	1,649.3	
Total assets	7,092.5	4,353.2	7,627.1	648.4	7,138.0	26,859.2	
2020							
Sales	$3,630.7	$1,926.3	$2,716.5	$364.9	$217.9	$8,856.3	(A)
Operating income (loss)	1,012.4	473.3	870.3	(40.0)	(112.2)	2,203.8	(B)
Depreciation and amortization	559.5	195.9	399.4	9.6	20.6	1,185.0	
Equity affiliates' income	84.3	74.8	61.0	10.9	—	231.0	(B)
Expenditures for long-lived assets	1,264.7	327.6	690.3	35.3	191.1	2,509.0	
Investments in net assets of and advances to equity affiliates	310.9	535.2	539.7	46.4	—	1,432.2	
Total assets	6,610.1	3,917.0	6,842.9	397.8	7,400.7	25,168.5	
2019							
Sales	$3,873.5	$2,002.5	$2,663.6	$261.0	$118.3	$8,918.9	(A)
Operating income (loss)	997.7	472.4	864.2	(11.7)	(152.8)	2,169.8	(B)
Depreciation and amortization	505.2	189.5	361.5	8.6	18.0	1,082.8	
Equity affiliates' income	84.8	69.0	58.4	3.2	—	215.4	(B)
Expenditures for long-lived assets	545.8	216.3	1,105.5	33.8	88.3	1,989.7	

(A) The sales information noted above relates to external customers only. All intersegment sales are eliminated in consolidation. Intersegment sales are generally transacted at market pricing. We generally do not have intersegment sales from our regional industrial gases businesses. Equipment manufactured for our regional industrial gases segments are generally transferred at cost and are not reflected as an intersegment sale.

(B) Refer to the *Reconciliations to Consolidated Results* section below.

Reconciliations to Consolidated Results

Operating Income

The table below reconciles total operating income disclosed in the table above to consolidated operating income as reflected on our consolidated income statements:

Fiscal Year Ended 30 September	**2021**	2020	2019
Total	**$2,267.8**	$2,203.8	$2,169.8
Facility closure	**(23.2)**	—	(29.0)
Cost reduction actions	**—**	—	(25.5)
Gain on exchange with joint venture partner	**36.8**	—	29.1
Company headquarters relocation income (expense)	**—**	33.8	—
Consolidated Operating Income	**$2,281.4**	$2,237.6	$2,144.4

Equity Affiliates' Income

The table below reconciles total equity affiliates' income disclosed in the table above to consolidated equity affiliates' income as reflected on our consolidated income statements:

Fiscal Year Ended 30 September	2021	2020	2019
Total	$294.1	$231.0	$215.4
India Finance Act 2020	—	33.8	—
Consolidated Equity Affiliates' Income	**$294.1**	**$264.8**	**$215.4**

Geographic Information

Sales to External Customers

Fiscal Year Ended 30 September	2021	2020	2019
United States	**$3,895.8**	$3,359.6	$3,351.8
China	**1,828.0**	1,719.7	1,730.2
Other foreign operations	**4,599.2**	3,777.0	3,836.9
Total	**$10,323.0**	$8,856.3	$8,918.9

Long-Lived Assets[(A)]

30 September	2021	2020	2019
United States	**$5,187.8**	$4,633.9	$3,721.3
China	**4,137.7**	3,719.4	3,302.6
Other foreign operations	**3,929.1**	3,611.4	3,313.7
Total	**$13,254.6**	$11,964.7	$10,337.6

(A) Long-lived assets represents plant and equipment, net.

Geographic information is based on country of origin.

24. SUBSEQUENT EVENTS

Equity Affiliate Investment in Jazan Integrated Gasification and Power Company ("JIGPC")

On 27 October 2021, we made an initial investment of $1.6 billion in Jazan Integrated Gasification and Power Company ("JIGPC"). JIGPC is a joint venture with Saudi Aramco Power Company (a subsidiary of Aramco), ACWA Power, and Air Products Qudra in the Jazan Economic City, Saudi Arabia. Our investment, which was made primarily in the form of shareholder loans, represents a 55% interest in the joint venture, of which 4% is attributable to the non-controlling partner of Air Products Qudra. Our $1.6 billion investment includes approximately $130 received from the non-controlling partner in September 2021. This cash receipt is reflected within "Investments by noncontrolling interests" on our consolidated statements of equity and cash flows for the fiscal year ended 30 September 2021.

We expect to make an additional investment in JIGPC of approximately $1 billion in 2023.

We determined JIGPC is a variable interest entity for which we are not the primary beneficiary. Therefore, we will account for our investment in JIGPC under the equity method within the Industrial Gases – Middle East segment, a new reporting segment in fiscal year 2022 as discussed below.

JIGPC Joint Venture

On 27 September 2021, JIGPC signed definitive agreements for the acquisition of $12 billion of assets from Aramco and related project financing for the purchase. JIGPC will complete the acquisition of the project assets, which include power blocks, gasifiers, air separation units, syngas cleanup assets, and utilities, in two phases. JIGPC will commission, operate, and maintain the project assets to supply electricity, steam, hydrogen and utilities to Aramco's refinery and terminal complex under a 25-year agreement.

The first phase was completed on 27 October 2021 and included $7 billion of the assets. The second phase is expected to be funded and completed in 2023. JIGPC will account for the asset transfer as a financing, recording a financing receivable upon acquisition and recognizing financing income over the supply term.

Jazan Gas Project Company

Jazan Gas Project Company ("JGPC"), a joint venture between Air Products and ACWA Holding, entered into a 20-year oxygen and nitrogen supply agreement in 2015 to supply Aramco's oil refinery and power plant in Jazan, Saudi Arabia. Air Products owns 26% of the joint venture. In October 2021, the supply agreement between JGPC and Aramco was terminated, and JGPC sold its air separation units to Aramco. We initially sold these assets to JGPC and deferred revenue and profit equal to our ownership percentage in the joint venture. With the termination of the supply agreement and sale of the air separation units complete, we will recognize the remaining deferred profit in equity affiliates' income in the first quarter of fiscal year 2022.

Segment Reorganization

On 4 November 2021, we announced the reorganization of our industrial gases segments. Beginning in the first quarter of fiscal year 2022, we will report our results under the following five reporting segments:

- Industrial Gases – Americas;
- Industrial Gases – Asia;
- Industrial Gases – Europe;
- Industrial Gases – Middle East; and
- Corporate and other

The reorganization reflects the separation of our former Industrial Gases – EMEA segment into two separate reporting segments: Industrial Gases – Europe and Industrial Gases – Middle East. The results of an affiliate formerly reflected in the Industrial Gases – Asia segment will now be reported in the Industrial Gases – Middle East segment. Additionally, the results of our Industrial Gases – Global operating segment will be reflected in the Corporate and other segment. Except for the Corporate and other segment, each reporting segment will meet the definition of an operating segment and will not include the aggregation of multiple operating segments. Our Corporate and other segment will include the aggregation of three operating segments that meet the aggregation criteria under GAAP.

Beginning with our Quarterly Report on Form 10-Q for the first quarter of fiscal year 2022, segment results will be presented on a retrospective basis to reflect the reorganization.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

Not applicable.

Item 9A. Controls and Procedures.

Disclosure Controls and Procedures

We maintain a comprehensive set of disclosure controls and procedures (as defined in Rules 13a-15 (e) and 15d-15(e) under the Exchange Act). Under the supervision of the Chief Executive Officer and Chief Financial Officer, our management conducted an evaluation of the effectiveness of our disclosure controls and procedures as of 30 September 2021. Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that, as of 30 September 2021, the disclosure controls and procedures were effective.

Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act). Management has evaluated the effectiveness of our internal control over financial reporting as of 30 September 2021 based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on that evaluation, management concluded that, as of 30 September 2021, our internal control over financial reporting was effective. Management's Report on Internal Control over Financial Reporting is provided under Part II, Item 8, of this Form 10-K.

There was no change in our internal control over financial reporting during the fourth quarter of fiscal year 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Deloitte & Touche LLP, our independent registered public accounting firm, has audited our internal control over financial reporting as of 30 September 2021. The Report of the Independent Registered Public Accounting Firm is provided under Part II, Item 8, of this Form 10-K.

Item 9B. Other Information.

M. Scott Crocco, the Company's former Executive Vice President and Chief Financial Officer, retired from the Company effective 30 September 2021. In connection with Mr. Crocco's retirement, the Company and Mr. Crocco entered into a project bonus and release agreement (the "Agreement") on 18 November 2021. Pursuant to the Agreement, Mr. Crocco will receive a lump sum payment of $1,775,000 in recognition of his significant contributions toward achieving the October 2021 financial closing of the Jazan gasification project. The Agreement also contains a customary release of claims arising from or relating to Mr. Crocco's service with the Company.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item relating to our directors and nominees is incorporated herein by reference to the section captioned "The Board of Directors" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022. The information required by this item relating to our executive officers is set forth in Part I, Item 1 of this Form 10-K.

The information required by this item relating to our Audit and Finance Committee and our Audit and Finance Committee Financial Expert is incorporated herein by reference to the sections captioned "Board Structure–Standing Committees of the Board" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022.

The information required by this item relating to our procedures regarding the consideration of candidates recommended by shareholders and a procedure for submission of such candidates is incorporated herein by reference to the section captioned "The Board of Directors–Selection of Directors" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022.

The information required by this item relating to Section 16(a) Beneficial Ownership Reporting Compliance is incorporated herein by reference to the section captioned "Section 16(a) Beneficial Ownership Reporting" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022.

We have adopted a Code of Conduct that applies to all employees, including the Chief Executive Officer, the Chief Financial Officer, and the Principal Accounting Officer. The Code of Conduct can be found at our website at www.airproducts.com/company/governance/code-of-conduct.

Item 11. Executive Compensation.

The information required by this item is incorporated herein by reference to the sections captioned "Executive Compensation" and "Compensation of Directors" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this item is incorporated herein by reference to the sections captioned "Information About Stock Ownership" and "Equity Compensation Plan Information" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item is incorporated herein by reference to the sections captioned "The Board of Directors–Director Independence" and "Board Practices, Processes and Policies–Transactions with Related Persons" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022.

Item 14. Principal Accountant Fees and Services.

The information required by this item is incorporated herein by reference to the section captioned "Fees of Independent Registered Public Accounting Firm" in the Proxy Statement for the Annual Meeting of Shareholders to be held on 3 February 2022.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

(a) The documents below are filed as a part of this report:

(1) *Financial Statements*:

The following is a list of the Consolidated Financial Statements of Air Products and Chemicals, Inc. and its subsidiaries included in Part II, Item 8. Financial Statements and Supplementary Data:

(2) *Financial Statement Schedules*.

Financial statement schedules are omitted as they are either not required or the information is otherwise included in the consolidated financial statements or notes thereto.

(3) *Exhibits*.

The exhibits filed as a part of this report as required by Item 601 of Regulation S-K are listed in the Index to Exhibits beginning on page 114.

Item 16. Form 10-K Summary.

None.

INDEX TO EXHIBITS

Exhibit No.	Description
(3)	Articles of Incorporation and Bylaws.
3.1	Restated Certificate of Incorporation of the Company. (Filed as Exhibit 3.2 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 1987.)*
3.2	Amendment to the Restated Certificate of Incorporation of the Company dated 25 January 1996. (Filed as Exhibit 3.3 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 1996.)*
3.3	Amendment to the Restated Certificate of Incorporation of the Company dated 28 January 2014. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 30 June 2014.)*
3.4	Amended and Restated Bylaws of the Company. (Filed as Exhibit 3.1 to the Company's Current Report on Form 8-K dated 26 November 2019.)*
(4)	Instruments defining the rights of security holders, including indentures. Upon request of the Securities and Exchange Commission, the Company hereby undertakes to furnish copies of the instruments with respect to its long-term debt.
4.1	Indenture, dated as of 10 January 1995, between the Company and The Bank of New York Trust, N.A. (formerly Wachovia Bank, National Association and initially First Fidelity Bank Company, National Association), as Trustee. (Filed as Exhibit 4(a) to the Company's Registration Statement on Form S-3 filed 19 January 1995, File No. 033-57357.)*
4.2	Indenture, dated as of 30 April 2020, between the Company and The Bank of New York Trust Company, N.A., as Trustee. (Filed as Exhibit 4.1 to the Company's Current Report on Form 8-K filed 30 April 2020.)*
4.3	Description of Securities.
(10)	Material Contracts.
10.1	Deferred Compensation Program for Directors, effective 7 October 2019. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for quarter ended 31 December 2019.)*†
10.2	Amended and Restated Long-Term Incentive Plan of the Company effective 1 October 2014. (Filed as Exhibit 10.1 to the Company's Current Report on Form 8-K filed on 23 September 2014.)*†
10.2(a)	Form of Restricted Stock Unit Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2020 awards. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 March 2020.)*†
10.2(b)	Form of Performance Share Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2020 awards. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 March 2020.)*†
10.3	Air Products and Chemicals, Inc. 2021 Long-Term Incentive Plan. (Filed as Exhibit 4.5 to the Company's Registration Statement on Form S-8 (File No. 333-252722) filed on 4 February 2021.)*†
10.3(a)	Form of Restricted Stock Unit Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2021 awards. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2020.)*†
10.3(b)	Form of Performance Share Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2021 awards. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2020.)*†
10.4	Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 November 2017 with provisions effective 1 January 2018. (Filed as Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2017.)*†
10.4(a)	Amendment No. 1 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 November 2017 with provisions effective 1 January 2018. (Filed as Exhibit 10.6(a) to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2018.)*†

INDEX TO EXHIBITS

Exhibit No.	Description
10.4(b)	Amendment No. 2 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 January 2019. (Filed as Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2018.)*†
10.4(c)	Amendment No. 3 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 January 2019. (Filed as Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2018.)*†
10.4(d)	Amendment No. 4 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 August 2019. (Filed as Exhibit 10.6D to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2019.)*†
10.4(e)	Amendment No. 5 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 August 2019. (Filed as Exhibit 10.6E to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2019.)*†
10.4(f)	Amendment No. 6 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 28 January 2021. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 March 2021.)*†
10.4(g)	Amendment No. 7 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 January 2020. (Filed as Exhibit 10.3 to the Company's Annual Report on Form 10-K for the fiscal year ended 31 March 2021.)*†
10.5	Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.10 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2014.)*†
10.5(a)	Amendment No. 1 dated as of 30 September 2015 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.10(a) to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2015.)*†
10.5(b)	Amendment No. 2 dated as of 30 September 2016 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.7(b) to the Company's Annual Report on Form 10-K for fiscal year ended 30 September 2016.)*†
10.5(c)	Amendment No. 3 dated as of 26 July 2017 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2017.(Filed as Exhibit 10.7(c) to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2017.)*†
10.6	Deferred Compensation Plan as Amended and Restated effective 1 January 2018. (Filed as Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2017.)*†
10.7	Air Products and Chemicals, Inc. Executive Separation Program as amended effective as of 20 July 2018. (Filed as Exhibit 10.10 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2018.)*†
10.8	Form of Change in Control Severance Agreement for an Executive Officer. (filed as Exhibit 10.2 of the Company's Current Report on Form 8-K dated 23 September 2014.)*†
10.9	Amended and Restated Employment Agreement dated 14 November 2017, between the Company and Seifollah Ghasemi. (Filed as Exhibit 10.1 to the Company's Current Report on Form 8-K filed 14 November 2017.)*†
10.9(a)	Amendment to Employment Agreement, dated 21 May 2020, between Air Products and Chemicals, Inc. and Seifollah Ghasemi. (Filed as Exhibit 10.1 to the Company's Current Report on Form 8-K filed 21 May 2020.)*†
10.10	Senior Management Severance and Summary Plan Description effective as of 1 October 2017. (Filed as Exhibit 10.16 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2017.)*†

INDEX TO EXHIBITS

Exhibit No.	Description
10.11	Compensation Programs for Nonemployee Directors effective 26 November 2019. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2019.)*†
10.12	Project Bonus and Release Agreement, dated 18 November 2021, between the Company and M. Scott Crocco.†
10.13	Revolving Credit Agreement dated as of 31 March 2021 for $2,500,000,000. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 March 2021.)*
10.13(a)	Amendment to the Revolving Credit Agreement dated as of 29 September 2021.
(21)	Subsidiaries of the Registrant.
21.1	Subsidiaries of the Registrant.
(23)	Consents of Experts and Counsel.
23.1	Consent of Independent Registered Public Accounting Firm.
(24)	Power of Attorney.
24.1	Power of Attorney.
(31)	Rule 13a-14(a)/15d-14(a) Certifications.
31.1	Certification by the Principal Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification by the Principal Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
(32)	Section 1350 Certifications.
32.1	Certification by the Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.††
(101)	Interactive Data Files.
101.INS	Inline XBRL Instance Document. The XBRL Instance Document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
104	Cover Page Interactive Data File, formatted in Inline XBRL (included in Exhibit 101).

* Previously filed as indicated and incorporated herein by reference. Exhibits incorporated by reference are located in SEC File No. 001-04534 unless otherwise indicated.

† Indicated management contract or compensatory arrangement.

†† The certification attached as Exhibit 32.1 that accompanies this Annual Report on Form 10-K, is not deemed filed with the SEC and is not to be incorporated by reference into any filing of Air Products and Chemicals, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Form 10-K, irrespective of any general incorporation language contained in such filing.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

AIR PRODUCTS AND CHEMICALS, INC.
(Registrant)

By: /s/ Melissa N. Schaeffer
Melissa N. Schaeffer
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

Date: 18 November 2021

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature and Title	Date
/s/ Seifi Ghasemi (Seifi Ghasemi) Director, Chairman, President, and Chief Executive Officer (Principal Executive Officer)	18 November 2021
/s/ Russell A. Flugel (Russell A. Flugel) Senior Vice President, Corporate Controller, and Principal Accounting Officer	18 November 2021
* (Charles I. Cogut) Director	18 November 2021
* (Lisa A. Davis) Director	18 November 2021
* (Chad C. Deaton) Director	18 November 2021
* (David H. Y. Ho) Director	18 November 2021

Signature and Title	Date
* (Edward L. Monser) Director	18 November 2021
* (Matthew H. Paull) Director	18 November 2021
* (Wayne T. Smith) Director	18 November 2021

* Sean D. Major, Executive Vice President, General Counsel and Secretary, by signing his name hereto, does sign this document on behalf of the above noted individuals, pursuant to a power of attorney duly executed by such individuals, which is filed with the Securities and Exchange Commission herewith.

/s/ Sean D. Major

Sean D. Major

Executive Vice President, General Counsel and Secretary

Date: 18 November 2021

Shareholders' Information

Common stock information

Ticker Symbol: APD
Exchange Listing: New York Stock Exchange
Transfer Agent and Registrar:
Broadridge Corporate Issuer Solutions, Inc.
P.O. Box 1342
Brentwood, NY 11717
Phone: 844-318-0129
International: 720-358-3595
Fax: 215-553-5402
shareholder.broadridge.com

Publications for shareholders

In addition to this Annual Report and the accompanying Annual Report on Form 10-K, Air Products informs shareholders about Company news through:

Notice of Annual Meeting and Proxy Statement—made available to shareholders in mid-December and posted to the Company's website at investors.airproducts.com/shareholder-info.

Earnings information—shareholders and investors can obtain copies of earnings releases, periodic and current reports, and news releases by visiting investors.airproducts.com. Shareholders and investors can also register for e-mail updates at that website.

Direct investment program

Current shareholders and new investors can conveniently and economically purchase shares of Air Products' common stock and reinvest cash dividends through Broadridge Corporate Issuer Solutions. Registered shareholders can purchase shares on Broadridge Corporate Issuer Solutions, shareholder.broadridge.com/airproducts. New investors can obtain information on the website or by calling:
Phone: 844-318-0129
International: 720-358-3595

Annual meeting

The 2022 annual meeting of shareholders will be held on Thursday, February 3, 2022.

Annual certifications

The most recent certifications by our Chief Executive Officer and Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 are filed as exhibits to our Form 10-K. We have also filed with the New York Stock Exchange the most recent Annual CEO Certification as required by Section 303A.12(a) of the New York Stock Exchange Listed Company Manual.

Additional information

The forward-looking statements contained in this Annual Report are qualified by reference to the section entitled "Forward-Looking Statements" beginning on page 3 of the accompanying Annual Report on Form 10-K.

For more information, please contact us at:

Corporate Headquarters
Air Products
1940 Air Products Boulevard
Allentown, PA 18106-5500
T 610-481-4911

Corporate Secretary's Office
Sean D. Major, Executive Vice President, General Counsel and Secretary
T 610-481-4880

Investor Relations Office
Simon Moore, Vice President, Investor Relations, Corporate Relations and Sustainability
T 610-481-4426

AIR PRODUCTS

tell me more
airproducts.com

2022 ANNUAL REPORT

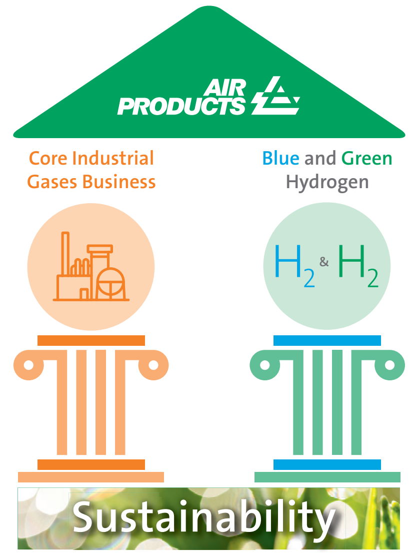
AIR PRODUCTS

Working Together.
Winning Together.

2022

OUR BUSINESSES

Air Products (**NYSE:APD**), a world-leading industrial gases company in operation for over 80 years, provides essential industrial gases, related equipment, and applications expertise to customers around the world. Focused on energy, environmental, and emerging markets, the Company has two growth pillars driven by sustainability. Air Products' core industrial gases business serves customers in dozens of industries, including refining, chemicals, metals, electronics, manufacturing, medical, and food. The Company also develops, engineers, builds, owns, and operates some of the world's largest industrial gas and carbon-capture projects, supplying world-scale clean hydrogen for global transportation, industrial markets, and the broader energy transition. Air Products is also a world leader in several growth markets including hydrogen, helium, and liquefied natural gas process technology and equipment, and provides turbomachinery, membrane systems, and cryogenic containers globally.



Air Products reported fiscal year 2022 results under five segments:

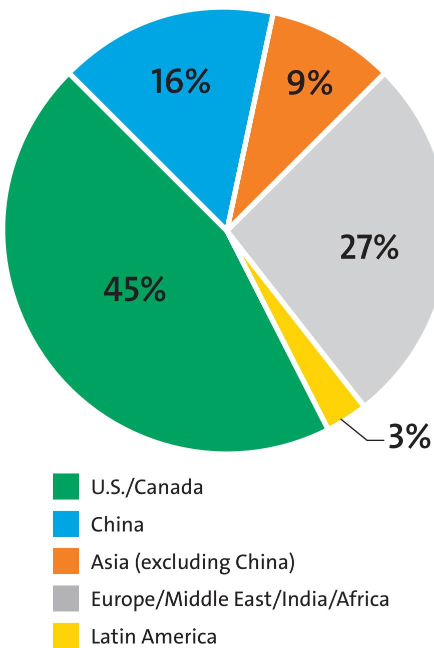
- **Americas;**
- **Asia;**
- **Europe;**
- **Middle East and India; and**
- **Corporate and other**

The **regional industrial gases** segments produce and sell atmospheric gases, such as oxygen, nitrogen and argon; process gases, such as hydrogen, helium, carbon dioxide, carbon monoxide, and syngas (a mixture of hydrogen and carbon monoxide); and specialty gases. The regional segments distribute gases to customers through a variety of supply modes, including liquid or gaseous bulk supply delivered by tanker or tube trailer and, for smaller customers, packaged gases delivered in cylinders and dewars. For large-volume customers with relatively constant demand, the Company constructs or acquires an on-site plant on or near the customer's facility or delivers product from one of its pipelines.

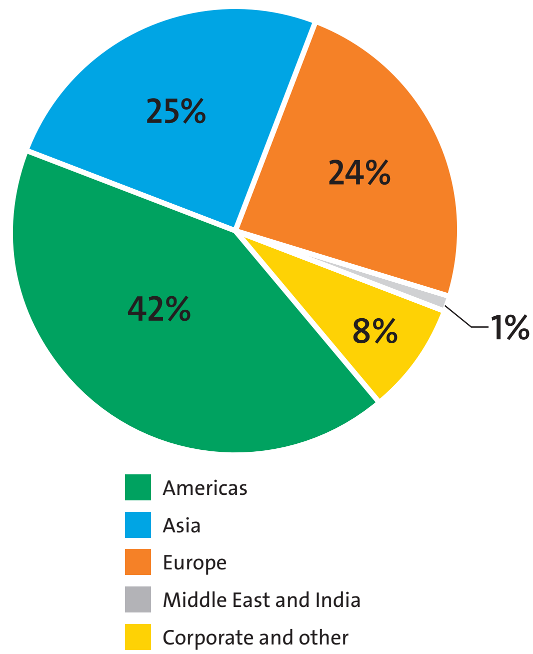
The **Corporate and other** segment includes the Company's sale of equipment businesses. This segment sells cryogenic and gas processing equipment for air separation, liquefied natural gas process technology and equipment, turbo machinery equipment and services, and distribution equipment, including membrane systems and cryogenic containers. The Corporate and other segment also reflects costs to provide corporate support functions and global management activities that benefit all segments.

FINANCIAL HIGHLIGHTS

Consolidated sales by region



Consolidated sales by business segment



Millions of dollars, except for per share data	**2022**	2021	Change
FOR THE YEAR (all from continuing operations, unless otherwise indicated)			
GAAP			
Sales	**$12,699**	$10,323	23%
Net income margin(A)	**17.8%**	20.5%	(270) bp
Operating margin	**18.4%**	22.1%	(370) bp
Return on capital employed ("ROCE") (GAAP Basis)	**8.3%**	8.1%	20 bp
Cash used for investing activities	**$3,857**	$2,733	41%
NON-GAAP			
Adjusted EBITDA margin(B)	**33.4%**	37.6%	(420) bp
Adjusted operating margin(B)	**19.0%**	22.0%	(300) bp
ROCE (Non-GAAP Basis)(B)	**11.2%**	10.1%	110 bp
Capital expenditures(C)	**$4,650**	$2,551	82%
PER SHARE			
GAAP diluted earnings per share ("EPS")	**$10.08**	$9.12	11%
Adjusted diluted EPS(B)	**$10.41**	$9.02	15%
Dividends declared per common share	**$6.36**	$5.84	9%

(A) Periods presented include impacts from discontinued operations.
(B) Amounts are non-GAAP financial measures. See pages III-VII for reconciliation to the comparable GAAP measures.
(C) Amounts are non-GAAP financial measures. See reconciliation to the comparable GAAP measure within Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations*, of the accompanying Annual Report on Form 10-K.

RECONCILIATIONS OF NON-GAAP FINANCIAL MEASURES

(Millions of dollars unless otherwise indicated, except for per share data)

Adjusted EBITDA

We define adjusted EBITDA as net income less income (loss) from discontinued operations, net of tax, and excluding certain items that we do not believe are indicative of underlying business trends, before interest expense, other non-operating income (expense), net, income tax provision, and depreciation and amortization expense. Adjusted EBITDA and adjusted EBITDA margin provide useful metrics for management to assess operating performance. Net income margin and adjusted EBITDA margin are calculated by dividing net income and adjusted EBITDA, respectively, by consolidated sales for each period. The tables below present consolidated sales and a reconciliation of net income on a GAAP basis to adjusted EBITDA and net income margin on a GAAP basis to adjusted EBITDA margin:

2022	Q1	Q2	Q3	Q4	Total
Sales	$2,994.2	$2,945.1	$3,189.3	$3,570.0	$12,698.6
Net income	549.6	536.8	587.1	593.0	2,266.5
Net income margin	18.4%	18.2%	18.4%	16.6%	17.8%
Reconciliation of GAAP to Non-GAAP:					
Net income	$549.6	$536.8	$587.1	$593.0	$2,266.5
Less: Income from discontinued operations, net of tax	—	—	—	12.6	12.6
Add: Interest expense	30.5	32.3	32.7	32.5	128.0
Less: Other non-operating income (expense), net	22.6	9.1	10.5	20.2	62.4
Add: Income tax provision	113.3	122.7	134.2	130.6	500.8
Add: Depreciation and amortization	332.3	335.9	337.2	332.8	1,338.2
Add: Business and asset actions	—	—	—	73.7	73.7
Add: Equity method investment impairment charge	—	—	—	14.8	14.8
Adjusted EBITDA	$1,003.1	$1,018.6	$1,080.7	$1,144.6	$4,247.0
Adjusted EBITDA margin	33.5%	34.6%	33.9%	32.1%	33.4%

2021	Q1	Q2	Q3	Q4	Total
Sales	$2,375.2	$2,502.0	$2,604.7	$2,841.1	$10,323.0
Net income	486.7	477.1	532.3	618.8	2,114.9
Net income margin	20.5%	19.1%	20.4%	21.8%	20.5%
Reconciliation of GAAP to Non-GAAP:					
Net income	$486.7	$477.1	$532.3	$618.8	$2,114.9
Less: Income from discontinued operations, net of tax	10.3	—	8.2	51.8	70.3
Add: Interest expense	36.7	36.1	35.6	33.4	141.8
Less: Other non-operating income (expense), net	18.6	16.8	21.1	17.2	73.7
Add: Income tax provision	113.9	121.9	101.7	125.3	462.8
Add: Depreciation and amortization	323.7	329.3	335.7	332.6	1,321.3
Add: Facility closure	—	23.2	—	—	23.2
Less: Gain on exchange with joint venture partner	—	36.8	—	—	36.8
Adjusted EBITDA	$932.1	$934.0	$976.0	$1,041.1	$3,883.2
Adjusted EBITDA margin	39.2%	37.3%	37.5%	36.6%	37.6%

2020	Q1	Q2	Q3	Q4	Total
Sales	$2,254.7	$2,216.3	$2,065.2	$2,320.1	$8,856.3
Net income	488.9	490.4	457.1	494.7	1,931.1
Net income margin	21.7%	22.1%	22.1%	21.3%	21.8%
Reconciliation of GAAP to Non-GAAP:					
Net income	$488.9	$490.4	$457.1	$494.7	$1,931.1
Less: Loss from discontinued operations, net of tax	—	(14.3)	—	—	(14.3)
Add: Interest expense	18.7	19.3	32.1	39.2	109.3
Less: Other non-operating income (expense), net	9.1	7.1	8.1	6.4	30.7
Add: Income tax provision	120.7	148.5	109.3	99.9	478.4
Add: Depreciation and amortization	289.2	294.7	290.6	310.5	1,185.0
Less: Company headquarters relocation income (expense)	—	33.8	—	—	33.8
Less: India Finance Act 2020 – equity affiliate income impact	—	33.8	—	—	33.8
Adjusted EBITDA	$908.4	$892.5	$881.0	$937.9	$3,619.8
Adjusted EBITDA margin	40.3%	40.3%	42.7%	40.4%	40.9%

2019	Q1	Q2	Q3	Q4
Sales	$2,224.0	$2,187.7	$2,224.0	$2,283.2
Net income	357.0	433.5	500.2	518.7
Net income margin	16.0%	19.8%	22.5%	22.7%
Reconciliation of GAAP to Non-GAAP:				
Net income	$357.0	$433.5	$500.2	$518.7
Less: Income from discontinued operations, net of tax	—	—	—	—
Add: Interest expense	37.3	35.4	34.2	30.1
Less: Other non-operating income (expense), net	18.5	13.7	17.6	16.9
Add: Income tax provision	132.1	107.5	109.3	131.2
Add: Depreciation and amortization	258.0	262.1	269.1	293.6
Add: Facility closure	29.0	—	—	—
Add: Cost reduction actions	—	—	25.5	—
Less: Gain on exchange with joint venture partner	—	—	29.1	—
Adjusted EBITDA	$794.9	$824.8	$891.6	$956.7
Adjusted EBITDA margin	35.7%	37.7%	40.1%	41.9%

2018	Q1	Q2	Q3	Q4
Sales	$2,216.6	$2,155.7	$2,259.0	$2,298.9
Net income	161.7	423.6	487.9	459.7
Net income margin	7.3%	19.7%	21.6%	20.0%
Reconciliation of GAAP to Non-GAAP:				
Net income	$161.7	$423.6	$487.9	$459.7
Less: Income (loss) from discontinued operations, net of tax	(1.0)	—	43.2	—
Add: Interest expense	29.8	30.4	34.9	35.4
Less: Other non-operating income (expense), net	9.8	11.1	12.8	(28.6)
Add: Income tax provision	291.8	56.2	107.1	69.2
Add: Depreciation and amortization	227.9	240.0	245.6	257.2
Less: Change in inventory valuation method	—	—	—	24.1
Add: Tax reform repatriation - equity method investment	32.5	—	—	(4.0)
Adjusted EBITDA	$734.9	$739.1	$819.5	$822.0
Adjusted EBITDA margin	33.2%	34.3%	36.3%	35.8%

2017	Q1	Q2	Q3	Q4
Sales	$1,882.5	$1,980.1	$2,121.9	$2,203.1
Net income	306.4	2,135.7	104.1	475.0
Net income margin	16.3%	107.9%	4.9%	21.6%
Reconciliation of GAAP to Non-GAAP:				
Net income	$306.4	$2,135.7	$104.1	$475.0
Less: Income (loss) from discontinued operations, net of tax	48.2	1,825.6	(2.3)	(5.5)
Add: Interest expense	29.5	30.5	29.8	30.8
Less: Other non-operating income (expense), net	(0.2)	5.3	3.7	7.8
Add: Income tax provision (benefit)	78.4	94.5	89.3	(1.3)
Add: Depreciation and amortization	206.1	211.8	216.9	231.0
Add: Business separation costs	32.5	—	—	—
Add: Cost reduction and asset actions	50.0	10.3	42.7	48.4
Add: Goodwill and intangible asset impairment charge	—	—	162.1	—
Less: Gain on land sale	—	—	—	12.2
Add: Equity method investment impairment charge	—	—	79.5	—
Adjusted EBITDA	$654.9	$651.9	$723.0	$769.4
Adjusted EBITDA margin	34.8%	32.9%	34.1%	34.9%

2016	Q1	Q2	Q3	Q4
Sales	$1,866.3	$1,777.4	$1,914.5	$1,945.5
Net income	372.0	(465.5)	354.1	400.9
Net income margin	19.9%	(26.2)%	18.5%	20.6%
Reconciliation of GAAP to Non-GAAP:				
Net income	$372.0	($465.5)	$354.1	$400.9
Less: Income (loss) from discontinued operations, net of tax	84.8	(750.2)	98.4	106.5
Add: Interest expense	22.2	25.7	35.1	32.2
Add: Income tax provision	96.4	93.5	145.9	96.8
Add: Depreciation and amortization	214.7	213.9	213.5	212.5
Add: Business separation costs	12.0	7.4	9.5	21.7
Add: Cost reduction and asset actions	—	10.7	13.2	10.6
Add: Pension settlement loss	—	2.0	1.0	2.1
Add: Loss on extinguishment of debt	—	—	—	6.9
Adjusted EBITDA	$632.5	$637.9	$673.9	$677.2
Adjusted EBITDA margin	33.9%	35.9%	35.2%	34.8%

2015	Q1	Q2	Q3	Q4
Sales	$2,041.0	$1,885.3	$1,934.4	$1,963.6
Net income	337.5	296.9	333.2	350.0
Net income margin	16.5%	15.7%	17.2%	17.8%
Reconciliation of GAAP to Non-GAAP:				
Net income	$337.5	$296.9	$333.2	$350.0
Less: Income from discontinued operations, net of tax	76.7	103.4	99.4	72.2
Add: Interest expense	28.8	23.2	28.1	22.7
Add: Income tax provision	76.8	63.0	74.7	85.7
Add: Depreciation and amortization	215.3	213.9	214.2	215.1
Add: Business separation costs	—	—	—	7.5
Add: Business restructuring and cost reduction actions	24.3	52.9	49.6	53.3
Less: Gain on previously held equity interest	17.9	—	—	—
Less: Gain on land sales	—	—	—	33.6
Add: Pension settlement loss	—	11.9	1.4	6.0
Add: Loss on extinguishment of debt	—	—	—	16.6
Adjusted EBITDA	$588.1	$558.4	$601.8	$651.1
Adjusted EBITDA margin	28.8%	29.6%	31.1%	33.2%

2014(A)	Q1	Q2	Q3	Q4
Sales	$2,545.5	$2,581.9	$2,634.6	$2,677.0
Net income	299.0	291.6	323.4	79.1
Net income margin	11.7%	11.3%	12.3%	3.0%
Reconciliation of GAAP to Non-GAAP:				
Net income	$299.0	$291.6	$323.4	$79.1
Less: Income (loss) from discontinued operations, net of tax	1.3	(2.1)	(2.0)	(0.1)
Add: Interest expense	33.3	31.5	31.3	29.0
Add: Income tax provision	95.3	93.0	103.0	78.1
Add: Depreciation and amortization	234.2	229.1	239.0	254.6
Add: Business restructuring and cost reduction actions	—	—	—	12.7
Add: Goodwill and intangible asset impairment charge	—	—	—	310.1
Add: Pension settlement loss	—	—	—	5.5
Adjusted EBITDA	$660.5	$647.3	$698.7	$769.2
Adjusted EBITDA margin	25.9%	25.1%	26.5%	28.7%

(A) Fiscal year 2014 is presented as previously reported in our Annual Report on Form 10-K for the fiscal year ended September 30, 2016, which included the results of the former Materials Technologies segment.

Adjusted Operating Margin

The table below reconciles operating margin on a GAAP basis to adjusted operating margin. Operating margin and adjusted operating margin are calculated by dividing operating income and adjusted operating income, respectively, by consolidated sales for each period. The adjusted measures exclude the impact of certain items that we do not believe are indicative of underlying business performance.

	2022	2021	Change
Sales	**$12,698.6**	$10,323.0	
Operating income	**2,338.8**	2,281.4	
Operating margin	**18.4%**	22.1%	(370) bp
Reconciliation of GAAP to Non-GAAP:			
Operating income	**$2,338.8**	$2,281.4	
Facility closure	**—**	23.2	
Business and asset actions	**73.7**	—	
Gain on exchange with joint venture partner	**—**	(36.8)	
Adjusted operating income	**$2,412.5**	$2,267.8	
Adjusted operating margin	**19.0%**	22.0%	(300) bp

Adjusted Diluted Earnings Per Share ("EPS")

Adjusted diluted EPS is calculated as net income from continuing operations attributable to Air Products, excluding the impact of certain items that we do not believe are indicative of underlying business performance ("non-GAAP adjustments"), divided by the weighted average common shares reflecting the potential dilution that could occur if stock options or other share-based awards were exercised or converted into common stock. We believe it is important for the reader to understand the per share impact of our non-GAAP adjustments because management does not consider these impacts when evaluating underlying business performance. Per share impacts are calculated independently and may not sum to total adjusted diluted EPS due to rounding.

	2022	2021	2020	2019	2018	2017	2016	2015	2014
Diluted EPS	**$10.08**	$9.12	$8.55	$7.94	$6.59	$5.16	$5.04	$4.29	$3.24
Change in inventory valuation method	**—**	—	—	—	(0.08)	—	—	—	—
Facility closure	**—**	0.08	—	0.10	—	—	—	—	—
Business and asset actions	**0.27**	—	—	—	—	—	—	—	—
Business separation costs	**—**	—	—	—	—	0.12	0.21	0.03	—
Tax (benefit) costs associated with business separation	**—**	—	—	—	—	(0.02)	0.24	—	—
Business restructuring, cost reduction, and asset actions	**—**	—	—	0.08	—	0.49	0.11	0.61	0.03
Goodwill and intangible asset impairment charge	**—**	—	—	—	—	0.70	—	—	1.27
Gain on exchange with joint venture partner	**—**	(0.12)	—	(0.13)	—	—	—	—	—
Gain on previously held equity interest	**—**	—	—	—	—	—	—	(0.05)	—
Company headquarters relocation (income) expense	**—**	—	(0.12)	—	—	—	—	—	—
Gain on land sales	**—**	—	—	—	—	(0.03)	—	(0.13)	—
India Finance Act 2020	**—**	—	(0.06)	—	—	—	—	—	—
Equity method investment impairment charge	**0.05**	—	—	—	—	0.36	—	—	—
Pension settlement loss	**—**	—	—	0.02	0.15	0.03	0.02	0.06	0.02
Loss on extinguishment of debt	**—**	—	—	—	—	—	0.02	0.07	—
Tax reform repatriation	**—**	—	—	(0.06)	2.16	—	—	—	—
Tax reform adjustment related to deemed foreign dividends	**—**	—	—	0.26	(0.25)	—	—	—	—
Tax reform rate change and other	**—**	—	—	—	(0.96)	—	—	—	—
Tax restructuring	**—**	—	—	—	(0.16)	—	—	—	—
Tax election benefit and other	**—**	(0.05)	—	—	—	(0.50)	—	—	(0.14)
Adjusted Diluted EPS	**$10.41**	$9.02	$8.38	$8.21	$7.45	$6.31	$5.64	$4.88	$4.42

	FY2022 vs. FY2021	FY2021 vs. FY2020	FY2020 vs. FY2019	FY2019 vs. FY2018	FY2018 vs. FY2017	FY2017 vs. FY2016	FY2016 vs. FY2015	FY2015 vs. FY2014
Change GAAP								
Diluted EPS $ change	**$0.96**	$0.57	$0.61	$1.35	$1.43	$0.12	$ 0.75	$1.05
Diluted EPS % change	**11%**	7%	8%	20%	28%	2%	17%	32%
Change Non-GAAP								
Adjusted diluted EPS $ change	**$1.39**	$0.64	$0.17	$0.76	$1.14	$0.67	$0.76	$0.46
Adjusted diluted EPS % change	**15%**	8%	2%	10%	18%	12%	16%	10%

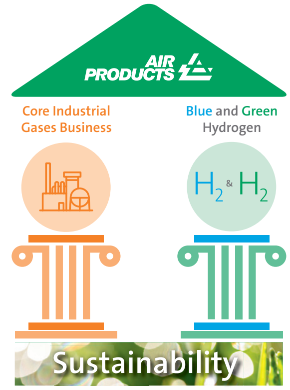
Return on Capital Employed ("ROCE") (Non-GAAP Basis)

Return on capital employed ("ROCE") is calculated on a continuing operations basis. Management considers this measure to be useful in evaluating the Company's returns on capital.

	2022				2021				2020
ROCE (GAAP Basis):	Q4	Q3	Q2	Q1	Q4	Q3	Q2	Q1	Q4
Net income	$593.0	$587.1	$536.8	$549.6	$618.8	$532.3	$477.1	$486.7	
Total liabilities and equity	27,192.6	27,489.0	27,449.7	27,125.3	26,859.2	26,252.1	26,158.9	26,088.1	25,168.5
Four-Quarter Trailing Net Income	$2,266.5				$2,114.9				
÷ Five-Quarter Average Total Liabilities and Equity	27,223.2				26,105.4				
ROCE (GAAP Basis)	8.3%				8.1%				
Change vs. prior year	20 bp								
ROCE (Non-GAAP Basis):									
Net income	$593.0	$587.1	$536.8	$549.6	$618.8	$532.3	$477.1	$486.7	
(Income) Loss from discontinued operations, net of tax	(12.6)	—	—	—	(51.8)	(8.2)	—	(10.3)	
Interest expense	32.5	32.7	32.3	30.5	33.4	35.6	36.1	36.7	
Facility closure	—	—	—	—	—	—	23.2	—	
Business and asset actions	73.7	—	—	—	—	—	—	—	
Gain on exchange with joint venture partner	—	—	—	—	—	—	(36.8)	—	
Equity investment impairment charge	14.8	—	—	—	—	—	—	—	
Tax election benefit and other	—	—	—	—	—	(12.2)	—	—	
Tax other[A]	(22.4)	(6.1)	(6.0)	(5.2)	(6.0)	(5.8)	(3.7)	(7.1)	
Return After-Tax (Non-GAAP Basis)	$679.0	$613.7	$563.1	$574.9	$594.4	$541.7	$495.9	$506.0	
Total liabilities and equity	$27,192.6	$27,489.0	$27,449.7	$27,125.3	$26,859.2	$26,252.1	$26,158.9	$26,088.1	$25,168.5
Less: Payables and accrued liabilities	2,771.6	2,544.4	2,407.1	2,310.6	2,218.3	2,118.4	2,042.2	1,962.2	1,833.2
Less: Accrued income taxes	135.2	107.9	104.6	119.8	93.9	78.8	86.7	108.4	105.8
Less: Other noncurrent liabilities	1,691.2	1,726.2	1,736.8	1,731.7	1,640.9	1,819.0	1,840.0	1,935.7	1,916.0
Less: Deferred income taxes	1,247.4	1,308.6	1,249.0	1,209.6	1,180.9	1,078.2	1,050.8	1,003.0	962.6
Capital Employed (Non-GAAP Basis)	$21,347.2	$21,801.9	$21,952.2	$21,753.6	$21,725.2	$21,157.7	$21,139.2	$21,078.8	$20,350.9
Four-Quarter Trailing Return After-Tax—Non-GAAP	$2,430.7				$2,138.0				
÷ Five-Quarter Average Capital Employed—Non-GAAP	21,716.0				21,090.4				
ROCE (Non-GAAP Basis)	11.2%				10.1%				
Change vs. prior year	110 bp								

(A) Represents the tax impact on interest expense and our pre-tax non-GAAP adjustments.

TO OUR SHAREHOLDERS



My fellow shareholders:

I am extremely proud that the people of Air Products again exceeded our financial goals in fiscal 2022, delivering impressive results despite the challenging macroeconomic and geopolitical environment. I would like to thank each of our talented, dedicated and motivated employees for their exceptional efforts toward this strong performance. I am honored every day to be working alongside the team, as they continue to focus on delivering near-term results while executing on our long-term growth strategy.

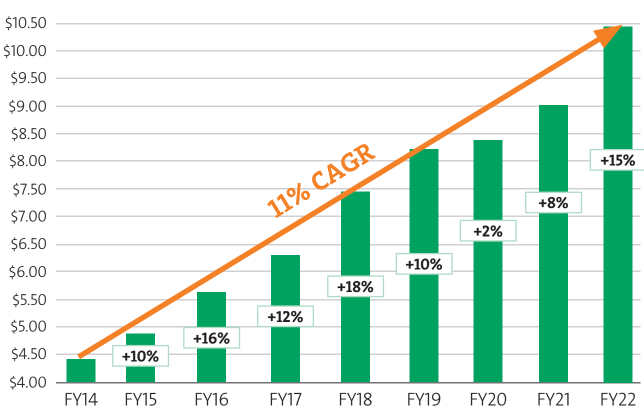
There are **two pillars** to our growth strategy at Air Products, and **sustainability** is the foundation. Through our **core industrial gases business**, we supply customers in dozens of industries with critical products and expertise that lower emissions and increase efficiency and productivity. Through our **blue and green hydrogen megaprojects**, we will commit more than $15 billion by 2027 to deliver clean hydrogen at scale, helping to drive the energy transition and move humanity forward.

These two pillars, which support and rely upon each other for success, put us at the heart of solving the world's needs for clean, sustainable energy and environmental solutions. As you know, this is our higher purpose as a Company. We continue to devote significant attention to corporate governance to support this growth. We also are continuing to build a diverse and inclusive culture where our more than 21,000 people feel they belong and matter and are motivated to achieve our goals.

For fiscal year 2022, our people delivered strong adjusted earnings per share* ("EPS") of $10.41, an increase of 15 percent compared to last year. Since 2014, our goal has been to deliver an average adjusted EPS* growth rate of 10 percent per year. In the last eight years, we have exceeded this goal, delivering 11 percent for this time period, regardless of the macroeconomic conditions.

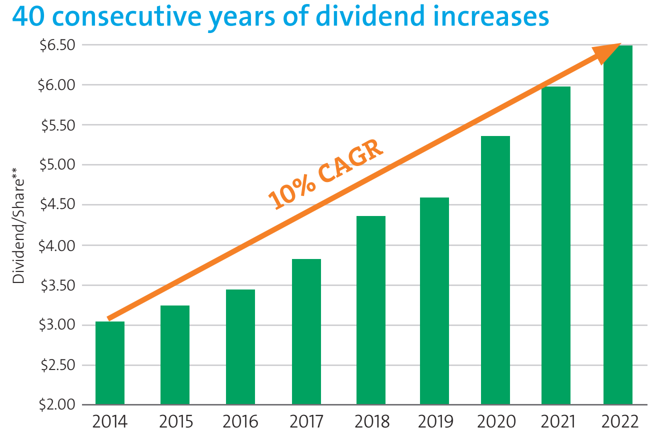
We also remain committed to creating shareholder value and are very proud that we have consistently increased the dividend for 40 consecutive years. Our dividend has grown 10 percent per year on average during the past eight years, mirroring our adjusted EPS* growth rate. In calendar 2022, we returned more than $1.4 billion to our shareholders and still have significant cash flow to support our many growth opportunities.

Adjusted EPS* trend



Dividend history

40 consecutive years of dividend increases



* Non-GAAP financial measures. See reconciliation to GAAP results on pages III-VII.
** Based on annualized quarterly dividend declared in first quarter.

Fiscal 2022 Performance

Our fiscal 2022 financial performance is detailed in the accompanying Annual Report on Form 10-K, and I also encourage you to review the investor slides on our website, which detail our accomplishments this year and our strategic path forward.

Safety is our #1 priority at Air Products. We are focused on improving our safety performance through intentional actions to engage everyone and ensure we follow procedures. Overall, we have seen a 63 percent improvement in the employee lost-time injury rate and a 40 percent improvement in the employee recordable injury rate since fiscal 2014. We are focused on ensuring the safety and well-being of all of our employees. Our ultimate goal will always be zero incidents and accidents.

"I am proud to say that we have continued to create and win projects that help customers and countries meet their growing needs for cleaner energy and environmental solutions. In doing so, **we are making our dream a reality**."

Making Our Dream a Reality

Air Products' goal is to be the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to our customers.

Our **dream of the future** is for Air Products to be the leader in providing solutions to the world's environmental challenges through innovative processes and facilities to provide green and blue hydrogen on a world-scale. This requires expertise and technologies in the production of green hydrogen and carbon capture technologies to enable the production of blue hydrogen.

Our **dream of the future** is to be a company that has a **higher purpose** beyond just creating value for shareholders through improved financial performance . . .

a company where people from all walks of life and nationalities come together, work together, and feel that they **belong** and that their contributions **matter** and are appreciated . . .

a company that is **focused on innovation** to solve the substantial environmental issues facing all humanity . . .

a company that is **compassionate and contributes** to the well-being of all the communities in which we operate around the globe . . .

a global company that **brings people from all over the world together**, to collaborate, improve understanding and prevent conflicts that arise from misunderstanding.

Making Our Dream a Reality **in Fiscal 2022**

This year, we took another significant step forward toward a clean hydrogen future, announcing our investment of about $500 million in a new **green hydrogen project in Massena, New York**, located on the banks of the St. Lawrence River. The facility will produce about 35 metric tons of green liquid hydrogen using almost 100 megawatts of hydro-electric power provided by the New York Power Authority. This project broadens our renewable energy sources beyond solar and wind energy to now include hydropower.

We also announced our **sustainable aviation fuel (SAF) project with World Energy**. This now $2.5 billion major expansion project will produce SAF at World Energy's Paramount, California location – the world's first and North America's only commercial-scale SAF production facility. Air Products will supply SAF to World Energy under a long-term on-site contract. We also extended our hydrogen pipeline network to further increase supply reliability for all of our Southern California hydrogen pipeline customers.

We expect the landmark U.S. Inflation Reduction Act to create additional opportunities for clean hydrogen and carbon sequestration projects in the future.

With our **net-zero hydrogen energy complex in Edmonton, Alberta, Canada**, we marked two significant milestones. First, we signed a long-term supply agreement for about half of the facility's output to supply Imperial Oil's Strathcona renewable diesel complex. Second, at a ceremony in Edmonton, federal and provincial government representatives announced approximately 475 million (CAD) in project funding for our energy complex, reflecting their confidence in our ability to operate one of the most competitive and lowest-carbon-intensity hydrogen networks in the world.

We also closed Phase I of the Jazan gasification and power project, which delivered a significant contribution in fiscal 2022. In addition, we signed two major on-site agreements this year, together valued at $1.3 billion, to supply industrial gases to major semiconductor manufacturers.

Also, we continued to make progress on the NEOM green hydrogen project in Saudi Arabia, finalizing the design and moving forward with the project execution, as well as the world-scale clean energy complex in Louisiana to produce blue hydrogen for local and global markets expected to come onstream in 2026.

We are seeing the manifestation of the major project strategy that we embarked on a few years ago, and that is going to drive a significant amount of growth as these major projects come onstream. This backdrop of the major projects for hydrogen and the energy transition, combined with our strong focus on the base business, makes this an exciting time for all of us to be working together and winning together.

Working Together. Winning Together.

Acknowledgments

In closing, as I do each year, I want to sincerely thank those who have supported us and helped us achieve our success.

To our customers . . . In innovating alongside you, we serve our higher purpose – supplying products that benefit the environment and help you be more efficient and sustainable. Thank you for your continued confidence and trust in us.

To our employees . . . Through your dedication and commitment, you continue to play a critical role and make a difference to the world every day, and especially during these challenging times.

To our shareholders . . . As always, thank you for your confidence and trust in Air Products. Our priority remains creating superior value for you.

I believe Air Products is uniquely positioned to help the world transition to a cleaner and better future. It is a better future we believe in and in which we are totally vested.

[redacted]

Seifi Ghasemi
Chairman, President and
Chief Executive Officer of Air Products

BOARD OF DIRECTORS

Tonit Calaway
Executive Vice President and Chief Administrative Officer, General Counsel and Secretary of BorgWarner Inc.
Director of the Company since 2022.

Charles I. Cogut
Retired Partner, Simpson Thacher & Bartlett LLP.
Director of the Company since 2015.

Lisa A. Davis
Former Member of the Managing Board and CEO of Gas and Power for Siemens AG.
Director of the Company since 2020.

Seifi Ghasemi
Chairman, President, and Chief Executive Officer of Air Products.
Director of the Company since 2013.

David H. Y. Ho
Chairman and Founder of Kiina Investment Ltd.
Director of the Company since 2013.

Edward L. Monser
(Lead Director)
Retired President and Chief Operating Officer of Emerson Electric Co.
Director of the Company since 2013.

Matthew H. Paull
Retired Senior Executive Vice President and Chief Financial Officer of McDonald's Corporation.
Director of the Company since 2013.

Wayne T. Smith
Retired Chairman and Chief Executive Officer of BASF Corporation.
Director of the Company since 2021.

EXECUTIVE OFFICERS

Seifi Ghasemi
Chairman, President and Chief Executive Officer

Sean D. Major
Executive Vice President, General Counsel and Secretary

Melissa Schaeffer
Senior Vice President and Chief Financial Officer

Dr. Samir J. Serhan
Chief Operating Officer

For more information about corporate governance practices at Air Products, visit our Governance website at airproducts.com/company/governance.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended 30 September 2022

or

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from ______________________ to ______________________

Commission file number **001-04534**

AIR PRODUCTS AND CHEMICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**23-1274455**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

1940 Air Products Boulevard
Allentown, Pennsylvania 18106-5500
(Address of principal executive offices) (Zip Code)

610-481-4911
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $1.00 per share	APD	New York Stock Exchange
1.000% Euro Notes due 2025	APD25	New York Stock Exchange
0.500% Euro Notes due 2028	APD28	New York Stock Exchange
0.800% Euro Notes due 2032	APD32	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.	Yes ☒	No ☐
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act.	Yes ☐	No ☒
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.	Yes ☒	No ☐
Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).	Yes ☒	No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C.7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the voting stock held by non-affiliates of the registrant on 31 March 2022 was approximately $55.3 billion. For purposes of the foregoing calculations, all directors and/or executive officers have been deemed to be affiliates, but the registrant disclaims that any such director and/or executive officer is an affiliate.

The number of shares of common stock issued and outstanding as of 31 October 2022 was 221,865,971.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023 are incorporated by reference into Part III.

AIR PRODUCTS AND CHEMICALS, INC. and Subsidiaries
ANNUAL REPORT ON FORM 10-K
For the fiscal year ended 30 September 2022

TABLE OF CONTENTS

FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains "forward-looking statements" within the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements include all statements that do not relate solely to historical or current facts and can generally be identified by words such as "anticipate," "believe," "could," "estimate," "expect," "forecast," "future," "goal," "intend," "may," "outlook," "plan," "positioned," "possible," "potential," "project," "should," "target," "will," "would," and similar expressions or variations thereof, or the negative thereof, but these terms are not the exclusive means of identifying such statements. Forward-looking statements are based on management's expectations and assumptions as of the date of this report and are not guarantees of future performance. You are cautioned not to place undue reliance on our forward-looking statements.

Forward-looking statements may relate to a number of matters, including expectations regarding revenue, margins, expenses, earnings, tax provisions, cash flows, pension obligations, share repurchases or other statements regarding economic conditions or our business outlook; statements regarding plans, projects, strategies and objectives for our future operations, including our ability to win new projects and execute the projects in our backlog; and statements regarding our expectations with respect to pending legal claims or disputes. While forward-looking statements are made in good faith and based on assumptions, expectations and projections that management believes are reasonable based on currently available information, actual performance and financial results may differ materially from projections and estimates expressed in the forward-looking statements because of many factors, including, without limitation:

- the duration and impacts of the ongoing COVID-19 global pandemic and efforts to contain its transmission, including the effect of these factors on our business, our customers, economic conditions and markets generally;
- changes in global or regional economic conditions, inflation, and supply and demand dynamics in the market segments we serve, including demand for technologies and projects to limit the impact of global climate change;
- changes in the financial markets that may affect the availability and terms on which we may obtain financing;
- the ability to implement price increases to offset cost increases;
- disruptions to our supply chain and related distribution delays and cost increases;
- risks associated with having extensive international operations, including political risks, risks associated with unanticipated government actions and risks of investing in developing markets;
- project delays, contract terminations, customer cancellations, or postponement of projects and sales;
- our ability to safely develop, operate, and manage costs of large-scale and technically complex projects;
- the future financial and operating performance of major customers, joint ventures, and equity affiliates;
- our ability to develop, implement, and operate new technologies and to market products produced utilizing new technologies;
- our ability to execute the projects in our backlog and refresh our pipeline of new projects;
- tariffs, economic sanctions and regulatory activities in jurisdictions in which we and our affiliates and joint ventures operate;
- the impact of environmental, tax, safety, or other legislation, as well as regulations and other public policy initiatives affecting our business and the business of our affiliates and related compliance requirements, including legislation, regulations, or policies intended to address global climate change;
- changes in tax rates and other changes in tax law;
- safety incidents relating to our operations;
- the timing, impact, and other uncertainties relating to acquisitions and divestitures, including our ability to integrate acquisitions and separate divested businesses, respectively;

FORWARD-LOOKING STATEMENTS (CONTINUED)

- risks relating to cybersecurity incidents, including risks from the interruption, failure or compromise of our information systems;
- catastrophic events, such as natural disasters and extreme weather events, public health crises, acts of war, including Russia's invasion of Ukraine and the ongoing civil war in Yemen, or terrorism;
- the impact on our business and customers of price fluctuations in oil and natural gas and disruptions in markets and the economy due to oil and natural gas price volatility;
- costs and outcomes of legal or regulatory proceedings and investigations;
- asset impairments due to economic conditions or specific events;
- significant fluctuations in inflation, interest rates and foreign currency exchange rates from those currently anticipated;
- damage to facilities, pipelines or delivery systems, including those we own or operate for third parties;
- availability and cost of electric power, natural gas, and other raw materials;
- the success of productivity and operational improvement programs.

In addition to the foregoing factors, forward-looking statements contained herein are qualified with respect to the risks disclosed elsewhere in this document, including in Item 1A, *Risk Factors*, Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations*, and Item 7A, *Quantitative and Qualitative Disclosures About Market Risk*. Any of these factors, as well as those not currently anticipated by management, could cause our results of operations, financial condition or liquidity to differ materially from what is expressed or implied by any forward-looking statement. Except as required by law, we disclaim any obligation or undertaking to update or revise any forward-looking statements contained herein to reflect any change in assumptions, beliefs, or expectations or any change in events, conditions, or circumstances upon which any such forward-looking statements are based.

PART I

Item 1. Business

About Air Products

Air Products and Chemicals, Inc., a Delaware corporation originally founded in 1940, provides essential industrial gases, related equipment, and applications expertise to customers around the world. We have a sustainability-driven two-pillar growth strategy that includes expansion and efficient operation of our core industrial gases business and execution of projects that provide world-scale clean hydrogen. We serve customers in dozens of industries, including refining, chemicals, metals, electronics, manufacturing, medical, and food. We also develop, engineer, build, own, and operate some of the world's largest industrial gas and carbon-capture projects, supplying clean hydrogen that will support global transportation, industrial markets, and the broader energy transition away from fossil fuels. We have built leading positions in several growth markets, such as hydrogen, helium, and liquefied natural gas ("LNG") process technology and equipment, and provide turbomachinery, membrane systems, and cryogenic containers globally.

As used in this report, unless the context indicates otherwise, the terms “we,” “our,” “us,” the “Company,” "Air Products," or “registrant” include our controlled subsidiaries and affiliates.

Except as otherwise noted, the description of our business below reflects our continuing operations. Refer to Note 5, *Discontinued Operations*, to the consolidated financial statements for activity associated with discontinued operations.

During the fiscal year ended 30 September 2022 (“fiscal year 2022”), we reported our continuing operations in five reporting segments under which we managed our operations, assessed performance, and reported earnings: Americas; Asia; Europe; Middle East and India; and Corporate and other. The discussion that follows is based on those operations. Refer to Note 23, *Business Segment and Geographic Information*, to the consolidated financial statements for additional details on our reportable business segments.

Industrial Gases Business

Our industrial gases business is organized and operated regionally. Our industrial gases business produces and sells atmospheric gases, such as oxygen, nitrogen, and argon; process gases, such as hydrogen, helium, carbon dioxide (CO_2), carbon monoxide, and syngas (a mixture of hydrogen and carbon monoxide); and specialty gases. Atmospheric gases are produced through various air separation processes, of which cryogenic is the most prevalent, while process gases are produced by methods other than air separation. For example, hydrogen, carbon monoxide, and syngas are produced by steam methane reforming of natural gas and by the gasification of liquid and solid hydrocarbons. For the production of hydrogen, we purify byproduct sources obtained from the chemical and petrochemical industries. Today, we primarily produce hydrogen from hydrocarbons without carbon capture. Our newer energy transition projects are focused on producing clean hydrogen from hydrocarbons with carbon capture (known as “blue hydrogen”) as well as from renewable energy (known as “green hydrogen”). Helium is produced as a byproduct of gases extracted from underground reservoirs, primarily natural gas, but also CO_2 purified before resale. The industrial gases business also develops, builds, and operates equipment for the production or processing of gases, such as air separation units and non-cryogenic generators.

The regional segments supply gases, related equipment, and applications in the relevant region to diversified customers in many industries, including those in refining, chemicals, metals, electronics, manufacturing, medical, and food. Hydrogen is used by refiners to facilitate the conversion of heavy crude feedstock and lower the sulfur content of gasoline and diesel fuels, as well as in the developing hydrogen-for-mobility markets. We have hydrogen fueling stations that support commercial markets as well as demonstration projects across the globe. The chemicals industry uses hydrogen, oxygen, nitrogen, carbon monoxide, and syngas as feedstocks in the production of many basic chemicals. The energy production industry uses nitrogen injection for enhanced recovery of oil and natural gas and oxygen for gasification. Oxygen is used in combustion and industrial heating applications, including in the steel, certain nonferrous metals, glass, and cement industries. Nitrogen applications are used in food processing for freezing and preserving flavor, and nitrogen is used for inerting in various fields, including the metals, chemical, and semiconductor industries. Helium is used in laboratories and healthcare for cooling and in other industries for pressurizing, purging, and lifting. Argon is used in the metals and other industries for its unique inerting, thermal conductivity, and other properties. Industrial gases are also used in welding and providing healthcare and are utilized in various manufacturing processes to make them more efficient and to optimize performance.

Industrial gases are generally produced at or near the point of use given the complexity and inefficiency with storing molecules at low temperatures. Helium, however, is generally sourced globally, at long distances from point of sale. As a result, we maintain an inventory of helium stored in our fleet of ISO containers as well as at the U.S. Bureau of Land Management underground storage facility in Amarillo, Texas, and our storage cavern near Beaumont, Texas.

We distribute gases to our sale of gas customers through different supply modes depending on various factors including the customer's volume requirements and location. Our supply modes are as follows:

- *Liquid Bulk*—Product is delivered in bulk in either liquid or gaseous form via tanker or tube trailer and stored, usually in its liquid state, in equipment that we typically design and install at the customer’s site for vaporizing into a gaseous state as needed. Liquid bulk sales are usually governed by three- to five-year contracts.

- *Packaged Gases*—Small quantities of product are delivered in either cylinders or dewars. We operate packaged gas businesses in Europe, Asia, and Latin America. In the United States, our packaged gas business sells products (principally helium) only for the electronics and magnetic resonance imaging industries.

- *On-Site Gases*—Large quantities of hydrogen, nitrogen, oxygen, carbon monoxide, and syngas are provided to customers, principally in the energy production and refining, chemical, metals, and electronics industries worldwide, that require large volumes of gases and have relatively constant demand. Gases are produced and supplied by large facilities we construct or acquire on or near the customers’ facilities or by pipeline systems from centrally located production facilities. These sale of gas contracts are generally governed by 15- to 20-year contracts. We also deliver smaller quantities of product through small on-site plants (cryogenic or non-cryogenic generators), typically via a 10- to 15-year sale of gas contract.

Electricity is the largest cost component in the production of atmospheric gases. Steam methane reformers utilize natural gas as the primary raw material and gasifiers use liquid and solid hydrocarbons as the principal raw material for the production of hydrogen, carbon monoxide, and syngas. We mitigate electricity, natural gas, and hydrocarbon price fluctuations contractually through pricing formulas, surcharges, and cost pass-through and tolling arrangements. During fiscal year 2022, no significant difficulties were encountered in obtaining adequate supplies of power and natural gas.

We obtain helium from a number of sources globally, including crude helium for purification from the U.S. Bureau of Land Management's helium reserve.

The regional industrial gases segments also include our share of the results of several joint ventures accounted for under the equity method. Our share of our investees' net earnings is primarily presented net of income taxes within “Equity affiliates’ income" on our consolidated income statements. The largest of these joint ventures operate in China, India, Italy, Mexico, Saudi Arabia, South Africa, and Thailand. The carrying value of our equity method investments is reflected as "Investment in net assets of and advances to equity affiliates" on our consolidated balance sheets.

Each of the regional industrial gases segments competes against three global industrial gas companies: Air Liquide S.A., Messer, and Linde plc, as well as regional competitors. Competition in industrial gases is based primarily on price, reliability of supply, and the development of industrial gas applications. We derive a competitive advantage in locations where we have pipeline networks, which enable us to provide reliable and economic supply of products to our larger customers.

Overall regional industrial gases sales constituted approximately 92%, 92%, and 94% of consolidated sales in fiscal years 2022, 2021, and 2020, respectively. Sales of atmospheric gases constituted approximately 43%, 47%, and 47% of consolidated sales in fiscal years 2022, 2021, and 2020, respectively, while sales of tonnage hydrogen, syngas, and related products constituted approximately 28%, 22%, and 22% of consolidated sales in fiscal years 2022, 2021, and 2020, respectively.

Industrial Gases Equipment

We design and manufacture equipment for air separation, hydrocarbon recovery and purification, natural gas liquefaction, and liquid helium and liquid hydrogen transport and storage. The Corporate and other segment includes activity related to the sale of cryogenic and gas processing equipment for air separation. The equipment is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. The Corporate and other segment also includes our LNG equipment business, our Gardner Cryogenics business fabricating helium and hydrogen transport and storage containers, and our Rotoflow business, which manufactures turboexpanders and other precision rotating equipment. Steel, aluminum, and capital equipment subcomponents such as compressors are the principal raw materials in the manufacturing of equipment. Raw materials for individual projects typically are acquired under firm purchase agreements. Equipment is produced at our manufacturing sites with certain components being procured from subcontractors and vendors. Competition in the equipment business is based primarily on plant efficiency, service, technical know-how, and price, as well as schedule and plant performance guarantees. Sale of equipment constituted approximately 8%, 8%, and 6% of consolidated sales in fiscal years 2022, 2021, and 2020, respectively.

International Operations

Through our subsidiaries, affiliates, and joint ventures accounted for using the equity method, we conduct business in approximately 50 countries outside the United States. Our international businesses are subject to risks customarily encountered in foreign operations, including fluctuations in foreign currency exchange rates and controls, tariffs, trade sanctions, import and export controls, and other economic, political, and regulatory policies of local governments described in Item 1A, *Risk Factors*, below.

We have majority or wholly owned foreign subsidiaries that operate in Canada and approximately 20 countries in Europe (including the Netherlands, Poland, Spain, and the countries of the United Kingdom); approximately 10 countries and regions in Asia (including China, South Korea, and Taiwan); approximately 10 countries in Latin America (including Brazil and Chile); approximately five countries in the Middle East (including Saudi Arabia and Israel), and approximately five countries in Africa. We also own less-than-controlling interests in entities operating in Europe, Asia, Latin America, the Middle East, and Africa.

Financial information about our foreign operations and investments is included in Note 7, *Equity Affiliates*; Note 21, *Income Taxes*; and Note 23, *Business Segment and Geographic Information*, to the consolidated financial statements included under Item 8, below. Information about foreign currency translation is included under “Foreign Currency” in Note 1, *Basis of Presentation and Major Accounting Policies*, and information on our exposure to currency fluctuations is included in Note 12, *Financial Instruments*, to the consolidated financial statements, included under Item 8, below, and in “Foreign Currency Exchange Rate Risk,” included under Item 7A, below.

Technology Development

We pursue a market-oriented approach to technology development through research and development, engineering, and commercial development processes. We conduct research and development principally in our laboratories located in the United States (Allentown, Pennsylvania), the United Kingdom (Basingstoke and Carrington), Spain (Barcelona), China (Shanghai), and Saudi Arabia (Dhahran). We also fund and cooperate in research and development programs conducted by a number of major universities and undertake research work funded by others, including the United States government.

Development of technology for use within the Industrial Gases business focuses primarily on new and improved processes and equipment for the production and delivery of industrial gases and new or improved applications for industrial gas products.

During fiscal year 2022, we owned approximately 674 United States patents, approximately 3,245 foreign patents, and were a licensee under certain patents owned by others. While the patents and licenses are considered important, we do not consider our business as a whole to be materially dependent upon any particular patent, patent license, or group of patents or licenses.

Environmental Regulation

We are subject to various environmental laws, regulations, and public policies in the countries in which we have operations. Compliance with these measures often results in higher capital expenditures and costs. In the normal course of business, we are involved in legal proceedings under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA," the federal Superfund law); Resource Conservation and Recovery Act ("RCRA"); and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Our accounting policy for environmental expenditures is discussed in Note 1, *Basis of Presentation and Major Accounting Policies*, and environmental loss contingencies are discussed in Note 16, *Commitments and Contingencies*, to the consolidated financial statements, included under Item 8, below.

Some of our operations are within jurisdictions that have or are developing regulatory regimes governing emissions of greenhouse gases ("GHG"), including CO_2. These include existing coverage under the European Union Emission Trading System, the California Cap-and-Trade Program, China's Emission Trading Scheme and its nation-wide expansion, and South Korea's Emission Trading Scheme. In the Netherlands, a CO_2 emissions tax was enacted on 1 January 2021. In Canada, Alberta's Technology Innovation and Emission Reduction System went into effect 1 January 2020. In Ontario, Environment & Climate Change Canada's Output Based Pricing System ("OBPS") was replaced by the GHG Emissions Performance Standards ("EPS") program beginning 1 January 2022. In Singapore, the Carbon Pricing Tax Act was implemented effective 1 January 2019. In Taiwan, Greenhouse Gases Emissions Registration and Verification Management Act will be enforced beginning in 2023. In addition, the U.S. Environmental Protection Agency ("EPA") requires mandatory reporting of GHG emissions and is regulating GHG emissions for new construction and major modifications to existing facilities. Some jurisdictions have various mechanisms to target the power sector to achieve emission reductions, which often result in higher power costs.

Increased public concern may result in more international, U.S. federal, and/or regional requirements to reduce or mitigate the effects of GHG emissions. Although uncertain, these developments could increase our costs related to consumption of electric power, hydrogen production and application of our gasification technology. We believe we will be able to mitigate some of the increased costs through contractual terms, but the lack of definitive legislation or regulatory requirements prevents an accurate estimate of the long-term impact these measures will have on our operations. Any legislation that limits or taxes GHG emissions could negatively impact our growth, increase our operating costs, or reduce demand for certain of our products.

Regulation of GHG may also produce new opportunities for us. We continue to develop technologies to help our facilities and our customers lower energy consumption, improve efficiency and lower emissions. We see significant opportunities for hydrogen for mobility and energy transition, carbon capture technologies, and gasification.

We estimate that we spent approximately $10 million, $8 million, and $4 million in fiscal years 2022, 2021, and 2020, respectively, on capital projects reflected in continuing operations to control pollution. Capital expenditures to control pollution are estimated to be approximately $11 million in both fiscal years 2023 and 2024.

For additional information regarding environmental matters, refer to Note 16, *Commitments and Contingencies*, to the consolidated financial statements.

Sustainability

Our Sustainability Report details our growth strategy and the role our employees play in achieving our goals. Through our "Grow–Conserve–Care" approach to sustainability, we are growing responsibly alongside our customers through sustainability-driven opportunities, conserving resources, and caring for our employees and communities. Our latest Sustainability Report is available at www.airproducts.com/company/sustainability/sustainability-report. The information posted on our website, including our Sustainability Report, is not incorporated by reference into, and does not form part of, this Annual Report on Form 10-K.

During fiscal 2022, we announced new sustainability goals, including a commitment to $15 billion in energy transition projects through 2027. We believe our higher purpose is to bring people together to collaborate and innovate solutions to the world's most significant energy and environmental sustainability challenges. We are living this commitment, putting sustainability in action through our major global projects that will support the energy transition.

Human Capital Management

As of 30 September 2022, we had approximately 21,900 employees, of which over 90% were working full-time and 62% were located outside the United States. We have collective bargaining agreements with unions and works councils at certain locations that expire on various dates over the next four years. Approximately 17% of our total workforce is covered by such agreements. Overall, we have a corporate strategy supported by our leaders and enabled by a positive organizational culture.

We believe our employees are our most valuable asset and are critical to our success as an organization. Our goal is to be the safest, most diverse, and most profitable industrial gas company in the world, providing excellent service to our customers. Integral to our success is the continued development of our 4S culture (Safety, Speed, Simplicity and Self-Confidence) and creating a work environment where our employees feel that they belong and matter. Our talent-related initiatives, including employee recruitment and development, diversity and inclusion, and compensation and benefit programs, focus on building and retaining the world-class talent needed to execute our two-pillar growth strategy and fulfill Air Products' higher purpose.

Safety

Safety is fundamental to who we are as a company. Safety is a shared value, and our employees' commitment to safety is demonstrated in many ways every day. Safety is a critical component of everything we do, everywhere in the world. Our goal is to be the safest industrial gas company in the world.

Diversity, Inclusion, and Belonging

Our 2022 Sustainability Report sets forth our announced goals to further increase the percentage of women and U.S. minorities in professional and managerial roles and the recruitment and talent development strategies we have in place to ensure we meet these ambitions. By 2025, Air Products aims to achieve at least 28 percent female representation in the professional and managerial population globally, and at least 30 percent minority representation in that same population in the United States. We established these goals following analysis of our global employee representation metrics and future talent needs, as well as assessing industry benchmarks and peer companies. For more information on these initiatives and to access our most recent Equal Employment Opportunity EEO-1 Report, please refer to our Diversity, Inclusion and Belonging website at www.airproducts.com/company/diversity. The information posted on our website is not incorporated by reference into, and does not form part of, this Annual Report on Form 10-K.

Compensation

As detailed in our 2022 Sustainability Report, in order to create a diverse workplace, individuals must be compensated fairly and equitably. A work environment where employees know they belong and matter includes fair and equitable pay. Our pay practices apply equally to all employees irrespective of gender, race, religion, disability, age, or any other form of personal difference. We strive to pay competitively in local markets where we do business and compete for talent. We benchmark our compensation to ensure that we are keeping pace with the market to provide competitive pay and benefits.

Seasonality

Our businesses are not subject to seasonal fluctuations to any material extent.

Inventories

We maintain inventory where required to facilitate the supply of products to customers on a reasonable delivery schedule. Inventory consists primarily of crude helium, industrial gas, and specialty gas inventories supplied to customers through liquid bulk and packaged gases supply modes.

Customers

We do not have a homogeneous customer base or end market, and no single customer accounts for more than 10% of our consolidated sales. We do have concentrations of customers in specific industries, primarily refining, chemicals, and electronics. Within each of these industries, we have several large-volume customers with long-term contracts. A negative trend affecting one of these industries, or the loss of one of these major customers, although not material to our consolidated revenue, could have an adverse impact on our financial results.

Governmental Contracts

Our business is not subject to a government entity's renegotiation of profits or termination of contracts that would be material to our business as a whole.

Available Information

All periodic and current reports, registration statements, proxy statements, and other filings that we are required to file with the Securities and Exchange Commission ("SEC"), including our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) of the Securities Exchange Act of 1934 (the "Exchange Act"), are available free of charge through our website at www.airproducts.com. Such documents are available as soon as reasonably practicable after electronic filing of the material with the SEC. All such reports filed during the period covered by this report were available on our website on the same day as filing. In addition, our filings with the SEC are available free of charge on the SEC's website, www.sec.gov.

Our Executive Officers

Our executive officers and their respective positions and ages on 22 November 2022 follow. Information with respect to offices held is stated in fiscal years.

Name	Age	Office
Seifi Ghasemi	78	Chairman, President, and Chief Executive Officer (became Chairman, President and Chief Executive Officer in 2014 and previously served as Chairman and Chief Executive Officer of Rockwood Holdings, Inc. from 2001 to 2014). Mr. Ghasemi is a member and Chairman of the Board of Directors and the Chairman of the Executive Committee of the Board of Directors.
Sean D. Major	58	Executive Vice President, General Counsel and Secretary since 2017. Previously, Mr. Major served as Executive Vice President, General Counsel and Secretary for Joy Global Inc. from 2007 to 2017.
Melissa N. Schaeffer	43	Senior Vice President and Chief Financial Officer (became Senior Vice President and Chief Financial Officer in August 2021). Ms. Schaeffer joined the Company in 2016 and most recently served as Vice President, Finance – GEMTE, Americas, Middle East, and India from 2020 to 2021 and previously served as Vice President, Chief Audit Executive from 2016 to 2020.
Dr. Samir J. Serhan	61	Chief Operating Officer (Executive Vice President since December 2016 and Chief Operating Officer since May 2020). Dr. Serhan served as President, Global HyCO, from 2014 to 2016 for Praxair Inc. From 2000-2014, he worked in leadership positions in the U.S. and Germany for The Linde Group, including as Managing Director of Linde Engineering from 2008-2014.

Item 1A. Risk Factors

Our operations are affected by various risks, many of which are beyond our control. In evaluating investment in the Company and the forward-looking information contained in this Annual Report on Form 10-K or presented elsewhere from time to time, you should carefully consider the risk factors discussed below. Any of these risks could have a material adverse effect on our business, operating results, financial condition, and the actual outcome of matters as to which forward-looking statements are made and could adversely affect the value of an investment in our securities. The risks described below are not all inclusive but are designed to highlight what we believe are important factors to consider when evaluating our expectations. In addition to such risks, there may be additional risks and uncertainties that adversely affect our business, performance, or financial condition in the future that are not presently known, are not currently believed to be significant, or are not identified below because they are common to all businesses.

Risks Related to Economic Conditions

The COVID-19 global pandemic may materially and adversely impact our business, financial condition and results of operations.

The COVID-19 global pandemic, including resurgences and variants of the virus that causes COVID-19, and efforts to reduce its spread have led, and may continue to lead to, significant changes in levels of economic activity and significant disruption and volatility in global markets. These factors have led, and may continue to lead, to reduced demand for industrial gas products, particularly in our merchant business. In addition, COVID-19 may result in reduced sales in our other businesses, lower returns for certain of our projects, and the potential delay or cancellation of certain projects in our pipeline. These effects may be exacerbated by actions by health or other governmental authorities to attempt to reduce the transmission of COVID-19.

Further, to the extent COVID-19 adversely affects our business, financial condition, and results of operations and global economic conditions more generally, it may also have the effect of heightening many of the other risks described herein.

Changes in global and regional economic conditions, the markets we serve, or the financial markets may adversely affect our results of operations and cash flows.

Unfavorable conditions in the global economy or regional economies, the markets we serve or financial markets may decrease the demand for our goods and services and adversely impact our revenues, operating results, and cash flows.

Demand for our products and services depends in part on the general economic conditions affecting the countries and markets in which we do business. Weak economic conditions in certain geographies and changing supply and demand balances in the markets we serve have negatively impacted demand for our products and services in the past, including most recently due to COVID-19, and may do so in the future. In addition, our growth strategy is largely based on demand for technologies and projects that limit the impact of global climate change. Demand for our solutions could be negatively impacted if public and private actors reduce their focus on reducing carbon emissions. Reduced demand for our products and services would have a negative impact on our revenues and earnings. In addition, reduced demand could depress sales, reduce our margins, constrain our operating flexibility or reduce efficient utilization of our manufacturing capacity, or result in charges which are unusual or nonrecurring. Excess capacity in our manufacturing facilities or those of our competitors could decrease our ability to maintain pricing and generate profits.

In addition, our operating results in one or more segments may be affected by uncertain or deteriorating economic conditions for particular customer markets within a segment. A decline in the industries served by our customers or adverse events or circumstances affecting individual customers can reduce demand for our products and services and impair the ability of such customers to satisfy their obligations to us, resulting in uncollected receivables, unanticipated contract terminations, project delays or the inability to recover plant investments, any of which may negatively impact our financial results.

Weak overall demand or specific customer conditions may also cause customer shutdowns or defaults or otherwise make us unable to operate facilities profitably and may force sale or abandonment of facilities and equipment or prevent projects from coming on-stream when expected. These or other events associated with weak economic conditions or specific market, product, or customer events may require us to record an impairment on tangible assets, such as facilities and equipment, or intangible assets, such as intellectual property or goodwill, which would have a negative impact on our financial results.

Our extensive international operations can be adversely impacted by operational, economic, political, security, legal, and currency translation risks that could decrease profitability.

In fiscal year 2022, over 60% of our sales were derived from customers outside the United States and many of our operations, suppliers, and employees are located outside the United States. Our operations in foreign jurisdictions may be subject to risks including exchange control regulations, import and trade restrictions, trade policy and other potentially detrimental domestic and foreign governmental practices or policies affecting U.S. companies doing business abroad. Changing economic and political conditions within foreign jurisdictions, strained relations between countries, or the imposition of tariffs or international sanctions can cause fluctuations in demand, price volatility, supply disruptions, or loss of property. The occurrence of any of these risks could have a material adverse impact on our financial condition, results of operation, and cash flows.

Our growth strategies depend in part on our ability to further penetrate markets outside the United States, particularly in markets such as China, India, Indonesia, and the Middle East, and involve significantly larger and more complex projects, including gasification and large-scale hydrogen projects, some in regions where there is the potential for significant economic and political disruptions. We are actively investing large amounts of capital and other resources, in some cases through joint ventures, in developing markets, which we believe to have high growth potential. Our operations in these markets may be subject to greater risks than those faced by our operations in mature economies, including political and economic instability, project delay or abandonment due to unanticipated government actions, inadequate investment in infrastructure, undeveloped property rights and legal systems, unfamiliar regulatory environments, relationships with local partners, language and cultural differences and increased difficulty recruiting, training and retaining qualified employees. In addition, our properties and contracts in these locations may be subject to seizure and cancellation, respectively, without full compensation for loss. Successful operation of particular facilities or execution of projects may be disrupted by civil unrest, acts of war, sabotage or terrorism, and other local security concerns. Such concerns may require us to incur greater costs for security or require us to shut down operations for a period of time.

Furthermore, because the majority of our revenue is generated from sales outside the United States, we are exposed to fluctuations in foreign currency exchange rates. Our business is primarily exposed to translational currency risk as the results of our foreign operations are translated into U.S. dollars at current exchange rates throughout the fiscal period. Our policy is to minimize cash flow volatility from changes in currency exchange rates. We choose not to hedge the translation of our foreign subsidiaries' earnings into dollars. Accordingly, reported sales, net earnings, cash flows, and fair values have been, and in the future will be, affected by changes in foreign exchange rates. For a more detailed discussion of currency exposure, see Item 7A, *Quantitative and Qualitative Disclosures About Market Risk*, below.

Risks Related to Our Business

Risks related to the approval, execution, and operation of our projects, particularly with respect to our largest projects, may adversely affect our operations or financial results.

A significant and growing portion of our business involves clean hydrogen, carbon capture, gasification, and other large-scale projects that involve challenging engineering, procurement and construction phases that may last several years and involve the investment of billions of dollars. These projects are technically complex, often reliant on significant interaction with government authorities and face significant financing, development, operational and reputational risks. These projects may also be subject to complex government approvals, as well as legal or regulatory challenges by government authorities or third parties. Delays in receiving required approvals or related to litigation could require us to delay or abandon certain projects, which may result in the incurrence of additional expense, the loss of invested proceeds and reputational damage.

We may encounter difficulties in engineering, delays in designs or materials provided by the customer or a third party, equipment and materials delivery delays, schedule changes, customer scope changes, delays related to obtaining regulatory permits and rights-of-way, inability to find adequate sources of labor in the locations where we are building new plants, weather-related delays, delays by customers' contractors in completing their portion of a project, technical or transportation difficulties, cost overruns, supply difficulties, geopolitical risks and other factors, many of which are beyond our control, that may impact our ability to complete a project within the original delivery schedule. In some cases, delays and additional costs may be substantial, and we may be required to cancel a project and/or compensate the customer for the delay. We may not be able to recover any of these costs. In addition, in some cases we seek financing for large projects and face market risk associated with the availability and terms of such financing. These financing arrangements may require that we comply with certain performance requirements which, if not met, could result in default and restructuring costs or other losses. All of these factors could also negatively impact our reputation or relationships with our customers, suppliers and other third parties, any of which could adversely affect our ability to secure new projects in the future.

The operation of our facilities, pipelines, and delivery systems inherently entails hazards that require continuous oversight and control, such as pipeline leaks and ruptures, fire, explosions, toxic releases, mechanical failures, vehicle accidents, or cyber incidents. If operational risks materialize, they could result in loss of life, damage to the environment, or loss of production, all of which could negatively impact our ongoing operations, reputation, financial results, and cash flows. In addition, our operating results are dependent on the continued operation of our production facilities and our ability to meet customer requirements, which depend, in part, on our ability to properly maintain and replace aging assets.

We are subject to extensive government regulation in the jurisdictions in which we do business. Regulations addressing, among other things, import/export restrictions, anti-bribery and corruption, and taxes, can negatively impact our financial condition, results of operation, and cash flows.

We are subject to government regulation in the United States and in the foreign jurisdictions where we conduct business. The application of laws and regulations to our business is sometimes unclear. Compliance with laws and regulations may involve significant costs or require changes in business practices that could result in reduced profitability. If there is a determination that we have failed to comply with applicable laws or regulations, we may be subject to penalties or sanctions that could adversely impact our reputation and financial results. Compliance with changes in laws or regulations can result in increased operating costs and require additional, unplanned capital expenditures. Export controls or other regulatory restrictions could prevent us from shipping our products to and from some markets or increase the cost of doing so. Changes in tax laws and regulations and international tax treaties could affect the financial results of our businesses. Increasingly aggressive enforcement of anti-bribery and anti-corruption requirements, including the U.S. Foreign Corrupt Practices Act, the United Kingdom Bribery Act and the China Anti-Unfair Competition Law, could subject us to criminal or civil sanctions if a violation is deemed to have occurred. In addition, we are subject to laws and sanctions imposed by the U.S. and other jurisdictions where we do business that may prohibit us, or certain of our affiliates, from doing business in certain countries, or restricting the kind of business that we may conduct. Such restrictions may provide a competitive advantage to competitors who are not subject to comparable restrictions or prevent us from taking advantage of growth opportunities.

Further, we cannot guarantee that our internal controls and compliance systems will always protect us from acts committed by employees, agents, business partners or that businesses that we acquire would not violate U.S. and/ or non-U.S. laws, including the laws governing payments to government officials, bribery, fraud, kickbacks and false claims, pricing, sales and marketing practices, conflicts of interest, competition, export and import compliance, money laundering, and data privacy. Any such improper actions or allegations of such acts could damage our reputation and subject us to civil or criminal investigations in the U.S. and in other jurisdictions and related shareholder lawsuits, could lead to substantial civil and criminal, monetary and non-monetary penalties, and could cause us to incur significant legal and investigatory fees. In addition, the government may seek to hold us liable as a successor for violations committed by companies in which we invest or that we acquire.

We may be unable to successfully identify, execute or effectively integrate acquisitions, manage our joint ventures, or effectively disentangle divested businesses.

Our ability to grow revenue, earnings, and cash flow at anticipated rates depends in part on our ability to identify, successfully acquire and integrate businesses and assets at appropriate prices, and realize expected growth, synergies, and operating efficiencies. We may not be able to complete transactions on favorable terms, on a timely basis or at all. In addition, our results of operations and cash flows may be adversely impacted by the failure of acquired businesses or assets to meet expected returns, the failure to integrate acquired businesses, the inability to dispose of non-core assets and businesses on satisfactory terms and conditions, and the discovery of unanticipated liabilities or other problems in acquired businesses or assets for which we lack adequate contractual protections or insurance. In addition, we may incur asset impairment charges related to acquisitions that do not meet expectations.

In addition, some of our largest projects involve joint ventures. These arrangements may involve significant risks and uncertainties, including our ability to cooperate with our strategic partners, our strategic partners having interests or goals that are inconsistent with ours, and the potential that our strategic partners may be unable to meet their economic or other obligations to the joint venture, which may negatively impact the expected benefits of the joint venture and cause us to incur additional expense or suffer reputational damage. In addition, due to the nature of these arrangements, we may have limited ability to direct or influence the management of the joint venture, which may limit our ability to assist and oversee the design and implementation of the joint venture's business as well as its accounting, legal, governance, human resources, information technology, and other administrative systems. This may expose us to additional risks and uncertainties because we may be dependent upon and subject to liability, losses, or reputational damage relating to systems, controls, and personnel that are not under our control. These risks may be augmented when the joint venture is operating outside the United States due to differences in language, culture, and regulation, as well as the factors listed above that are relevant to our international operations.

We continually assess the strategic fit of our existing businesses and may divest businesses that are deemed not to fit with our strategic plan or are not achieving the desired return on investment. These transactions pose risks and challenges that could negatively impact our business and financial statements. For example, when we decide to sell or otherwise dispose of a business or assets, we may be unable to do so on satisfactory terms within our anticipated time frame or at all. In addition, divestitures or other dispositions may dilute our earnings per share, have other adverse financial and accounting impacts, distract management, and give rise to disputes with buyers. In addition, we have agreed, and may in the future agree, to indemnify buyers against known and unknown contingent liabilities. Our financial results could be impacted adversely by claims under these indemnification provisions.

The security of our information technology systems could be compromised, which could adversely affect our ability to operate.

We depend on information technology to enable us to operate safely and efficiently and interface with our customers as well as to maintain our internal control environment and financial reporting accuracy and efficiency. Our information technology capabilities are delivered through a combination of internal and external services and service providers. If we do not allocate and effectively manage the resources necessary to build and sustain the proper technology infrastructure, we could be subject to transaction errors, processing inefficiencies, the loss of customers, business disruptions, property damage, or the loss of or damage to our confidential business information due to a security breach. In addition, our information technology systems may be damaged, disrupted or shut down due to attacks by computer hackers, computer viruses, employee error or malfeasance, power outages, hardware failures, telecommunication or utility failures, catastrophes or other unforeseen events, and in any such circumstances our system redundancy and other disaster recovery planning may be ineffective or inadequate. Security breaches of our systems (or the systems of our customers, suppliers or other business partners) could result in the misappropriation, destruction or unauthorized disclosure of confidential information or personal data belonging to us or to our employees, partners, customers or suppliers, and may subject us to legal liability.

As with most large systems, our information technology systems have in the past been, and in the future likely will be subject to computer viruses, malicious codes, unauthorized access and other cyber-attacks, and we expect the sophistication and frequency of such attacks to continue to increase. To date, we are not aware of any significant impact on our operations or financial results from such attempts; however, unauthorized access could disrupt our business operations, result in the loss of assets, and have a material adverse effect on our business, financial condition, or results of operations. Any of the attacks, breaches or other disruptions or damage described above could: interrupt our operations at one or more sites; delay production and shipments; result in the theft of our and our customers' intellectual property and trade secrets; damage customer and business partner relationships and our reputation; result in defective products or services, physical damage to facilities, pipelines or delivery systems, including those we own or operate for third parties, legal claims and proceedings, liability and penalties under privacy laws, or increased costs for security and remediation; or raise concerns regarding our internal control environment and internal control over financial reporting. Each of these consequences could adversely affect our business, reputation and our financial statements.

Our business involves the use, storage, and transmission of information about our employees, vendors, and customers. The protection of such information, as well as our proprietary information, is critical to us. The regulatory environment surrounding information security and privacy is increasingly demanding, with the frequent imposition of new and constantly changing requirements. We have established policies and procedures to help protect the security and privacy of this information. We also, from time to time, export sensitive customer data and technical information to recipients outside the United States. Breaches of our security measures or the accidental loss, inadvertent disclosure, or unapproved dissemination of proprietary information or sensitive or confidential data about us or our customers, including the potential loss or disclosure of such information or data as a result of fraud, trickery, or other forms of deception, could expose us, our customers, or the individuals affected to a risk of loss or misuse of this information, which could ultimately result in litigation and potential legal and financial liability. These events could also damage our reputation or otherwise harm our business.

Interruption in ordinary sources of raw material or energy supply or an inability to recover increases in energy and raw material costs from customers could result in lost sales or reduced profitability.

Hydrocarbons, including natural gas, are the primary feedstock for the production of hydrogen, carbon monoxide, and syngas. Energy, including electricity, natural gas, and diesel fuel for delivery trucks, is the largest cost component of our business. Because our industrial gas facilities use substantial amounts of electricity, inflation and energy price fluctuations could materially impact our revenues and earnings. A disruption in the supply of energy, components, or raw materials, whether due to market conditions, legislative or regulatory actions, the COVID-19 pandemic, natural events, or other disruption, could prevent us from meeting our contractual commitments and harm our business and financial results.

Our supply of crude helium for purification and resale is largely dependent upon natural gas production by crude helium suppliers. Lower natural gas production resulting from natural gas pricing dynamics, supplier operating or transportation issues, or other interruptions in sales from crude helium suppliers, can reduce our supplies of crude helium available for processing and resale to customers.

We typically contract to pass-through cost increases in energy and raw materials to customers, but such cost pass-through results in declining margins, and cost variability can negatively impact our other operating results. For example, we may be unable to raise prices as quickly as costs rise, or competitive pressures may prevent full recovery of such costs. In addition, increases in energy or raw material costs that cannot be passed on to customers for competitive or other reasons may negatively impact our revenues and earnings. Even where costs are passed through, price increases can cause lower sales volume.

New technologies create performance risks that could impact our financial results or reputation.

We are continually developing and implementing new technologies and product offerings. Existing technologies are being implemented in products and designs or at scales beyond our experience base. These technological expansions can create nontraditional performance risks to our operations. Failure of the technologies to work as predicted, or unintended consequences of new designs or uses, could lead to cost overruns, project delays, financial penalties, or damage to our reputation. We may face difficulties marketing products produced using new technologies including, but not limited to, green hydrogen, which may adversely impact our sales and financial results. In addition, certain large-scale projects may contain processes or technologies that we have not operated at the same scale or in the same combination, and although such projects generally include technologies and processes that have been demonstrated previously by others, such technologies or processes may be new to us and may introduce new risks to our operations. Additionally, there is also a risk that our new technologies may become obsolete and replaced by other market alternatives. Performance difficulties on these larger projects may have a material adverse effect on our operations and financial results. In addition, performance challenges may adversely affect our reputation and our ability to obtain future contracts.

Protecting our intellectual property is critical to our technological development and we may suffer competitive harm from infringement on such rights.

As we develop new technologies, it is critical that we protect our intellectual property assets against third-party infringement. We own a number of patents and other forms of intellectual property related to our products and services. As we develop new technologies there is a risk that our patent applications may not be granted, or we may not receive sufficient protection of our proprietary interests. We may also expend considerable resources in defending our patents against third-party infringement. It is critical that we protect our proprietary interests to prevent competitive harm.

Legal and Regulatory Risks

Legislative, regulatory, societal, and market efforts to address global climate change may impact our business and create financial risk.

We are the world’s leading supplier of hydrogen, the primary use of which is the production of ultra-low sulfur transportation fuels that have significantly reduced transportation emissions and helped improve human health. To make the high volumes of hydrogen needed by our customers, we use steam methane reforming, which produces carbon dioxide. In addition, gasification enables the conversion of lower value feedstocks into cleaner energy and value-added products; however, our gasification projects also produce carbon dioxide. Some of our operations are within jurisdictions that have or are developing regulatory regimes governing GHG emissions, including CO2, which may lead to direct and indirect costs on our operations. Furthermore, some jurisdictions have various mechanisms to target the power sector to achieve emission reductions, which often result in higher power costs.

Increased public concern and governmental action may result in more international, U.S. federal and/or regional requirements to reduce or mitigate the effects of GHG emissions or increased demand for technologies and projects to limit the impact of global climate change. Although uncertain, these developments could increase our costs related to consumption of electric power, hydrogen production and application of our gasification technology. We believe we will be able to mitigate some of the increased costs through contractual terms, but the lack of definitive legislation or regulatory requirements prevents an accurate estimate of the long-term impact these measures will have on our operations. Any legislation or governmental action that limits or taxes GHG emissions could negatively impact our growth, increase our operating costs, or reduce demand for certain of our products.

Our operations may present a safety risk to our employees.

Notwithstanding our emphasis on the safety of our employees and contractors and the precautions we take related to health and safety, we may be unable to avoid safety incidents relating to our operations that result in injuries or deaths. Certain safety incidents may result in legal or regulatory action that could result in increased expenses or reputational damage. We maintain workers' compensation insurance to address the risk of incurring material liabilities for injuries or deaths, but there can be no assurance that the insurance coverage will be adequate or will continue to be available on terms acceptable to us, or at all, which could result in material liabilities to us for any injuries or deaths. Changes to federal, state, and local employee health and safety regulations, and legislative, regulatory, or societal responses to safety incidents may result in heightened regulations or public scrutiny that may increase our compliance costs or result in reputational damage.

Our financial results may be affected by various legal and regulatory proceedings, including antitrust, tax, environmental, or other matters.

We are subject to litigation and regulatory investigations and proceedings in the normal course of business and could become subject to additional claims in the future, some of which could be material. While we seek to limit our liability in our commercial contractual arrangements, there are no guarantees that each contract will contain suitable limitations of liability or that limitations of liability will be enforceable. Also, the outcome of existing legal proceedings may differ from our expectations because the outcomes of litigation, including regulatory matters, are often difficult to predict reliably. Various factors or developments can lead us to change current estimates of liabilities and related insurance receivables, where applicable, or make such estimates for matters previously not susceptible to reasonable estimates, such as a significant judicial ruling or judgment, a significant settlement, significant regulatory developments, or changes in applicable law. A future adverse ruling, settlement, or unfavorable development could result in charges that could have a material adverse effect on our financial condition, results of operations, and cash flows in any particular period.

Costs and expenses resulting from compliance with environmental regulations may negatively impact our operations and financial results.

We are subject to extensive federal, state, local, and foreign environmental and safety laws and regulations concerning, among other things, emissions in the air; discharges to land and water; and the generation, handling, treatment, and disposal of hazardous waste and other materials. We take our environmental responsibilities very seriously, but there is a risk of adverse environmental impact inherent in our manufacturing operations and in the transportation of our products. Future developments and more stringent environmental regulations may require us to make additional unforeseen environmental expenditures. In addition, laws and regulations may require significant expenditures for environmental protection equipment, compliance, and remediation. These additional costs may adversely affect our financial results. For a more detailed description of these matters, see Item 1, *Business–Environmental Regulation*, above.

A change of tax law in key jurisdictions could result in a material increase in our tax expense.

The multinational nature of our business subjects us to taxation in the United States and numerous foreign jurisdictions. Due to economic and political conditions, tax rates in various jurisdictions may be subject to significant change. Our future effective tax rates could be affected by changes in the mix of earnings in countries with differing statutory tax rates, changes in the valuation of deferred tax assets and liabilities, or changes in tax laws or their interpretation.

Changes to income tax laws and regulations in any of the jurisdictions in which we operate, or in the interpretation of such laws, could significantly increase our effective tax rate and adversely impact our financial condition, results of operations, or cash flows. Various levels of government, including the U.S. federal government, are increasingly focused on tax reform and other legislative action to increase tax revenue. Further changes in tax laws in the U.S. or foreign jurisdictions where we operate could have a material adverse effect on our business, results of operations, or financial condition.

General Risk Factors

Catastrophic events could disrupt our operations or the operations of our suppliers or customers, having a negative impact on our business, financial results, and cash flows.

Our operations could be impacted by catastrophic events outside our control, including severe weather conditions such as hurricanes, floods, earthquakes, storms, epidemics, pandemics, acts of war, and terrorism. Any such event could cause a serious business disruption that could affect our ability to produce and distribute products and possibly expose us to third-party liability claims. Additionally, such events could impact our suppliers, customers, and partners, which could cause energy and raw materials to be unavailable to us, or our customers to be unable to purchase or accept our products and services. Any such occurrence could have a negative impact on our operations and financial results.

The United Kingdom's ("UK") exit from European Union ("EU") membership could adversely affect our European Operations.

Although the UK's exit from EU membership on 31 January 2021 ("Brexit") did not result in material disruptions to customer demand, our relationships with customers and suppliers, or our European business, the ultimate effects of Brexit on us are still difficult to predict. Adverse consequences from Brexit may include greater restrictions on imports and exports between the UK and EU members and increased regulatory complexities. Any of these factors could adversely affect customer demand, our relationships with customers and suppliers, and our European business overall.

Inability to compete effectively in a segment could adversely impact sales and financial performance.

We face strong competition from large global competitors and many smaller regional competitors in many of our business segments. Introduction by competitors of new technologies, competing products, or additional capacity could weaken demand for, or impact pricing of our products, negatively impacting financial results. In addition, competitors' pricing policies could affect our profitability or market share.

Item 1B. Unresolved Staff Comments

We have not received any written comments from the Commission staff that remain unresolved.

Item 2. Properties

Air Products and Chemicals, Inc. owns its principal administrative offices located at the Company's new global headquarters and co-located research and development facility in Allentown, Pennsylvania, as well as regional offices in Hersham, England; Medellin, Colombia; and Santiago, Chile. We lease the principal administrative offices in Shanghai, China; Pune, India; Vadodara, India; and Dhahran, Saudi Arabia. We lease administrative offices in the United States, Canada, Spain, Malaysia, and China primarily for our Finance and Business Services organization.

Descriptions of the properties used by our five business segments are provided below. We believe that our facilities are suitable and adequate for our current and anticipated future levels of operation.

Americas

This business segment currently operates from over 450 production and distribution facilities in North and South America. Approximately 25% of these facilities are located on owned property and 10% are integrated sites that serve dedicated customers as well as merchant customers. We have sufficient property rights and permits for the ongoing operation of our pipeline systems in the Gulf Coast, California, and Arizona in the United States and Alberta and Ontario in Canada. Management and sales support is based in our Allentown, Medellin, and Santiago offices referred to above, and at 12 leased properties located throughout North and South America.

Asia

This business segment currently operates from over 250 production and distribution facilities within Asia, approximately 25% of which are on owned property or long-duration term grants. We have sufficient property rights and permits for the ongoing operation of our pipeline systems in China, South Korea, Taiwan, Malaysia, Singapore, and Indonesia. Management and sales support for this business segment is based in Shanghai, China, and Kuala Lumpur, Malaysia, and in 30 leased office locations throughout the region.

Europe

This business segment currently operates from over 200 production and distribution facilities in Europe, approximately one-third of which are on owned property. We have sufficient property rights and permits for the ongoing operation of our pipeline systems in the Netherlands, the United Kingdom, Belgium, France, and Germany. Management and sales support for this business segment is based in Hersham, England, referred to above; Barcelona, Spain; and at 15 leased regional office sites and 10 leased local office sites, located throughout the region.

Middle East and India

This business segment currently operates from over 15 production and distribution facilities in the Middle East and India, all of which are leasehold properties. Management and sales support for this business segment are based in Dharan, Saudi Arabia; Dubai, United Arab Emirates; and Pune, India; as well as nine leased local office sites located throughout the region.

Corporate and other

This business segment includes our sale of equipment businesses for which equipment is manufactured in Missouri in the United States and Shanghai, China. The LNG business operates a manufacturing facility in Florida in the United States with management, engineering, and sales support based in the Allentown offices referred to above. The Gardner Cryogenic business operates at facilities in Pennsylvania and Kansas in the United States. The Rotoflow business operates manufacturing and service facilities in Texas and Pennsylvania in the United States with management, engineering, and sales support based in the Allentown offices referred to above and a nearby leased office.

Research and development activities are primarily conducted at owned locations in the United States, the United Kingdom, and Saudi Arabia.

Helium is processed at multiple sites in the United States and then distributed to and from transfill sites globally.

Our Corporate and other segment also has management, sales, engineering support, and corporate administrative functions that are based in our administrative offices referred to above.

Item 3. Legal Proceedings

In the normal course of business, we and our subsidiaries are involved in various legal proceedings, including commercial, competition, environmental, intellectual property, regulatory, product liability, and insurance matters. Although litigation with respect to these matters is routine and incidental to the conduct of our business, such litigation could result in large monetary awards, especially if compensatory and/or punitive damages are awarded. However, we believe that litigation currently pending to which we are a party will be resolved without any material adverse effect on our financial position, earnings, or cash flows.

From time to time, we are also involved in proceedings, investigations, and audits involving governmental authorities in connection with environmental, health, safety, competition, and tax matters.

We are a party to proceedings under CERCLA, RCRA, and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Presently there are 30 sites on which a final settlement has not been reached where we, usually along with others, have been designated a potentially responsible party by the Environmental Protection Agency or is otherwise engaged in investigation or remediation, including cleanup activity at certain of its current and former manufacturing sites. We do not expect that any sums we may have to pay in connection with these environmental matters would have a material adverse impact on our consolidated financial position. Additional information on our environmental exposure is included under Item 1, Business–Environmental Regulation, and Note 16, *Commitments and Contingencies*, to the consolidated financial statements.

In September 2010, the Brazilian Administrative Council for Economic Defense ("CADE") issued a decision against our Brazilian subsidiary, Air Products Brasil Ltda., and several other Brazilian industrial gas companies for alleged anticompetitive activities. CADE imposed a civil fine of R$179.2 million (approximately $33 million at 30 September 2022) on Air Products Brasil Ltda. This fine was based on a recommendation by a unit of the Brazilian Ministry of Justice, following an investigation beginning in 2003, which alleged violation of competition laws with respect to the sale of industrial and medical gases. The fines are based on a percentage of our total revenue in Brazil in 2003.

We have denied the allegations made by the authorities and filed an appeal in October 2010 with the Brazilian courts. On 6 May 2014, our appeal was granted and the fine against Air Products Brasil Ltda. was dismissed. CADE has appealed that ruling and the matter remains pending. We, with advice of our outside legal counsel, have assessed the status of this matter and have concluded that, although an adverse final judgment after exhausting all appeals is possible, such a judgment is not probable. As a result, no provision has been made in the consolidated financial statements. In the event of an adverse final judgment, we estimate the maximum possible loss to be the full amount of the fine of R$179.2 million (approximately $33 million at 30 September 2022) plus interest accrued thereon until final disposition of the proceedings.

Additionally, Winter Storm Uri, a severe winter weather storm in the U.S. Gulf Coast in February 2021, disrupted our operations and caused power and natural gas prices to spike significantly in Texas. We remain in litigation of a dispute regarding energy management services related to the impact of this event, and other disputes may arise from such power price increases. In addition, legislative action may affect power supply and energy management charges. While it is reasonably possible that we could incur additional costs related to power supply and energy management services in Texas related to the winter storm, it is too early to estimate potential losses, if any, given significant unknowns resulting from the unusual nature of this event.

Other than the matters discussed above, we do not currently believe there are any legal proceedings, individually or in the aggregate, that are reasonably possible to have a material impact on our financial condition, results of operations, or cash flows. However, a future charge for regulatory fines or damage awards could have a significant impact on our net income in the period in which it is recorded.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters, and Issuer Purchases of Equity Securities

Our common stock is listed on the New York Stock Exchange under the symbol "APD." As of 31 October 2022, there were 4,599 record holders of our common stock.

Cash dividends on our common stock are paid quarterly. It is our expectation that we will continue to pay cash dividends in the future at comparable or increased levels. The Board of Directors determines whether to declare dividends and the timing and amount based on financial condition and other factors it deems relevant. Dividend information for each quarter of fiscal years 2022 and 2021 is summarized below:

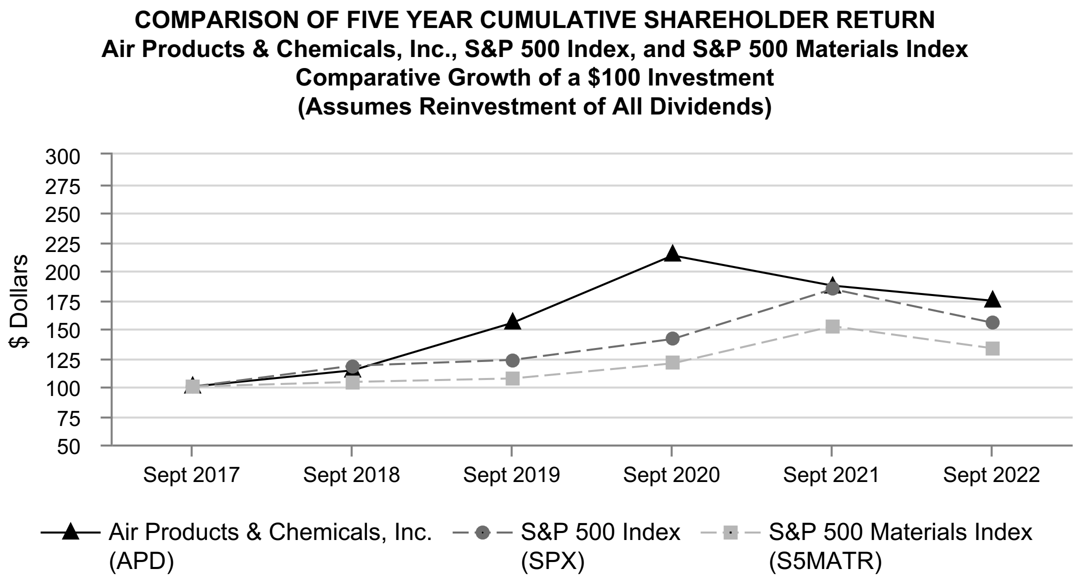
	2022	2021
Fourth quarter	**$1.62**	$1.50
Third quarter	**$1.62**	$1.50
Second quarter	**$1.62**	$1.50
First quarter	**$1.50**	$1.34
Total	**$6.36**	$5.84

Purchases of Equity Securities by the Issuer

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1.0 billion of our outstanding common stock. This program does not have a stated expiration date. We repurchase shares pursuant to Rules 10b5-1 and 10b-18 under the Exchange Act through repurchase agreements established with one or more brokers. There were no purchases of stock during fiscal year 2022. As of 30 September 2022, $485.3 million in share repurchase authorization remained. Any future purchases will be completed at our discretion while maintaining sufficient funds for investing in our business and pursuing growth opportunities.

Performance Graph

The performance graph below compares the five-year cumulative returns of our common stock with those of the Standard & Poor’s 500 Index ("S&P 500 Index") and the Standard & Poor’s 500 Materials Index ("S&P 500 Materials Index"). The figures assume an initial investment of $100 and the reinvestment of all dividends.



	Sept 2017	Sept 2018	Sept 2019	Sept 2020	Sept 2021	Sept 2022
Air Products & Chemicals, Inc.	100	114	155	213	187	174
S&P 500 Index	100	118	123	141	184	155
S&P 500 Materials Index	100	104	107	120	152	133

Item 6. [Reserved]

Not applicable.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

This Management's Discussion and Analysis contains "forward-looking statements" within the safe harbor provisions of the Private Securities Litigation Reform Act of 1995, including statements about business outlook. These forward-looking statements are based on management's expectations and assumptions as of the date of this Annual Report on Form 10-K and are not guarantees of future performance. Actual performance and financial results may differ materially from projections and estimates expressed in the forward-looking statements because of many factors not anticipated by management, including, without limitation, those described in "*Forward-Looking Statements"* and Item 1A, *Risk Factors*, of this Annual Report.

Our Management's Discussion and Analysis should be read in conjunction with the consolidated financial statements and the accompanying notes contained in this Annual Report. Unless otherwise stated, financial information is presented in millions of dollars, except for per share data. Except for net income, which includes the results of discontinued operations, financial information is presented on a continuing operations basis.

The financial measures discussed below are presented in accordance with U.S. generally accepted accounting principles ("GAAP"), except as noted. We present certain financial measures on an "adjusted," or "non-GAAP," basis because we believe such measures, when viewed together with financial results computed in accordance with GAAP, provide a more complete understanding of the factors and trends affecting our historical financial performance. For each non-GAAP financial measure, including adjusted diluted earnings per share ("EPS"), adjusted EBITDA, adjusted EBITDA margin, adjusted effective tax rate, and capital expenditures, we present a reconciliation to the most directly comparable financial measure calculated in accordance with GAAP. These reconciliations and explanations regarding the use of non-GAAP measures are presented under the heading "*Reconciliations of Non-GAAP Financial Measures*" beginning on page 35.

Comparisons included within the "Results of Operations" section below are for fiscal years 2022 versus ("vs.") 2021 and 2021 vs. 2020. We have updated our segment information to reflect the reorganization of our reporting segments effective 1 October 2021. We provide reconciliations for any adjusted measures discussed within the "Reconciliations of Non-GAAP Financial Measures" section. Comparisons for all other sections within this Management's Discussion and Analysis are for fiscal years 2022 vs. 2021, while fiscal year 2021 vs. 2020 comparisons are available within Part II, Item 7, *Management's Discussion and Analysis of Financial Condition and Results of Operations*, of our Annual Report on Form 10-K for the fiscal year ended 30 September 2021, which was filed with the SEC on 18 November 2021.

For information concerning activity with our related parties, refer to Note 22, *Supplemental Information*, to the consolidated financial statements.

Russia's Invasion of Ukraine

In the fourth quarter of fiscal year 2022, we recorded a noncash charge of $73.7 ($61.0 after tax, or $0.27 per share) associated with the divestiture of our small industrial gas business in Russia, which generated annual sales of less than $25 in our Europe segment.

During the second quarter of fiscal year 2022, we suspended construction of a plant in Ukraine. Our ability to complete the project and recover the carrying value of the assets, which was approximately $45 as of 30 September 2022, could be impacted by future events. Annual sales generated from our business in Ukraine were less than $5 in our Europe segment.

BUSINESS OVERVIEW

Air Products and Chemicals, Inc., a Delaware corporation originally founded in 1940, has built a reputation for its innovative culture, operational excellence, and commitment to safety and the environment. Our passionate, talented, and committed employees are from diverse backgrounds, but are driven by our higher purpose to create innovative solutions that benefit the environment, enhance sustainability, and address the challenges facing customers, communities, and the world.

We offer a unique portfolio of products, services, and solutions that include atmospheric gases, process and specialty gases, equipment, and related services. Focused on energy, environmental, and emerging markets, we serve customers in dozens of industries, including refining, chemicals, metals, electronics, manufacturing, medical, and food. Our gases, equipment, and applications expertise enable our customers to improve their sustainability performance by increasing productivity, producing better quality products, reducing energy use, and lowering emissions.

We also develop, engineer, build, own, and operate some of the world's largest industrial gas and carbon-capture projects, supplying clean hydrogen that will support global transportation, industrial markets, and the broader energy transition away from fossil fuels. We have built leading positions in several growth markets, such as hydrogen, helium, and liquefied natural gas ("LNG") process technology and equipment, and provide turbomachinery, membrane systems, and cryogenic containers globally.

With operations in over 50 countries, in fiscal year 2022 we had sales of $12.7 billion and assets of $27.2 billion. During the fiscal year ended 30 September 2022, we managed our operations, assessed performance, and reported earnings under the following five reporting segments:

- Americas;
- Asia;
- Europe;
- Middle East and India; and
- Corporate and other

This Management's Discussion and Analysis discusses our results based on these operations. Refer to Note 23, *Business Segment and Geographic Information*, to the consolidated financial statements for additional details on our reportable business segments.

2022 IN SUMMARY

Our fiscal year 2022 results demonstrate our employees' commitment to excellence and service to our customers as our earnings grew despite economic headwinds. Our on-site business continued to provide stable cash flow due to the structure of our contracts, which generally contain fixed monthly charges and/or minimum purchase requirements. These contracts also protected us from energy price fluctuations, particularly in Europe, due to pass-through provisions that allow us to recover the cost of energy. Our merchant business also successfully implemented pricing actions to recover higher costs, including soaring energy prices, in our three largest regional segments and across most major product lines.

We also made progress on our growth strategy, including completion of an initial investment in the Jazan Integrated Gasification and Power Company ("JIGPC") joint venture. JIGPC acquired the first phase of assets for the gasification and power project and began contributing to our results through equity affiliates' income in late October 2021.

We shared the cash flows generated during fiscal year 2022 with our investors by increasing the quarterly dividend on our common stock to $1.62 per share, representing an 8% increase, or $0.12 per share, from the previous dividend of $1.50 per share. This is the 40th consecutive year that we have increased our quarterly dividend.

Fiscal Year 2022 Highlights

- Sales of $12,698.6 increased 23%, or $2,375.6, due to higher energy cost pass-through to customers of 13%, higher volumes of 8%, and higher pricing of 6%, partially offset by unfavorable currency of 4% due to the strengthening of the U.S. Dollar. Volume growth was driven by recovery in hydrogen, new assets, better merchant demand, and higher sale of equipment project activity. In our merchant business, we successfully implemented pricing actions across the regional segments, particularly in Europe, to offset unprecedented power and fuel costs.

- Operating income of $2,338.8 increased 3%, or $57.4, as our pricing actions and higher volumes overcame unfavorable costs, including the loss on the divestiture of our Russia business, and currency. Operating margin of 18.4% decreased 370 basis points (bp) from the prior year, primarily due to higher energy cost pass-through to customers and unfavorable costs.

- Equity affiliates' income of $481.5 increased 64%, or $187.4, driven by the JIGPC joint venture. JIGPC began contributing to our results in the Middle East and India segment in late October 2021.

- Net income of $2,266.5 increased 7%, or $151.6, primarily due to higher pricing, net of power and fuel costs, higher volumes, and higher equity affiliates' income driven by JIGPC, partially offset by higher costs. Net income margin of 17.8% decreased 270 bp, primarily due to higher energy cost pass-through to customers, as unfavorable costs offset the impact of higher equity affiliates' income.

- Adjusted EBITDA of $4,247.0 increased 9%, or $363.8, while adjusted EBITDA margin of 33.4% decreased 420 bp.

- Diluted EPS of $10.08 increased 11%, or $0.96 per share, and adjusted diluted EPS of $10.41 increased 15%, or $1.39 per share. A summary table of changes in diluted EPS is presented below.

Changes in Diluted EPS Attributable to Air Products

The per share impacts presented in the table below were calculated independently and do not sum to the total change in diluted EPS due to rounding.

Fiscal Year Ended 30 September	**2022**	2021	Increase (Decrease)
Total Diluted EPS	**$10.14**	$9.43	$0.71
Less: Diluted EPS from income from discontinued operations	**0.06**	0.32	(0.26)
Diluted EPS From Continuing Operations	**$10.08**	$9.12	$0.96
Operating Impacts			
Underlying business			
Volume			$0.80
Price, net of variable costs			0.81
Other costs			(0.84)
Currency			(0.24)
Facility closure			0.08
Business and asset actions			(0.27)
Gain on exchange with joint venture partner			(0.12)
Total Operating Impacts			$0.22
Other Impacts			
Equity affiliates' income, excluding item below			$0.74
Equity method investment impairment charge			(0.05)
Interest expense			0.05
Other non-operating income/expense, net			(0.04)
Change in effective tax rate, excluding discrete item below			0.09
Tax election benefit and other			(0.05)
Noncontrolling interests			0.02
Total Other Impacts			$0.76
Total Change in Diluted EPS From Continuing Operations			$0.96
% Change from prior year			11%

Fiscal Year Ended 30 September	**2022**	2021	Increase (Decrease)
Diluted EPS From Continuing Operations	**$10.08**	$9.12	$0.96
Facility closure	**—**	0.08	(0.08)
Business and asset actions	**0.27**	—	0.27
Gain on exchange with joint venture partner	**—**	(0.12)	0.12
Equity method investment impairment charge	**0.05**	—	0.05
Tax election benefit and other	**—**	(0.05)	0.05
Adjusted Diluted EPS From Continuing Operations	**$10.41**	$9.02	$1.39
% Change from prior year			15%

OUTLOOK

The guidance below should be read in conjunction with the *Forward-Looking Statements* of this Annual Report on Form 10-K.

We are committed to efficiently operating and deploying capital to grow our core industrial gases business. While global economic challenges are likely to continue in fiscal year 2023, we remain focused on pricing actions to recover higher energy costs in our merchant business, pursuing additional volume opportunities, and closely monitoring our costs. We expect our onsite business model, which has contractual protection from energy cost fluctuations, to continue providing stable cash flow. This business consistently generates approximately half our total company sales. Further, we expect several new projects to contribute to our results in 2023, including the second phase of JIGPC's gasification and power project that we expect to commence in the second quarter.

Sustainability is our growth strategy at Air Products, and we have the financial capacity to support our zero- and low-carbon hydrogen projects. We believe there will be additional opportunities for clean hydrogen and carbon capture technologies, which are further supported by the U.S. Inflation Reduction Act of 2022 that was enacted in August. We anticipate benefits from tax incentives for carbon sequestration and clean hydrogen production in future years once our new projects in these areas come on-stream in the U.S. We continue to evaluate the impact this act could have on our business.

RESULTS OF OPERATIONS

DISCUSSION OF CONSOLIDATED RESULTS

	Fiscal Year Ended 30 September			**2022 vs. 2021**		2021 vs. 2020	
	2022	2021	2020	$	%/bp	$	%/bp
GAAP Measures							
Sales	**$12,698.6**	$10,323.0	$8,856.3	**$2,375.6**	**23%**	$1,466.7	17%
Operating income	**2,338.8**	2,281.4	2,237.6	**57.4**	**3%**	43.8	2%
Operating margin	**18.4%**	22.1%	25.3%		**(370) bp**		(320) bp
Equity affiliates’ income	**$481.5**	$294.1	$264.8	**187.4**	**64%**	29.3	11%
Net income	**2,266.5**	2,114.9	1,931.1	**151.6**	**7%**	183.8	10%
Net income margin	**17.8%**	20.5%	21.8%		**(270) bp**		(130) bp
Non-GAAP Measures							
Adjusted EBITDA	**$4,247.0**	$3,883.2	$3,619.8	**363.8**	**9%**	263.4	7%
Adjusted EBITDA margin	**33.4%**	37.6%	40.9%		**(420) bp**		(330) bp

Sales

	2022 vs. 2021	2021 vs. 2020
Volume	**8%**	5 %
Price	**6%**	2 %
Energy cost pass-through to customers	**13%**	6 %
Currency	**(4%)**	4 %
Total Consolidated Sales Change	**23%**	17 %

2022 vs. 2021

Sales of $12,698.6 increased 23%, or $2,375.6, due to higher energy cost pass-through to customers of 13%, higher volumes of 8%, and positive pricing of 6%, partially offset by unfavorable currency impacts of 4%. Energy costs were significantly higher versus the prior year, particularly in Europe and the Americas. Contractual provisions associated with our on-site business, which generates approximately half our total company sales, allow us to pass the higher energy costs through to our customers. Volume growth was driven by recovery in hydrogen, new assets, better merchant demand, and higher sale of equipment project activity. Continued focus on pricing actions in our merchant businesses, including those intended to recover escalating power and fuel costs, resulted in price improvement in our three largest segments. Currency was unfavorable as the U.S. Dollar strengthened against most major currencies.

2021 vs. 2020

Sales of $10,323.0 increased 17%, or $1,466.7, due to higher energy cost pass-through to customers of 6%, higher volumes of 5%, favorable currency impacts of 4%, and positive pricing of 2%. We experienced significantly higher energy costs in the second half of fiscal year 2021, particularly in North America and Europe, which were passed to our on-site customers. Positive volumes from new assets, our sale of equipment businesses, and merchant demand recovery from COVID-19 were partially offset by reduced contributions from our gasification joint venture with Lu'An Clean Energy Company. Favorable currency was driven by the appreciation of the British Pound Sterling, Chinese Renminbi, Euro, and South Korean Won against the U.S. Dollar. Continued focus on pricing actions, including energy cost recovery, in our merchant businesses resulted in price improvement in the Americas, Asia, and Europe segments.

Cost of Sales and Gross Margin

2022 vs. 2021

Cost of sales of $9,338.5 increased 30%, or $2,129.2, from total cost of sales of $7,209.3 in the prior year, which included a charge of $23.2 for a facility closure as discussed below. The increase was due to higher energy cost pass-through to customers of $1,263, unfavorable costs of $617, and higher costs associated with sales volumes of $575, partially offset by favorable currency impacts of $302. The unfavorable cost impact was driven by power for our merchant business, higher planned maintenance, inflation, and supply chain challenges. Additionally, we also incurred higher costs to support long-term growth, such as costs for resources needed to bring projects on-stream as well as costs for a helium storage cavern to support reliable helium supply to our customers globally. Gross margin of 26.5% decreased 370 bp from 30.2% in the prior year, primarily due to the unfavorable costs and higher energy cost pass-through to customers, partially offset by the positive impact of our pricing actions.

2021 vs. 2020

Total cost of sales of $7,209.3, including the facility closure discussed below, increased 23%, or $1,351.2. The increase from the prior year was primarily due to higher energy cost pass-through to customers of $479, higher costs associated with sales volumes of $433, unfavorable currency impacts of $233, and higher costs, including power and other cost inflation, of $183. Gross margin of 30.2% decreased 370 bp from 33.9% in the prior year, primarily due to higher energy cost pass-through to customers, higher costs, and a reduced contribution from our Lu'An joint venture, partially offset by the positive impact of our pricing actions.

Facility Closure

During the second quarter of fiscal year 2021, we recorded a charge of $23.2 ($17.4 after-tax, or $0.08 per share) primarily for a noncash write-down of assets associated with a contract termination in the Americas segment. This charge is reflected as "Facility closure" on our consolidated income statements for the fiscal year ended 30 September 2021 and was not recorded in segment results.

Selling and Administrative

2022 vs. 2021
Selling and administrative expense of $900.6 increased 9%, or $72.2, primarily due to higher incentive compensation, depreciation expense associated with our new global headquarters, inflation, and increased headcount to support our growth strategy, partially offset by a favorable currency impact from the strengthening of the U.S. Dollar. Selling and administrative expense as a percentage of sales decreased to 7.1% from 8.0% in the prior year.

2021 vs. 2020
Selling and administrative expense of $828.4 increased 7%, or $52.5, primarily due to higher spending for business development resources to support our growth strategy and unfavorable currency impacts. Selling and administrative expense as a percentage of sales decreased to 8.0% in fiscal year 2021 from 8.8% in fiscal year 2020.

Research and Development

2022 vs. 2021
Research and development expense of $102.9 increased 10%, or $9.4. Research and development expense as a percentage of sales decreased to 0.8% from 0.9% in the prior year.

2021 vs. 2020
Research and development expense of $93.5 increased 11%, or $9.6. Research and development expense as a percentage of sales of 0.9% was flat versus fiscal year 2020.

Business and Asset Actions

During the fourth quarter of fiscal year 2022, we divested our small industrial gas business in Russia due to Russia's invasion of Ukraine. As a result, we recorded a noncash charge of $73.7 ($61.0 after tax, or $0.27 per share), which included transaction costs and cumulative currency translation losses. This charge is reflected as "Business and asset actions" on our consolidated income statement for the fiscal year ended 30 September 2022 and was not recorded in segment results.

Gain On Exchange With Joint Venture Partner

In the second quarter of fiscal year 2021, we recognized a gain of $36.8 ($27.3 after-tax, or $0.12 per share) on an exchange with the Tyczka Group, a former joint venture partner. As part of the exchange, we separated our 50/50 joint venture in Germany into two separate businesses so each party could acquire a portion of the business on a 100% basis. The gain included $12.7 from the revaluation of our previously held equity interest in the portion of the business that we retained and $24.1 from the sale of our interest in the remaining business. The gain is reflected as "Gain on exchange with joint venture partner" on our consolidated income statements for the fiscal year ended 30 September 2021 and was not recorded in segment results. Refer to Note 3, *Acquisitions*, to the consolidated financial statements for additional information.

Company Headquarters Relocation Income

In 2020, we sold property at our former corporate headquarters located in Trexlertown, Pennsylvania. We received net proceeds of $44.1 and recorded a gain of $33.8 ($25.6 after-tax, or $0.12 per share), which is reflected on our consolidated income statements as "Company headquarters relocation income (expense)" for the fiscal year ended 30 September 2020. The gain was not recorded in segment results.

Other Income (Expense), Net

2022 vs. 2021
Other income of $55.9 increased 6%, or $3.1, as higher income from the sale of assets in fiscal year 2022 was partially offset by a prior year settlement of a supply contract.

2021 vs. 2020
Other income of $52.8 decreased 19%, or $12.6. Fiscal year 2020 was favorably impacted by an adjustment for a benefit plan liability due to a change in plan terms. This impact was partially offset by the settlement of a supply contract in fiscal year 2021.

Operating Income and Margin

2022 vs. 2021

Operating income of $2,338.8 increased 3%, or $57.4, as positive pricing, net of power and fuel costs, of $222 and higher volumes of $218 were partially offset by higher costs of $229 and an unfavorable currency impact of $66. Higher costs were primarily attributable to operating and distribution costs driven by higher planned maintenance and various external factors, including inflation and supply chain challenges, as well as higher incentive compensation. Additionally, we incurred higher costs in the current year to support long-term growth, such as costs for resources needed to bring projects on-stream. In fiscal year 2022, we also recorded a charge of $74 for business and asset actions associated with the divestiture of our Russia business. The prior year included a gain of $37 on an exchange with a joint venture partner and a charge of $23 associated with a facility closure.

Operating margin of 18.4% decreased 370 bp from 22.1% in the prior year, primarily due to higher energy cost pass-through to customers and unfavorable costs.

2021 vs. 2020

Operating income of $2,281.4 increased 2%, or $43.8, as favorable currency of $96, positive pricing, net of power and fuel costs, of $95, and a gain on an exchange with a joint venture partner of $37 were partially offset by higher operating costs of $127 and a facility closure of $23. Additionally, fiscal year 2020 included income of $34 associated with our company headquarters relocation. Despite higher sales volumes, the volume impact on operating income was minimal due to a reduced contribution from our Lu'An joint venture in fiscal year 2021. Unfavorable operating costs were driven by the addition of resources to support our growth strategy and higher planned maintenance activities.

Operating margin of 22.1% decreased 320 bp from 25.3% in fiscal year 2020, primarily due to the higher operating costs, higher energy cost pass-through to customers and the reduced contribution from our Lu'An joint venture, partially offset by positive pricing. The positive impact from a gain on an exchange with a joint venture partner in 2021 was offset by income in fiscal year 2020 associated with the company headquarters relocation.

Equity Affiliates' Income

2022 vs. 2021

Equity affiliates' income of $481.5 increased 64%, or $187.4, driven by the JIGPC joint venture, which began contributing to our results in the Middle East and India segment in late October 2021. In the first quarter, we also recognized the remaining deferred profit associated with air separation units previously sold to Jazan Gas Project Company, net of other project finalization costs. These factors were partially offset by an impairment charge of $14.8 ($11.1 after tax, or $0.05 per share) related to two small affiliates in the Asia segment and lower contributions from several affiliates in our regional segments.

For additional information on our equity affiliates, refer to Note 7, *Equity Affiliates*, to the consolidated financial statements.

2021 vs. 2020

Equity affiliates' income of $294.1 increased 11%, or $29.3. Higher income from affiliates in the regional segments was partially offset by a benefit of $33.8 in fiscal year 2020 from the enactment of the India Finance Act 2020. Refer to Note 21, *Income Taxes*, to the consolidated financial statements for additional information.

Interest Expense

Fiscal Year Ended 30 September	**2022**	2021	2020
Interest incurred	**$169.0**	$170.1	$125.2
Less: Capitalized interest	**41.0**	28.3	15.9
Interest expense	**$128.0**	$141.8	$109.3

2022 vs. 2021
Interest incurred decreased 1%, or $1.1, as the impacts of a lower debt balance and currency were mostly offset by a higher average interest rate on the debt portfolio. Capitalized interest increased 45%, or $12.7, due to a higher carrying value of projects under construction.

2021 vs. 2020
Interest incurred increased 36%, or $44.9, driven by a higher debt balance due to the issuance of U.S. Dollar- and Euro-denominated fixed-rate notes in the third quarter of fiscal year 2020. Capitalized interest increased $12.4 due to a higher carrying value of projects under construction.

Other Non-Operating Income (Expense), Net

2022 vs. 2021
Other non-operating income of $62.4 decreased 15%, or $11.3. Non-service pension income decreased $38 primarily due to lower expected returns on plan assets for the U.S. salaried pension plan and the U.K. pension plan. This impact was partially offset by higher interest income on cash and cash items due to higher interest rates and lower expense for excluded components of cash flow hedges of intercompany loans.

2021 vs. 2020
Other non-operating income of $73.7 increased $43.0. We recorded higher non-service pension income in 2021 due to lower interest costs and higher total assets, primarily for our U.S. pension plans. Fiscal year 2021 also included favorable currency impacts. These factors were partially offset by lower interest income on cash and cash items due to lower interest rates.

Discontinued Operations

In fiscal year 2022, income from discontinued operations, net of tax, was $12.6 ($0.06 per share). This primarily resulted from a net tax benefit recorded in the fourth quarter upon release of tax liabilities for uncertain tax positions associated with our former Performance Materials Division ("PMD") for which the statute of limitations expired.

In fiscal year 2021, income from discontinued operations, net of tax, was $70.3 ($0.32 per share). This included net tax benefits of $60.0 recorded for the release of tax reserves for uncertain tax positions, of which $51.8 ($0.23 per share) was recorded in the fourth quarter for liabilities associated with the 2017 sale of PMD and $8.2 was recorded in the third quarter for liabilities associated with our former Energy-from-Waste business. Additionally, we recorded a tax benefit from discontinued operations of $10.3 in the first quarter, primarily from the settlement of a state tax appeal related to the gain on the sale of PMD.

In fiscal year 2020, loss from discontinued operations, net of tax, was $14.3 ($0.06 per share). This resulted from a pre-tax loss of $19.0 recorded in the second quarter to increase our existing liability for retained environmental obligations associated with the sale of our former Amines business in September 2006. Refer to the Pace discussion within Note 16, *Commitments and Contingencies*, for additional information.

Net Income and Net Income Margin

2022 vs. 2021

Net income of $2,266.5 increased 7%, or $151.6, primarily due to higher pricing, net of power and fuel costs, higher volumes, and higher equity affiliates' income driven by JIGPC, partially offset by higher costs, including charges for business and asset actions and the equity affiliate impairment, and unfavorable currency due to the strengthening of the U.S. dollar. Additionally, the prior year included higher net income from discontinued operations.

Net income margin of 17.8% decreased 270 bp from 20.5% in the prior year primarily due to higher energy cost pass-through to customers as the impact of higher equity affiliates' income was offset by unfavorable costs. Higher energy cost pass-through to customers accounted for approximately 200 bp of the decline.

2021 vs. 2020

Net income of $2,114.9 increased 10%, or $183.8. As discussed above, fiscal year 2021 included higher net income from discontinued operations. On a continuing operations basis, the increase was driven by positive pricing, net of power and fuel costs, favorable currency impacts, higher equity affiliates' income, and a gain on an exchange with a joint venture partner, partially offset by unfavorable operating costs and a loss from a facility closure. Additionally, less net income was attributable to noncontrolling interests, including our Lu'An joint venture partner. Fiscal year 2020 also included income associated with the company headquarters relocation and a net benefit from the India Finance Act 2020.

Net income margin of 20.5% decreased 130 bp from 21.8% in the prior year, primarily due to higher energy and natural gas cost pass-through to customers, which decreased margin by approximately 100 bp, and unfavorable net operating costs, partially offset by the impact from our pricing actions.

Adjusted EBITDA and Adjusted EBITDA Margin

2022 vs. 2021

Adjusted EBITDA of $4,247.0 increased 9%, or $363.8, primarily due to higher volumes, higher pricing, net of power and fuel costs, and higher equity affiliates' income, partially offset by higher costs and unfavorable currency. Adjusted EBITDA margin of 33.4% decreased 420 bp from 37.6% in the prior year primarily due to higher energy cost pass-through to customers as the impact of higher equity affiliates' income was offset by unfavorable costs. Higher energy cost pass-through to customers accounted for approximately 400 bp of the decline.

2021 vs. 2020

Adjusted EBITDA of $3,883.2 increased 7%, or $263.4, primarily due to favorable currency impacts, positive pricing, net of power and fuel costs, and higher equity affiliates' income, partially offset by unfavorable operating costs. Adjusted EBITDA margin of 37.6% decreased 330 bp from 40.9% in the prior year, primarily due to higher energy and natural gas cost pass-through to customers, which decreased margin by approximately 200 bp, and the unfavorable net operating costs.

Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes. Refer to Note 21, *Income Taxes*, to the consolidated financial statements for details on factors affecting the effective tax rate.

2022 vs. 2021

Our effective tax rate was 18.2% and 18.5% for the fiscal years ended 30 September 2022 and 2021, respectively. The current year reflects a favorable effective tax rate impact from higher equity affiliates' income, which is primarily presented net of income taxes within income from continuing operations on our consolidated income statements. The higher equity affiliates' income was driven by the JIGPC joint venture, which began contributing to our results in late October 2021. The prior year included a tax benefit of $21.5 from the release of tax reserves established for uncertain tax positions. This included a benefit of $12.2 ($0.05 per share) for the release of reserves established in 2017 for a tax election related to a non-U.S. subsidiary and other previously disclosed items ("tax election benefit and other").

Our adjusted effective tax rate was 18.2% and 18.9% for the fiscal years ended 30 September 2022 and 2021, respectively.

2021 vs. 2020

Our effective tax rate was 18.5% and 19.7% for the fiscal years ended 30 September 2021 and 2020, respectively. The fiscal year 2021 rate was lower primarily due to income tax benefits of $21.5 recorded upon expiration of the statute of limitations for tax reserves previously established for uncertain tax positions taken in prior years. This included a benefit of $12.2 ($0.05 per share) for release of reserves established in 2017 for a tax election related to a non-U.S. subsidiary and other previously disclosed items ("tax election benefit and other").

Additionally, the fiscal year 2020 effective tax rate reflected the unfavorable impact of India Finance Act 2020, which resulted in additional net income of $13.5 ($0.06 per share). This included an increase to equity affiliates' income of $33.8, partially offset by an increase to our income tax provision of $20.3 for changes in the future tax costs of repatriated earnings.

Our adjusted effective tax rate was 18.9% and 19.1% for the fiscal years ended 30 September 2021 and 2020, respectively.

DISCUSSION OF RESULTS BY BUSINESS SEGMENT

Prior year segment information presented below has been updated to reflect the reorganization of our reporting segments effective 1 October 2021. The reorganization included the separation of our former Industrial Gases – EMEA (Europe, Middle East, and Africa) segment into two separate reporting segments: (1) Europe and (2) Middle East and India. The results of an affiliate formerly reflected in the Asia segment are now reported in the Middle East and India segment. Additionally, the results of our Industrial Gases – Global operating segment are reflected in the Corporate and other segment. The reorganization did not impact the Americas segment.

Americas

	Fiscal Year Ended 30 September			**2022 vs. 2021**		2021 vs. 2020	
	2022	2021	2020	$	%/bp	$	%/bp
Sales	**$5,368.9**	$4,167.6	$3,630.7	**$1,201.3**	**29%**	$536.9	15%
Operating income	**1,174.4**	1,065.5	1,012.4	**108.9**	**10%**	53.1	5%
Operating margin	**21.9%**	25.6%	27.9%		**(370) bp**		(230) bp
Equity affiliates' income	**$98.2**	$112.5	$84.3	**(14.3)**	**(13%)**	28.2	33%
Adjusted EBITDA	**1,902.1**	1,789.9	1,656.2	**112.2**	**6%**	133.7	8%
Adjusted EBITDA margin	**35.4%**	42.9%	45.6%		**(750) bp**		(270) bp

The table below summarizes the major factors that impacted sales in the Americas segment for the periods presented:

	2022 vs. 2021	2021 vs. 2020
Volume	**8%**	—%
Price	**6%**	4%
Energy cost pass-through to customers	**16%**	11%
Currency	**(1%)**	—%
Total Americas Sales Change	**29%**	15%

2022 vs. 2021 (Americas)

Sales of $5,368.9 increased 29%, or $1,201.3, due to higher energy cost pass-through to customers of 16%, higher volumes of 8%, and positive pricing of 6%, partially offset by an unfavorable currency impact of 1%. Significantly higher energy costs increased contractual cost pass-through to our on-site customers. In our merchant business, we successfully implemented pricing actions across all major product lines. The volume improvement was driven by a recovery in hydrogen and better demand for merchant products in North America. The unfavorable currency impact was primarily attributable to the strengthening of the U.S. Dollar against the Chilean Peso.

Operating income of $1,174.4 increased 10%, or $108.9, primarily from pricing, net of power and fuel costs, of $146 and favorable volumes of $68, partially offset by higher costs of $100. Higher costs were driven by supply chain challenges, including driver shortages that continue to impact the industry broadly, inflation, higher planned maintenance, and higher incentive compensation. Operating margin of 21.9% decreased 370 bp from 25.6% in the prior year, as higher energy cost pass-through to customers and higher costs were only partially offset by higher pricing. The higher energy cost pass-through to customers accounted for approximately 300 bp of the decline.

Equity affiliates' income of $98.2 decreased 13%, or $14.3, driven by our Mexico affiliate.

2021 vs. 2020 (Americas)
Sales of $4,167.6 increased 15%, or $536.9, due to higher energy cost pass-through to customers of 11% and positive pricing of 4%, as volumes and currency were flat versus the prior year. Energy cost pass-through to customers was higher in fiscal year 2021 primarily due to natural gas prices, which rose significantly in the second quarter and remained elevated throughout the year. The pricing improvement was attributable to continued focus on pricing actions in our merchant business. Volumes were flat as positive contributions from new assets, including hydrogen assets we acquired in April 2020, were offset by lower hydrogen and merchant demand.

Operating income of $1,065.5 increased 5%, or $53.1, due to higher pricing, net of power and fuel costs, of $79 and favorable currency of $10, partially offset by higher operating costs, including planned maintenance, of $36. Operating margin of 25.6% decreased 230 bp from 27.9% in 2020 primarily due to higher energy cost pass-through to customers, which negatively impacted margin by approximately 250 bp, and higher operating costs, partially offset by the impact of our pricing actions.

Equity affiliates' income of $112.5 increased 33%, or $28.2, driven by higher income from our Mexico affiliate.

Asia

	Fiscal Year Ended 30 September			**2022 vs. 2021**		2021 vs. 2020	
	2022	2021	2020	$	%/bp	$	%/bp
Sales	**$3,143.3**	$2,920.8	$2,716.5	**$222.5**	**8%**	$204.3	8%
Operating income	**898.3**	838.3	870.3	**60.0**	**7%**	(32.0)	(4%)
Operating margin	**28.6%**	28.7%	32.0%		**(10) bp**		(330) bp
Equity affiliates' income	**$22.1**	$35.9	$32.1	**(13.8)**	**(38%)**	3.8	12%
Adjusted EBITDA	**1,356.9**	1,318.6	1,301.8	**38.3**	**3%**	16.8	1%
Adjusted EBITDA margin	**43.2%**	45.1%	47.9%		**(190) bp**		(280) bp

The table below summarizes the major factors that impacted sales in the Asia segment for the periods presented:

	2022 vs. 2021	2021 vs. 2020
Volume	**7%**	—%
Price	**3%**	1%
Energy cost pass-through to customers	**1%**	—%
Currency	**(3%)**	7%
Total Asia Sales Change	**8%**	8%

2022 vs. 2021 (Asia)
Sales of $3,143.3 increased 8%, or $222.5, due to higher volumes of 7%, positive pricing of 3%, and higher energy cost pass-through to customers of 1%, partially offset by unfavorable currency impacts of 3%. Volumes improved overall despite COVID-19 restrictions in certain parts of China and included contributions from several traditional industrial gas plants that were brought on-stream in our on-site business across the region. Pricing improved across all key countries and most major merchant product lines. The unfavorable currency impact was primarily attributable to the strengthening of the U.S. Dollar against the Chinese Renminbi and the South Korean Won.

Operating income of $898.3 increased 7%, or $60.0, as higher volumes of $104 and positive pricing, net of power and fuel costs, of $22 were partially offset by higher operating costs of $43 and an unfavorable currency impact of $23. Higher costs were driven by higher distribution and product sourcing costs, including those related to supply chain inefficiencies, inflation, higher incentive compensation, and resources needed to support new project start-ups. Operating margin of 28.6% decreased 10 bp from 28.7% in the prior year as the positive impact of our volume growth was mostly offset by the higher costs.

Equity affiliates' income of $22.1 decreased 38%, or $13.8, driven by an affiliate in Thailand.

2021 vs. 2020 (Asia)
Sales of $2,920.8 increased 8%, or $204.3, due to favorable currency of 7% and positive pricing of 1%, as both volumes and energy cost pass-through to customers were flat versus 2020. Positive volume contributions from our base merchant business and new plants were offset by a reduced contribution from our Lu'An joint venture. The favorable currency impact was primarily attributable to the appreciation of the Chinese Renminbi and South Korean Won against the U.S. Dollar.

Operating income of $838.3 decreased 4%, or $32.0, primarily due to unfavorable volume mix of $62 and higher operating costs, including inflation and product sourcing costs, of $32, partially offset by favorable currency of $59. Operating margin of 28.7% decreased 330 bp from 32.0% in the prior year primarily due to a reduced contribution from our Lu'An joint venture.

Equity affiliates' income of $35.9 increased 12%, or $3.8.

Europe

	Fiscal Year Ended 30 September			**2022 vs. 2021**		2021 vs. 2020	
	2022	2021	2020	$	%/bp	$	%/bp
Sales	**$3,086.1**	$2,345.6	$1,847.0	**$740.5**	**32%**	$498.6	27%
Operating income	**503.4**	529.4	454.8	**(26.0)**	**(5%)**	74.6	16%
Operating margin	**16.3%**	22.6%	24.6%		**(630) bp**		(200) bp
Equity affiliates' income	**$78.2**	$62.8	$51.8	**15.4**	**25%**	11.0	21%
Adjusted EBITDA	**776.8**	796.7	682.5	**(19.9)**	**(2%)**	114.2	17%
Adjusted EBITDA margin	**25.2%**	34.0%	37.0%		**(880) bp**		(300) bp

The table below summarizes the major factors that impacted sales in the Europe segment for the periods presented:

	2022 vs. 2021	2021 vs. 2020
Volume	**1%**	11%
Price	**15%**	3%
Energy cost pass-through to customers	**27%**	6%
Currency	**(11%)**	7%
Total Europe Sales Change	**32%**	27%

2022 vs. 2021 (Europe)
Sales of $3,086.1 increased 32%, or $740.5, due to higher energy cost pass-through to customers of 27%, higher pricing of 15%, and higher volumes of 1%, partially offset by an unfavorable currency impact of 11%. Significantly higher energy costs across the region increased contractual cost pass-through to our on-site customers. In our merchant business, we successfully implemented pricing actions in all major product lines. While we experienced better demand for merchant products, volumes were relatively flat due to lower hydrogen demand. Additionally, sales in this region were negatively impacted by the strengthening of the U.S. Dollar against the Euro and the British Pound Sterling.

Operating income of $503.4 decreased 5%, or $26.0, due to unfavorable currency impacts of $37, higher costs of $31, and unfavorable volume mix of $19, partially offset by higher pricing, net of power and fuel costs, of $61. Higher costs were primarily attributable to inflation and distribution and sourcing costs. Operating margin of 16.3% decreased 630 bp from 22.6% in the prior year primarily due to higher energy cost pass-through to customers, which accounted for approximately 450 bp of the margin decline, and higher costs.

Equity affiliates’ income of $78.2 increased 25%, or $15.4, driven by an affiliate in Italy.

2021 vs. 2020 (Europe)
Sales of $2,345.6 increased 27%, or $498.6, due to higher volumes of 11%, favorable currency impacts of 7%, higher energy cost pass-through to customers of 6%, and positive pricing of 3%. The volume improvement was driven by our base merchant business and new assets, including those from a business in Israel that we acquired in the fourth quarter of 2020. While our liquid bulk business largely recovered from COVID-19 in fiscal year 2021, demand for packaged gases and hydrogen continued to be lower than pre-pandemic levels. Favorable currency impacts were primarily attributable to the appreciation of the British Pound Sterling and Euro against the U.S. Dollar. Energy cost pass-through to customers was higher primarily in the second half of the year as we had experienced significantly higher natural gas and electricity costs in Europe. The pricing improvement was primarily attributable to our merchant business.

Operating income of $529.4 increased 16%, or $74.6, due to higher volumes of $47, favorable currency impacts of $31, and positive pricing, net of power and fuel costs, of $13, partially offset by unfavorable costs of $16. Operating margin of 22.6% decreased 200 bp from 24.6% in the prior year, primarily due to impacts from higher energy cost pass-through to customers, which negatively impacted margin by approximately 100 bp, and unfavorable operating costs.

Equity affiliates’ income of $62.8 increased 21%, or $11.0, primarily due to higher income from affiliates in Italy and South Africa.

Middle East and India

	Fiscal Year Ended 30 September			**2022 vs. 2021**		2021 vs. 2020	
	2022	2021	2020	$	%/bp	$	%/bp
Sales	**$129.5**	$99.3	$79.3	**$30.2**	**30%**	$20.0	25%
Operating income	**21.1**	28.0	18.5	**(6.9)**	**(25%)**	9.5	51%
Equity affiliates’ income	**293.9**	76.4	51.9	**217.5**	**285%**	24.5	47%
Adjusted EBITDA	**341.9**	129.7	90.4	**212.2**	**164%**	39.3	43%

2022 vs. 2021 (Middle East and India)
Sales of $129.5 increased 30%, or $30.2, primarily due to a new plant in India and a small acquisition. Operating income of $21.1 decreased 25%, or $6.9, due to unfavorable volume mix and higher costs. Equity affiliates' income of $293.9 increased $217.5 primarily from the JIGPC joint venture, which began contributing to our results in late October 2021, as well as recognition of the remaining deferred profit associated with air separation units previously sold to Jazan Gas Project Company, net of other project finalization costs, in the first quarter.

2021 vs. 2020 (Middle East and India)
Sales of $99.3 increased 25%, or $20.0, and operating income of $28.0 increased 51%, or $9.5, primarily due to a new plant in India. Equity affiliates’ income of $76.4 increased 47%, or $24.5, primarily due to higher income from an affiliate in India.

Corporate and other

	Fiscal Year Ended 30 September			**2022 vs. 2021**		2021 vs. 2020	
	2022	2021	2020	$	%/bp	$	%/bp
Sales	**$970.8**	$789.7	$582.8	**$181.1**	**23%**	$206.9	36%
Operating loss	**(184.7)**	(193.4)	(152.2)	**8.7**	**4%**	(41.2)	(27%)
Adjusted EBITDA	**(130.7)**	(151.7)	(111.1)	**21.0**	**14%**	(40.6)	(37%)

2022 vs. 2021 (Corporate and other)
Sales of $970.8 increased 23%, or $181.1, and operating loss of $184.7 decreased 4%, or $8.7, as the current year included higher sale of equipment project activity related to air separation equipment, completion of liquefaction equipment for an LNG project, as well as distribution equipment.

2021 vs. 2020 (Corporate and other)
Sales of $789.7 increased 36%, or $206.9, primarily due to higher project activity in our sale of equipment and turbo machinery equipment and services businesses. Despite higher sales, operating loss of $193.4 increased 27%, or $41.2, as higher project costs, product development spending, and corporate support costs were only partially offset by higher sale of equipment activity and a favorable settlement of a supply contract.

RECONCILIATIONS OF NON-GAAP FINANCIAL MEASURES

(Millions of dollars unless otherwise indicated, except for per share data)

We present certain financial measures, other than in accordance with U.S. generally accepted accounting principles ("GAAP"), on an "adjusted" or "non-GAAP" basis. On a consolidated basis, these measures include adjusted diluted earnings per share ("EPS"), adjusted EBITDA, adjusted EBITDA margin, adjusted effective tax rate, and capital expenditures. On a segment basis, these measures include adjusted EBITDA and adjusted EBITDA margin. In addition to these measures, we also present certain supplemental non-GAAP financial measures to help the reader understand the impact that certain disclosed items, or "non-GAAP adjustments," have on the calculation of our adjusted diluted EPS. For each non-GAAP financial measure, we present a reconciliation to the most directly comparable financial measure calculated in accordance with GAAP.

In many cases, non-GAAP financial measures are determined by adjusting the most directly comparable GAAP measure to exclude certain items that we believe are not representative of our underlying business performance, or "non-GAAP adjustments." For example, we previously excluded certain expenses associated with cost reduction actions, impairment charges, and gains on disclosed transactions. The reader should be aware that we may recognize similar losses or gains in the future.

When applicable, the tax impact of our pre-tax non-GAAP adjustments reflects the expected current and deferred income tax impact of our non-GAAP adjustments. These tax impacts are primarily driven by the statutory tax rate of the various relevant jurisdictions and the taxability of the adjustments in those jurisdictions.

We provide these non-GAAP financial measures to allow investors, potential investors, securities analysts, and others to evaluate the performance of our business in the same manner as our management. We believe these measures, when viewed together with financial results computed in accordance with GAAP, provide a more complete understanding of the factors and trends affecting our historical financial performance and projected future results. However, we caution readers not to consider these measures in isolation or as a substitute for the most directly comparable measures calculated in accordance with GAAP. Readers should also consider the limitations associated with these non-GAAP financial measures, including the potential lack of comparability of these measures from one company to another.

Adjusted Diluted EPS

The table below provides a reconciliation to the most directly comparable GAAP measure for each of the major components used to calculate adjusted diluted EPS from continuing operations, which we view as a key performance metric. In periods that we have non-GAAP adjustments, we believe it is important for the reader to understand the per share impact of each such adjustment because management does not consider these impacts when evaluating underlying business performance. Per share impacts are calculated independently and may not sum to total diluted EPS and total adjusted diluted EPS due to rounding.

Fiscal Year Ended 30 September	Operating Income	Equity Affiliates' Income	Income Tax Provision	Net Income Attributable to Air Products	Diluted EPS
2022 GAAP	**$2,338.8**	**$481.5**	**$500.8**	**$2,243.5**	**$10.08**
2021 GAAP	**2,281.4**	**294.1**	**462.8**	**2,028.8**	**9.12**
Change GAAP					$0.96
% Change GAAP					11%
2022 GAAP	$2,338.8	$481.5	$500.8	$2,243.5	$10.08
Business and asset actions	73.7	—	12.7	61.0	0.27
Equity method investment impairment charge	—	14.8	3.7	11.1	0.05
2022 Non-GAAP ("Adjusted")	**$2,412.5**	**$496.3**	**$517.2**	**$2,315.6**	**$10.41**
2021 GAAP	$2,281.4	$294.1	$462.8	$2,028.8	$9.12
Facility closure	23.2	—	5.8	17.4	0.08
Gain on exchange with joint venture partner	(36.8)	—	(9.5)	(27.3)	(0.12)
Tax election benefit and other	—	—	12.2	(12.2)	(0.05)
2021 Non-GAAP ("Adjusted")	**$2,267.8**	**$294.1**	**$471.3**	**$2,006.7**	**$9.02**
Change Non-GAAP ("Adjusted")					$1.39
% Change Non-GAAP ("Adjusted")					15%

Fiscal Year Ended 30 September	Operating Income	Equity Affiliates' Income	Income Tax Provision	Net Income Attributable to Air Products	Diluted EPS
2021 GAAP	**$2,281.4**	**$294.1**	**$462.8**	**$2,028.8**	**$9.12**
2020 GAAP	**2,237.6**	**264.8**	**478.4**	**1,901.0**	**8.55**
Change GAAP					$0.57
% Change GAAP					7 %
2021 GAAP	$2,281.4	$294.1	$462.8	$2,028.8	$9.12
Facility closure	23.2	—	5.8	17.4	0.08
Gain on exchange with joint venture partner	(36.8)	—	(9.5)	(27.3)	(0.12)
Tax election benefit and other	—	—	12.2	(12.2)	(0.05)
2021 Non-GAAP ("Adjusted")	**$2,267.8**	**$294.1**	**$471.3**	**$2,006.7**	**$9.02**
2020 GAAP	$2,237.6	$264.8	$478.4	$1,901.0	$8.55
Company headquarters relocation (income) expense	(33.8)	—	(8.2)	(25.6)	(0.12)
India Finance Act 2020	—	(33.8)	(20.3)	(13.5)	(0.06)
2020 Non-GAAP ("Adjusted")	**$2,203.8**	**$231.0**	**$449.9**	**$1,861.9**	**$8.38**
Change Non-GAAP ("Adjusted")					$0.64
% Change Non-GAAP ("Adjusted")					8 %

Adjusted EBITDA and Adjusted EBITDA Margin

We define adjusted EBITDA as net income less income (loss) from discontinued operations, net of tax, and excluding certain items that we do not believe are indicative of underlying business trends, before interest expense, other non-operating income (expense), net, income tax provision, and depreciation and amortization expense. Adjusted EBITDA and adjusted EBITDA margin provide useful metrics for management to assess operating performance. Margins are calculated independently for each period by dividing each line item by consolidated sales for the respective period and may not sum to total margin due to rounding.

The tables below present consolidated sales and a reconciliation of net income on a GAAP basis to adjusted EBITDA and net income margin on a GAAP basis to adjusted EBITDA margin:

	Fiscal Year Ended 30 September					
	2022		2021		2020	
	$	**Margin**	$	Margin	$	Margin
Sales	**$12,698.6**		$10,323.0		$8,856.3	
Net income and net income margin	**$2,266.5**	**17.8%**	$2,114.9	20.5%	$1,931.1	21.8 %
Less: Income (Loss) from discontinued operations, net of tax	**12.6**	**0.1%**	70.3	0.7%	(14.3)	(0.2%)
Add: Interest expense	**128.0**	**1.0%**	141.8	1.4%	109.3	1.2 %
Less: Other non-operating income (expense), net	**62.4**	**0.5%**	73.7	0.7%	30.7	0.3 %
Add: Income tax provision	**500.8**	**3.9%**	462.8	4.5%	478.4	5.4 %
Add: Depreciation and amortization	**1,338.2**	**10.5%**	1,321.3	12.8%	1,185.0	13.4 %
Add: Facility closure	**—**	**—%**	23.2	0.2%	—	— %
Add: Business and asset actions	**73.7**	**0.6%**	—	—%	—	— %
Less: Gain on exchange with joint venture partner	**—**	**—%**	36.8	0.4%	—	— %
Less: Company headquarters relocation income (expense)	**—**	**—%**	—	—%	33.8	0.4 %
Less: India Finance Act 2020 – equity affiliate income impact	**—**	**—%**	—	—%	33.8	0.4 %
Add: Equity method investment impairment charge	**14.8**	**0.1%**	—	—%	—	— %
Adjusted EBITDA and adjusted EBITDA margin	**$4,247.0**	**33.4%**	$3,883.2	37.6%	$3,619.8	40.9 %

	2022 vs. 2021	2021 vs. 2020
Change GAAP		
Net income $ change	**$151.6**	$183.8
Net income % change	**7%**	10%
Net income margin change	**(270) bp**	(130) bp
Change Non-GAAP		
Adjusted EBITDA $ change	**$363.8**	$263.4
Adjusted EBITDA % change	**9%**	7%
Adjusted EBITDA margin change	**(420) bp**	(330) bp

The tables below present sales and a reconciliation of operating income and operating margin to adjusted EBITDA and adjusted EBITDA margin for each of our reporting segments for the fiscal years ended 30 September:

Americas

	Fiscal Year Ended 30 September			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020	**$**	**%/bp**	$	%/bp
Sales	**$5,368.9**	$4,167.6	$3,630.7	**$1,201.3**	**29%**	$536.9	15%
Operating income	**$1,174.4**	$1,065.5	$1,012.4	**$108.9**	**10%**	$53.1	5%
Operating margin	**21.9%**	25.6%	27.9%		**(370) bp**		(230) bp
Reconciliation of GAAP to Non-GAAP:							
Operating income	**$1,174.4**	$1,065.5	$1,012.4				
Add: Depreciation and amortization	**629.5**	611.9	559.5				
Add: Equity affiliates' income	**98.2**	112.5	84.3				
Adjusted EBITDA	**$1,902.1**	$1,789.9	$1,656.2	**$112.2**	**6%**	$133.7	8%
Adjusted EBITDA margin	**35.4%**	42.9%	45.6%		**(750) bp**		(270) bp

Asia

	Fiscal Year Ended 30 September			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020	$	%/bp	$	%/bp
Sales	**$3,143.3**	$2,920.8	$2,716.5	**$222.5**	**8%**	$204.3	8%
Operating income	**$898.3**	$838.3	$870.3	**$60.0**	**7%**	($32.0)	(4%)
Operating margin	**28.6%**	28.7%	32.0%		**(10) bp**		(330) bp
Reconciliation of GAAP to Non-GAAP:							
Operating income	**$898.3**	$838.3	$870.3				
Add: Depreciation and amortization	**436.5**	444.4	399.4				
Add: Equity affiliates' income	**22.1**	35.9	32.1				
Adjusted EBITDA	**$1,356.9**	$1,318.6	$1,301.8	**$38.3**	**3%**	$16.8	1%
Adjusted EBITDA margin	**43.2%**	45.1%	47.9%		**(190) bp**		(280) bp

Europe

	Fiscal Year Ended 30 September			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020	**$**	**%/bp**	$	%/bp
Sales	**$3,086.1**	$2,345.6	$1,847.0	**$740.5**	**32%**	$498.6	27%
Operating income	**$503.4**	$529.4	$454.8	**($26.0)**	**(5%)**	$74.6	16%
Operating margin	**16.3%**	22.6%	24.6%		**(630) bp**		(200) bp
Reconciliation of GAAP to Non-GAAP:							
Operating income	**$503.4**	$529.4	$454.8				
Add: Depreciation and amortization	**195.2**	204.5	175.9				
Add: Equity affiliates' income	**78.2**	62.8	51.8				
Adjusted EBITDA	**$776.8**	$796.7	$682.5	**($19.9)**	**(2%)**	$114.2	17%
Adjusted EBITDA margin	**25.2%**	34.0%	37.0%		**(880) bp**		(300) bp

Middle East and India

	Fiscal Year Ended 30 September			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020	**$**	**%/bp**	$	%/bp
Sales	**$129.5**	$99.3	$79.3	**$30.2**	**30%**	$20.0	25%
Operating income	**$21.1**	$28.0	$18.5	**($6.9)**	**(25%)**	$9.5	51%
Reconciliation of GAAP to Non-GAAP:							
Operating income	**$21.1**	$28.0	$18.5				
Add: Depreciation and amortization	**26.9**	25.3	20.0				
Add: Equity affiliates' income	**293.9**	76.4	51.9				
Adjusted EBITDA	**$341.9**	$129.7	$90.4	**$212.2**	**164 bp**	$39.3	43%

Corporate and other

	Fiscal Year Ended 30 September			2022 vs. 2021		2021 vs. 2020	
	2022	2021	2020	**$**	**%/bp**	$	%/bp
Sales	**$970.8**	$789.7	$582.8	**$181.1**	**23%**	$206.9	36%
Operating loss	**($184.7)**	($193.4)	($152.2)	**$8.7**	**4%**	($41.2)	(27%)
Reconciliation of GAAP to Non-GAAP:							
Operating income	**($184.7)**	($193.4)	($152.2)				
Add: Depreciation and amortization	**50.1**	35.2	30.2				
Add: Equity affiliates' income	**3.9**	6.5	10.9				
Adjusted EBITDA	**($130.7)**	($151.7)	($111.1)	**$21.0**	**14 bp**	($40.6)	(37%)

Adjusted Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes.

Fiscal Year Ended 30 September	**2022**	2021	2020
Income tax provision	**$500.8**	$462.8	$478.4
Income from continuing operations before taxes	**2,754.7**	2,507.4	2,423.8
Effective tax rate	**18.2%**	18.5%	19.7%
Income tax provision	**$500.8**	$462.8	$478.4
Facility closure	**—**	5.8	—
Business and asset actions	**12.7**	—	—
Gain on exchange with joint venture partner	**—**	(9.5)	—
Company headquarters relocation	**—**	—	(8.2)
India Finance Act 2020	**—**	—	(20.3)
Equity method investment impairment charge	**3.7**	—	—
Tax election benefit and other	**—**	12.2	—
Adjusted income tax provision	**$517.2**	$471.3	$449.9
Income from continuing operations before taxes	**$2,754.7**	$2,507.4	$2,423.8
Facility closure	**—**	23.2	—
Business and asset actions	**73.7**	—	—
Gain on exchange with joint venture partner	**—**	(36.8)	—
Company headquarters relocation (income) expense	**—**	—	(33.8)
India Finance Act 2020 – equity affiliate income impact	**—**	—	(33.8)
Equity method investment impairment charge	**14.8**	—	—
Adjusted income from continuing operations before taxes	**$2,843.2**	$2,493.8	$2,356.2
Adjusted effective tax rate	**18.2%**	18.9%	19.1%

Capital Expenditures

We define capital expenditures as cash flows for additions to plant and equipment, including long-term deposits, acquisitions (less cash acquired), and investment in and advances to unconsolidated affiliates. A reconciliation of cash used for investing activities to our reported capital expenditures is provided below:

Fiscal Year Ended 30 September	**2022**	2021
Cash used for investing activities	**$3,857.2**	$2,732.9
Proceeds from sale of assets and investments	**46.2**	37.5
Purchases of investments	**(1,637.8)**	(2,100.7)
Proceeds from investments	**2,377.4**	1,875.2
Other investing activities	**7.0**	5.8
Capital expenditures	**$4,650.0**	$2,550.7

LIQUIDITY AND CAPITAL RESOURCES

Our cash balance and cash flows from operations are our primary sources of liquidity and are generally sufficient to meet our liquidity needs. In addition, we have the flexibility to access capital through a variety of financing activities, including accessing the capital markets, drawing upon our credit facility, or alternatively, accessing the commercial paper markets. At this time, we have not utilized, nor do we expect to access, our credit facility for additional liquidity.

As of 30 September 2022, we had $1,611.1 of foreign cash and cash items compared to total cash and cash items of $2,711.0. We do not expect that a significant portion of the earnings of our foreign subsidiaries and affiliates will be subject to U.S. income tax upon repatriation to the U.S. Depending on the country in which the subsidiaries and affiliates reside, the repatriation of these earnings may be subject to foreign withholding and other taxes. However, since we have significant current investment plans outside the U.S., it is our intent to permanently reinvest the majority of our foreign cash and cash items that would be subject to additional taxes outside the U.S.

Cash Flows From Operations

Fiscal Year Ended 30 September	**2022**	2021
Net income from continuing operations attributable to Air Products	**$2,243.5**	$2,028.8
Adjustments to reconcile income to cash provided by operating activities:		
Depreciation and amortization	**1,338.2**	1,321.3
Deferred income taxes	**32.3**	94.0
Facility closure	**—**	23.2
Business and asset actions	**73.7**	—
Undistributed earnings of equity method investments	**(214.7)**	(138.2)
Gain on sale of assets and investments	**(24.1)**	(37.2)
Share-based compensation	**48.4**	44.5
Noncurrent lease receivables	**94.0**	98.8
Other adjustments	**(304.9)**	(116.7)
Changes in working capital accounts	**(115.8)**	16.7
Cash Provided by Operating Activities	**$3,170.6**	$3,335.2

For the fiscal year ended 30 September 2022, cash provided by operating activities was $3,170.6. Undistributed earnings of equity method investments reflects activity from the JIGPC joint venture, which began contributing to our results in late October 2021. We received cash distributions of approximately $155 from this joint venture during the fiscal year. Other adjustments of $304.9 included adjustments for noncash currency impacts of intercompany balances, deferred costs associated with new projects, contributions to pension plans, and payments made for leasing activities. The working capital accounts were a use of cash of $115.8, primarily driven by a use of cash of $475.2 from trade receivables, less allowances, $94.3 from inventory and $77.0 from other working capital, partially offset by a source of cash of $532.5 from payables and accrued liabilities. The use of cash within trade receivables includes the impacts of higher natural gas costs contractually passed through to customers and higher underlying sales. The source of cash within payables and accrued liabilities primarily resulted from higher natural gas costs and customer advances for sale of equipment projects. The use of cash within other working capital primarily relates to contract fulfillment costs and the timing of income tax payments.

For the fiscal year ended 30 September 2021, cash provided by operating activities was $3,335.2. Other adjustments of $116.7 included pension plan contributions of $44.6 and pension income of $38.9 that did not have a cash impact. The working capital accounts were a source of cash of $16.7, primarily driven by a $187.9 source of cash from payables and accrued liabilities, partially offset by a $130.5 use of cash from trade receivables, less allowances. The source of cash within payables and accrued liabilities primarily resulted from higher natural gas costs, which also drove the use of cash within trade receivables as we contractually passed through these higher costs to customers.

Cash Flows From Investing Activities

Fiscal Year Ended 30 September	**2022**	2021
Additions to plant and equipment, including long-term deposits	**($2,926.5)**	($2,464.2)
Acquisitions, less cash acquired	**(65.1)**	(10.5)
Investment in and advances to unconsolidated affiliates	**(1,658.4)**	(76.0)
Proceeds from sale of assets and investments	**46.2**	37.5
Purchases of investments	**(1,637.8)**	(2,100.7)
Proceeds from investments	**2,377.4**	1,875.2
Other investing activities	**7.0**	5.8
Cash Used for Investing Activities	**($3,857.2)**	($2,732.9)

For the fiscal year ended 30 September 2022, cash used for investing activities was $3,857.2. Capital expenditures primarily included $2,926.5 for additions to plant and equipment, including long-term deposits and $1,658.4 for investment in and advances to unconsolidated affiliates. Refer to the *Capital Expenditures* section below for further detail. Proceeds from investments of $2,377.4 resulted from maturities of time deposits and treasury securities with terms greater than three months but less than one year and exceeded purchases of investments of $1,637.8.

For the fiscal year ended 30 September 2021, cash used for investing activities was $2,732.9. Capital expenditures for plant and equipment, including long-term deposits, were $2,464.2. Purchases of investments with terms greater than three months but less than one year of $2,100.7 exceeded proceeds from investments of $1,875.2, which resulted from maturities of time deposits and treasury securities.

Capital Expenditures

Capital expenditures is a non-GAAP financial measure that we define as cash flows for additions to plant and equipment, including long-term deposits, acquisitions (less cash acquired), and investment in and advances to unconsolidated affiliates. The components of our capital expenditures are detailed in the table below. We also present a reconciliation of our capital expenditures to cash used for investing activities on page 40.

Fiscal Year Ended 30 September	**2022**	2021
Additions to plant and equipment, including long-term deposits	**$2,926.5**	$2,464.2
Acquisitions, less cash acquired	**65.1**	10.5
Investment in and advances to unconsolidated affiliates[(A)]	**1,658.4**	76.0
Capital Expenditures	**$4,650.0**	$2,550.7

[(A)] Includes contributions from noncontrolling partners in consolidated subsidiaries as discussed below.

Capital expenditures in fiscal year 2022 totaled $4,650.0 compared to $2,550.7 in fiscal year 2021. The increase of $2,099.3 was primarily driven by our initial investment of $1.6 billion in the new JIGPC joint venture, which included approximately $130 from a non-controlling partner in one of our subsidiaries. We expect to make an additional investment of approximately $1 billion, which will also include a contribution from our non-controlling partner, for the second phase of the project, which we expect to occur in the second quarter of fiscal year 2023. Refer to Note 7, *Equity Affiliates*, to the consolidated financial statements for additional information.

Outlook for Investing Activities

We expect capital expenditures for fiscal year 2023 to be approximately $5 to $5.5 billion.

It is not possible, without unreasonable efforts, to reconcile our forecasted capital expenditures to future cash used for investing activities because we are unable to identify the timing or occurrence of our future investment activity, which is driven by our assessment of competing opportunities at the time we enter into transactions. These decisions, either individually or in the aggregate, could have a significant effect on our cash used for investing activities.

We anticipate capital expenditures to be funded principally with our current cash balance, cash generated from continuing operations, and financing activities as needed. In addition, we intend to continue to evaluate (1) investments in large industrial gas projects driven by demand for more energy, cleaner energy, and emerging market growth; (2) purchases of existing industrial gas facilities from our customers to create long-term contracts under which we own and operate the plant and sell industrial gases to the customer based on a fixed fee; and (3) acquisitions of small- and medium-sized industrial gas companies or assets from other industrial gas companies.

Cash Flows From Financing Activities

Fiscal Year Ended 30 September	**2022**	2021
Long-term debt proceeds	**$766.2**	$178.9
Payments on long-term debt	**(400.0)**	(462.9)
Net increase in commercial paper and short-term borrowings	**17.9**	1.0
Dividends paid to shareholders	**(1,383.3)**	(1,256.7)
Proceeds from stock option exercises	**19.3**	10.6
Investments by noncontrolling interests	**21.0**	136.6
Other financing activities	**(41.7)**	(28.4)
Cash Used for Financing Activities	**($1,000.6)**	($1,420.9)

In fiscal year 2022, cash used for financing activities was $1,000.6. The use of cash was primarily driven by dividend payments to shareholders of $1,383.3 and payments on long-term debt of $400.0 for the repayment of a 3.0% Senior Note at maturity. These uses of cash were partially offset by long-term debt proceeds of $766.2.

In fiscal year 2021, cash used for financing activities was $1,420.9 and primarily included dividend payments to shareholders of $1,256.7 and payments on long-term debt of $462.9, partially offset by long-term debt proceeds of $178.9 and investments by noncontrolling interests of $136.6. The payments on long-term debt included the repayment of a 0.375% €350.0 million Eurobond ($428) in June 2021.

Financing and Capital Structure

Capital needs in fiscal year 2022 were satisfied with our cash balance and cash from operations. Total debt increased from $7,637.2 as of 30 September 2021 to $7,644.8 as of 30 September 2022. Total debt includes related party debt of $781.0 and $358.4 as of 30 September 2022 and 30 September 2021, respectively.

Various debt agreements to which we are a party include financial covenants and other restrictions, including restrictions pertaining to the ability to create property liens and enter into certain sale and leaseback transactions. As of 30 September 2022, we are in compliance with all of the financial and other covenants under our debt agreements.

Credit Facilities

On 31 March 2021, we entered into a five-year $2,500 revolving credit agreement maturing 31 March 2026 with a syndicate of banks (the “2021 Credit Agreement”), under which senior unsecured debt is available to us and certain of our subsidiaries. On 31 March 2022, we amended the 2021 Credit Agreement to exercise our option to increase the maximum borrowing capacity to $2,750 and transition the benchmark rate from the London Inter-Bank Offered Rate ("LIBOR") to the Secured Overnight Financing Rate ("SOFR"). All other terms remain unchanged from the original agreement.

The only financial covenant in the 2021 Credit Agreement is a maximum ratio of total debt to total capitalization (equal to total debt plus total equity) not to exceed 70%. Total debt as of 30 September 2022 and 30 September 2021, expressed as a percentage of total capitalization, was 35.8% and 35.2%, respectively. No borrowings were outstanding under the 2021 Credit Agreement as of 30 September 2022.

We also have credit facilities available to certain of our foreign subsidiaries totaling $749.0, of which $457.5 was borrowed and outstanding as of 30 September 2022. The amount borrowed and outstanding as of 30 September 2021 was $176.2.

Equity Securities
On 15 September 2011, the Board of Directors authorized the repurchase of up to $1,000 of our outstanding common stock. We did not purchase any of our outstanding shares in fiscal years 2022 or 2021. As of 30 September 2022, $485.3 in share repurchase authorization remained.

Dividends
The Board of Directors determines whether to declare cash dividends on our common stock and the timing and amount based on financial condition and other factors it deems relevant. Dividends are paid quarterly, usually during the sixth week after the close of the fiscal quarter. In fiscal year 2022, the Board of Directors increased the quarterly dividend on our common stock to $1.62 per share, representing an 8% increase, or $0.12 per share, from the previous dividend of $1.50 per share. This is the 40th consecutive year that we have increased our quarterly dividend. We expect to continue to pay cash dividends in the future at comparable or increased levels.

On 22 November 2022, the Board of Directors declared a quarterly dividend of $1.62 per share that is payable on 13 February 2023 to shareholders of record at the close of business on 3 January 2023.

Discontinued Operations

In fiscal year 2022, cash provided by operating activities of discontinued operations of $59.6 resulted from cash received as part of a state tax refund related to the sale of our former Performance Materials Division in fiscal year 2017.

In fiscal year 2021, cash provided by operating activities of discontinued operations of $6.7 resulted from cash received as part of a state tax settlement related to the sale of our former Performance Materials Division in fiscal year 2017.

PENSION BENEFITS

We and certain of our subsidiaries sponsor defined benefit pension plans and defined contribution plans that cover a substantial portion of our worldwide employees. The principal defined benefit pension plans are the U.S. salaried pension plan and the U.K. pension plan. These plans were closed to new participants in 2005, after which defined contribution plans were offered to new employees. The shift to defined contribution plans is expected to continue to reduce volatility of both plan expense and contributions. Refer to Note 15, *Retirement Benefits*, to the consolidated financial statements for additional disclosures on our postretirement benefits.

Net Periodic Benefit

The table below summarizes the components of net periodic benefit for our U.S. and international defined benefit pension plans for the fiscal years ended 30 September:

	2022	2021
Service cost	**$39.8**	$44.7
Non-service related benefits	**(44.7)**	(83.0)
Other	**1.3**	1.0
Net periodic benefit	**($3.6)**	($37.3)

Net periodic benefit of $3.6 decreased from $37.3 in the prior year, primarily due to lower non-service related benefits. We increased the percentage of fixed income investments within the plan asset portfolios, which resulted in lower expected returns on plan assets for both the U.S. salaried and the U.K. pension plans. Additionally, a higher discount rate resulted in higher interest costs. These two reductions in non-service related benefits were only partially offset by lower actuarial loss amortization. Our non-service related benefits are reflected within "Other non-operating income (expense), net" on our consolidated income statements.

Service costs result from benefits earned by active employees and are reflected as operating expenses primarily within "Cost of sales" and "Selling and administrative" on our consolidated income statements. The amount of service costs capitalized in fiscal years 2022 and 2021 was not material.

The table below summarizes the assumptions used in the calculation of net periodic benefit for the fiscal years ended 30 September:

	2022	2021
Weighted average discount rate – Service cost	**2.4%**	2.3%
Weighted average discount rate – Interest cost	**2.0%**	1.8%
Weighted average expected rate of return on plan assets	**5.1%**	6.0%
Weighted average expected rate of compensation increase	**3.4%**	3.4%

2023 Outlook

In fiscal year 2023, we expect to recognize pension expense of approximately $110 to $120 primarily driven by non-service related costs, including higher interest cost and lower estimated expected returns on plan assets due to a smaller beginning balance of plan assets.

In fiscal year 2022, we recognized net actuarial losses of $143.5 in other comprehensive income. Actuarial gains and losses are amortized into pension expense over prospective periods to the extent they are not offset by future gains or losses. Future changes in the discount rate and actual returns on plan assets could impact the actuarial gain or loss and resulting amortization in years beyond fiscal year 2023.

Effective beginning in the first quarter of fiscal year 2023, management will review and disclose our adjusted results excluding the impact of non-service related costs as they are not indicative of the plans' future contribution needs due to the funded status of the plans. Non-service related costs are driven by factors that are unrelated to our operations, such as recent changes to the allocation of our pension plan assets associated with de-risking as well as volatility in equity and debt markets.

Pension Funding

Funded Status

The projected benefit obligation represents the actuarial present value of benefits attributable to employee service rendered to date, including the effects of estimated future salary increases. The plan funded status is calculated as the difference between the projected benefit obligation and the fair value of plan assets at the end of the period.

The table below summarizes the project benefit obligation, the fair value of plan assets, and the funded status for our U.S. and international plans as of 30 September:

	2022	2021
Projected benefit obligation	**$3,588.3**	$5,304.9
Fair value of plan assets at end of year	**3,526.0**	5,248.7
Plan funded status	**($62.3)**	($56.2)

The net unfunded liability of $62.3 as of 30 September 2022 increased $6.1 from $56.2 as of 30 September 2021, primarily due to unfavorable asset experience, partially offset by a lower liability due to increased discount rates.

Company Contributions

Pension funding includes both contributions to funded plans and benefit payments for unfunded plans, which are primarily non-qualified plans. With respect to funded plans, our funding policy is that contributions, combined with appreciation and earnings, will be sufficient to pay benefits without creating unnecessary surpluses.

In addition, we make contributions to satisfy all legal funding requirements while managing our capacity to benefit from tax deductions attributable to plan contributions. With the assistance of third-party actuaries, we analyze the liabilities and demographics of each plan, which help guide the level of contributions. During 2022 and 2021, our cash contributions to funded plans and benefit payments for unfunded plans were $44.7 and $44.6, respectively.

Funding Outlook

For fiscal year 2023, cash contributions to defined benefit plans are estimated to be $25 to $35. The estimate is based on expected contributions to certain international plans and anticipated benefit payments for unfunded plans, which are dependent upon the timing of retirements. Actual future contributions will depend on future funding legislation, discount rates, investment performance, plan design, and various other factors.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Refer to Note 1, *Basis of Presentation and Major Accounting Policies*, and Note 2, *New Accounting Guidance*, to the consolidated financial statements for a description of our major accounting policies and information concerning implementation and impact of new accounting guidance.

The accounting policies discussed below are those policies that we consider to be the most critical to understanding our financial statements because they require management's most difficult, subjective, or complex judgments, often as the result of the need to make estimates about the effects of matters that are inherently uncertain. These estimates reflect our best judgment about current and/or future economic and market conditions and their effect based on information available as of the date of our consolidated financial statements. If conditions change, actual results may differ materially from these estimates. Our management has reviewed these critical accounting policies and estimates and related disclosures with the Audit and Finance Committee of our Board of Directors.

Depreciable Lives of Plant and Equipment

Plant and equipment, net at 30 September 2022 totaled $14,160.5, and depreciation expense totaled $1,302.7 during fiscal year 2022. Plant and equipment is recorded at cost and depreciated using the straight-line method, which deducts equal amounts of the cost of each asset from earnings every year over its estimated economic useful life.

Economic useful life is the duration of time an asset is expected to be productively employed by us, which may be less than its physical life. Assumptions on the following factors, among others, affect the determination of estimated economic useful life: wear and tear, obsolescence, technical standards, contract life, market demand, competitive position, raw material availability, and geographic location.

The estimated economic useful life of an asset is monitored to determine its appropriateness, especially when business circumstances change. For example, changes in technology, changes in the estimated future demand for products, excessive wear and tear, or unanticipated government actions may result in a shorter estimated useful life than originally anticipated. In these cases, we would depreciate the remaining net book value over the new estimated remaining life, thereby increasing depreciation expense per year on a prospective basis. Likewise, if the estimated useful life is increased, the adjustment to the useful life decreases depreciation expense per year on a prospective basis.

Our regional segments have numerous long-term customer supply contracts for which we construct an on-site plant adjacent to or near the customer’s facility. These contracts typically have initial contract terms of 10 to 20 years. Depreciable lives of the production assets related to long-term supply contracts are generally matched to the contract lives. Extensions to the contract term of supply frequently occur prior to the expiration of the initial term. As contract terms are extended, the depreciable life of the associated production assets is adjusted to match the new contract term, as long as it does not exceed the remaining physical life of the asset.

Our regional segments also have contracts for liquid or gaseous bulk supply and, for smaller customers, packaged gases. The depreciable lives of production facilities associated with these contracts are generally 15 years. These depreciable lives have been determined based on historical experience combined with judgment on future assumptions such as technological advances, potential obsolescence, competitors’ actions, etc.

In addition, we may purchase assets through transactions accounted for as either an asset acquisition or a business combination. Depreciable lives are assigned to acquired assets based on the age and condition of the assets, the remaining duration of long-term supply contracts served by the assets, and our historical experience with similar assets. Management monitors its assumptions and may potentially need to adjust depreciable life as circumstances change.

Impairment of Assets

There were no triggering events in fiscal year 2022 that would require impairment testing for any of our asset groups, reporting units that contain goodwill, or indefinite-lived intangibles assets. We completed our annual impairment tests for goodwill and other indefinite-lived intangible assets and concluded there were no indications of impairment.

In the fourth quarter of fiscal year 2022, we recorded a noncash charge of $14.8 for the other-than-temporary impairment of two small equity method investments in our Asia segment.

Refer to the “Impairment of Assets” subsections below for additional detail.

Impairment of Assets – Plant and Equipment

Plant and equipment meeting the held for sale criteria are reported at the lower of carrying amount or fair value less cost to sell. Plant and equipment to be disposed of other than by sale may be reviewed for impairment upon the occurrence of certain triggering events, such as unexpected contract terminations or unexpected foreign government-imposed restrictions or expropriations. Plant and equipment held for use is grouped for impairment testing at the lowest level for which there is identifiable cash flows. Impairment testing of the asset group occurs whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. Such circumstances may include:

- a significant decrease in the market value of a long-lived asset grouping;
- a significant adverse change in the manner in which the asset grouping is being used or in its physical condition;
- an accumulation of costs significantly in excess of the amount originally expected for the acquisition or construction of the long-lived asset;
- a reduction in revenues that is other than temporary;
- a history of operating or cash flow losses associated with the use of the asset grouping; or
- changes in the expected useful life of the long-lived assets.

If such circumstances are determined to exist, an estimate of undiscounted future cash flows produced by that asset group is compared to the carrying value to determine whether impairment exists. If an asset group is determined to be impaired, the loss is measured based on the difference between the asset group's fair value and its carrying value. An estimate of the asset group's fair value is based on the discounted value of its estimated cash flows.

The assumptions underlying the undiscounted future cash flow projections require significant management judgment. Factors that management must estimate include industry and market conditions, sales volume and prices, costs to produce, inflation, etc. The assumptions underlying the cash flow projections represent management's best estimates at the time of the impairment review and could include probability weighting of cash flow projections associated with multiple potential future scenarios. Changes in key assumptions or actual conditions that differ from estimates could result in an impairment charge. We use reasonable and supportable assumptions when performing impairment reviews and cannot predict the occurrence of future events and circumstances that could result in impairment charges.

In fiscal year 2022, there was no need to test for impairment on any of our asset groupings as no events or changes in circumstances indicated that the carrying amount of our asset groupings may not be recoverable.

Impairment of Assets – Goodwill

The acquisition method of accounting for business combinations requires us to make use of estimates and judgments to allocate the purchase price paid for acquisitions to the fair value of the net tangible and identifiable intangible assets. Goodwill represents the excess of the aggregate purchase price (plus the fair value of any noncontrolling interest and previously held equity interest in the acquiree) over the fair value of identifiable net assets of an acquired entity. Goodwill was $823.0 as of 30 September 2022. Disclosures related to goodwill are included in Note 9, *Goodwill*, to the consolidated financial statements.

We review goodwill for impairment annually in the fourth quarter of the fiscal year and whenever events or changes in circumstances indicate that the carrying value of goodwill might not be recoverable. The tests are done at the reporting unit level, which is defined as being equal to or one level below the operating segment for which discrete financial information is available and whose operating results are reviewed by segment managers regularly. We have five reportable business segments, seven operating segments and 11 reporting units, eight of which include a goodwill balance. Refer to Note 23, *Business Segment and Geographic Information*, for additional information. Reporting units are primarily based on products and subregions within each reportable segment. The majority of our goodwill is assigned to reporting units within our regional industrial gases segments.

As part of the goodwill impairment testing, we have the option to first assess qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying value. However, we choose to bypass the qualitative assessment and conduct quantitative testing to determine if the carrying value of the reporting unit exceeds its fair value. An impairment loss will be recognized for the amount by which the carrying value of the reporting unit exceeds its fair value, not to exceed the total amount of goodwill allocated to that reporting unit.

To determine the fair value of a reporting unit, we initially use an income approach valuation model, representing the present value of estimated future cash flows. Our valuation model uses a discrete growth period and an estimated exit trading multiple. The income approach is an appropriate valuation method due to our capital-intensive nature, the long-term contractual nature of our business, and the relatively consistent cash flows generated by our reporting units. The principal assumptions utilized in our income approach valuation model include revenue growth rates, operating profit and/or adjusted EBITDA margins, discount rate, and exit multiple. Projected revenue growth rates and operating profit and/or adjusted EBITDA assumptions are consistent with those utilized in our operating plan and/or revised forecasts and long-term financial planning process. The discount rate assumption is calculated based on an estimated market-participant risk-adjusted weighted-average cost of capital, which includes factors such as the risk-free rate of return, cost of debt, and expected equity premiums. The exit multiple is determined from comparable industry transactions and where appropriate, reflects expected long-term growth rates.

If our initial review under the income approach indicates there may be impairment, we incorporate results under the market approach to further evaluate the existence of impairment. When the market approach is utilized, fair value is estimated based on market multiples of revenue and earnings derived from comparable publicly-traded industrial gases companies and/or regional manufacturing companies engaged in the same or similar lines of business as the reporting unit, adjusted to reflect differences in size and growth prospects. When both the income and market approach are utilized, we review relevant facts and circumstances and make a qualitative assessment to determine the proper weighting. Management judgment is required in the determination of each assumption utilized in the valuation model, and actual results could differ from the estimates.

During the fourth quarter of fiscal year 2022, we conducted our annual goodwill impairment test, noting no indications of impairment. The fair value of all of our reporting units substantially exceeded their carrying value.

Future events that could have a negative impact on the level of excess fair value over carrying value of the reporting units include, but are not limited to: long-term economic weakness, decline in market share, pricing pressures, inability to successfully implement cost improvement measures, increases to our cost of capital, changes in the strategy of the reporting unit, and changes to the structure of our business as a result of future reorganizations or divestitures of assets or businesses. Negative changes in one or more of these factors, among others, could result in impairment charges.

Impairment of Assets – Intangible Assets

Intangible assets, net with determinable lives at 30 September 2022 totaled $314.4 and consisted primarily of customer relationships, purchased patents and technology, and land use rights. These intangible assets are tested for impairment as part of the long-lived asset grouping impairment tests. Impairment testing of the asset group occurs whenever events or changes in circumstances indicate that the carrying value of the assets may not be recoverable. See the impairment discussion above under "*Impairment of Assets – Plant and Equipment*" for a description of how impairment losses are determined.

Indefinite-lived intangible assets at 30 September 2022 totaled $33.1 and consisted of trade names and trademarks. Indefinite-lived intangibles are subject to impairment testing at least annually or more frequently if events or changes in circumstances indicate that potential impairment exists. The impairment test for indefinite-lived intangible assets involves calculating the fair value of the indefinite-lived intangible assets and comparing the fair value to their carrying value. If the fair value is less than the carrying value, the difference is recorded as an impairment loss. To determine fair value, we utilize the royalty savings method, a form of the income approach. This method values an intangible asset by estimating the royalties avoided through ownership of the asset.

Disclosures related to intangible assets other than goodwill are included in Note 10, *Intangible Assets*, to the consolidated financial statements.

In the fourth quarter of 2022, we conducted our annual impairment test of indefinite-lived intangibles which resulted in no impairment.

Impairment of Assets – Equity Method Investments

Investments in and advances to equity affiliates totaled $3,353.8 at 30 September 2022. The majority of our investments are ventures with other industrial gas companies. Summarized financial information of our equity affiliates is included in Note 7, *Equity Affiliates*, to the consolidated financial statements. We review our equity method investments for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment may not be recoverable.

An impairment loss is recognized in the event that an other-than-temporary decline in fair value below the carrying value of an investment occurs. We estimate the fair value of our investments under the income approach, which considers the estimated discounted future cash flows expected to be generated by the investee, and/or the market approach, which considers market multiples of revenue and earnings derived from comparable publicly-traded industrial gas companies. Changes in key assumptions about the financial condition of an investee or actual conditions that differ from estimates could result in an impairment charge.

During the fourth quarter of fiscal year 2022, we determined there was an other-than-temporary impairment of our investments in two small equity affiliates in the Asia segment. As a result, we recorded a noncash charge of $14.8 ($11.1 after-tax, or $0.05 per share) to write down the full carrying value of the investments. This charge is reflected on our consolidated income statements within “Equity affiliates' income” and was not recorded in segment results. There were no events or changes in circumstances that indicated that the carrying amount of our other investments may not be recoverable.

Revenue Recognition – Cost Incurred Input Method

Revenue from equipment sale contracts is generally recognized over time as we have an enforceable right to payment for performance completed to date and our performance under the contract terms does not create an asset with alternative use. We use a cost incurred input method to recognize revenue by which costs incurred to date relative to total estimated costs at completion are used to measure progress toward satisfying performance obligations. Costs incurred include material, labor, and overhead costs and represent work contributing and proportionate to the transfer of control to the customer.

Accounting for contracts using the cost incurred input method requires management judgment relative to assessing risks and their impact on the estimates of revenues and costs. Our estimates are impacted by factors such as the potential for incentives or penalties on performance, schedule delays, technical issues, cost inflation, labor productivity, the complexity of work performed, the availability of materials, and performance of subcontractors. When adjustments in estimated total contract revenues or estimated total costs are required, any changes in the estimated profit from prior estimates are recognized in the current period for the inception-to-date effect of such change. When estimates of total costs to be incurred on a contract exceed estimates of total revenues to be earned, a provision for the entire estimated loss on the contract is recorded in the period in which the loss is determined.

In addition to the typical risks associated with underlying performance of project procurement and construction activities, our sale of equipment projects within our Corporate and other segment require monitoring of risks associated with schedule, geography, and other aspects of the contract and their effects on our estimates of total revenues and total costs to complete the contract.

Changes in estimates on projects accounted for under the cost incurred input method unfavorably impacted operating income by approximately $30 in fiscal year 2022 and $19 in fiscal year 2021. Our changes in estimates would not have significantly impacted amounts recorded in prior years.

We assess the performance of our sale of equipment projects as they progress. Our earnings could be positively or negatively impacted by changes to our forecast of revenues and costs on these projects.

Revenue Recognition – On-site Customer Contracts

For customers who require large volumes of gases on a long-term basis, we produce and supply gases under long-term contracts from large facilities that we build, own and operate on or near the customer’s facilities. Certain of these on-site contracts contain complex terms and provisions such as tolling arrangements, minimum payment requirements, variable components and pricing provisions that require significant judgment to determine the amount and timing of revenue recognition.

Income Taxes

We account for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities measured using enacted tax rates in effect for the year in which the differences are expected to be recovered or settled. As of 30 September 2022, accrued income taxes, including the amount recorded as noncurrent, was $269.8, and net deferred tax liabilities were $1,111.7. Tax liabilities related to uncertain tax positions as of 30 September 2022 were $103.5, excluding interest and penalties. Income tax expense for the fiscal year ended 30 September 2022 was $500.8. Disclosures related to income taxes are included in Note 21, *Income Taxes*, to the consolidated financial statements.

Management judgment is required concerning the ultimate outcome of tax contingencies and the realization of deferred tax assets.

Actual income taxes paid may vary from estimates, depending upon changes in income tax laws, actual results of operations, and the final audit of tax returns by taxing authorities. Tax assessments may arise several years after tax returns have been filed. We believe that our recorded tax liabilities adequately provide for these assessments.

Deferred tax assets are recorded for operating losses and tax credit carryforwards. However, when we do not expect sufficient sources of future taxable income to realize the benefit of the operating losses or tax credit carryforwards, these deferred tax assets are reduced by a valuation allowance. A valuation allowance is recognized if, based on the weight of available evidence, it is considered more likely than not that some portion or all of the deferred tax asset will not be realized. The factors used to assess the likelihood of realization include forecasted future taxable income and available tax planning strategies that could be implemented to realize or renew net deferred tax assets in order to avoid the potential loss of future tax benefits. The effect of a change in the valuation allowance is reported in income tax expense.

A 1% increase or decrease in our effective tax rate may result in a decrease or increase to net income, respectively, of approximately $28.

Pension and Other Postretirement Benefits

The amounts recognized in the consolidated financial statements for pension and other postretirement benefits are determined on an actuarial basis utilizing numerous assumptions. The discussion that follows provides information on the significant assumptions, expense, and obligations associated with the defined benefit plans.

Actuarial models are used in calculating the expense and liability related to the various defined benefit plans. These models have an underlying assumption that the employees render service over their service lives on a relatively consistent basis; therefore, the expense of benefits earned should follow a similar pattern.

Several assumptions and statistical variables are used in the models to calculate the expense and liability related to the plans. We determine assumptions about the discount rate, the expected rate of return on plan assets, and the rate of compensation increase. Note 15, *Retirement Benefits*, to the consolidated financial statements includes disclosure of these rates on a weighted-average basis for both the U.S. and international plans. The actuarial models also use assumptions about demographic factors such as retirement age, mortality, and turnover rates. Mortality rates are based on the most recent U.S. and international mortality tables. We believe the actuarial assumptions are reasonable. However, actual results could vary materially from these actuarial assumptions due to economic events and differences in rates of retirement, mortality, and turnover.

One of the assumptions used in the actuarial models is the discount rate used to measure benefit obligations. This rate reflects the prevailing market rate for high-quality, fixed-income debt instruments with maturities corresponding to the expected timing of benefit payments as of the annual measurement date for each of the various plans. We measure the service cost and interest cost components of pension expense by applying spot rates along the yield curve to the relevant projected cash flows. The rates along the yield curve are used to discount the future cash flows of benefit obligations back to the measurement date. These rates change from year to year based on market conditions that affect corporate bond yields. A higher discount rate decreases the present value of the benefit obligations and results in lower pension expense. With respect to impacts on pension benefit obligations, a 50 bp increase or decrease in the discount rate may result in a decrease or increase, respectively, to pension expense of approximately $20 per year.

The expected rate of return on plan assets represents an estimate of the long-term average rate of return to be earned by plan assets reflecting current asset allocations. In determining estimated asset class returns, we take into account historical and future expected long-term returns and the value of active management, as well as the interest rate environment. Asset allocation is determined based on long-term return, volatility and correlation characteristics of the asset classes, the profiles of the plans' liabilities, and acceptable levels of risk. Lower returns on the plan assets result in higher pension expense. A 50 bp increase or decrease in the estimated rate of return on plan assets may result in a decrease or increase, respectively, to pension expense of approximately $23 per year.

We use a market-related valuation method for recognizing certain investment gains or losses for our significant pension plans. Investment gains or losses are the difference between the expected return and actual return on plan assets. The expected return on plan assets is determined based on a market-related value of plan assets. This is a calculated value that recognizes investment gains and losses on equities over a five-year period from the year in which they occur and reduces year-to-year volatility. The market-related value for non-equity investments equals the actual fair value. Expense in future periods will be impacted as gains or losses are recognized in the market-related value of assets.

The expected rate of compensation increase is another key assumption. We determine this rate based on review of the underlying long-term salary increase trend characteristic of labor markets and historical experience, as well as comparison to peer companies. A 50 bp increase or decrease in the expected rate of compensation may result in an increase or decrease to pension expense, respectively, of approximately $7 per year.

Loss Contingencies

In the normal course of business, we encounter contingencies, or situations involving varying degrees of uncertainty as to the outcome and effect on our company. We accrue a liability for loss contingencies when it is considered probable that a liability has been incurred and the amount of loss can be reasonably estimated. When only a range of possible loss can be established, the most probable amount in the range is accrued. If no amount within this range is a better estimate than any other amount within the range, the minimum amount in the range is accrued.

Contingencies include those associated with litigation and environmental matters, for which our accounting policy is discussed in Note 1, *Basis of Presentation and Major Accounting Policies*, to the consolidated financial statements, and details are provided in Note 16, *Commitments and Contingencies*, to the consolidated financial statements. Significant judgment is required to determine both the probability and whether the amount of loss associated with a contingency can be reasonably estimated. These determinations are made based on the best available information at the time. As additional information becomes available, we reassess probability and estimates of loss contingencies. Revisions to the estimates associated with loss contingencies could have a significant impact on our results of operations in the period in which an accrual for loss contingencies is recorded or adjusted. For example, due to the inherent uncertainties related to environmental exposures, a significant increase to environmental liabilities could occur if a new site is designated, the scope of remediation is increased, a different remediation alternative is identified, or our proportionate share of the liability increases. Similarly, a future charge for regulatory fines or damage awards associated with litigation could have a significant impact on our net income in the period in which it is recorded.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Our earnings, cash flows, and financial position are exposed to market risks arising from fluctuations in interest rates and foreign currency exchange rates. It is our policy to minimize our cash flow exposure to adverse changes in currency exchange rates and to manage the financial risks inherent in funding with debt capital.

We address these financial exposures through a controlled program of risk management that includes the use of derivative financial instruments. We have established counterparty credit guidelines and generally enter into transactions with financial institutions of investment grade or better, thereby minimizing the risk of credit loss. All instruments are entered into for other than trading purposes. For details on the types and use of these derivative instruments and related major accounting policies, refer to Note 1, *Basis of Presentation and Major Accounting Policies*, and Note 12, *Financial Instruments*, to the consolidated financial statements. Additionally, we mitigate adverse energy price impacts through our cost pass-through contracts with customers and price increases.

Our derivative and other financial instruments consist of long-term debt, including the current portion and amounts owed to related parties; interest rate swaps; cross currency interest rate swaps; and foreign exchange-forward contracts. The net market value of these financial instruments combined is referred to below as the "net financial instrument position" and is disclosed in Note 13, *Fair Value Measurements*, to the consolidated financial statements. Our net financial instrument position decreased from a liability of $7,850.3 at 30 September 2021 to a liability of $6,898.6 at 30 September 2022. The decrease was primarily due to the effect of higher interest rates on the fair value of U.S. Dollar- and Euro-denominated fixed-rate debt and the effect of a stronger U.S Dollar on foreign currency-denominated debt.

The analysis below presents the sensitivity of the market value of our financial instruments to selected changes in market rates and prices. Market values are the present values of projected future cash flows based on the market rates and prices chosen. The market values for interest rate risk and foreign currency risk are calculated by us using a third-party software model that utilizes standard pricing models to determine the present value of the instruments based on market conditions as of the valuation date, such as interest rates, spot and forward exchange rates, and implied volatility.

Interest Rate Risk

Our debt portfolio as of 30 September 2022, including the effect of currency and interest rate swap agreements, was composed of 79% fixed-rate debt and 21% variable-rate debt. Our debt portfolio as of 30 September 2021, including the effect of currency and interest rate swap agreements, was composed of 89% fixed-rate debt and 11% variable-rate debt. The increase in variable-rate debt is primarily the result of a $600 million increase in the outstanding notional of fixed-to-variable interest rate swaps.

The sensitivity analysis related to the interest rate risk on the fixed portion of our debt portfolio assumes an instantaneous 100 bp parallel move in interest rates from the level at 30 September 2022, with all other variables held constant. A 100 bp increase in market interest rates would result in a decrease of $364 and $587 in the net liability position of financial instruments at 30 September 2022 and 2021, respectively. A 100 bp decrease in market interest rates would result in an increase of $425 and $692 in the net liability position of financial instruments at 30 September 2022 and 2021, respectively.

Based on the variable-rate debt included in our debt portfolio, including the interest rate swap agreements, a 100 bp increase in interest rates would result in an additional $16 and $8 of interest incurred per year at 30 September 2022 and 2021, respectively. A 100 bp decline in interest rates would lower interest incurred by $16 and $8 per year at 30 September 2022 and 2021, respectively.

Foreign Currency Exchange Rate Risk

The sensitivity analysis related to foreign currency exchange rates assumes an instantaneous 10% change in the foreign currency exchange rates from their levels at 30 September 2022 and 2021, with all other variables held constant. A 10% strengthening or weakening of the functional currency of an entity versus all other currencies would result in a decrease or increase, respectively, of $165 and $343 in the net liability position of financial instruments at 30 September 2022 and 2021, respectively. The lower decrease or increase from a 10% strengthening or weakening, respectively, was primarily due to the origination of project cost hedges that generate losses and increase the net liability position when the functional currency strengthens or generate gains and decrease the net liability position when the functional currency weakens.

The primary currency pairs for which we have exchange rate exposure are the Euro and U.S. Dollar and Chinese Renminbi and U.S. Dollar. Foreign currency debt, cross currency interest rate swaps, and foreign exchange-forward contracts are used in countries where we do business, thereby reducing our net asset exposure. Foreign exchange-forward contracts and cross currency interest rate swaps are also used to hedge our firm and highly anticipated foreign currency cash flows. Thus, there is either an asset or liability or cash flow exposure related to all of the financial instruments in the above sensitivity analysis for which the impact of a movement in exchange rates would be in the opposite direction and materially equal to the impact on the instruments in the analysis.

The majority of our sales are denominated in foreign currencies as they are derived outside the United States. Therefore, financial results will be affected by changes in foreign currency rates. The Chinese Renminbi and the Euro represent the largest exposures in terms of our foreign earnings. We estimate that a 10% reduction in either the Chinese Renminbi or the Euro versus the U.S. Dollar would lower our annual operating income by approximately $45 and $25, respectively.

Item 8. Financial Statements and Supplementary Data

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Air Products' management is responsible for establishing and maintaining adequate internal control over financial reporting. Our internal control over financial reporting, which is defined in the following sentences, is a process designed to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements for external purposes in accordance with U.S. generally accepted accounting principles and includes those policies and procedures that:

(i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company;

(ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and

(iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on the financial statements.

Because of inherent limitations, internal control over financial reporting can only provide reasonable assurance and may not prevent or detect misstatements. Further, because of changes in conditions, the effectiveness of our internal control over financial reporting may vary over time. Our processes contain self-monitoring mechanisms, and actions are taken to correct deficiencies as they are identified.

Management has evaluated the effectiveness of its internal control over financial reporting based on criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this evaluation, management concluded that, as of 30 September 2022, the Company's internal control over financial reporting was effective.

Deloitte & Touche LLP, an independent registered public accounting firm, has issued its opinion on the Company's internal control over financial reporting as of 30 September 2022 as stated in its report which appears herein.

/s/ Seifi Ghasemi	/s/ Melissa N. Schaeffer
Seifi Ghasemi	Melissa N. Schaeffer
Chairman, President, and	Senior Vice President and
Chief Executive Officer	Chief Financial Officer
22 November 2022	22 November 2022

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the shareholders and the Board of Directors of Air Products and Chemicals, Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Air Products and Chemicals, Inc. and subsidiaries (the "Company") as of September 30, 2022 and 2021, the related consolidated income statements, comprehensive income statements, statements of equity, and statements of cash flows, for each of the three years in the period ended September 30, 2022, and the related notes (collectively referred to as the "financial statements"). We also have audited the Company's internal control over financial reporting as of September 30, 2022, based on criteria established in Internal Control — Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Company as of September 30, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended September 30, 2022, in conformity with accounting principles generally accepted in the United States of America. Also, in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of September 30, 2022, based on criteria established in Internal Control — Integrated Framework (2013) issued by COSO.

Basis for Opinions

The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on these financial statements and an opinion on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the financial statements included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures to respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current-period audit of the financial statements that were communicated or required to be communicated to the audit committee and that (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing a separate opinion on the critical audit matters or on the accounts or disclosures to which they relate.

Revenue Recognition – On-site Customer Contracts – Refer to Notes 1 and 4 to the Financial Statements

Critical Audit Matter Description

On-site industrial gas customer contracts involve large capital investments to serve customers who require large volumes of gases and have relatively constant demand. The Company builds, owns and operates facilities on or near the customer's facilities to produce and supply the customer with gases under a long-term arrangement. Typically, these contracts have 15- to 20-year terms and contain fixed monthly charges and/or minimum purchase requirements. Revenue associated with these contracts is generally recognized over time during the period in which the Company delivers or makes available the agreed upon quantity of gases. In addition, certain on-site industrial gas contracts contain complex terms and provisions such as tolling arrangements, minimum payment requirements, pricing provisions, and variable components that are specific to a customer arrangement, including certain contracts with related parties. These arrangements may require greater judgment in determining when contractual requirements have been met, impacting the timing and amount of revenue to be recorded.

We identified revenue recognition for certain on-site industrial gas customer contracts with complex terms and provisions as a critical audit matter because of the judgments necessary for management to evaluate these contract terms, including amendments, in order to determine the amount of revenue to be recognized. This required a high degree of auditor judgment when performing procedures to audit management's determination of the amount and timing of revenue recognition and evaluating the results of those procedures.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to revenue recognition for certain on-site industrial gas customer contracts with complex terms and provisions included the following procedures, among others:

- We tested the effectiveness of the Company's controls related to the amount and timing of revenue recognition, including controls over the evaluation of complex terms and provisions in certain on-site industrial gas customer contracts.
- We evaluated the terms included within original customer contracts and related amendments to assess the accounting for provisions such as minimum payment requirements, pricing provisions, settlement terms, and variable components that require management to apply judgment in determining revenue recognition associated with the contract.
- We evaluated customer transactions and agreed the amount of revenue recognized to underlying contracts, customer invoices, and cash receipts.
- We tested the probability of collection of variable components, including penalties, which impacts the amount and timing of revenue which the Company expects to collect.
- We inquired of personnel who oversee operations, customer relations, and revenue recognition as to the presence of contract amendments, and interpretation of contract terms.
- We considered the nature of transactions with related parties and any potential impact on revenue recognition.

Investments in Joint Ventures – Consolidation Accounting – Refer to Notes 1, 7, and 22 to the Financial Statements

Critical Audit Matter Description

In 2022, the Company entered into two significant joint ventures, the Jazan Integrated Gasification and Power Company ("JIGPC") joint venture and the NEOM Green Hydrogen Company (“NGHC”) joint venture, which required assessments to determine if the respective investments should be consolidated by the Company. The consolidation assessments include an evaluation to determine whether the joint venture investments are variable interest entities (“VIE”). Application of the VIE accounting model requires the Company to identify whether it is the primary beneficiary of a joint venture when voting interests may not indicate which party maintains a controlling financial interest in the joint venture.

We identified the VIE analysis and primary beneficiary assessment as a critical audit matter. The application of the VIE accounting model requires a high degree of auditor judgment and additional effort when performing audit procedures to evaluate the reasonableness of management’s judgments related to the VIE analysis and control over the investment, including the need to use professionals in our firm with expertise in accounting for consolidations.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the application of the VIE accounting model for certain joint ventures included the following, among others:

- We tested the effectiveness of the Company’s controls over the initial accounting assessment of joint ventures, including controls over the accuracy and completeness of information the Company used to evaluate the VIE analysis and accounting control criteria.
- We read the joint ventures shareholders’ agreements and related contracts, which govern the formation and activities of the investment, and evaluated the appropriateness of the Company’s accounting conclusion related to the VIE analysis and control of the joint venture.
- We analyzed other qualitative factors, such as the nature of the other investors in the joint venture and relationships with lenders and other counterparties as well as the nature and relative significance of the activities conducted by the shareholders under the various arrangements, to identify factors that may suggest a different conclusion related to management’s assessment of the primary beneficiary.
- We used professionals in our firm having expertise in accounting for consolidations when evaluating the provisions of the joint venture shareholders’ agreement and related contracts.

/s/ Deloitte & Touche LLP
Philadelphia, Pennsylvania
November 22, 2022

We have served as the Company's auditor since 2018.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED INCOME STATEMENTS
For the Fiscal Years Ended 30 September

(Millions of U.S. Dollars, except for share and per share data)	**2022**	2021	2020
Sales	**$12,698.6**	$10,323.0	$8,856.3
Cost of sales	**9,338.5**	7,186.1	5,858.1
Facility closure	**—**	23.2	—
Selling and administrative	**900.6**	828.4	775.9
Research and development	**102.9**	93.5	83.9
Business and asset actions	**73.7**	—	—
Gain on exchange with joint venture partner	**—**	36.8	—
Company headquarters relocation income (expense)	**—**	—	33.8
Other income (expense), net	**55.9**	52.8	65.4
Operating Income	**2,338.8**	2,281.4	2,237.6
Equity affiliates' income	**481.5**	294.1	264.8
Interest expense	**128.0**	141.8	109.3
Other non-operating income (expense), net	**62.4**	73.7	30.7
Income From Continuing Operations Before Taxes	**2,754.7**	2,507.4	2,423.8
Income tax provision	**500.8**	462.8	478.4
Income From Continuing Operations	**2,253.9**	2,044.6	1,945.4
Income (Loss) from discontinued operations, net of tax	**12.6**	70.3	(14.3)
Net Income	**2,266.5**	2,114.9	1,931.1
Net income attributable to noncontrolling interests of continuing operations	**10.4**	15.8	44.4
Net Income Attributable to Air Products	**$2,256.1**	$2,099.1	$1,886.7
Net Income Attributable to Air Products			
Net income from continuing operations	**$2,243.5**	$2,028.8	$1,901.0
Net income (loss) from discontinued operations	**12.6**	70.3	(14.3)
Net Income Attributable to Air Products	**$2,256.1**	$2,099.1	$1,886.7
Per Share Data*			
Basic EPS from continuing operations	**$10.11**	$9.16	$8.59
Basic EPS from discontinued operations	**0.06**	0.32	(0.06)
Basic EPS Attributable to Air Products	**$10.16**	$9.47	$8.53
Diluted EPS from continuing operations	**$10.08**	$9.12	$8.55
Diluted EPS from discontinued operations	**0.06**	0.32	(0.06)
Diluted EPS Attributable to Air Products	**$10.14**	$9.43	$8.49
Weighted Average Common Shares *(in millions)*			
Basic	**222.0**	221.6	221.2
Diluted	**222.5**	222.5	222.3

*Earnings per share ("EPS") is calculated independently for each component and may not sum to total EPS due to rounding.

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED COMPREHENSIVE INCOME STATEMENTS
For the Fiscal Years Ended 30 September

(Millions of U.S. Dollars)	**2022**	2021	2020
Net Income	**$2,266.5**	$2,114.9	$1,931.1
Other Comprehensive (Loss) Income, net of tax:			
Translation adjustments, net of tax of $71.2, $2.8, and ($29.4)	**(1,230.5)**	267.3	233.4
Net (loss) gain on derivatives, net of tax of ($63.9), ($9.0), and $23.7	**(120.3)**	3.3	43.5
Pension and postretirement benefits, net of tax of ($33.4), $91.4, and ($15.6)	**(112.2)**	274.3	(68.2)
Reclassification adjustments:			
Currency translation adjustment	**7.3**	—	—
Derivatives, net of tax of $30.3, $13.9, and ($17.7)	**91.4**	43.5	(57.7)
Pension and postretirement benefits, net of tax of $21.8, $24.4, and $27.1	**64.8**	74.6	82.5
Total Other Comprehensive (Loss) Income	**(1,299.5)**	663.0	233.5
Comprehensive Income	**967.0**	2,777.9	2,164.6
Net Income Attributable to Noncontrolling Interests	**10.4**	15.8	44.4
Other Comprehensive (Loss) Income Attributable to Noncontrolling Interests	**(29.3)**	38.8	(2.0)
Comprehensive Income Attributable to Air Products	**$985.9**	$2,723.3	$2,122.2

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED BALANCE SHEETS
As of the Fiscal Years Ended 30 September

(Millions of U.S. Dollars, except for share and per share data)	**2022**	2021
Assets		
Current Assets		
Cash and cash items	**$2,711.0**	$4,468.9
Short-term investments	**590.7**	1,331.9
Trade receivables, net	**1,794.4**	1,451.3
Inventories	**514.2**	453.9
Prepaid expenses	**156.8**	119.4
Other receivables and current assets	**515.8**	550.9
Total Current Assets	**6,282.9**	8,376.3
Investment in net assets of and advances to equity affiliates	**3,353.8**	1,649.3
Plant and equipment, net	**14,160.5**	13,254.6
Goodwill, net	**823.0**	911.5
Intangible assets, net	**347.5**	420.7
Noncurrent lease receivables	**583.1**	740.3
Other noncurrent assets	**1,641.8**	1,506.5
Total Noncurrent Assets	**20,909.7**	18,482.9
Total Assets	**$27,192.6**	$26,859.2
Liabilities and Equity		
Current Liabilities		
Payables and accrued liabilities	**$2,771.6**	$2,218.3
Accrued income taxes	**135.2**	93.9
Short-term borrowings	**10.7**	2.4
Current portion of long-term debt	**548.3**	484.5
Total Current Liabilities	**3,465.8**	2,799.1
Long-term debt	**6,433.8**	6,875.7
Long-term debt – related party	**652.0**	274.6
Other noncurrent liabilities	**1,691.2**	1,640.9
Deferred income taxes	**1,247.4**	1,180.9
Total Noncurrent Liabilities	**10,024.4**	9,972.1
Total Liabilities	**13,490.2**	12,771.2
Commitments and Contingencies - See Note 16		
Air Products Shareholders' Equity		
Common stock (par value $1 per share; issued 2022 and 2021 - 249,455,584 shares)	**249.4**	249.4
Capital in excess of par value	**1,141.4**	1,115.8
Retained earnings	**16,520.3**	15,678.3
Accumulated other comprehensive loss	**(2,786.1)**	(1,515.9)
Treasury stock, at cost (2022 - 27,616,888 shares; 2021 - 28,058,829 shares)	**(1,981.0)**	(1,987.9)
Total Air Products Shareholders' Equity	**13,144.0**	13,539.7
Noncontrolling Interests	**558.4**	548.3
Total Equity	**13,702.4**	14,088.0
Total Liabilities and Equity	**$27,192.6**	$26,859.2

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED STATEMENTS OF CASH FLOWS
For the Fiscal Years Ended 30 September

(Millions of U.S. Dollars)	**2022**	2021	2020
Operating Activities			
Net income	**$2,266.5**	$2,114.9	$1,931.1
Less: Net income attributable to noncontrolling interests of continuing operations	**10.4**	15.8	44.4
Net income attributable to Air Products	**2,256.1**	2,099.1	1,886.7
Net (income) loss from discontinued operations	**(12.6)**	(70.3)	14.3
Net income from continuing operations attributable to Air Products	**2,243.5**	2,028.8	1,901.0
Adjustments to reconcile income to cash provided by operating activities:			
Depreciation and amortization	**1,338.2**	1,321.3	1,185.0
Deferred income taxes	**32.3**	94.0	165.0
Facility closure	**—**	23.2	—
Business and asset actions	**73.7**	—	—
Undistributed earnings of equity method investments	**(214.7)**	(138.2)	(161.9)
Gain on sale of assets and investments	**(24.1)**	(37.2)	(45.8)
Share-based compensation	**48.4**	44.5	53.5
Noncurrent lease receivables	**94.0**	98.8	91.6
Other adjustments	**(304.9)**	(116.7)	116.4
Working capital changes that provided (used) cash, excluding effects of acquisitions:			
Trade receivables	**(475.2)**	(130.5)	43.2
Inventories	**(94.3)**	(47.2)	(5.2)
Other receivables	**(1.8)**	75.5	84.4
Payables and accrued liabilities	**532.5**	187.9	(31.9)
Other working capital	**(77.0)**	(69.0)	(130.6)
Cash Provided by Operating Activities	**3,170.6**	3,335.2	3,264.7
Investing Activities			
Additions to plant and equipment, including long-term deposits	**(2,926.5)**	(2,464.2)	(2,509.0)
Acquisitions, less cash acquired	**(65.1)**	(10.5)	(183.3)
Investment in and advances to unconsolidated affiliates	**(1,658.4)**	(76.0)	(24.4)
Proceeds from sale of assets and investments	**46.2**	37.5	80.3
Purchases of investments	**(1,637.8)**	(2,100.7)	(2,865.5)
Proceeds from investments	**2,377.4**	1,875.2	1,938.0
Other investing activities	**7.0**	5.8	3.9
Cash Used for Investing Activities	**(3,857.2)**	(2,732.9)	(3,560.0)
Financing Activities			
Long-term debt proceeds	**766.2**	178.9	4,895.8
Payments on long-term debt	**(400.0)**	(462.9)	(406.6)
Net increase (decrease) in commercial paper and short-term borrowings	**17.9**	1.0	(54.9)
Dividends paid to shareholders	**(1,383.3)**	(1,256.7)	(1,103.6)
Proceeds from stock option exercises	**19.3**	10.6	34.1
Investments by noncontrolling interests	**21.0**	136.6	17.1
Other financing activities	**(41.7)**	(28.4)	(97.2)
Cash Provided by (Used for) Financing Activities	**(1,000.6)**	(1,420.9)	3,284.7
Discontinued Operations			
Cash provided by operating activities	**59.6**	6.7	—
Cash provided by investing activities	**—**	—	—
Cash provided by financing activities	**—**	—	—
Cash Provided by Discontinued Operations	**59.6**	6.7	—
Effect of Exchange Rate Changes on Cash	**(130.3)**	27.8	14.9
Increase (Decrease) in cash and cash items	**(1,757.9)**	(784.1)	3,004.3
Cash and Cash items – Beginning of Year	**4,468.9**	5,253.0	2,248.7
Cash and Cash Items – End of Period	**$2,711.0**	$4,468.9	$5,253.0

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
CONSOLIDATED STATEMENTS OF EQUITY
For the Fiscal Years Ended 30 September

(Millions of U.S. Dollars, except for per share data)	Common Stock	Capital in Excess of Par Value	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Treasury Stock	Air Products Shareholders' Equity	Non-controlling Interests	Total Equity
Balance as of 30 September 2019	**$249.4**	**$1,070.9**	**$14,138.4**	**($2,375.6)**	**($2,029.5)**	**$11,053.6**	**$334.7**	**$11,388.3**
Net income	—	—	1,886.7	—	—	1,886.7	44.4	1,931.1
Other comprehensive income (loss)	—	—	—	235.5	—	235.5	(2.0)	233.5
Dividends on common stock (per share $5.18)	—	—	(1,144.1)	—	—	(1,144.1)	—	(1,144.1)
Dividends to noncontrolling interests	—	—	—	—	—	—	(31.8)	(31.8)
Share-based compensation	—	44.2	—	—	—	44.2	—	44.2
Issuance of treasury shares for stock option and award plans	—	(14.1)	—	—	29.5	15.4	—	15.4
Investments by noncontrolling interest	—	—	—	—	—	—	17.1	17.1
Other equity transactions	—	(6.2)	(5.3)	—	—	(11.5)	0.9	(10.6)
Balance as of 30 September 2020	**$249.4**	**$1,094.8**	**$14,875.7**	**($2,140.1)**	**($2,000.0)**	**$12,079.8**	**$363.3**	**$12,443.1**
Net income	—	—	2,099.1	—	—	2,099.1	15.8	2,114.9
Other comprehensive income (loss)	—	—	—	624.2	—	624.2	38.8	663.0
Dividends on common stock (per share $5.84)	—	—	(1,292.6)	—	—	(1,292.6)	—	(1,292.6)
Dividends to noncontrolling interests	—	—	—	—	—	—	(5.3)	(5.3)
Share-based compensation	—	43.5	—	—	—	43.5	—	43.5
Issuance of treasury shares for stock option and award plans	—	(21.5)	—	—	12.1	(9.4)	—	(9.4)
Investments by noncontrolling interests	—	—	—	—	—	—	139.8	139.8
Purchase of noncontrolling interests	—	(1.2)	—	—	—	(1.2)	(4.1)	(5.3)
Other equity transactions	—	0.2	(3.9)	—	—	(3.7)	—	(3.7)
Balance as of 30 September 2021	**$249.4**	**$1,115.8**	**$15,678.3**	**($1,515.9)**	**($1,987.9)**	**$13,539.7**	**$548.3**	**$14,088.0**
Net income	—	—	2,256.1	—	—	2,256.1	10.4	2,266.5
Other comprehensive income (loss)	—	—	—	(1,270.2)	—	(1,270.2)	(29.3)	(1,299.5)
Dividends on common stock (per share $6.36)	—	—	(1,410.6)	—	—	(1,410.6)	—	(1,410.6)
Dividends to noncontrolling interests	—	—	—	—	—	—	(4.8)	(4.8)
Share-based compensation	—	46.0	—	—	—	46.0	—	46.0
Issuance of treasury shares for stock option and award plans	—	(20.9)	—	—	6.9	(14.0)	—	(14.0)
Investments by noncontrolling interests	—	—	—	—	—	—	33.0	33.0
Purchase of noncontrolling interests	—	—	—	—	—	—	(1.9)	(1.9)
Other equity transactions	—	0.5	(3.5)	—	—	(3.0)	2.7	(0.3)
Balance as of 30 September 2022	**$249.4**	**$1,141.4**	**$16,520.3**	**($2,786.1)**	**($1,981.0)**	**$13,144.0**	**$558.4**	**$13,702.4**

The accompanying notes are an integral part of these statements.

Air Products and Chemicals, Inc. and Subsidiaries
NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS
(Millions of U.S. Dollars unless otherwise indicated, except for share and per share data)

1. BASIS OF PRESENTATION AND MAJOR ACCOUNTING POLICIES

About Air Products

Air Products, a Delaware corporation originally founded in 1940, is a world-leading industrial gases company. Focused on energy, environmental, and emerging markets, Air Products' core business provides a unique portfolio of products, services, and solutions that include atmospheric gases, process and specialty gases, equipment, and related services to customers in dozens of industries. Air Products also develops, engineers, builds, owns, and operates some of the world's largest industrial gas and carbon-capture projects, supplying world-scale clean hydrogen for global transportation, industrial markets, and the broader energy transition. Air Products trades on the New York Stock Exchange under the symbol "APD."

Air Products manages and reports its operating results through five reportable segments: Americas, Asia, Europe, Middle East and India, and Corporate and other. Refer to Note 23, *Business Segment and Geographic Information*, for additional information.

As used in this report, unless the context indicates otherwise, the terms “we,” “our,” “us,” the “Company,” "Air Products," or “registrant” include our controlled subsidiaries and affiliates.

Basis of Presentation

The accompanying consolidated financial statements were prepared in accordance with accounting principles generally accepted in the United States of America (“GAAP”) and include the accounts of Air Products and Chemicals, Inc. and those of its controlled subsidiaries. The notes that follow are an integral part of our consolidated financial statements. These notes, unless otherwise indicated, are presented on a continuing operations basis. Intercompany transactions and balances are eliminated in consolidation.

Discontinued Operations

The results of operations and cash flows for our discontinued operations have been segregated from the results of continuing operations and segment results. The comprehensive income related to discontinued operations has not been segregated and is included in the consolidated comprehensive income statements. There were no assets and liabilities presented as discontinued operations on the consolidated balance sheets. Refer to Note 5, *Discontinued Operations*, for additional information.

Estimates and Assumptions

Preparation of the consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect amounts reported in the consolidated financial statements and the accompanying notes. Actual results could differ from those estimates.

Risks and Uncertainties

We are subject to various risks and uncertainties, including, but not limited to, those resulting from the COVID-19 pandemic as well as from increased inflationary pressures and Russia's invasion of Ukraine. Due to the dynamic nature of these circumstances, uncertainty remains regarding how these events may affect our business, results of operations, and overall financial performance in future periods. For example, future events could impact our ability to complete a suspended project in Ukraine and recover the carrying value of related assets, which totaled approximately $45 within "Plant and equipment, net" on our consolidated balance sheet as of 30 September 2022.

Reclassifications

Prior year segment information has been reclassified to conform to the fiscal year 2022 presentation, which reflects the reorganization of our reporting segments effective 1 October 2021.

Consolidation Principles

We consolidate all entities we control under either the voting interest model, which generally applies when we hold a majority of the voting interest of an entity, or the variable interest model, which applies to arrangements for which we are the primary beneficiary of a variable interest entity ("VIE"). For consolidated subsidiaries in which our ownership is less than 100%, the outside shareholders’ interests are reflected as non-controlling interests on our consolidated financial statements.

We are considered the primary beneficiary of a VIE when we have both the power to direct the activities that most significantly impact the economic performance of the VIE and the obligation to absorb losses or the right to receive benefits that could potentially be significant to the VIE. During the third quarter of fiscal year 2022, we determined that we are the primary beneficiary of the NEOM Green Hydrogen Company and consolidated the joint venture within our Middle East and India segment. For additional information, refer to Note 22, *Supplemental Information*. We are not the primary beneficiary of any other material VIEs.

We account for a VIE for which we exercise significant influence but are not the primary beneficiary, such as the Jazan Integrated Gasification and Power Company joint venture, as an equity method investment. For additional information on this joint venture, refer to Note 7, *Equity Affiliates*.

Revenue Recognition

We recognize revenue when or as performance obligations are satisfied, which occurs when control is transferred to the customer.

We determine the transaction price of our contracts based on the amount of consideration to which we expect to be entitled to receive in exchange for the goods or services provided. Our contracts within the scope of revenue guidance do not contain payment terms that include a significant financing component.

Sales returns and allowances are not a business practice in the industry.

Our sale of gas contracts are either accounted for over time during the period in which we deliver or make available the agreed upon quantity of goods or at a point in time when the customer receives and obtains control of the product, which generally occurs upon delivery. We generally recognize revenue from our sale of gas contracts based on the right to invoice practical expedient.

Our sale of equipment contracts are generally comprised of a single performance obligation as the individual promised goods or services contained within the contracts are integrated with or dependent upon other goods or services in the contract for a single output to the customer. Revenue from our sale of equipment contracts is generally recognized over time as we have an enforceable right to payment for performance completed to date and our performance under the contract terms does not create an asset with alternative use. We recognize these contracts using a cost incurred input method by which costs incurred to date relative to total estimated costs at completion are used to measure progress toward satisfying performance obligations.

Amounts billed for shipping and handling fees are classified as sales in the consolidated income statements. Shipping and handling activities for our sale of equipment contracts may be performed after the customer obtains control of the promised goods. In these cases, we have elected to apply the practical expedient to account for shipping and handling as activities to fulfill the promise to transfer the goods.

Amounts billed for sales and use taxes, value-added taxes, and certain excise and other specific transactional taxes imposed on revenue-producing transactions are presented on a net basis and excluded from sales in the consolidated income statements.

For additional information, refer to Note 4, *Revenue Recognition*.

Cost of Sales

Cost of sales predominantly represents the cost of tangible products sold. These costs include labor, raw materials, plant engineering, power, depreciation, production supplies and materials packaging costs, and maintenance costs. Costs incurred for shipping and handling are also included in cost of sales.

Depreciation

Depreciation is recorded using the straight-line method, which deducts equal amounts of the cost of each asset from earnings every year over its expected economic useful life. The principal lives for major classes of plant and equipment are summarized in Note 8, *Plant and Equipment, net*.

Selling and Administrative

The principal components of selling and administrative expenses are compensation, advertising, and promotional costs.

Postemployment Benefits

We provide termination benefits to employees as part of ongoing benefit arrangements and record a liability for termination benefits when probable and estimable. These criteria are met when management, with the appropriate level of authority, approves and commits to its plan of action for termination; the plan identifies the employees to be terminated and their related benefits; and the plan is to be completed within one year. We do not provide material one-time benefit arrangements.

Fair Value Measurements

We are required to measure certain assets and liabilities at fair value, either upon initial measurement or for subsequent accounting or reporting. For example, fair value is used in the initial measurement of assets and liabilities acquired in a business combination; on a recurring basis in the measurement of derivative financial instruments; and on a nonrecurring basis when long-lived assets are written down to fair value when held for sale or determined to be impaired. Refer to Note 13, *Fair Value Measurements*, and Note 15, *Retirement Benefits*, for information on the methods and assumptions used in our fair value measurements.

Financial Instruments

We address certain financial exposures through a controlled program of risk management that includes the use of derivative financial instruments. The types of derivative financial instruments permitted for such risk management programs are specified in policies set by management. Refer to Note 12, *Financial Instruments*, for further detail on the types and use of derivative instruments into which we enter.

Major financial institutions are counterparties to all of these derivative contracts. We have established counterparty credit guidelines and generally enter into transactions with financial institutions of investment grade or better. Management believes the risk of incurring losses related to credit risk is remote, and any losses would be immaterial to the consolidated financial results, financial condition, or liquidity.

We recognize derivatives on the balance sheet at fair value. On the date the derivative instrument is entered into, we generally designate the derivative as either (1) a hedge of a forecasted transaction or of the variability of cash flows to be received or paid related to a recognized asset or liability (cash flow hedge), (2) a hedge of a net investment in a foreign operation (net investment hedge), or (3) a hedge of the fair value of a recognized asset or liability (fair value hedge).

The following details the accounting treatment of our cash flow, fair value, net investment, and non-designated hedges:

- Changes in the fair value of a derivative that is designated as and meets the cash flow hedge criteria are recorded in accumulated other comprehensive loss ("AOCL") to the extent effective and then recognized in earnings when the hedged items affect earnings.
- Changes in the fair value of a derivative that is designated as and meets all the required criteria for a fair value hedge, along with the gain or loss on the hedged asset or liability that is attributable to the hedged risk, are recorded in current period earnings.
- Changes in the fair value of a derivative and foreign currency debt that are designated as and meet all the required criteria for a hedge of a net investment are recorded as translation adjustments in AOCL.
- Changes in the fair value of a derivative that is not designated as a hedge are recorded immediately in earnings.

We formally document the relationships between hedging instruments and hedged items, as well as our risk management objective and strategy for undertaking various hedge transactions. This process includes relating derivatives that are designated as fair value or cash flow hedges to specific assets and liabilities on the balance sheet or to specific firm commitments or forecasted transactions. We also formally assess, at the inception of the hedge and on an ongoing basis, whether derivatives are highly effective in offsetting changes in fair values or cash flows of the hedged item. If it is determined that a derivative is not highly effective as a hedge, or if a derivative ceases to be a highly effective hedge, we will discontinue hedge accounting with respect to that derivative prospectively.

Foreign Currency

Since we do business in many foreign countries, fluctuations in currency exchange rates affect our financial position and results of operations.

In most of our foreign operations, the local currency is considered the functional currency. Foreign subsidiaries translate their assets and liabilities into U.S. dollars at current exchange rates in effect as of the balance sheet date. The gains or losses that result from this process are shown as translation adjustments in AOCL in the equity section of the balance sheet.

The revenue and expense accounts of foreign subsidiaries are translated into U.S. dollars at the average exchange rates that prevail during the period. Therefore, the U.S. dollar value of these items on the consolidated income statements fluctuates from period to period, depending on the value of the U.S. dollar against foreign currencies. Some transactions are made in currencies different from an entity's functional currency. Gains and losses from these foreign currency transactions, and the impact of related hedges, are generally reflected in "Other income (expense), net" on our consolidated income statements as they occur and were not material for the periods presented.

Foreign exchange gains and losses from the foreign currency remeasurement of balances associated with intercompany and third-party financing transactions, related income tax assets and liabilities, and the impact of related hedges are reflected within "Other non-operating income (expense), net" and were not material for the periods presented.

In addition, foreign currency forward points and currency swap basis differences that are excluded from the assessment of hedge effectiveness of our cash flow hedges of intercompany loans ("excluded components") are recorded within "Other non-operating income (expense), net" on a straight-line basis. Excluded components were expenses of $23.2, $31.0, and $33.5 in fiscal years 2022, 2021, and 2020, respectively.

Environmental Expenditures

Accruals for environmental loss contingencies are recorded when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. Remediation costs are capitalized if the costs improve our property as compared with the condition of the property when originally constructed or acquired, or if the costs prevent environmental contamination from future operations. We expense environmental costs related to existing conditions resulting from past or current operations and from which no current or future benefit is discernible. The amounts charged to income from continuing operations related to environmental matters totaled $22.3, $18.6, and $18.3 in fiscal years 2022, 2021, and 2020, respectively. In addition, we recorded a pre-tax expense of $19.0 in results from discontinued operations to increase our environmental accrual for the Pace facility in the second quarter of fiscal year 2020. Refer to the Pace discussion within Note 16, *Commitments and Contingencies*, for additional information.

The measurement of environmental liabilities is based on an evaluation of currently available information with respect to each individual site and considers factors such as existing technology, presently enacted laws and regulations, and prior experience in remediation of contaminated sites. An environmental liability related to cleanup of a contaminated site might include, for example, a provision for one or more of the following types of costs: site investigation and testing costs, remediation costs, post-remediation monitoring costs, natural resource damages, and outside legal fees. These liabilities include costs related to other potentially responsible parties to the extent that we have reason to believe such parties will not fully pay their proportionate share. They do not consider any claims for recoveries from insurance or other parties and are not discounted.

As assessments and remediation progress at individual sites, the amount of projected cost is reviewed and the liability is adjusted to reflect additional technical and legal information that becomes available. Management has an established process in place to identify and monitor our environmental exposures. An environmental accrual analysis is prepared and maintained that lists all environmental loss contingencies, even where an accrual has not been established. This analysis assists in monitoring our overall environmental exposure and serves as a tool to facilitate ongoing communication among our technical experts, environmental managers, environmental lawyers, and financial management to ensure that required accruals are recorded and potential exposures disclosed.

Given inherent uncertainties in evaluating environmental exposures, actual costs to be incurred at identified sites in future periods may vary from the estimates. Refer to Note 16, *Commitments and Contingencies*, for additional information on our environmental loss contingencies.

The accruals for environmental liabilities are reflected in the consolidated balance sheets, primarily as part of other noncurrent liabilities.

Litigation

In the normal course of business, we are involved in legal proceedings. We accrue a liability for such matters when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. When only a range of possible loss can be established, the most probable amount in the range is accrued. If no amount within this range is a better estimate than any other amount within the range, the minimum amount in the range is accrued. The accrual for a litigation loss contingency includes estimates of potential damages and other directly related costs expected to be incurred. Refer to Note 16, *Commitments and Contingencies*, for additional information on our current legal proceedings.

Share-Based Compensation

We expense the grant-date fair value of our share-based awards over the vesting period during which employees perform related services. Expense recognition is accelerated for retirement-eligible individuals who would meet the requirements for vesting of awards upon their retirement. Refer to Note 18, *Share-Based Compensation*, for additional information regarding our awards, including the models and assumptions used to determine their grant-date fair value.

Income Taxes

We account for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the tax effects of temporary differences between the financial reporting and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to be recovered or settled. A principal temporary difference results from the excess of tax depreciation over book depreciation because accelerated methods of depreciation and shorter useful lives are used for income tax purposes. The cumulative impact of a change in tax rates or regulations is included in income tax expense in the period that includes the enactment date. We recognize deferred tax assets net of existing valuation allowances to the extent we believe that these assets are more likely than not to be realized considering all available evidence.

A tax benefit for an uncertain tax position is recognized when it is more likely than not that the position will be sustained upon examination based on its technical merits. This position is measured as the largest amount of tax benefit that is greater than 50% likely of being realized. Interest and penalties related to unrecognized tax benefits are recognized as a component of income tax expense. For additional information regarding our income taxes, refer to Note 21, *Income Taxes*.

Other Non-Operating Income (Expense), net

"Other non-operating income (expense), net" includes interest income associated with our cash and cash items and short-term investments, certain foreign currency remeasurements and impacts from the related hedging activities discussed in the *Foreign Currency* section above, and non-service cost components of net periodic pension and postretirement benefit cost. Our non-service costs primarily include interest cost, expected return on plan assets, amortization of actuarial gains and losses, and settlements.

Cash and Cash Items

"Cash and cash items" include cash, time deposits, and treasury securities acquired with an original maturity of three months or less.

Short-term Investments

"Short-term investments" include time deposits and treasury securities with original maturities greater than three months and less than one year.

Credit Losses

We are exposed to credit losses through sales of products and services. When extending credit, we evaluate customer creditworthiness based on a combination of qualitative and quantitative factors that include, but are not limited to, the customer's credit score from external providers, financial condition, and past payment experience.

We assess allowances for credit losses on our trade receivables, lease receivable, and notes receivable portfolios. Allowances are evaluated by portfolio on a collective basis where similar characteristics exist. A provision for customer defaults is made on a general formula basis as the risk of some default is expected but cannot yet be associated with specific customers. The assessment of the likelihood of default is based on various factors, including the length of time the receivables are past due, historical experience, existing economic conditions, and forward-looking information. When we identify specific customers with known collectability issues, the assessment for credit losses is performed on an individual basis, considering current and forward-looking information of the customer.

The use of forward-looking information considers economic conditions that may affect the customers' ability to pay. Although we historically have not experienced significant credit losses, our exposure to credit losses may increase if our customers are adversely affected by economic pressures or uncertainty associated with local or global economic recessions, disruption associated with the ongoing COVID-19 pandemic, or other customer-specific factors. We review our reserves for credit losses on a quarterly basis.

Trade receivables comprise amounts owed to us through our operating activities and are presented net of allowances for credit losses. Changes to the carrying amount of the allowance for credit losses on trade receivables are summarized below:

Balance at 30 September 2019	$24.8
Provision for credit losses	7.7
Write-offs charged against the allowance	(8.3)
Currency translation and other	(0.3)
Balance at 30 September 2020	$23.9
Adoption of new credit losses standard	0.5
Provision for credit losses	2.7
Write-offs charged against the allowance	(3.8)
Currency translation and other	1.8
Balance at 30 September 2021	$25.1
Provision for credit losses	7.5
Write-offs charged against the allowance	(7.9)
Currency translation and other	(0.6)
Balance at 30 September 2022	**$24.1**

In addition, our lease receivables and notes receivable are presented net of allowances for credit losses. As of 30 September 2022 and 2021, the credit quality of lease receivables and notes receivable did not require a material allowance for credit losses. For additional information on our lease arrangements, refer to Note 11, *Leases*.

Inventories

We carry inventory that is comprised of finished goods, work-in-process, raw materials and supplies. Refer to Note 6, *Inventories*, for further detail.

Inventories on our consolidated balance sheets are stated at the lower of cost or net realizable value. We determine the cost of all our inventories on a first-in, first-out basis ("FIFO"). We write down our inventories for estimated obsolescence or unmarketable inventory based upon assumptions about future demand and market conditions.

Equity Method Investments

We apply the equity method of accounting when we have the ability to exercise significant influence but do not control the operating and financial decisions of an investee, which generally applies when our ownership interest in common stock or in-substance common stock of the investee is between 20% and 50%. Under the equity method, we initially record our investment at cost and subsequently adjust the investment to recognize our share of net earnings or losses, distributions received, and other-than-temporary impairments. The carrying value of our equity method investments is reflected as "Investment in net assets of and advances to equity affiliates" on our consolidated balance sheets. We use the cumulative earnings approach for determining cash flow presentation of cash distributions received from equity method investees. Equity investments are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment may not be recoverable.

Our share of the investee's net earnings is primarily presented net of income taxes within “Equity affiliates’ income" on our consolidated income statements. Profits or losses related to intra-entity sales with our equity method investees are eliminated consistent with our ownership percentage in the entity until realized by the investee through a transaction with a third party. In addition, “Equity affiliates’ income” includes interest income from shareholder loans viewed as in-substance common stock.

Plant and Equipment, net

Plant and equipment, net is stated at cost less accumulated depreciation. Construction costs, labor, and applicable overhead related to installations are capitalized. Expenditures for additions and improvements that extend the lives or increase the capacity of plant assets are capitalized. The costs of maintenance and repairs of plant and equipment are expensed as incurred.

Fully depreciated assets are retained in the gross plant and equipment and accumulated depreciation accounts until they are removed from service. In the case of disposals, assets and related accumulated depreciation are removed from the accounts, and the net amounts, less proceeds from disposal, are included in income. Refer to Note 8, *Plant and Equipment, net*, for further detail.

Computer Software

We capitalize costs incurred to purchase or develop software for internal use. Capitalized costs include purchased computer software packages, payments to vendors/consultants for development and implementation or modification to a purchased package to meet our requirements, payroll and related costs for employees directly involved in development, and interest incurred while software is being developed. Capitalized costs are reflected in "Plant and equipment, net" on the consolidated balance sheets and are depreciated over the estimated useful life of the software, generally a period of three to five years.

We capitalize costs incurred with the implementation of a cloud computing arrangement that is a service contract, consistent with our policy for software developed or obtained for internal use. However, the capitalized costs are reflected in "Other noncurrent assets" on our consolidated balance sheets and expensed over the term of the related hosting arrangement.

Capitalized Interest

As we build new plant and equipment, we include in the cost of these assets a portion of the interest payments we make during the year. The amount of capitalized interest was $41.0, $28.3, and $15.9 in fiscal years 2022, 2021, and 2020, respectively.

Leases

As lessee, we recognize a right-of-use ("ROU") asset and lease liability on the balance sheet for all leases with a term in excess of 12 months. We determine if an arrangement contains a lease at inception. The arrangement contains a lease when there is an identifiable asset, we obtain substantially all of the economic benefits from that asset, and we direct how and for what purpose the asset is used during the term of the arrangement. If the initial term of an arrangement is 12 months or less, we have made an accounting election to not assess if these arrangements contain a lease for inclusion on our balance sheet.

ROU assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. ROU assets and lease liabilities are recognized at the commencement date based on the present value of lease payments over the lease term. Since our leases generally do not provide an implicit discount rate, we use our incremental borrowing rates based on the information available at the commencement date in determining the present value of lease payments. To determine the incremental borrowing rate, we consider our unsecured borrowings and published market rates, and then adjust those rates to assume full collateralization and to factor in the individual lease term, geography, and payment structure.

Our lease term includes periods covered by options to extend or terminate the lease when it is reasonably certain that we will exercise an option to extend or not exercise an option to terminate. Lease payments consider our practical expedient to combine amounts for lease and related non-lease components for all classes of underlying assets in which we are lessee. Fixed payments and payments associated with escalation clauses based on an index are included in the ROU asset and lease liability at commencement. Variable lease payments are excluded from the ROU assets and lease liabilities and are recognized in the period in which the obligation for those payments is incurred. Our variable lease payments primarily include the impact from escalation clauses that are not fixed or based on an index. Prepaid lease payments are included in the recognition of ROU assets. Our lease agreements do not contain any material lease incentives, residual value guarantees or restrictions or covenants.

Impairment of Long-Lived Assets

Long-lived assets are grouped for impairment testing at the lowest level for which there are identifiable cash flows that are largely independent of the cash flows of other assets and liabilities and are evaluated for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset group may not be recoverable. We assess recoverability by comparing the carrying amount of the asset group to estimated undiscounted future cash flows expected to be generated by the asset group. If an asset group is considered impaired, the impairment loss to be recognized is measured as the amount by which the asset group’s carrying amount exceeds its fair value. Long-lived assets meeting the held for sale criteria are reported at the lower of carrying amount or fair value less cost to sell.

Asset Retirement Obligations

The fair value of a liability for an asset retirement obligation is recognized in the period in which it is incurred. The fair value of the liability is measured using discounted estimated cash flows and is adjusted to its present value in subsequent periods as accretion expense is recorded. The corresponding asset retirement costs are capitalized as part of the carrying amount of the related long-lived asset and depreciated over the asset’s useful life. Our asset retirement obligations are primarily associated with on-site long-term supply contracts under which we have built a facility on land owned by the customer and are obligated to remove the facility at the end of the contract term. Our asset retirement obligations totaled $274.7 and $269.6 at 30 September 2022 and 2021, respectively. Refer to Note 16, *Commitments and Contingencies*, for further detail.

Goodwill

Business combinations are accounted for using the acquisition method. The purchase price is allocated to the assets acquired and liabilities assumed based on their estimated fair values. Any excess purchase price (plus the fair value of any noncontrolling interest and previously held equity interest in the acquiree) over the fair market value of the net assets acquired, including identified intangibles, is recorded as goodwill. Preliminary purchase price allocations are made at the date of acquisition and finalized when information about facts and circumstances that existed as of the acquisition date needed to finalize underlying estimates is obtained or when we determine that such information is not obtainable, within a maximum measurement period of one year.

Goodwill is subject to impairment testing at least annually. In addition, goodwill is tested more frequently if a change in circumstances or the occurrence of events indicates that potential impairment exists. Refer to Note 9, *Goodwill*, for further detail.

Intangible Assets

Intangible assets with determinable lives primarily consist of customer relationships, purchased patents and technology, and certain land use rights. The cost of intangible assets with determinable lives is amortized on a straight-line basis over the estimated period of economic benefit. No residual value is estimated for these intangible assets. Indefinite-lived intangible assets consist of trade names and trademarks. Indefinite-lived intangibles are subject to impairment testing at least annually. In addition, intangible assets are tested more frequently if a change in circumstances or the occurrence of events indicates that potential impairment exists.

Customer relationships are generally amortized over periods of five to 25 years. Purchased patents and technology and other finite-lived intangibles are generally amortized over periods of five to 15 years. Other intangibles includes certain land use rights, which are generally amortized over a period of 50 years. Amortizable lives are adjusted whenever there is a change in the estimated period of economic benefit. Refer to Note 10, *Intangible Assets*, for further detail.

Retirement Benefits

Our retirement benefit plans are discussed in Note 15, *Retirement Benefits*. The cost of benefits we contribute to defined contribution plans is recognized in the year earned. The cost of benefits under our defined benefit and other post-retirement plans is generally recognized over the employees' service period. We use actuarial methods and assumptions in the valuation of defined benefit obligations and the determination of expense. Differences between actual and expected results or changes in the value of obligations and plan assets are recognized systematically over subsequent periods.

2. NEW ACCOUNTING GUIDANCE

New Accounting Guidance to be Implemented

Government Assistance

In November 2021, the Financial Accounting Standards Board ("FASB") issued disclosure guidance to increase the transparency of transactions an entity has with a government that are accounted for by applying a grant or contribution accounting model. We are evaluating the impact this guidance will have on our annual disclosures within the consolidated financial statements. We will adopt this guidance prospectively in fiscal year 2023.

Acquired Revenue Contracts in a Business Combination

In October 2021, the FASB issued an update for the recognition of contract assets and liabilities acquired in a business combination. Rather than recognizing such items at fair value on the acquisition date, the acquirer would measure and recognize contract assets and liabilities in accordance with ASC 606, *Revenue from Contracts with Customers*, as if it had originated the contract. This guidance is effective beginning in fiscal year 2024, with early adoption permitted. The impact of the new standard on our consolidated financial statements and related disclosures will depend on future acquisitions.

Reference Rate Reform

In March 2020, the FASB issued an update to provide practical expedients and exceptions for applying GAAP to contracts, hedging relationships and other transactions affected by reference rate reform if certain criteria are met. This update is primarily applicable to our contracts and hedging relationships that reference the London Inter-Bank Offered Rate ("LIBOR"). The amendments may be applied to impacted contracts and hedges through 31 December 2022. We have had no reference rate reform modifications to date. This update will be adopted on a prospective basis in the event of any such modifications.

3. ACQUISITIONS

Fiscal Year 2021

Gain on Exchange With Joint Venture Partner

We previously held a 50% ownership interest in Tyczka Industrie-Gases GmbH ("TIG"), a joint venture in Germany with the Tyczka Group that was primarily a merchant gases business. We accounted for this arrangement as an equity method investment in our former Industrial Gases – EMEA segment.

Effective 23 February 2021 (the "acquisition date"), TIG was separated into two businesses, one of which we acquired on a 100% basis. Our partner paid us $10.8 to acquire the other business. The exchange resulted in a gain of $36.8 ($27.3 after-tax), which is reflected as “Gain on exchange with joint venture partner” on our consolidated income statements for the fiscal year ended 30 September 2021. The gain included $12.7 from the revaluation of our previously held equity interest in the portion of the business that we retained and $24.1 from the sale of our equity interest in the remaining business. The gain was not recorded in segment results.

We estimated an acquisition date fair value of $15.4 for our previously held equity interest in the acquired portion of the business using a market approach, which considered historical earnings and the application of a market-based multiple derived from comparable transactions.

We accounted for the acquisition as a business combination. The results of this business are consolidated within our Europe segment.

Fiscal Year 2020

Asset Acquisition

On 17 April 2020, we acquired five operating hydrogen production plants from PBF Energy Inc. ("PBF") and commenced contractual long-term supply of hydrogen from those plants to PBF's refineries. We accounted for the transaction as an asset acquisition in the Americas segment. The aggregate purchase price of $580 is reflected in "Additions to plant and equipment, including long-term deposits" on our consolidated statement of cash flows for the fiscal year ended 30 September 2020.

Business Combinations

We completed three acquisitions on 1 July 2020 that were accounted for as business combinations. These acquisitions had an aggregate purchase price, net of cash acquired, of $185.4. The largest of these acquisitions was the purchase of Oxygen & Argon Works Ltd., the leading manufacturer and marketer of industrial gases in Israel, primarily offering merchant gas products. The results of this business are consolidated within our Europe segment.

4. REVENUE RECOGNITION

Nature of Goods and Services

The principal activities from which we generate sales from our contracts with customers are described below with their respective revenue recognition policies. For an overall summary of these policies and discussion on payment terms and presentation, refer to Note 1, *Basis of Presentation and Major Accounting Policies*.

Regional Industrial Gases

Our regional industrial gases businesses produce and sell atmospheric gases such as oxygen, nitrogen, and argon (primarily recovered by the cryogenic distillation of air) and process gases such as hydrogen, helium, carbon dioxide, carbon monoxide, syngas, and specialty gases. We distribute gases to our sale of gas customers through different supply modes depending on various factors including the customer's volume requirements and location. Our supply modes are as follows:

- *On-site Gases*—Supply mode associated with customers who require large volumes of gases and have relatively constant demand. Gases are produced and supplied by large facilities on or near the customers' facilities or by pipeline systems from centrally located production facilities. These sale of gas contracts generally have 15- to 20-year terms. We also deliver smaller quantities of product through small on-site plants (cryogenic or non-cryogenic generators), typically via 10- to 15-year sale of gas contracts. The contracts within this supply mode generally contain fixed monthly charges and/or minimum purchase requirements with price escalation provisions that are generally based on external indices. Revenue associated with this supply mode is generally recognized over time during the period in which we deliver or make available the agreed upon quantity of goods.

- *Merchant Gases*—Supply mode associated with liquid bulk and packaged gases customers. Liquid bulk customers receive delivery of product in liquid or gaseous form by tanker or tube trailer. The product is stored, usually in its liquid state, in equipment we typically design and install at the customer's site for vaporizing into a gaseous state as needed. Packaged gases customers receive small quantities of product delivered in either cylinders or dewars. Both liquid bulk and packaged gases sales do not contain minimum purchase requirements as they are governed by contracts and/or purchase orders that are based on the customer's requirements. These contracts contain stated terms that are generally five years or less. Performance obligations associated with this supply mode are satisfied at a point in time when the customer receives and obtains control of the product, which generally occurs upon delivery.

The timing of revenue recognition for our regional industrial gases businesses is generally consistent with our right to invoice the customer. Variable components of consideration that may not be resolved within the month, such as the ability to earn an annual bonus or incur a penalty, are more relevant to on-site contracts and are considered constrained as they can be impacted by a single significant event such as a plant outage, which could occur at the end of a contract period. We consider contract modifications on an individual basis to determine appropriate accounting treatment. However, contract modifications are generally accounted for prospectively as they relate to distinct goods or services associated with future periods of performance.

We mitigate energy and natural gas price risk contractually through pricing formulas, surcharges, and cost pass-through arrangements.

Equipment

We design and manufacture equipment for air separation, hydrocarbon recovery and purification, natural gas liquefaction, and liquid helium and liquid hydrogen transport and storage. The Corporate and other segment serves our sale of equipment customers.

Our sale of equipment contracts are generally comprised of a single performance obligation as the individual promised goods or services contained within the contracts are integrated with or dependent upon other goods or services in the contract for a single output to the customer. Revenue from our sale of equipment contracts is generally recognized over time as we have an enforceable right to payment for performance completed to date and our performance under the contract terms does not create an asset with alternative use. Otherwise, sale of equipment contracts are satisfied at the point in time the customer obtains control of the equipment, which is generally determined based on the shipping terms of the contract. For contracts recognized over time, we primarily recognize revenue using a cost incurred input method by which costs incurred to date relative to total estimated costs at completion are used to measure progress toward satisfying performance obligations. Costs incurred include those for materials, labor, and overhead and represent work contributing and proportionate to the transfer of control to the customer.

Since our contracts are generally comprised of a single performance obligation, contract modifications are typically accounted for as part of the existing contract and are recognized as a cumulative adjustment for the inception-to-date effect of such change. In addition, changes in estimates on projects accounted for under the cost incurred input method are recognized as a cumulative adjustment for the inception-to-date effect of such change. We recorded changes to project estimates that unfavorably impacted operating income by approximately $30 and $19 in fiscal years 2022 and 2021, respectively. Changes in estimates favorably impacted operating income by approximately $7 in fiscal year 2020. Our changes in estimates would not have significantly impacted amounts recorded in prior years.

Disaggregation of Revenue

The table below presents our consolidated sales disaggregated by supply mode for each of our reporting segments. We believe this presentation best depicts the nature, timing, type of customer, and contract terms for our sales.

	Americas	Asia	Europe	Middle East and India	Corporate and other	Total	%
2022							
On-site	$3,423.1	$1,833.9	$1,298.2	$77.9	$—	$6,633.1	52%
Merchant	1,945.8	1,309.4	1,787.9	51.6	—	5,094.7	40%
Sale of equipment	—	—	—	—	970.8	970.8	8%
Total	**$5,368.9**	**$3,143.3**	**$3,086.1**	**$129.5**	**$970.8**	**$12,698.6**	**100%**
2021							
On-site	$2,469.5	$1,718.8	$802.4	$70.7	$—	$5,061.4	49%
Merchant	1,698.1	1,202.0	1,543.2	28.6	—	4,471.9	43%
Sale of equipment	—	—	—	—	789.7	789.7	8%
Total	**$4,167.6**	**$2,920.8**	**$2,345.6**	**$99.3**	**$789.7**	**$10,323.0**	**100%**
2020							
On-site	$2,040.2	$1,652.8	$574.6	$54.7	$—	$4,322.3	49%
Merchant	1,590.5	1,063.7	1,272.4	24.6	—	3,951.2	45%
Sale of equipment	—	—	—	—	582.8	582.8	6%
Total	**$3,630.7**	**$2,716.5**	**$1,847.0**	**$79.3**	**$582.8**	**$8,856.3**	**100%**

Remaining Performance Obligations

As of 30 September 2022, the transaction price allocated to remaining performance obligations is estimated to be approximately $23 billion. This amount includes fixed-charge contract provisions associated with our on-site and sale of equipment supply modes. We estimate that approximately half of this revenue will be recognized over approximately the next five years and the balance thereafter.

Our remaining performance obligations do not include (1) expected revenue associated with new on-site plants that are not yet on-stream; (2) consideration associated with contracts that have an expected duration of less than one year; and (3) variable consideration for which we recognize revenue at the amount to which we have the right to invoice, including energy cost pass-through to customers.

In the future, actual amounts will differ due to events outside of our control, including, but not limited to, inflationary price escalations; currency exchange rates; and amended, terminated, or renewed contracts.

Contract Balances

The table below details balances arising from contracts with customers:

30 September	Balance Sheet Location	**2022**	2021
Assets			
Contract assets – current	Other receivables and current assets	**$69.0**	$119.4
Contract fulfillment costs – current	Other receivables and current assets	**84.1**	125.5
Liabilities			
Contract liabilities – current	Payables and accrued liabilities	**$439.1**	$366.8
Contract liabilities – noncurrent	Other noncurrent liabilities	**67.2**	58.4

Contract assets and liabilities result from differences in timing of revenue recognition and customer invoicing. These balances are reported on the consolidated balance sheets on a contract-by-contract basis at the end of each reporting period.

Contract assets primarily relate to our sale of equipment contracts for which revenue is recognized over time. These balances represent unbilled revenue, which occurs when revenue recognized under the measure of progress exceeds the amount invoiced to our customers. Our ability to invoice the customer for contract asset balances is not only based on the passage of time, but also the achievement of certain contractual milestones.

Contract fulfillment costs primarily include deferred costs related to sale of equipment projects that cannot be inventoried and for which we expect to recognize revenue upon transfer of control at project completion or costs related to fulfilling a specific anticipated contract.

Costs to obtain a contract, or "contract acquisition costs," are capitalized only after we have established a contract with the customer. We elected to apply the practical expedient to expense these costs as they are incurred if the amortization period of the asset that would have otherwise been recognized is one year or less. Our contract acquisition costs capitalized as of 30 September 2022 and 2021 were not material.

Contract liabilities include advanced payments or right to consideration prior to performance under the contract and are recognized as revenue when or as we perform. Increases to our current contract liabilities primarily relate to new sale of equipment projects as balances associated with our sale of gas contracts are generally related to fixed charges and are relatively consistent period over period. During the fiscal year ended 30 September 2022, we recognized sales of approximately $242 associated with sale of equipment contracts that were included within our contract liabilities balance as of 30 September 2021. Advanced payments from our customers do not represent a significant financing component as these payments are intended for purposes other than financing, such as to meet working capital demands or to protect us from our customer failing to meet its obligations under the terms of the contract.

5. DISCONTINUED OPERATIONS

In fiscal year 2022, income from discontinued operations, net of tax, was $12.6. This primarily resulted from a net tax benefit recorded in the fourth quarter upon release of tax liabilities for uncertain tax positions associated with our former Performance Materials Division ("PMD") for which the statute of limitations expired. Our consolidated statement of cash flows for the fiscal year ended 30 September 2022 reflects cash provided by operating activities of discontinued operations of $59.6 primarily from income tax refunds associated with the sale of PMD in 2017.

In fiscal year 2021, income from discontinued operations, net of tax, was $70.3. This included net tax benefits of $60.0 recorded upon release of tax liabilities related to uncertain tax positions for which the statute of limitations expired. Of this benefit, we recorded $51.8 in the fourth quarter for liabilities associated with PMD and $8.2 in the third quarter for liabilities associated with our former Energy-from-Waste ("EfW") business. Additionally, we recorded a tax benefit of $10.3 in the first quarter of fiscal year 2021 primarily from the settlement of a state tax appeal related to the gain on the sale of PMD in fiscal year 2017. Our consolidated statement of cash flows for the fiscal year ended 30 September 2021 reflects cash provided by operating activities of discontinued operations of $6.7 from cash received as part of the settlement.

In fiscal year 2020, loss from discontinued operations, net of tax, was $14.3. This resulted from a pre-tax loss of $19.0 recorded in the second quarter to increase our existing liability for retained environmental obligations associated with the sale of our former Amines business in September 2006. Refer to the Pace discussion within Note 16, *Commitments and Contingencies*, for additional information. The loss did not have an impact on our consolidated statement of cash flows for the fiscal year ended 30 September 2020.

6. INVENTORIES

The components of inventories are as follows:

30 September	**2022**	2021
Finished goods	**$162.0**	$150.7
Work in process	**22.0**	24.0
Raw materials, supplies, and other	**330.2**	279.2
Inventories	**$514.2**	$453.9

7. EQUITY AFFILIATES

"Investment in net assets of and advances to equity affiliates" on our consolidated balance sheets were $3,353.8 and $1,649.3 as of 30 September 2022 and 2021, respectively. Substantially all our equity method investments are in foreign affiliates. In fiscal year 2022, we made an initial investment in the Jazan Integrated Gasification and Power Company ("JIGPC") joint venture as further discussed below.

As of 30 September 2022, our equity affiliates were as follows:

Abdullah Hashim Industrial Gases & Equipment Co., Ltd. (25%);	INFRA Group (40%);
Air Products South Africa (Proprietary) Limited (50%);	INOX Air Products Private Limited (50%);
Bangkok Cogeneration Company Limited (49%);	Jazan Integrated Gasification and Power Company (51%);
Bangkok Industrial Gases Co., Ltd. (49%);	Kulim Industrial Gases Sdn. Bhd. (50%);
Chengdu Air & Gas Products Ltd. (50%);	Sapio Produzione Idrogeno Ossigeno S.r.l. (49%);
Helios S.p.A. (49%);	and principally, other industrial gas producers.

Dividends and other distributions received from equity affiliates were $285.1, $157.3, and $107.0 in fiscal years 2022, 2021, and 2020, respectively.

As of 30 September 2022 and 2021, the amount of investment in companies accounted for by the equity method included equity method goodwill of $44.6 and $55.3, respectively.

Summarized Financial Information

The summarized financial information presented below is on a combined 100% basis and has been compiled based on financial statements of our equity affiliates.

30 September	2022	2021
Current assets	**$2,454.6**	$2,244.6
Noncurrent assets	**9,805.6**	4,630.7
Current liabilities	**939.0**	774.0
Noncurrent liabilities	**7,713.5**	2,852.5

Fiscal Year Ended 30 September	2022	2021	2020
Net sales(A)	**$4,124.4**	$3,338.1	$2,809.1
Gross profit	**1,894.0**	1,492.9	1,212.5
Operating income	**1,320.1**	962.2	748.6
Net income	**895.1**	646.0	567.8

(A) Includes financing revenue of $674.6, $134.9, and $137.7 in fiscal years 2022, 2021, and 2020, respectively. Financing revenue in fiscal year 2022 primarily relates to the JIGPC joint venture discussed below.

Investment in Jazan Integrated Gasification and Power Company (“JIGPC”)

On 27 October 2021, we made an initial investment of $1.6 billion in JIGPC, a joint venture with Saudi Aramco Power Company (a subsidiary of Aramco), ACWA Power, and Air Products Qudra in the Jazan Economic City, Saudi Arabia. Our investment represents a 55% interest in the joint venture, of which 4% is attributable to the non-controlling partner of Air Products Qudra. The $1.6 billion investment, which includes approximately $130 from the non-controlling partner, is primarily in the form of shareholder loans that qualify as in-substance common stock in the joint venture.

We expect to make an additional investment in JIGPC of approximately $1 billion in 2023.

We determined JIGPC is a variable interest entity for which we are not the primary beneficiary as we do not have the power to direct the activities that are most significant to the economic performance of the joint venture. Instead, these activities, including plant dispatch, operating and maintenance decisions, budgeting, capital expenditures, and financing, require unanimous approval of the owners or are controlled by the customer. Since we have the ability to exercise significant influence in the joint venture, we accounted for our investment in JIGPC under the equity method within the Middle East and India segment.

Certain shareholders receive a preferred cash distribution pursuant to the joint venture agreement, which specifies each shareholder's share of income after considering the amount of cash available for distribution. As such, the earnings attributable to Air Products may not be proportionate to our ownership interest in the venture.

As of 30 September 2022, the carrying value of our investment totaled $1,780.0 and is presented as "Investments in and advances to equity affiliates" on our consolidated balance sheet. Our loss exposure is limited to our investment in the joint venture.

JIGPC Joint Venture

On 27 September 2021, JIGPC signed definitive agreements for the acquisition of project assets from Aramco for $12 billion and entered into related project financing for the purchase. JIGPC will complete the acquisition of the project assets, which include power blocks, gasifiers, air separation units, syngas cleanup assets, and utilities, in two phases. The first phase was completed on 27 October 2021 for $7 billion. The second phase is expected to be completed in 2023. JIGPC will commission, operate, and maintain the project assets to supply electricity, steam, hydrogen, and utilities to Aramco's refinery and terminal complex under a 25-year agreement, which commenced in the first quarter of fiscal year 2022.

JIGPC accounted for the asset transfer as a financing. Accordingly, the joint venture recorded a financing receivable upon acquisition and will recognize financing income over the supply term.

Jazan Gas Project Company

Jazan Gas Project Company ("JGPC"), a joint venture between Air Products and ACWA Holding, entered into a 20-year oxygen and nitrogen supply agreement in 2015 to supply Aramco's oil refinery and power plant in Jazan, Saudi Arabia.

In October 2021, the supply agreement between JGPC and Aramco was terminated, and JGPC sold its air separation units to Aramco. We initially sold these assets to JGPC and deferred profit proportionate to our 26% ownership in the joint venture. With the termination of the supply agreement and sale of the air separation units complete, we recognized the remaining deferred profit, net of other project finalization costs, in equity affiliates' income in the first quarter of fiscal year 2022.

As of 30 September 2021, our consolidated balance sheets included $94.4 reflected within "Payables and accrued liabilities" for our obligation to make equity contributions based on our proportionate share of advances received by the joint venture under an equity bridge loan. The joint venture utilized a portion of the proceeds from the sale of the air separation units to repay its outstanding debt, including the equity bridge loan. Accordingly, we recorded a noncash adjustment of $94.4 in the first quarter of fiscal year 2022 to reduce our obligation to zero with a corresponding reduction to the carrying value of our investment in the joint venture. As of 30 September 2022, we no longer have an investment balance in the JGPC joint venture.

Equity Method Investment Impairment

During the fourth quarter of fiscal year 2022, we determined there was an other-than-temporary impairment in two small equity affiliates in the Asia segment. As a result, we recorded a noncash charge of $14.8 to write down the full carrying value of the investments. This charge is reflected on our consolidated income statements within "Equity affiliates' income" and was not recorded in segment results.

India Finance Act 2020

Our consolidated income statements in fiscal year 2020 include a benefit of $33.8 reflected in equity affiliates' income for our share of accumulated dividend distribution taxes released with respect to INOX Air Products Private Limited, an equity affiliate investment in our Asia segment. This benefit, which related to tax legislation passed by the Indian government, was not recorded in segment results. Refer to Note 21, *Income Taxes*, for additional information. The benefit is included in fiscal year 2020 net income in the summarized financial information table above on a 100% basis.

8. PLANT AND EQUIPMENT, NET

The major classes of plant and equipment are as follows:

30 September	Useful life	2022	2021
Land		**$266.7**	$312.1
Buildings	30 years	**1,431.3**	1,083.1
Production facilities[A]	10-20 years	**18,000.5**	18,236.9
Distribution and other machinery and equipment[B]	5-25 years	**4,784.9**	5,111.6
Construction in progress		**3,676.7**	2,745.1
Plant and equipment, at cost		**$28,160.1**	$27,488.8
Less: Accumulated depreciation		**13,999.6**	14,234.2
Plant and equipment, net		**$14,160.5**	$13,254.6

[A] Depreciable lives of production facilities related to long-term customer supply contracts are generally matched to the contract lives.

[B] The depreciable lives for various types of distribution equipment are: 10 to 25 years for cylinders, depending on the nature and properties of the product; 20 years for tanks; generally 7.5 years for customer stations; and 5 to 15 years for tractors and trailers.

Depreciation expense was $1,302.7, $1,284.1, and $1,150.5 in fiscal years 2022, 2021, and 2020, respectively.

9. GOODWILL

Changes to the carrying amount of consolidated goodwill by segment are as follows:

	Americas	Asia	Europe	Middle East and India	Corporate and other	Total
Goodwill, net at 30 September 2020	$152.6	$180.4	$516.3	$7.8	$34.4	$891.5
Acquisitions[A]	—	—	21.0	—	—	21.0
Currency translation and other	(1.6)	3.9	(3.8)	0.2	0.3	(1.0)
Goodwill, net at 30 September 2021	$151.0	$184.3	$533.5	$8.0	$34.7	$911.5
Acquisitions[A]	—	—	17.0	7.5	—	24.5
Currency translation and other	(7.8)	(11.6)	(93.0)	0.3	(0.9)	(113.0)
Goodwill, net at 30 September 2022	**$143.2**	**$172.7**	**$457.5**	**$15.8**	**$33.8**	**$823.0**

[A] Goodwill acquired in fiscal year 2021 was primarily attributable to a business combination completed in the second quarter. Refer to Note 3, *Acquisitions*, for additional information. In fiscal year 2022, goodwill acquired is primarily attributable to expected cost synergies associated with small business combinations, of which $3.2 is deductible for tax purposes.

30 September	2022	2021	2020
Goodwill, gross	**$1,096.0**	$1,239.2	$1,230.2
Accumulated impairment losses[A]	**(273.0)**	(327.7)	(338.7)
Goodwill, net	**$823.0**	$911.5	$891.5

[A] Accumulated impairment losses include the impacts of currency translation. These losses are attributable to our Latin America reporting unit ("LASA") within the Americas segment.

We review goodwill for impairment annually in the fourth quarter of the fiscal year and whenever events or changes in circumstances indicate that the carrying value of goodwill might not be recoverable. The impairment test for goodwill involves calculating the fair value of each reporting unit and comparing that value to the carrying value. If the fair value of the reporting unit is less than its carrying value, the difference is recorded as a goodwill impairment charge, not to exceed the total amount of goodwill allocated to that reporting unit. During the fourth quarter of fiscal year 2022, we conducted our annual goodwill impairment test and determined that the fair value of all our reporting units exceeded their carrying value.

10. INTANGIBLE ASSETS

The table below summarizes the major classes of our intangible assets:

	2022			2021		
30 September	**Gross**	**Accumulated Amortization/ Impairment**	**Net**	Gross	Accumulated Amortization/ Impairment	Net
Finite-lived:						
Customer relationships	**$487.5**	**($226.3)**	**$261.2**	$552.0	($234.7)	$317.3
Patents and technology	**33.1**	**(16.3)**	**16.8**	36.8	(16.9)	19.9
Other	**73.4**	**(37.0)**	**36.4**	80.5	(37.3)	43.2
Total finite-lived intangible assets	**$594.0**	**($279.6)**	**$314.4**	$669.3	($288.9)	$380.4
Indefinite-lived:						
Trade names and trademarks	**42.2**	**(9.1)**	**33.1**	51.2	(10.9)	40.3
Total intangible assets	**$636.2**	**($288.7)**	**$347.5**	$720.5	($299.8)	$420.7

The decrease in net intangible assets in fiscal year 2022 was primarily attributable to currency impacts due to the strengthening of the U.S Dollar as well as amortization.

Amortization expense for intangible assets was $35.5, $37.2, and $34.5 in fiscal years 2022, 2021, and 2020, respectively. Refer to Note 1, *Basis of Presentation and Major Accounting Policies*, for the amortization periods for each major class of intangible assets.

The table below details the amount of amortization expense expected to be recorded for our finite-lived intangible assets in each of the next five years and thereafter:

2023	$29.9
2024	28.8
2025	27.7
2026	26.7
2027	26.3
Thereafter	175.0
Total	$314.4

Indefinite-lived intangible assets are subject to impairment testing at least annually or more frequently if events or changes in circumstances indicate that potential impairment exists. The impairment test for indefinite-lived intangible assets involves calculating the fair value of the indefinite-lived intangible assets and comparing the fair value to their carrying value. If the fair value is less than the carrying value, the difference is recorded as an impairment loss. During the fourth quarter of fiscal year 2022, we conducted our annual impairment test of indefinite-lived intangible assets and determined that the fair value of all our intangible assets exceeded their carrying value.

11. LEASES

Lessee Accounting

We are the lessee under various agreements for real estate, vehicles, aircraft, and other equipment that are accounted for as operating leases. Our finance leases principally relate to the right to use machinery and equipment and are not material.

Operating lease expense was $105.3, $89.5, and $80.1 for fiscal years 2022, 2021, and 2020, respectively. These amounts do not include short-term and variable lease expenses, which were not material.

Amounts associated with operating leases and their presentation on our consolidated balance sheets are as follows:

30 September	2022	2021
Operating lease right-of-use assets		
Other noncurrent assets	**$694.7**	$566.2
Operating lease liabilities		
Payables and accrued liabilities	**90.0**	78.6
Other noncurrent liabilities	**592.1**	503.4
Total operating lease liabilities	**$682.1**	$582.0

30 September	2022	2021
Weighted-average remaining lease term in years[A]	**19.1**	17.2
Weighted-average discount rate[B]	**2.1%**	1.9%

[A] Calculated on the basis of the remaining lease term and the lease liability balance for each lease as of the reporting date.

[B] Calculated on the basis of the discount rate used to calculate the lease liability for each lease and the remaining balance of the lease payments for each lease as of the reporting date.

The following maturity analysis of our operating lease liabilities as of 30 September 2022 presents the undiscounted cash flows for each of the next five years and thereafter with a reconciliation to the lease liability recognized on our balance sheet:

	Operating Leases
2023	$102.3
2024	85.0
2025	69.1
2026	52.4
2027	39.1
Thereafter	461.3
Total undiscounted lease payments	809.2
Imputed interest	(127.1)
Present value of lease liability recognized on balance sheet	**$682.1**

The impacts associated with our operating leases on the consolidated statements of cash flows are reflected within "Other adjustments" within operating activities. This includes non-cash operating lease expense of $105.3, $89.5, and $80.1, as well as a use of cash of $128.0, $98.8, and $90.0 for payments on amounts included in the measurement of the lease liability for fiscal years 2022, 2021, and 2020, respectively.

We recorded $252, $259, and $442 of noncash right-of-use asset additions during fiscal years 2022, 2021, and 2020, respectively.

We have additional operating leases that have not yet commenced as of 30 September 2022 having lease payments totaling approximately $120.

Lessor Accounting

Certain contracts associated with facilities that are built to provide product to a specific customer have been accounted for as leases. As we generally control the operations and maintenance of the assets that provide the supply of gas to our customers, there have been no new arrangements that qualified as a lease in fiscal year 2022.

In cases for which operating lease treatment is appropriate, there is no difference in revenue recognition over the life of the contract as compared to accounting for the contract under a sale of gas agreement. These contracts qualify for a practical expedient available to lessors to combine the lease and non-lease components and account for the combined component in accordance with the accounting treatment for the predominant component. We elected to apply this practical expedient and have accounted for the combined component as product sales under the revenue standard as we control the operations and maintenance of the assets that provide the supply of gas to our customers.

In cases for which sales-type lease treatment is appropriate, revenue and expense are recognized up front for the sale of equipment component of the contract as compared to revenue recognition over the life of the arrangement under contracts not qualifying as sales-type leases. Additionally, a portion of the revenue representing interest income from the financing component of the lease receivable is reflected as sales over the life of the contract. During fiscal years 2022, 2021, and 2020, we recognized interest income of $59.1, $67.4, and $71.2 on our lease receivables, respectively.

Our contracts generally do not have the option to extend or terminate the lease or provide the customer the right to purchase the asset at the end of the contract term. Instead, renewal of such contracts requires negotiation of mutually agreed terms by both parties. Unless the customer terminates within the required notice period, the contract will go into evergreen. Given the long-term duration of our contracts, there is no assumed residual value for the assets at the end of the lease term.

"Lease receivables, net" primarily relate to sales-type leases on certain on-site assets for which payments are collected over the contract term. As of 30 September 2022 and 2021, our lease receivables, net were $660.9 and $824.7, respectively, and are primarily included within "Noncurrent lease receivables" on our consolidated balance sheets, with the remaining balance in "Other receivables and current assets." The majority of our leases are of high credit quality and were originated prior to fiscal year 2017. As of 30 September 2022 and 2021, the credit quality of lease receivables did not require a material allowance for credit losses.

Lease payments collected in fiscal years 2022, 2021, and 2020 were $153.1, $166.2, and $162.8, respectively. These payments reduced the noncurrent lease receivable balance by $94.0, $98.8, and $91.6 in fiscal years 2022, 2021, and 2020, respectively.

As of 30 September 2022, minimum lease payments expected to be collected, which reconciles to lease receivables, net, were as follows:

2023	$126.9
2024	122.0
2025	116.9
2026	107.3
2027	94.3
Thereafter	363.6
Total	931.0
Unearned interest income	(270.1)
Lease Receivables, net	**$660.9**

12. FINANCIAL INSTRUMENTS

Currency Price Risk Management

Our earnings, cash flows, and financial position are exposed to foreign currency risk from foreign currency-denominated transactions and net investments in foreign operations. It is our policy to seek to minimize our cash flow volatility from changes in currency exchange rates. This is accomplished by identifying and evaluating the risk that our cash flows will change in value due to changes in exchange rates and by executing strategies necessary to manage such exposures. Our objective is to maintain economically balanced currency risk management strategies that provide adequate downside protection.

Forward Exchange Contracts

We enter into forward exchange contracts to reduce the cash flow exposure to foreign currency fluctuations associated with highly anticipated cash flows and certain firm commitments, such as the purchase of plant and equipment. We also enter into forward exchange contracts to hedge the cash flow exposure on intercompany loans and third-party debt. This portfolio of forward exchange contracts consists primarily of Euros and U.S. Dollars. The maximum remaining term of any forward exchange contract currently outstanding and designated as a cash flow hedge at 30 September 2022 is 3.7 years.

Forward exchange contracts are also used to hedge the value of investments in certain foreign subsidiaries and affiliates by creating a liability in a currency in which we have a net equity position. The primary currency pair in this portfolio of forward exchange contracts is Euros and U.S. Dollars.

We also utilize forward exchange contracts that are not designated as hedges. These contracts are used to economically hedge foreign currency-denominated monetary assets and liabilities, primarily working capital. The primary objective of these forward exchange contracts is to protect the value of foreign currency-denominated monetary assets and liabilities from the effects of volatility in foreign exchange rates that might occur prior to their receipt or settlement. This portfolio of forward exchange contracts consists of many different foreign currency pairs, with a profile that changes from time to time depending on our business activity and sourcing decisions.

The table below summarizes our outstanding currency price risk management instruments:

	2022		2021	
30 September	**US$ Notional**	**Years Average Maturity**	US$ Notional	Years Average Maturity
Forward Exchange Contracts				
Cash flow hedges	**$4,525.0**	**0.7**	$3,465.2	0.6
Net investment hedges	**542.2**	**2.2**	638.0	3.0
Not designated	**534.3**	**0.3**	692.6	0.1
Total Forward Exchange Contracts	**$5,601.5**	**0.8**	$4,795.8	0.8

The increase in the notional value of cash flow hedges in fiscal year 2022 is primarily due to the origination of forward exchange contracts that hedge forecasted foreign currency costs for capital projects.

We also use foreign currency-denominated debt to hedge the foreign currency exposures of our net investment in certain foreign subsidiaries. The designated foreign currency-denominated debt and related accrued interest was €1,265.4 million ($1,240.4) at 30 September 2022 and €1,297.5 million ($1,502.6) at 30 September 2021. The designated foreign currency-denominated debt is presented within "Long-term debt" on the consolidated balance sheets.

Debt Portfolio Management

It is our policy to identify, on a continuing basis, the need for debt capital and to evaluate the financial risks inherent in funding the Company with debt capital. Reflecting the result of this ongoing review, we manage our debt portfolio and hedging program with the intent to (1) reduce funding risk with respect to our borrowings to preserve our access to debt capital and provide debt capital as required for funding and liquidity purposes, and (2) manage the aggregate interest rate risk and the debt portfolio in accordance with certain debt management parameters.

Interest Rate Management Contracts

We enter into interest rate swaps to change the fixed/variable interest rate mix of our debt portfolio in order to maintain the percentage of fixed- and variable-rate debt within the parameters set by management. In accordance with these parameters, the agreements are used to manage interest rate risks and costs inherent in our debt portfolio. Our interest rate management portfolio generally consists of fixed-to-floating interest rate swaps (which are designated as fair value hedges), pre-issuance interest rate swaps and treasury locks (which hedge the interest rate risk associated with anticipated fixed-rate debt issuances and are designated as cash flow hedges), and floating-to-fixed interest rate swaps (which are designated as cash flow hedges). As of 30 September 2022, the outstanding interest rate swaps were denominated in U.S. Dollars. The notional amount of the interest rate swap agreements is equal to or less than the designated debt being hedged. When interest rate swaps are used to hedge variable-rate debt, the indices of the swaps and the debt to which they are designated are the same. It is our policy not to enter into any interest rate management contracts which lever a move in interest rates on a greater than one-to-one basis.

Cross Currency Interest Rate Swap Contracts

We enter into cross currency interest rate swap contracts when our risk management function deems necessary. These contracts may entail both the exchange of fixed- and floating-rate interest payments periodically over the life of the agreement and the exchange of one currency for another currency at inception and at a specified future date. The contracts are used to hedge either certain net investments in foreign operations or non-functional currency cash flows related to intercompany loans. The current cross currency interest rate swap portfolio consists of fixed-to-fixed swaps primarily between the U.S. Dollar and each of the Chinese Renminbi, Indian Rupee, and Chilean Peso.

The table below summarizes our outstanding interest rate management contracts and cross currency interest rate swaps:

	2022				2021			
30 September	**US$ Notional**	**Average Pay %**	**Average Receive %**	**Years Average Maturity**	US$ Notional	Average Pay %	Average Receive %	Years Average Maturity
Interest rate swaps (fair value hedge)	**$800.0**	**Various**	**1.64%**	**5.0**	$200.0	LIBOR	2.76%	0.1
Cross currency interest rate swaps (net investment hedge)	**$176.7**	**4.12%**	**3.07%**	**1.2**	$210.2	4.32%	3.14%	2.2
Cross currency interest rate swaps (cash flow hedge)	**$785.7**	**4.78%**	**3.05%**	**2.3**	$1,005.7	4.98%	2.93%	2.7
Cross currency interest rate swaps (not designated)	**$37.7**	**5.39%**	**3.54%**	**1.2**	$4.2	5.39%	3.54%	2.2

The table below provides the amounts recorded on the consolidated balance sheet related to cumulative basis adjustments for fair value hedges:

	Carrying amounts of hedged item		Cumulative hedging adjustment, included in carrying amount	
30 September	**2022**	2021	**2022**	2021
Current portion of long-term debt	**$—**	$400.5	**$—**	$0.5
Long-term debt	**2,012.9**	—	**(77.1)**	—

The table below summarizes the fair value and balance sheet location of our outstanding derivatives. Refer to Note 13, *Fair Value Measurements*, which defines fair value, describes the method for measuring fair value, and provides additional disclosures regarding fair value measurements.

30 September	Balance Sheet Location	2022	2021	Balance Sheet Location	2022	2021
Derivatives Designated as Hedging Instruments:						
Forward exchange contracts	Other receivables and current assets	**$71.6**	$35.1	Payables and accrued liabilities	**$226.2**	$57.2
Interest rate management contracts	Other receivables and current assets	**36.7**	16.0	Payables and accrued liabilities	**—**	5.2
Forward exchange contracts	Other noncurrent assets	**60.8**	5.5	Other noncurrent liabilities	**46.9**	25.2
Interest rate management contracts	Other noncurrent assets	**12.5**	18.1	Other noncurrent liabilities	**91.2**	27.5
Total Derivatives Designated as Hedging Instruments		**$181.6**	$74.7		**$364.3**	$115.1
Derivatives Not Designated as Hedging Instruments:						
Forward exchange contracts	Other receivables and current assets	**$6.1**	$8.7	Payables and accrued liabilities	**$2.1**	$6.4
Forward exchange contracts	Other noncurrent assets	**0.1**	—	Other noncurrent liabilities	**0.1**	—
Interest rate management contracts	Other noncurrent assets	**1.3**	—	Other noncurrent liabilities	**—**	—
Total Derivatives Not Designated as Hedging Instruments		**$7.5**	$8.7		**$2.2**	$6.4
Total Derivatives		**$189.1**	$83.4		**$366.5**	$121.5

The table below summarizes gains (losses) recognized in other comprehensive income during the period related to our net investment and cash flow hedging relationships:

	2022	2021
Net Investment Hedging Relationships		
Forward exchange contracts	**$89.8**	$11.4
Foreign currency debt	**229.6**	18.1
Cross currency interest rate swaps	**12.5**	(7.9)
Total Amount Recognized in OCI	**331.9**	21.6
Tax effects	**(82.1)**	(5.5)
Net Amount Recognized in OCI	**$249.8**	$16.1
Derivatives in Cash Flow Hedging Relationships		
Forward exchange contracts	**($310.2)**	$12.7
Forward exchange contracts, excluded components	**2.8**	(11.7)
Other[A]	**123.2**	(6.7)
Total Amount Recognized in OCI	**(184.2)**	(5.7)
Tax effects	**63.9**	9.0
Net Amount Recognized in OCI	**($120.3)**	$3.3

[A] Other primarily includes interest rate and cross currency interest rate swaps for which excluded components are recognized in “Payables and accrued liabilities” and “Other receivables and current assets” as a component of accrued interest payable and accrued interest receivable, respectively. These excluded components are recorded in “Other non-operating income (expense), net” over the life of the cross currency interest rate swap. Other also includes the recognition of our share of gains and losses, net of tax, related to interest rate swaps held by our equity affiliates.

The table below summarizes the location and amounts recognized in income related to our cash flow and fair value hedging relationships by contract type:

	Sales		Cost of Sales		Interest Expense		Other Non-Operating Income (Expense), Net	
	2022	2021	**2022**	2021	**2022**	2021	**2022**	2021
Total presented in consolidated income statements that includes effects of hedging below	**$12,698.6**	$10,323.0	**$9,338.5**	$7,186.1	**$128.0**	$141.8	**$62.4**	$73.7
(Gain) Loss Effects of Cash Flow Hedging:								
Forward Exchange Contracts:								
Amount reclassified from OCI into income	**$0.8**	($0.8)	**($0.1)**	($0.8)	**$—**	$—	**$205.7**	$5.2
Amount excluded from effectiveness testing recognized in earnings based on amortization approach	**—**	—	**—**	—	**—**	—	**4.6**	9.1
Other:								
Amount reclassified from OCI into income	**—**	—	**—**	—	**5.8**	5.6	**(95.1)**	39.1
Total (Gain) Loss Reclassified from OCI to Income	**0.8**	(0.8)	**(0.1)**	(0.8)	**5.8**	5.6	**115.2**	53.4
Tax effects	**(0.3)**	0.2	**(0.3)**	0.5	**(2.2)**	(2.1)	**(27.5)**	(12.5)
Net (Gain) Loss Reclassified from OCI to Income	**$0.5**	($0.6)	**($0.4)**	($0.3)	**$3.6**	$3.5	**$87.7**	$40.9
(Gain) Loss Effects of Fair Value Hedging:								
Other:								
Hedged items	**$—**	$—	**$—**	$—	**($77.6)**	($5.2)	**$—**	$—
Derivatives designated as hedging instruments	**—**	—	**—**	—	**77.6**	5.2	**—**	—
Total (Gain) Loss Recognized in Income	**$—**	$—	**$—**	$—	**$—**	$—	**$—**	$—

The table below summarizes the location and amounts recognized in income related to our derivatives not designated as hedging instruments by contract type:

	Other Income (Expense), Net		Other Non-Operating Income (Expense), Net	
	2022	2021	**2022**	2021
The Effects of Derivatives Not Designated as Hedging Instruments:				
Forward Exchange Contracts	**($3.7)**	$2.8	**($2.9)**	($2.7)
Other	**—**	—	**(2.3)**	0.5
Total (Gain) Loss Recognized in Income	**($3.7)**	$2.8	**($5.2)**	($2.2)

The amount of unrealized gains and losses related to cash flow hedges as of 30 September 2022 that are expected to be reclassified to earnings in the next twelve months is not material.

The cash flows related to all derivative contracts are reported in the operating activities section of the consolidated statements of cash flows.

Credit Risk-Related Contingent Features

Certain derivative instruments are executed under agreements that require us to maintain a minimum credit rating with both Standard & Poor's and Moody's. If our credit rating falls below this threshold, the counterparty to the derivative instruments has the right to request full collateralization on the derivatives' net liability position. The net liability position of derivatives with credit risk-related contingent features was $114.8 and $53.4 as of 30 September 2022 and 2021, respectively. Because our current credit rating is above the various pre-established thresholds, no collateral has been posted on these liability positions.

Counterparty Credit Risk Management

We execute financial derivative transactions with counterparties that are highly rated financial institutions, all of which are investment grade at this time. Some of our underlying derivative agreements give us the right to require the institution to post collateral if its credit rating falls below the pre-established thresholds with Standard & Poor's or Moody's. The collateral that the counterparties would be required to post was $62.8 and $38.1 as of 30 September 2022 and 2021, respectively. No financial institution is required to post collateral at this time, as all have credit ratings at or above the applicable threshold.

13. FAIR VALUE MEASUREMENTS

Fair value is defined as an exit price, or the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

The fair value hierarchy prioritizes the inputs to valuation techniques used to measure fair value into three broad levels as follows:

- *Level 1*—Quoted prices (unadjusted) in active markets for identical assets or liabilities.
- *Level 2*—Inputs that are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the asset or liability.
- *Level 3*—Inputs that are unobservable for the asset or liability based on our own assumptions about the assumptions market participants would use in pricing the asset or liability.

The methods and assumptions used to measure the fair value of financial instruments are as follows:

Short-term Investments

Short-term investments primarily include time deposits with original maturities greater than three months and less than one year. We estimated the fair value of our short-term investments, which approximates carrying value as of the balance sheet date, using Level 2 inputs within the fair value hierarchy. Level 2 measurements were based on current interest rates for similar investments with comparable credit risk and time to maturity.

Derivatives

The fair value of our interest rate management contracts and forward exchange contracts are quantified using the income approach and are based on estimates using standard pricing models. These models consider the value of future cash flows as of the balance sheet date, discounted to a present value using discount factors that match both the time to maturity and currency of the underlying instruments. These standard pricing models utilize inputs that are derived from or corroborated by observable market data such as interest rate yield curves as well as currency spot and forward rates; therefore, the fair value of our derivatives is classified as a Level 2 measurement. On an ongoing basis, we randomly test a subset of our valuations against valuations received from the transaction's counterparty to validate the accuracy of our standard pricing models. Counterparties to these derivative contracts are highly rated financial institutions.

Refer to Note 12, *Financial Instruments*, for a description of derivative instruments, including details related to the balance sheet line classifications.

Long-term Debt, Including Related Party

The fair value of our debt is based on estimates using standard pricing models that consider the value of future cash flows as of the balance sheet date, discounted to a present value using discount factors that match both the time to maturity and currency of the underlying instruments. These standard valuation models utilize observable market data such as interest rate yield curves and currency spot rates; therefore, the fair value of our debt is classified as a Level 2 measurement. We generally perform the computation of the fair value of these instruments.

The carrying values and fair values of financial instruments were as follows:

	2022		2021	
30 September	**Carrying Value**	**Fair Value**	Carrying Value	Fair Value
Assets				
Derivatives				
Forward exchange contracts	**$138.6**	**$138.6**	$49.3	$49.3
Interest rate management contracts	**50.5**	**50.5**	34.1	34.1
Liabilities				
Derivatives				
Forward exchange contracts	**$275.3**	**$275.3**	$88.8	$88.8
Interest rate management contracts	**91.2**	**91.2**	32.7	32.7
Long-term debt, including current portion and related party	**7,634.1**	**6,721.2**	7,634.8	7,812.2

The carrying amounts reported on the consolidated balance sheets for cash and cash items, short-term investments, trade receivables, payables and accrued liabilities, accrued income taxes, and short-term borrowings approximate fair value due to the short-term nature of these instruments. Accordingly, these items have been excluded from the above table.

The following table summarizes assets and liabilities on the consolidated balance sheets that are measured at fair value on a recurring basis:

	2022				2021			
30 September	**Total**	**Level 1**	**Level 2**	**Level 3**	Total	Level 1	Level 2	Level 3
Assets at Fair Value								
Derivatives								
Forward exchange contracts	**$138.6**	**$—**	**$138.6**	**$—**	$49.3	$—	$49.3	$—
Interest rate management contracts	**50.5**	**—**	**50.5**	**—**	34.1	—	34.1	—
Total Assets at Fair Value	**$189.1**	**$—**	**$189.1**	**$—**	$83.4	$—	$83.4	$—
Liabilities at Fair Value								
Derivatives								
Forward exchange contracts	**$275.3**	**$—**	**$275.3**	**$—**	$88.8	$—	$88.8	$—
Interest rate management contracts	**91.2**	**—**	**91.2**	**—**	32.7	—	32.7	—
Total Liabilities at Fair Value	**$366.5**	**$—**	**$366.5**	**$—**	$121.5	$—	$121.5	$—

14. DEBT

The table below summarizes our total outstanding debt as reflected on our consolidated balance sheets:

30 September	2022	2021
Short-term borrowings[A]	**$10.7**	$2.4
Current portion of long-term debt	**548.3**	484.5
Long-term debt	**6,433.8**	6,875.7
Long-term debt – related party	**652.0**	274.6
Total Debt	**$7,644.8**	$7,637.2

[A] Includes bank obligations with weighted average interest rates of 4.2% and 0.6% as of 30 September 2022 and 2021, respectively.

Related Party Debt

Total debt owed to related parties was $781.0 and $358.4 as of 30 September 2022 and 30 September 2021, respectively. "Current portion of long-term debt" includes amounts owed to related parties of $129.0 and $83.8 as of 30 September 2022 and 2021, respectively. Our related party debt includes loans with joint venture partners, including Lu’An Clean Energy Company, as well as shareholder loans associated with the NEOM project. Refer to Note 22, *Supplemental Information*, for additional information.

Summary of Debt Instruments

The table below summarizes the coupon interest rates, fiscal year maturities, and carrying amounts of our long-term debt, including current portion and amounts owed to related parties:

30 September	Maturities	2022	2021
Payable in U.S. Dollars			
Medium-term Notes (weighted average rate)			
Series E 7.6%	2026	**$17.2**	$17.2
Senior Notes			
Note 3.0%	2022	**—**	400.0
Note 2.75%	2023	**400.0**	400.0
Note 3.35%	2024	**400.0**	400.0
Note 1.50%	2026	**550.0**	550.0
Note 1.85%	2027	**650.0**	650.0
Note 2.05%	2030	**900.0**	900.0
Note 2.70%	2040	**750.0**	750.0
Note 2.80%	2050	**950.0**	950.0
Other (weighted average rate)			
Variable-rate industrial revenue bonds 1.59%	2035 to 2050	**618.9**	618.9
Other variable-rate 3.42%	2024 to 2032	**41.4**	14.4
Payable in Other Currencies			
Eurobonds 1.0%	2025	**294.1**	347.4
Eurobonds 0.50%	2028	**490.1**	579.1
Eurobonds 0.80%	2032	**490.1**	579.1
Saudi Riyal Loan Facility variable-rate 4.10%	2023	**195.6**	—
New Taiwan Dollar Loan Facility 1.86%	2023 to 2028	**189.0**	161.8
New Taiwan Dollar Loan Facility 2.66%	2026 to 2029	**31.5**	—
Other	2023	**0.1**	0.3
Related Party Debt			
Chinese Renminbi 5.5%	2023 to 2027	**321.5**	355.0
Chinese Renminbi 5.7%	2033	**12.2**	3.4
Finance Lease Obligations *(weighted average rate)*			
Foreign 11.3%	2023 to 2036	**7.6**	8.1
Total Principal Amount		**$7,309.3**	$7,684.7
Plus: Related party shareholder loans to NGHC		**447.3**	—
Less: Unamortized discount and debt issuance costs		**(45.4)**	(50.4)
Less: Fair value hedge accounting adjustments[A]		**(77.1)**	0.5
Total Long-term Debt		**$7,634.1**	$7,634.8
Less: Current portion of long-term debt		**(548.3)**	(484.5)
Less: Long-term debt – related party		**(652.0)**	(274.6)
Long-term Debt		**$6,433.8**	$6,875.7

[A] Refer to Note 12, *Financial Instruments*, for additional information.

Principal maturities of long-term debt, including current portion and amounts owed to related parties, in each of the next five years and thereafter are as follows:

2023[(A)]	$744.0
2024	496.8
2025	398.4
2026	673.6
2027	725.0
Thereafter	4,271.5
Total	**$7,309.3**

(A) Principal maturities in fiscal year 2023 include the 4.10% Saudi Riyal Loan Facility of $195.6, which is presented within long-term debt on our consolidated balance sheet as of 30 September 2022 as we entered into a Saudi Riyal Loan Facility in October 2022 and utilized the proceeds to repay the outstanding balance. The new facility is due in 2027.

Cash paid for interest, net of amounts capitalized, was $128.5, $150.4, and $67.2 in fiscal years 2022, 2021, and 2020, respectively.

In November 2021, we repaid the 3.0% Senior Note of $400, plus interest, on its maturity date.

Debt Covenants

Various debt agreements to which we are a party include financial covenants and other restrictions, including restrictions pertaining to the ability to create property liens and enter into certain sale and leaseback transactions. As of 30 September 2022, we are in compliance with all the financial and other covenants under our debt agreements.

Credit Facilities

2021 Credit Agreement

On 31 March 2021, we entered into a five-year $2,500 revolving credit agreement with a syndicate of banks (the “2021 Credit Agreement”), under which senior unsecured debt is available to us and certain of our subsidiaries. On 31 March 2022, we amended the 2021 Credit Agreement to exercise our option to increase the maximum borrowing capacity to $2,750 and transition the benchmark rate from LIBOR to the Secured Overnight Financing Rate ("SOFR"). All other terms remain unchanged from the original agreement. The 2021 Credit Agreement provides a source of liquidity and supports our commercial paper program. The only financial covenant in the 2021 Credit Agreement is a maximum ratio of total debt to capitalization (equal to total debt plus total equity) not to exceed 70%. No borrowings were outstanding under the 2021 Credit Agreement as of 30 September 2022.

Other

We have credit facilities available to certain of our foreign subsidiaries totaling $749.0, of which $457.5 was borrowed and outstanding as of 30 September 2022. The amount borrowed and outstanding as of 30 September 2021 was $176.2.

2020 Debt Issuance

In fiscal year 2020, we issued U.S. Dollar- and Euro-denominated fixed-rate notes with aggregate principal amounts of $3.8 billion and €1.0 billion, respectively. Our consolidated statement of cash flows for the fiscal year ended 30 September 2020 includes long-term debt proceeds of $4,895.8 from these issuances.

15. RETIREMENT BENEFITS

We and certain of our subsidiaries sponsor defined benefit pension plans and defined contribution plans that cover a substantial portion of our worldwide employees. The principal defined benefit pension plans are the U.S. salaried pension plan and the U.K. pension plan. These plans were closed to new participants in 2005, after which defined contribution plans were offered to new employees. The principal defined contribution plan is the Retirement Savings Plan, in which a substantial portion of the U.S. employees participate. A similar plan is offered to U.K. employees. We also provide other postretirement benefits consisting primarily of healthcare benefits to U.S. retirees who meet age and service requirements.

Defined Benefit Pension Plans

Pension benefits earned are generally based on years of service and compensation during active employment. The components of net periodic (benefit) cost for our defined benefit pension plans for fiscal years 2022, 2021, and 2020 were as follows:

	Fiscal Year Ended 30 September								
	2022			2021			2020		
	U.S.	International	**Total**	U.S.	International	Total	U.S.	International	Total
Service cost	$18.3	$21.5	**$39.8**	$21.3	$23.4	$44.7	$23.4	$23.3	$46.7
Non-service (benefit) cost:									
Interest cost	73.9	28.9	**102.8**	68.9	25.2	94.1	91.2	24.8	116.0
Expected return on plan assets	(168.3)	(67.4)	**(235.7)**	(194.5)	(83.4)	(277.9)	(188.7)	(77.4)	(266.1)
Prior service cost amortization	1.3	—	**1.3**	1.2	—	1.2	1.2	—	1.2
Actuarial loss amortization	66.0	14.7	**80.7**	78.5	19.3	97.8	83.7	19.5	103.2
Settlements	6.0	0.2	**6.2**	1.3	0.5	1.8	5.0	0.2	5.2
Other	—	1.3	**1.3**	—	1.0	1.0	—	0.8	0.8
Net Periodic (Benefit) Cost	($2.8)	($0.8)	**($3.6)**	($23.3)	($14.0)	($37.3)	$15.8	($8.8)	$7.0

Our service costs are primarily included within "Cost of sales" and "Selling and administrative" on our consolidated income statements. The amount of service costs capitalized in fiscal years 2022, 2021 and 2020 were not material. The non-service related costs, including pension settlement losses, are presented outside operating income within "Other non-operating income (expense), net."

Certain of our pension plans provide for a lump sum benefit payment option at the time of retirement, or for corporate officers, six months after their retirement date. A participant's vested benefit is considered settled upon cash payment of the lump sum. We recognize pension settlement losses when cash payments exceed the sum of the service and interest cost components of net periodic benefit cost of the plan for the fiscal year. We recognized pension settlement losses of $6.0, $1.3 and $5.0 in fiscal years 2022, 2021 and 2020, respectively, to accelerate recognition of a portion of actuarial losses deferred in accumulated other comprehensive loss associated with the U.S. supplementary pension plan.

We calculate net periodic benefit cost for a given fiscal year based on assumptions developed at the end of the previous fiscal year. The following table sets forth the weighted average assumptions used in the calculation of net periodic benefit cost:

	2022		2021		2020	
	U.S.	**International**	U.S.	International	U.S.	International
Discount rate – Service cost	**3.0%**	**1.9%**	3.0%	1.6%	3.3%	1.5%
Discount rate – Interest cost	**2.3%**	**1.6%**	2.1%	1.2%	2.9%	1.3%
Expected return on plan assets	**5.8%**	**4.0%**	6.8%	4.7%	7.0%	5.0%
Rate of compensation increase	**3.5%**	**3.3%**	3.5%	3.3%	3.5%	3.3%

The projected benefit obligation ("PBO") is the actuarial present value of benefits attributable to employee service rendered to date, including the effects of estimated future salary increases. The following table sets forth the weighted average assumptions used in the calculation of the PBO:

	2022		2021	
	U.S.	**International**	U.S.	International
Discount rate	**5.6%**	**4.7%**	2.9%	1.8%
Rate of compensation increase	**3.5%**	**3.4%**	3.5%	3.3%

The following tables reflect the change in the PBO and the change in the fair value of plan assets based on the plan year measurement date, as well as the amounts recognized in the consolidated balance sheets:

	2022		2021	
	U.S.	**International**	U.S.	International
Change in Projected Benefit Obligation				
Obligation at beginning of year	**$3,335.3**	**$1,969.6**	$3,423.8	$1,949.7
Service cost	**18.3**	**21.5**	21.3	23.4
Interest cost	**73.9**	**28.9**	68.9	25.2
Amendments	**1.5**	**0.1**	0.5	—
Actuarial (gain) loss	**(793.8)**	**(575.2)**	(17.7)	(30.9)
Settlements	**(19.2)**	**(0.9)**	(3.0)	(1.8)
Participant contributions	**—**	**1.2**	—	1.3
Benefits paid	**(165.2)**	**(53.0)**	(158.5)	(52.8)
Currency translation and other	**—**	**(254.7)**	—	55.5
Obligation at End of Year	**$2,450.8**	**$1,137.5**	$3,335.3	$1,969.6

	2022		2021	
	U.S.	**International**	U.S.	International
Change in Plan Assets				
Fair value at beginning of year	**$3,343.7**	**$1,905.0**	$3,048.3	$1,726.8
Actual return on plan assets	**(778.3)**	**(498.5)**	450.0	140.1
Company contributions	**23.0**	**21.7**	6.9	37.7
Participant contributions	**—**	**1.2**	—	1.3
Benefits paid	**(165.2)**	**(53.0)**	(158.5)	(52.8)
Settlements	**(19.2)**	**(0.9)**	(3.0)	(1.8)
Currency translation and other	**—**	**(253.5)**	—	53.7
Fair Value at End of Year	**$2,404.0**	**$1,122.0**	$3,343.7	$1,905.0
Funded Status at End of Year	**($46.8)**	**($15.5)**	$8.4	($64.6)

	2022		2021	
	U.S.	**International**	U.S.	International
Amounts Recognized				
Noncurrent assets	**$36.4**	**$97.5**	$90.5	$128.7
Accrued liabilities	**5.8**	**0.4**	19.6	0.5
Noncurrent liabilities	**77.4**	**112.6**	62.5	192.8
Net Asset (Liability) Recognized	**($46.8)**	**($15.5)**	$8.4	($64.6)

The changes in plan assets and benefit obligation that have been recognized in other comprehensive income on a pretax basis during fiscal years 2022 and 2021 consist of the following:

	2022		2021	
	U.S.	**International**	U.S.	International
Net actuarial (gain) loss arising during the period	**$152.8**	**($9.3)**	($273.2)	($87.6)
Amortization of net actuarial loss	**(72.0)**	**(14.9)**	(79.8)	(19.8)
Prior service cost arising during the period	**1.5**	**0.1**	0.5	—
Amortization of prior service cost	**(1.3)**	**—**	(1.2)	—
Total	**$81.0**	**($24.1)**	($353.7)	($107.4)

The net actuarial gains and losses represent the actual changes in the estimated obligation and plan assets that have not yet been recognized in the consolidated income statements and are included in accumulated other comprehensive loss. Actuarial losses arising during fiscal year 2022 are primarily attributable to lower than expected returns on plan assets that were partially offset by higher discount rates. Accumulated actuarial gains and losses that exceed a corridor are amortized over the average remaining service period of active U.S. participants, which was approximately seven years as of 30 September 2022. For U.K. participants, accumulated actuarial gains and losses that exceed a corridor are amortized over the average remaining life expectancy, which was approximately 23 years as of 30 September 2022.

The components recognized in accumulated other comprehensive loss on a pretax basis at 30 September consisted of the following:

	2022		2021	
	U.S.	**International**	U.S.	International
Net actuarial loss	**$525.5**	**$511.6**	$444.7	$535.8
Prior service cost	**6.5**	**3.7**	6.3	3.6
Net transition liability	**—**	**0.4**	—	0.4
Total	**$532.0**	**$515.7**	$451.0	$539.8

The accumulated benefit obligation ("ABO") is the actuarial present value of benefits attributed to employee service rendered to a particular date, based on current salaries. The ABO for all defined benefit pension plans was $3,491.4 and $5,140.0 as of 30 September 2022 and 2021, respectively.

The following table provides information on pension plans where the benefit liability exceeds the value of plan assets:

	2022		2021	
30 September	**U.S.**	**International**	U.S.	International
Pension Plans with PBO in Excess of Plan Assets:				
PBO	**$2,289.7**	**$284.9**	$82.1	$456.6
Fair value of plan assets	**2,206.5**	**171.8**	—	263.4
PBO in excess of plan assets	**$83.2**	**$113.1**	$82.1	$193.2
Pension Plans with ABO in Excess of Plan Assets:				
ABO	**$50.5**	**$101.3**	$79.2	$416.8
Fair value of plan assets	**—**	**20.1**	—	263.4
ABO in excess of plan assets	**$50.5**	**$81.2**	$79.2	$153.4

The tables above include several pension arrangements that are not funded because of jurisdictional practice. The ABO and PBO related to these plans as of 30 September 2022 were $56.7 and $60.8, respectively. As of 30 September 2022, the U.S. salaried pension plan had a PBO in excess of plan assets, which resulted in an increase to the U.S. balances presented above. As of 30 September 2021, the U.S. salaried pension plan had plan assets in excess of both PBO and ABO.

Pension Plan Assets

Our pension plan investment strategy is to invest in diversified portfolios to earn a long-term return consistent with acceptable risk in order to pay retirement benefits and meet regulatory funding requirements while minimizing company cash contributions over time. De-risking strategies are also employed for closed plans as funding improves, generally resulting in higher allocations to long duration bonds. The plans invest primarily in passive and actively managed equity and debt securities. Equity investments are diversified geographically and by investment style and market capitalization. Fixed income investments include sovereign, corporate and asset-backed securities generally denominated in the currency of the plan. The U.S. and U.K. plans' investment managers are authorized to utilize derivatives to manage interest and inflation exposure.

Asset allocation targets are established based on the long-term return, volatility and correlation characteristics of the asset classes, the profiles of the plans' liabilities, and acceptable levels of risk. As of 30 September 2022, the U.S pension plan was at target with respect to the fixed income securities portfolio. The company continues to monitor the investment portfolio and various investment markets and will take action accordingly. Assets are routinely rebalanced through contributions, benefit payments, and otherwise as deemed appropriate. The actual and target allocations at the measurement date are as follows:

	2022 Target Allocation		**2022 Actual Allocation**		2021 Actual Allocation	
	U.S.	**International**	**U.S.**	**International**	U.S.	International
Asset Category						
Equity securities	**17 - 29%**	**10 - 36%**	**17%**	**31%**	30%	36%
Fixed income securities	**66 - 80%**	**64 - 90%**	**73%**	**68%**	64%	63%
Real estate and other	**3 - 5%**	**—%**	**10%**	**—%**	6%	—%
Cash	**—%**	**—%**	**—%**	**1%**	—%	1%
Total			**100%**	**100%**	100%	100%

In fiscal year 2022, the 5.8% expected return for U.S. plan assets was based on a weighted average of estimated long-term returns of major asset classes and the historical performance of plan assets. In determining the estimated long-term asset class returns, we take into account historical long-term returns and the value of active management, as well as other economic and market factors, and input from our actuaries and investment advisors.

In fiscal year 2022, the 4.0% expected rate of return for international plan assets was based on a weighted average return for plans outside the U.S., which vary significantly in size, asset structure and expected returns. The expected asset return for the U.K. plan, which represents approximately 80% of the assets of our International plans, was 4.3% and was derived from expected equity and debt security returns.

The table below summarizes pension plan assets measured at fair value by asset class (see Note 13, *Fair Value Measurements*, for definition of the levels):

	2022				2021			
30 September	**Total**	**Level 1**	**Level 2**	**Level 3**	Total	Level 1	Level 2	Level 3
U.S. Qualified Pension Plans								
Cash and cash equivalents	**$14.0**	**$14.0**	**$—**	**$—**	$14.8	$14.8	$—	$—
Equity securities	**127.4**	**127.4**	**—**	**—**	325.3	325.3	—	—
Equity mutual funds	**84.5**	**84.5**	**—**	**—**	243.4	243.4	—	—
Equity pooled funds	**188.4**	**—**	**188.4**	**—**	448.7	—	448.7	—
Fixed income securities	**1,759.1**	**—**	**1,759.1**	**—**	2,125.6	—	2,125.6	—
Total U.S. Qualified Pension Plans at Fair Value	**$2,173.4**	**$225.9**	**$1,947.5**	**$—**	$3,157.8	$583.5	$2,574.3	$—
Real estate pooled funds(A)	**230.6**				185.9			
Total U.S. Qualified Pension Plans	**$2,404.0**				$3,343.7			
International Pension Plans								
Cash and cash equivalents	**$12.1**	**$12.1**	**$—**	**$—**	$16.8	$16.8	$—	$—
Equity pooled funds	**348.1**	**—**	**348.1**	**—**	676.4	—	676.4	—
Fixed income pooled funds	**589.9**	**—**	**536.4**	**53.5**	948.5	—	948.5	—
Other pooled funds	**16.4**	**—**	**16.4**	**—**	16.7	—	16.7	—
Insurance contracts	**155.5**	**—**	**—**	**155.5**	246.6	—	—	246.6
Total International Pension Plans	**$1,122.0**	**$12.1**	**$900.9**	**$209.0**	$1,905.0	$16.8	$1,641.6	$246.6

(A) Real estate pooled funds consist of funds that invest in properties. These funds generally allow for quarterly redemption with 30 days' notice. Timing for redemption could be delayed based on the priority of our request and the availability of funds. Interests in these funds are valued using the net asset value ("NAV") per share practical expedient and are not classified in the fair value hierarchy.

The table below summarizes changes in fair value of the pension plan assets classified as Level 3:

	Insurance Contracts	Fixed Income Pooled Funds	Total Level 3
Balance at 30 September 2020	$256.5	$—	$256.5
Purchases, sales, and settlements, net	(2.0)	—	(2.0)
Actual return on plan assets held at end of year	(7.9)	—	(7.9)
Balance at 30 September 2021	$246.6	$—	$246.6
Purchases, sales, and settlements, net	—	80.3	80.3
Actual return on plan assets held at end of year	(91.1)	(26.8)	(117.9)
Balance at 30 September 2022	**$155.5**	**$53.5**	**$209.0**

The descriptions and fair value methodologies for the U.S. and International pension plan assets are as follows:

Cash and Cash Equivalents

The carrying amounts of cash and cash equivalents approximate fair value due to the short-term maturity.

Equity Securities

Equity securities are valued at the closing market price reported on a U.S. or international exchange where the security is actively traded and are therefore classified as Level 1 assets.

Equity Mutual and Pooled Funds
Shares of mutual funds are valued at the daily closing price as reported by the fund. The mutual funds are required to publish their daily NAV and to transact at that price. The mutual funds are deemed to be actively traded and are classified as Level 1 assets. Units of pooled funds are valued at the per unit NAV determined by the fund manager based on the value of the underlying traded holdings and are classified as Level 2 assets.

Fixed Income Securities
Corporate and government bonds, and related fixed income securities, are classified as Level 2 assets, as they are either valued at quoted market prices from observable pricing sources at the reporting date or valued based upon comparable securities with similar yields and credit ratings. U.S. plan fixed income investments primarily include U.S. corporate bonds, U.S. treasury investments, interest rate swaps, total return swaps, and U.S. treasury future contracts.

Fixed Income Pooled Funds
Fixed income pooled funds are classified as either Level 2 or Level 3 assets depending on the underlying investments of the fund. Fixed income pooled funds classified as Level 2 assets may hold government bonds, index linked bonds, corporate bonds, cash, and derivative instruments. The NAV of these assets is based on quoted market pricing from observable pricing sources or valued based upon comparable securities with similar yields, credit ratings, or factors as of the reporting date. Fixed income pooled funds classified as Level 3 may hold high yield bonds, emerging market debt, loans, structured credit, and other instruments. Due to the limited market activity of the underlying securities, the NAV of these assets is based on the fund manager's estimate of the fair value of the shares held as of the reporting date.

Other Pooled Funds
Other pooled funds are classified as Level 2 assets, as they are valued at the NAV of the shares held at year end, which is based on the fair value of the underlying investments.

Insurance Contracts
Insurance contracts are classified as Level 3 assets, as they are carried at contract value, which approximates the estimated fair value. The estimated fair value is based on the fair value of the underlying investment of the insurance company and discount rates that require inputs with limited observability.

Contributions and Projected Benefit Payments

Pension contributions to funded plans and benefit payments for unfunded plans for fiscal year 2022 were $44.7. Contributions for funded plans resulted primarily from contractual and regulatory requirements. Benefit payments to unfunded plans were due primarily to the timing of retirements. We anticipate contributing $25 to $35 to the defined benefit pension plans in fiscal year 2023. These contributions are anticipated to be driven primarily by contractual and regulatory requirements for funded plans and benefit payments for unfunded plans, which are dependent upon timing of retirements.

Projected benefit payments, which reflect expected future service, are as follows:

	U.S.	International
2023	$171.7	$53.4
2024	175.4	57.7
2025	179.3	58.3
2026	181.7	62.3
2027	184.0	64.3
2028-2032	944.2	356.0

These estimated benefit payments are based on assumptions about future events. Actual benefit payments may vary significantly from these estimates.

Defined Contribution Plans

We maintain a non-leveraged employee stock ownership plan ("ESOP") which forms part of the Air Products and Chemicals, Inc. Retirement Savings Plan ("RSP"). The ESOP was established in May of 2002. The balance of the RSP is a qualified defined contribution plan including a 401(k) elective deferral component. A substantial portion of U.S. employees are eligible and participate.

We treat dividends paid on ESOP shares as ordinary dividends. Under existing tax law, we may deduct dividends which are paid with respect to shares held by the plan. Shares of our common stock in the ESOP totaled 1,914,842 as of 30 September 2022.

Our contributions to the RSP include a Company core contribution for certain eligible employees who do not receive their primary retirement benefit from the defined benefit pension plans, with the core contribution based on a percentage of pay that is dependent on years of service. For the RSP, we also make matching contributions on overall employee contributions as a percentage of the employee contribution and include an enhanced contribution for certain eligible employees that do not participate in the defined benefit pension plans. Worldwide contributions expensed to income in fiscal years 2022, 2021, and 2020 were $60.6, $53.3, and $45.6, respectively.

Other Postretirement Benefits

We provide other postretirement benefits consisting primarily of healthcare benefits to certain U.S. retirees who meet age and service requirements. The healthcare benefit is a continued medical benefit until the retiree reaches age 65. Healthcare benefits are contributory, with contributions adjusted periodically. The retiree medical costs are capped at a specified dollar amount, with the retiree contributing the remainder. The cost of these benefits was not material in fiscal years 2022, 2021, and 2020. Accumulated postretirement benefit obligations as of the end of fiscal years 2022 and 2021 were $19.9 and $27.4, respectively, of which $4.9 and $5.5 were current obligations, respectively.

We recognize changes in other postretirement benefit plan obligations in other comprehensive income on a pretax basis. During fiscal years 2022 and 2021 we recognized a loss of $0.5 and a gain of $5.4, respectively, that arose during the period, and $1.6 and $1.8 of net actuarial gain amortization, respectively.

The net actuarial gain recognized in accumulated other comprehensive loss on a pretax basis was $4.5 and $6.6 as of 30 September 2022 and 2021, respectively.

16. COMMITMENTS AND CONTINGENCIES

Litigation

We are involved in various legal proceedings, including commercial, competition, environmental, intellectual property, regulatory, product liability, and insurance matters. We do not currently believe there are any legal proceedings, individually or in the aggregate, that are reasonably possible to have a material impact on our financial condition, results of operations, or cash flows.

In September 2010, the Brazilian Administrative Council for Economic Defense ("CADE") issued a decision against our Brazilian subsidiary, Air Products Brasil Ltda., and several other Brazilian industrial gas companies for alleged anticompetitive activities. CADE imposed a civil fine of R$179.2 million (approximately $33 at 30 September 2022) on Air Products Brasil Ltda. This fine was based on a recommendation by a unit of the Brazilian Ministry of Justice, following an investigation beginning in 2003, which alleged violation of competition laws with respect to the sale of industrial and medical gases. The fines are based on a percentage of our total revenue in Brazil in 2003.

We have denied the allegations made by the authorities and filed an appeal in October 2010 with the Brazilian courts. On 6 May 2014, our appeal was granted and the fine against Air Products Brasil Ltda. was dismissed. CADE has appealed that ruling and the matter remains pending. We, with advice of our outside legal counsel, have assessed the status of this matter and have concluded that, although an adverse final judgment after exhausting all appeals is possible, such a judgment is not probable. As a result, no provision has been made in the consolidated financial statements. In the event of an adverse final judgment, we estimate the maximum possible loss to be the full amount of the fine of R$179.2 million (approximately $33 at 30 September 2022) plus interest accrued thereon until final disposition of the proceedings.

Additionally, Winter Storm Uri, a severe winter weather storm in the U.S. Gulf Coast in February 2021, disrupted our operations and caused power and natural gas prices to spike significantly in Texas. We remain in litigation of a dispute regarding energy management services related to the impact of this event, and other disputes may arise from such power price increases. In addition, legislative action may affect power supply and energy management charges. While it is reasonably possible that we could incur additional costs related to power supply and energy management services in Texas related to the winter storm, it is too early to estimate potential losses, if any, given significant unknowns resulting from the unusual nature of this event.

Environmental

In the normal course of business, we are involved in legal proceedings under the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA," the federal Superfund law), Resource Conservation and Recovery Act ("RCRA"), and similar state and foreign environmental laws relating to the designation of certain sites for investigation or remediation. Presently, there are 30 sites on which a final settlement or remediation has not been achieved where we, along with others in some cases, have been designated a potentially responsible party by environmental authorities or are otherwise engaged in investigation or remediation, including cleanup activity at certain of our current and former manufacturing sites. We continually monitor these sites for which we have environmental exposure.

Accruals for environmental loss contingencies are recorded when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. The consolidated balance sheets at 30 September 2022 and 2021 included an accrual of $71.3 and $76.7, respectively, primarily as part of other noncurrent liabilities. The environmental liabilities will be paid over a period of up to 30 years. We estimate the exposure for environmental loss contingencies to range from $71 to a reasonably possible upper exposure of $84 as of 30 September 2022.

Actual costs to be incurred at identified sites in future periods may vary from the estimates, given inherent uncertainties in evaluating environmental exposures. Using reasonably possible alternative assumptions of the exposure level could result in an increase to the environmental accrual. Due to the inherent uncertainties related to environmental exposures, a significant increase to the reasonably possible upper exposure level could occur if a new site is designated, the scope of remediation is increased, a different remediation alternative is identified, or a significant increase in our proportionate share occurs. We do not expect that any sum we may have to pay in connection with environmental matters in excess of the amounts recorded or disclosed above would have a material adverse impact on our financial position or results of operations in any one year.

Pace

At 30 September 2022, $38.2 of the environmental accrual was related to the Pace facility.

In 2006, we sold our Amines business, which included operations at Pace, Florida, and recognized a liability for retained environmental obligations associated with remediation activities at Pace. We are required by the Florida Department of Environmental Protection ("FDEP") and the United States Environmental Protection Agency ("USEPA") to continue our remediation efforts. We recognized a before-tax expense of $42 in fiscal year 2006 in results from discontinued operations and recorded an environmental accrual of $42 in continuing operations on the consolidated balance sheets.

During the second quarter of fiscal year 2020, we completed an updated cost review of the environmental remediation status at the Pace facility. The review was completed in conjunction with requirements to maintain financial assurance per the Consent Order issued by the FDEP discussed below. Based on our review, we expect ongoing activities to continue for 30 years. Additionally, we will require near-term spending to install new groundwater recovery wells and ancillary equipment, in addition to future capital to consider the extended time horizon for remediation at the site. As a result of these changes, we increased our environmental accrual for this site by $19 in continuing operations on the consolidated balance sheets and recognized a before-tax expense of $19 in results from discontinued operations in the second quarter of fiscal year 2020. There have been no significant changes to the estimated exposure range related to the Pace facility since the second quarter of fiscal year 2020.

We have implemented many of the remedial corrective measures at the Pace facility required under 1995 Consent Orders issued by the FDEP and the USEPA. Contaminated soils have been bioremediated, and the treated soils have been secured in a lined on-site corrective action management unit. Several groundwater recovery systems have been installed to contain and remove contamination from groundwater. We completed an extensive assessment of the site to determine the efficacy of existing measures, what additional corrective measures may be needed, and whether newer remediation technologies that were not available in the 1990s might be suitable to more quickly and effectively remediate groundwater. Based on assessment results, we completed a focused feasibility study that has identified alternative approaches that may more effectively remove contaminants. We continue to review alternative remedial approaches with the FDEP and completed additional field work during 2021 to support the design of an improved groundwater recovery network with the objective of targeting areas of higher contaminant concentration and avoiding areas of high groundwater iron which has proven to be a significant operability issue for the project. The design of the optimized recovery system will likely be finalized in fiscal year 2023 with construction to begin thereafter. In the first quarter of 2015, we entered into a new Consent Order with the FDEP requiring us to continue our remediation efforts at the Pace facility, along with the completion of a cost review every five years.

Piedmont

At 30 September 2022, $7.4 of the environmental accrual was related to the Piedmont site.

On 30 June 2008, we sold our Elkton, Maryland, and Piedmont, South Carolina, production facilities and the related North American atmospheric emulsions and global pressure sensitive adhesives businesses. In connection with the sale, we recognized a liability for retained environmental obligations associated with remediation activities at the Piedmont site. This site is under active remediation for contamination caused by an insolvent prior owner.

We are required by the South Carolina Department of Health and Environmental Control ("SCDHEC") to address both contaminated soil and groundwater. Numerous areas of soil contamination have been addressed, and contaminated groundwater is being recovered and treated. The SCDHEC issued its final approval to the site-wide feasibility study on 13 June 2017 and the Record of Decision for the site on 27 June 2018, after which we signed a Consent Agreement Amendment memorializing our obligations to complete the cleanup of the site. Remediation is ongoing in accordance with the design, which includes in-situ chemical oxidation treatment, as well as the operation of a soil vapor extraction system to remove volatile organic compounds from the unsaturated soils beneath the impacted areas of the plant. We estimate that source area remediation and groundwater recovery and treatment will continue through 2029. Thereafter, we expect this site to go into a state of monitored natural attenuation through 2047.

We recognized a before-tax expense of $24 in 2008 as a component of income from discontinued operations and recorded an environmental liability of $24 in continuing operations on the consolidated balance sheets. There have been no significant changes to the estimated exposure.

Pasadena

At 30 September 2022, $10.7 of the environmental accrual was related to the Pasadena site.

During the fourth quarter of 2012, management committed to permanently shutting down our polyurethane intermediates ("PUI") production facility in Pasadena, Texas. In shutting down and dismantling the facility, we have undertaken certain obligations related to soil and groundwater contaminants. We have been pumping and treating groundwater to control off-site contaminant migration in compliance with regulatory requirements and under the approval of the Texas Commission on Environmental Quality. We estimate that the pump and treat system will continue to operate until 2042.

We continue to progress on additional work to address other environmental obligations at the site. This additional work includes remediating, as required, impacted soils, investigating groundwater west of the former PUI facility, continuing post closure care for two closed RCRA surface impoundment units, and maintaining engineering controls. Additionally, a chemical reduction pilot test to evaluate treating source material was conducted, and is currently undergoing performance monitoring. In 2012, we estimated the total exposure at this site to be $13. There have been no significant changes to the estimated exposure.

Asset Retirement Obligations

Our asset retirement obligations are primarily associated with long-term on-site supply contracts under which we have built a facility on land owned by the customer and are obligated to remove the facility at the end of the contract term. The retirement of assets includes the contractually required removal of a long-lived asset from service and encompasses the sale, removal, abandonment, recycling, or disposal of the assets as required at the end of the contract term. These obligations are primarily reflected within "Other noncurrent liabilities" on the consolidated balance sheets. The timing and/or method of settlement of these obligations are conditional on a future event that may or may not be within our control.

Changes to the carrying amount of our asset retirement obligations were as follows:

Balance at 30 September 2020	$241.4
Additional accruals	16.5
Liabilities settled	(4.1)
Accretion expense	10.5
Currency translation adjustment	5.3
Balance at 30 September 2021	$269.6
Additional accruals	17.9
Liabilities settled	(7.8)
Accretion expense	11.1
Currency translation adjustment	(16.1)
Balance at 30 September 2022	**$274.7**

Warranties and Guarantees

We do not expect that any sum we may have to pay in connection with warranties and guarantees will have a material adverse effect on our consolidated financial condition, liquidity, or results of operations.

Warranties

We, in the normal course of business operations, have issued product warranties related to equipment sales. Also, contracts often contain standard terms and conditions which typically include a warranty and indemnification to the buyer that the goods and services purchased do not infringe on third-party intellectual property rights. The provision for estimated future costs relating to warranties is not material to the consolidated financial statements.

Guarantees

To date, no equity contributions or payments have been made since the inception of the guarantees discussed below. The fair value of these guarantees is not material.

We are party to an equity support agreement and operations guarantee related to an air separation facility constructed in Trinidad for a venture in which we own 50%. At 30 September 2022, maximum potential payments under joint and several guarantees were $23.0. Exposures under the guarantees decline over time and will be completely extinguished by 2024.

We also have a long-term sale of equipment contract with the JIGPC joint venture to engineer, procure, and construct the industrial gas facilities that will supply gases to Aramco. We provided bank guarantees to the joint venture to support our performance under the contract. As of 30 September 2022, our maximum potential payments were $244.5.

Unconditional Purchase Obligations

We are obligated to make future payments under unconditional purchase obligations as summarized below:

2023	$3,788
2024	500
2025	489
2026	522
2027	549
Thereafter	4,740
Total	**$10,588**

Approximately $6.6 billion of our unconditional purchase obligations relate to helium and rare gases. The majority of our obligations occur after fiscal year 2027. Helium purchases include crude feedstock supply to helium refining plants in North America as well as refined helium purchases from sources around the world. As a rare byproduct of natural gas production in the energy sector, these helium sourcing agreements are medium- to long-term and contain take-if-tendered provisions. The refined helium is distributed globally and sold as a merchant gas, primarily under medium-term requirements contracts. While contract terms in our helium sourcing contracts are generally longer than our customer sales contracts, helium is a rare gas used in applications with few or no substitutions because of its unique physical and chemical properties.

We estimate our maximum obligation for future purchases of plant and equipment to be approximately $3.1 billion based on open purchase orders as of 30 September 2022. Although open purchase orders are considered enforceable and legally binding, the terms generally allow us the option to reschedule, cancel, or otherwise modify based on our business needs. We have disclosed this obligation in fiscal year 2023; however, timing of actual satisfaction of the obligation may vary.

Our unconditional purchase obligations also include commitments for power and natural gas supply as well as feedstock supply for numerous HyCO (hydrogen, carbon monoxide, and syngas) facilities. Our long-term sales contracts to customers are generally matched to the term of these obligations and provide recovery of price increases. As a result, we do not believe these purchase obligations would have a material effect on our financial condition or results of operations.

17. CAPITAL STOCK

Common Stock

Authorized common stock consists of 300 million shares with a par value of $1 per share. As of 30 September 2022, 249 million shares were issued, with 222 million issued and outstanding.

On 15 September 2011, the Board of Directors authorized the repurchase of up to $1.0 billion of our outstanding common stock. We repurchase shares pursuant to Rules 10b5-1 and 10b-18 under the Securities Exchange Act of 1934, as amended, through repurchase agreements established with several brokers. We did not purchase any of our outstanding shares during fiscal year 2022. At 30 September 2022, $485.3 in share repurchase authorization remained available.

A summary of the changes in common shares issued and outstanding in fiscal year 2022 is presented below:

Fiscal Year Ended 30 September	2022	2021	2020
Number of common shares, beginning of year	**221,396,755**	221,017,459	220,415,262
Issuance of treasury shares for stock option and award plans	**441,941**	379,296	602,197
Number of common shares, end of year	**221,838,696**	221,396,755	221,017,459

Preferred Stock

Authorized preferred stock consisted of 25 million shares with a par value of $1 per share, of which 2.5 million were designated as Series A Junior Participating Preferred Stock. There were no preferred shares issued or outstanding as of 30 September 2022 and 2021.

18. SHARE-BASED COMPENSATION

Our outstanding share-based compensation programs include deferred stock units and stock options. During the fiscal year ended 30 September 2022, we granted market-based and time-based deferred stock units. We have not issued stock option awards since fiscal year 2015. The terms of our share-based awards are fixed at the grant date. We issue shares from treasury stock upon payout of deferred stock units and exercise of stock options. As of 30 September 2022, there were 1.5 million shares available for future grant under our Long-Term Incentive Plan ("LTIP"), which is shareholder approved.

Share-based compensation cost recognized on the consolidated income statements is summarized below:

	2022	2021	2020
Before-tax share-based compensation cost	**$49.5**	$44.5	$55.8
Income tax benefit	**(12.1)**	(11.0)	(13.0)
After-tax share-based compensation cost	**$37.4**	$33.5	$42.8

Before-tax share-based compensation cost relates to deferred stock units and is primarily included in "Selling and administrative" on our consolidated income statements. The amount of share-based compensation cost capitalized in fiscal years 2022, 2021, and 2020 was not material.

Deferred Stock Units

We have granted deferred stock units to executives, selected employees, and outside directors. These deferred stock units entitle the recipient to one share of common stock upon vesting, which is conditioned, for employee recipients, on continued employment during the deferral period and may be conditioned on achieving certain performance targets. We grant deferred stock unit awards with a two- to five-year deferral period that are subject to payout upon death, disability, or retirement. Deferred stock units issued to outside directors are paid after service on the Board of Directors ends at the time elected by the director (not to exceed 10 years after service ends). We generally expense the grant-date fair value of these awards on a straight-line basis over the vesting period; however, expense recognition is accelerated for retirement eligible individuals who meet the requirements for vesting upon retirement. We have elected to account for forfeitures as they occur, rather than to estimate them. Forfeitures have not been significant historically.

Market-based deferred stock units vest as long as the employee continues to be employed by the Company and upon the achievement of the performance target. The performance target, which is approved by the Compensation Committee, is our share price appreciation and dividends paid, or "total shareholder return," in relation to the S&P 500 Index (for fiscal year 2022 awards) or a defined peer group (for awards granted prior to fiscal year 2022) over a three-year performance period beginning 1 October of the fiscal year of grant. We granted 74,364, 77,251, and 80,215 market-based deferred stock units in fiscal years 2022, 2021, and 2020, respectively.

The fair value of market-based deferred stock units was estimated using a Monte Carlo simulation model as these equity awards are tied to a market condition. The model utilizes multiple input variables that determine the probability of satisfying the market condition stipulated in the grant and calculates the fair value of the awards. We generally expense the grant-date fair value of these awards on a straight-line basis over the vesting period. The estimated grant-date fair value of market-based deferred stock units was $427.23, $235.48, and $275.19 per unit in fiscal years 2022, 2021, and 2020, respectively. The calculation of the fair value of these market-based deferred stock units used the following assumptions:

	2022	2021	2020
Expected volatility	**30.5%**	29.9%	17.8%
Risk-free interest rate	**0.8%**	0.2%	1.6%
Expected dividend yield	**2.1%**	2.1%	2.4%

In addition, in fiscal year 2022, we granted 120,996 time-based deferred stock units at a weighted average grant-date fair value of $278.67. In fiscal years 2021 and 2020, we granted 110,555 and 123,448 time-based deferred stock units at a weighted average grant-date fair value of $282.48 and $230.92, respectively.

A summary of deferred stock unit activity in fiscal year 2022 is presented below:

	Shares (000)	Weighted Average Grant-Date Fair Value
Deferred stock units outstanding at 30 September 2021	854	$194.12
Granted	195	329.65
Paid out	(343)	196.95
Forfeited	(40)	266.51
Adjusted	64	161.64
Deferred stock units outstanding at 30 September 2022	**730**	**$222.13**

Cash payments made for deferred stock units totaled $5.5, $5.2, and $4.8 in fiscal years 2022, 2021, and 2020, respectively. As of 30 September 2022, there was $56.0 of unrecognized compensation cost related to deferred stock units. This cost is expected to be recognized over a weighted average period of 1.6 years. The total fair value of deferred stock units paid out during fiscal years 2022, 2021, and 2020, including shares vested in prior periods, was $92.9, $88.0, and $65.4, respectively.

Stock Options

We have granted awards of options to purchase common stock to executives and selected employees. The exercise price of stock options equals the market price of our stock on the date of the grant. As of 30 September 2022, there was no unrecognized compensation cost as all stock option awards were fully vested.

A summary of stock option activity in fiscal year 2022 is presented below:

	Shares (000)	Weighted Average Exercise Price
Stock options outstanding and exercisable at 30 September 2021	801	$99.79
Exercised	(237)	84.75
Stock options outstanding and exercisable at 30 September 2022	**564**	**$106.14**

The weighted average remaining contractual term of stock options outstanding and exercisable at 30 September 2022 was 1.3 years. The aggregate intrinsic value of these stock options was $71.3, which represents the amount by which our closing stock price of $232.73 as of 30 September 2022 exceeds the exercise price multiplied by the number of in-the-money options outstanding or exercisable. The intrinsic value of stock options exercised during fiscal years 2022, 2021, and 2020 was $20.2, $29.0, and $65.7, respectively.

Compensation cost is generally recognized over the stated vesting period consistent with the terms of the arrangement, which is either on a straight-line or graded-vesting basis. Expense recognition is accelerated for retirement-eligible individuals who would meet the requirements for vesting of awards upon their retirement.

Cash received from option exercises during fiscal year 2022 was $19.3. The total tax benefit realized from stock option exercises in fiscal year 2022 was $11.2, of which $10.5 was the excess tax benefit.

19. ACCUMULATED OTHER COMPREHENSIVE LOSS

The table below summarizes changes in accumulated other comprehensive loss ("AOCL"), net of tax, attributable to Air Products:

	Derivatives qualifying as hedges	Foreign currency translation adjustments	Pension and postretirement benefits	Total
Balance at 30 September 2019	**($61.4)**	**($1,356.9)**	**($957.3)**	**($2,375.6)**
Other comprehensive income (loss) before reclassifications	43.5	233.4	(68.2)	208.7
Amounts reclassified from AOCL	(57.7)	—	82.5	24.8
Net current period other comprehensive (loss) income	($14.2)	$233.4	$14.3	$233.5
Amount attributable to noncontrolling interests	(21.1)	19.3	(0.2)	(2.0)
Balance at 30 September 2020	**($54.5)**	**($1,142.8)**	**($942.8)**	**($2,140.1)**
Other comprehensive income before reclassifications	3.3	267.3	274.3	544.9
Amounts reclassified from AOCL	43.5	—	74.6	118.1
Net current period other comprehensive income	$46.8	$267.3	$348.9	$663.0
Amount attributable to noncontrolling interest	20.6	18.3	(0.1)	38.8
Balance at 30 September 2021	**($28.3)**	**($893.8)**	**($593.8)**	**($1,515.9)**
Other comprehensive loss before reclassifications	(120.3)	(1,230.5)	(112.2)	(1,463.0)
Amounts reclassified from AOCL	91.4	7.3	64.8	163.5
Net current period other comprehensive loss	($28.9)	($1,223.2)	($47.4)	($1,299.5)
Amount attributable to noncontrolling interest	14.7	(44.6)	0.6	(29.3)
Balance at 30 September 2022	**($71.9)**	**($2,072.4)**	**($641.8)**	**($2,786.1)**

The table below summarizes the reclassifications out of AOCL and the affected line item on the consolidated income statements:

Fiscal Year Ended 30 September	**2022**	2021	2020
Loss (Gain) on Cash Flow Hedges, net of tax			
Sales	**$0.5**	($0.6)	($0.2)
Cost of sales	**(0.4)**	(0.3)	(0.8)
Interest expense	**3.6**	3.5	2.8
Other non-operating income (expense), net	**87.7**	40.9	(59.5)
Total Loss (Gain) on Cash Flow Hedges, net of tax	**$91.4**	$43.5	($57.7)
Currency Translation Adjustment			
Business and asset actions	**$5.1**	$—	$—
Income from discontinued operations, net of tax	**2.2**	—	—
Currency Translation Adjustment	**$7.3**	$—	$—
Pension and Postretirement Benefits, net of tax[(A)]	**$64.8**	$74.6	$82.5

[(A)] The components of net periodic benefit cost reclassified out of AOCL include items such as prior service cost amortization, actuarial loss amortization, and settlements and are included in “Other non-operating income (expense), net” on the consolidated income statements. Refer to Note 15, *Retirement Benefits*, for additional information.

20. EARNINGS PER SHARE

The table below details the computation of basic and diluted earnings per share ("EPS"):

Fiscal Year Ended 30 September	2022	2021	2020
Numerator			
Net income from continuing operations	**$2,243.5**	$2,028.8	$1,901.0
Net income (loss) from discontinued operations	**12.6**	70.3	(14.3)
Net Income Attributable to Air Products	**$2,256.1**	$2,099.1	$1,886.7
Denominator (in millions)			
Weighted average common shares — Basic	**222.0**	221.6	221.2
Effect of dilutive securities			
Employee stock option and other award plans	**0.5**	0.9	1.1
Weighted average common shares — Diluted	**222.5**	**222.5**	**222.3**
Per Share Data*			
Basic EPS from continuing operations	**$10.11**	$9.16	$8.59
Basic EPS from discontinued operations	**0.06**	0.32	(0.06)
Basic EPS Attributable to Air Products	**$10.16**	$9.47	$8.53
Diluted EPS from continuing operations	**$10.08**	$9.12	$8.55
Diluted EPS from discontinued operations	**0.06**	0.32	(0.06)
Diluted EPS Attributable to Air Products	**$10.14**	$9.43	$8.49

*EPS is calculated independently for each component and may not sum to total EPS due to rounding.

Diluted EPS attributable to Air Products reflects the potential dilution that could occur if stock options or other share-based awards were exercised or converted into common stock. The dilutive effect is computed using the treasury stock method, which assumes all share-based awards are exercised, and the hypothetical proceeds from exercise are used by the Company to purchase common stock at the average market price during the period. To the extent they would have been dilutive, the incremental shares, or the difference between shares assumed to be issued versus purchased, are included in the denominator of the diluted EPS calculation. There were no antidilutive outstanding share-based awards in fiscal years 2022, 2021 and 2020.

21. INCOME TAXES

The table below summarizes income from U.S. and foreign operations before taxes:

	2022	2021	2020
United States income	**$947.9**	$924.6	$943.7
Foreign income	**1,325.3**	1,288.7	1,215.3
Equity affiliates' income	**481.5**	294.1	264.8
Income from continuing operations before taxes	**$2,754.7**	$2,507.4	$2,423.8

The table below details the components of our income tax provision:

	2022	2021	2020
Current Tax Provision			
Federal	**$149.1**	$85.6	$26.9
State	**30.1**	28.4	23.8
Foreign	**289.3**	254.8	262.7
Total current tax provision	**468.5**	368.8	313.4
Deferred Tax Provision			
Federal	**15.6**	54.7	108.8
State	**(1.9)**	(0.1)	(3.6)
Foreign	**18.6**	39.4	59.8
Total deferred tax provision	**32.3**	94.0	165.0
Total income tax provision	**$500.8**	$462.8	$478.4

Cash Paid for Taxes (Net of Cash Refunds)

Income tax payments, net of refunds, were $369.2, $383.8, and $379.9 in fiscal years 2022, 2021, and 2020, respectively. Fiscal year 2022 and 2021 reflect income tax refunds associated with discontinued operations of $59.6 and $6.7, respectively.

India Finance Act 2020

On 27 March 2020, the Indian government passed Finance Act 2020 (the "India Finance Act"), which amended rules regarding the taxation of dividends declared and distributed by Indian companies. Under the India Finance Act, future dividends declared or distributed by an Indian company are no longer subject to dividend distribution tax. Instead, any non-resident recipient is subject to a withholding tax. Our income tax provision for the fiscal year ended 30 September 2020 reflected an expense of $20.3 for estimated withholding taxes that we may incur on future dividends related to INOX Air Products Private Limited ("INOX"), an equity affiliate investment in our Asia segment. Additionally, we recorded a benefit of $33.8 within "Equity affiliates' income" for our share of accumulated dividend distribution taxes released with respect to INOX.

U.S. Tax Cuts and Jobs Act

On 22 December 2017, the United States enacted the U.S. Tax Cuts and Jobs Act (the “Tax Act” or "Tax Reform"), which significantly changed existing U.S. tax laws, including a reduction in the federal corporate income tax rate to 21%, a deemed repatriation tax on unremitted foreign earnings, as well as other changes. As of 30 September 2022, our outstanding liability for the deemed repatriation tax was $155.2, of which $134.6 is presented within noncurrent liabilities on our consolidated balance sheets. We are paying this obligation in installments over four remaining years.

Inflation Reduction Act and CHIPS and Science Act of 2022

In August 2022, the U.S. Inflation Reduction Act of 2022 and the CHIPS and Science Act of 2022 were signed into law. These acts include, among other provisions, a corporate alternative minimum tax of 15%, an excise tax on the repurchase of corporate stock, various climate and energy provisions, and incentives for investment in semiconductor manufacturing. We are evaluating the impact these acts could have on our financial statements, including the impact of tax incentives for carbon sequestration and clean hydrogen production once our new projects in these areas come on-stream in the U.S.

Effective Tax Rate

The effective tax rate equals the income tax provision divided by income from continuing operations before taxes. A reconciliation of the differences between the United States federal statutory tax rate and the effective tax rate is provided below:

(Percent of income before taxes)	**2022**	2021	2020
U.S. federal statutory tax rate	**21.0%**	21.0%	21.0%
State taxes, net of federal benefit	**0.8**	0.9	0.6
Income from equity affiliates	**(3.4)**	(2.5)	(2.3)
Foreign tax differentials	**0.7**	0.5	0.1
Tax on foreign repatriated earnings	**0.7**	0.7	0.9
Share-based compensation	**(0.7)**	(0.7)	(0.8)
Other	**(0.9)**	(1.4)	0.2
Effective Tax Rate	**18.2%**	18.5%	19.7%

Foreign tax differentials represent the differences between foreign earnings subject to foreign tax rates that are different than the U.S. federal statutory rate and include tax holidays and incentives. Our income tax holidays relate to operations in jurisdictions that provide reduced income tax rates for certain qualifying activities and are conditional upon us meeting certain operating thresholds. The impact of these tax holidays decreased income tax expense by $26.9 ($0.12 per share) in fiscal year 2020, primarily related to a preferential tax rate in China that is effective until 31 December 2030. This includes the impact of remeasurement of the deferred tax assets and liabilities in 2020 due to an extension of the holiday period in China. The impact of tax holidays in fiscal years 2022 and 2021 was not material.

Tax on foreign repatriated earnings includes benefits and costs related to U.S. and foreign taxation on the current and future repatriation of foreign earnings and a U.S. benefit for related foreign tax credits. The effective tax rate in 2020 reflects impacts from the India Finance Act 2020 discussed above. In addition, the Tax Act included new provisions related to the taxation of foreign operations, known as Global Intangible Low Tax Income (“GILTI”). We have elected as an accounting policy to account for GILTI as a period cost when incurred.

Equity affiliates’ income, which is primarily presented net of income taxes on our consolidated income statements, favorably impacts our effective tax rate. The increase in the impact for fiscal year 2022 is primarily due to the results of the new JIGPC joint venture as well as recognition of the remaining deferred profit associated with air separation units previously sold to Jazan Gas Project Company, net of other project finalization costs.

Share-based compensation reflects the impact from recognition of $18.3, $17.0, and $20.0 of excess tax benefits in our provision for income taxes during fiscal years 2022, 2021, and 2020, respectively.

In fiscal year 2021, other includes net tax benefits of $21.5, including interest, resulting from the release of U.S. unrecognized tax benefits upon expiration of the statute of limitations on uncertain tax positions taken in prior years.

Deferred Tax Assets and Liabilities

The significant components of deferred tax assets and liabilities are as follows:

30 September	2022	2021
Gross Deferred Tax Assets		
Retirement benefits and compensation accruals	**$77.2**	$69.4
Tax loss carryforwards	**126.3**	120.9
Tax credits and other tax carryforwards	**39.2**	27.3
Reserves and accruals	**55.4**	74.5
Currency losses	**—**	30.4
Other	**68.3**	44.0
Valuation allowance	**(100.1)**	(97.6)
Deferred Tax Assets	**266.3**	268.9
Gross Deferred Tax Liabilities		
Plant and equipment	**1,187.6**	1,171.8
Currency gains	**22.5**	—
Unremitted earnings of foreign entities	**72.9**	69.1
Partnership and other investments	**16.1**	15.3
Intangible assets	**69.8**	86.2
Other	**9.1**	7.2
Deferred Tax Liabilities	**1,378.0**	1,349.6
Net Deferred Income Tax Liability	**$1,111.7**	$1,080.7

Deferred tax assets and liabilities are included within the consolidated balance sheets as follows:

	2022	2021
Deferred Tax Assets		
Other noncurrent assets	**$135.7**	$100.2
Deferred Tax Liabilities		
Deferred income taxes	**1,247.4**	1,180.9
Net Deferred Income Tax Liability	**$1,111.7**	$1,080.7

Deferred tax assets for "Reserves and accruals" and "Other" were impacted by changes in tax deferred deductions related to the timing of recognizing accruals for local tax and accounting purposes as well as foreign currency movement. The deferred tax component for currency transactions moved into an overall deferred tax liability position due primarily to currency movements on hedging transactions as several foreign based currencies weakened against the U.S. dollar in fiscal year 2022.

Deferred tax liabilities related to plant and equipment increased due to the impact of accelerated tax depreciation deductions in excess of book depreciation primarily in the United States. Deferred tax liabilities related to Intangible assets decreased primarily due to amortization deductions for book purposes being in excess of that for tax purposes as well as foreign currency movement.

As of 30 September 2022, we had the following deferred tax assets for certain tax credits:

Jurisdiction	Gross Tax Asset	Expiration Period
U.S. State	$2.7	2023 - 2035
U.S. Federal	15.7	2028 - 2032
Credits in Foreign Jurisdictions	18.5	2025 - 2041; Indefinite

Of the $18.5 credits in foreign jurisdictions, $12.2 have indefinite carryforward periods.

As of 30 September 2022, we had the following loss carryforwards:

Jurisdiction	Gross Loss Carryforward	Expiration Period
U.S. State Net Operating Loss	$279.5	2023 - 2040
U.S. State Capital Loss	36.3	2023 - 2027
U.S. Federal Capital Loss	88.8	2025 - 2027
Foreign Net Operating Loss	268.8	2023 - 2038; Indefinite
Foreign Capital Loss	181.1	Indefinite

Of the $268.8 of foreign net operating loss carryforwards, $94.6 have indefinite carryforward periods.

The valuation allowance was $100.1 and $97.6 as of 30 September 2022 and 2021, respectively. As of 30 September 2022, the balance primarily related to $26.8 of foreign credits and loss carryforwards, $14.0 of U.S. federal foreign income tax credits, and $45.3 related to foreign capital losses that were generated from the loss recorded on the exit from the Energy-from-Waste project in 2016. If events warrant the reversal of the valuation allowance, it would result in a reduction of tax expense. We believe it is more likely than not that future earnings and reversal of deferred tax liabilities will be sufficient to utilize our deferred tax assets, net of existing valuation allowance, as of 30 September 2022.

Our U.S. federal and U.S. state capital losses primarily related to a loss realized upon the divestiture of our Russian subsidiary in fiscal year 2022. We believe it is more likely than not that we will recognize sufficient U.S. capital gain income in the future to utilize our capital losses before expiration.

We record income taxes on the undistributed earnings of our foreign subsidiaries and corporate joint ventures unless those earnings are indefinitely reinvested. Such earnings may be subject to foreign withholding and other taxes. The cumulative undistributed earnings that are considered to be indefinitely reinvested in foreign subsidiaries and corporate joint ventures are included in retained earnings on the consolidated balance sheets and amounted to $6.7 billion as of 30 September 2022. An estimated $621.6 in additional foreign withholding and other income taxes would be due if these earnings were remitted as dividends.

Unrecognized Tax Benefits

A reconciliation of the beginning and ending amount of the unrecognized tax benefits, which excludes interest and penalties, is as follows:

	2022	2021	2020
Unrecognized tax benefits balance at beginning of year	**$140.3**	$237.0	$231.7
Additions for tax positions of the current year	**7.4**	14.5	7.6
Additions for tax positions of prior years	**6.6**	3.5	17.7
Reductions for tax positions of prior years	**(15.4)**	(8.2)	(4.1)
Settlements	**(0.6)**	(3.1)	(1.2)
Statute of limitations expiration	**(25.5)**	(104.6)	(14.0)
Foreign currency translation	**(9.3)**	1.2	(0.7)
Unrecognized tax benefits balance at end of year	**$103.5**	$140.3	$237.0

Of our unrecognized tax benefits as of 30 September 2022, $74.9 would impact the effective tax rate from continuing operations if recognized.

In fiscal year 2022, reserves for unrecognized tax benefits decreased $25.5 due to statute of limitation expirations. We released reserves of $17.2 related to the sale of PMD. Upon release of the reserves, we recorded income tax benefits of $14.8 as a component of discontinued operations. The PMD reserve was net of related deferred tax assets of $2.4. Fiscal year 2022 also reflects a $15.4 reduction for tax positions of prior years. This was primarily due to a $10.6 reduction caused by changes to income tax rates.

In fiscal year 2021, reserves for unrecognized tax benefits decreased $104.6 due to statute of limitation expirations. We released reserves of $65.6 related to the sale of PMD, $8.2 associated with our former Energy-from-Waste business (“EfW”), and $27.5 for other reserves, including those associated with a tax election benefit related to a non-U.S. subsidiary in 2017. Upon release of the reserves related to PMD and EfW, we recorded income tax benefits of $51.8 and $8.2, respectively, as a component of discontinued operations. The PMD reserve was net of related deferred tax assets of $13.8. The release of other reserves of $27.5 was net of related deferred tax assets of $8.4 and resulted in an income tax benefit, including interest, of $21.5.

Interest and penalties related to unrecognized tax benefits are recorded as a component of income tax expense and totaled $1.2, ($0.2), and $6.1 in fiscal years 2022, 2021, and 2020, respectively. Our 2022 and 2021 expense reflects a benefit from the reversal of accrued interest on reserves released during the period. Our accrued balance for interest and penalties was $22.6 and $24.9 as of 30 September 2022 and 2021, respectively.

Income Tax Examinations

We are currently under examination in a number of tax jurisdictions. It is reasonably possible that a change in our unrecognized tax benefits may occur in fiscal year 2022 if any of these examinations are resolved during the next twelve months. However, quantification of an estimated range cannot be made as of the date of this report.

We generally remain subject to examination in the following major tax jurisdictions for the years indicated below:

Major Tax Jurisdiction	Open Tax Years
North America	
United States – Federal	2018 - 2022
United States – State	2013 - 2022
Canada	2015 - 2022
Europe	
France	2019 - 2022
Germany	2017 - 2022
Netherlands	2018 - 2022
Spain	2017 - 2022
United Kingdom	2019 - 2022
Asia	
China	2012 - 2022
South Korea	2014 - 2022
Taiwan	2017 - 2022
Latin America	
Chile	2018 - 2022

22. SUPPLEMENTAL INFORMATION

NEOM Green Hydrogen Project

In the fourth quarter of fiscal year 2020, we announced the NEOM Green Hydrogen Project (the "NEOM project"), a multi-billion dollar green hydrogen-based ammonia production facility powered by renewable energy located in the NEOM city of the Kingdom of Saudi Arabia. We, along with our joint venture partners, ACWA Power and NEOM Company, are equal owners in the newly formed NEOM Green Hydrogen Company joint venture ("NGHC") that will develop, construct, own, operate, and finance the NEOM project. The NEOM project is expected to be financed through non-recourse project financing and the partners' investments.

During the third quarter of fiscal year 2022, we entered into an agreement with NGHC under which we commenced construction of the NEOM project. In addition, we executed an agreement with NGHC under which we will be the exclusive offtaker of green ammonia produced by the NEOM project under a long-term take-if-tendered agreement. The NEOM project is expected to be on-stream in 2026. We intend to transport green ammonia around the world to be dissociated to produce green hydrogen, primarily for the transportation market.

Air Products has one-third of the voting interests in the NGHC joint venture; however, substantially all the activities of the joint venture involve or are conducted on behalf of Air Products. Since we have disproportionately few voting rights relative to our economic interests in the joint venture, we determined that NGHC is a variable interest entity. In addition, we determined that we are the primary beneficiary of NGHC since we have the power to unilaterally direct certain significant activities, including key design and construction decisions, and we share power with our joint venture partners related to other activities that are significant to the economic performance of NGHC. Therefore, we consolidated NGHC within the Middle East and India segment beginning in the third quarter of fiscal year 2022.

As of 30 September 2022, our consolidated balance sheet includes the following balances attributable to NGHC: $275 in "Cash and cash items," $23 in "Other receivables and current assets," $219 in "Plant and equipment, net," $58 in "Payables and accrued liabilities," $447 in "Long-term debt – related party," and $30 in "Noncontrolling interests."

Business and Asset Actions

During the fourth quarter of fiscal year 2022, we divested our small industrial gas business in Russia due to Russia's invasion of Ukraine. As a result, we recorded a noncash charge of $73.7, which included transaction costs and cumulative currency translation losses. This charge is reflected as "Business and asset actions" on our consolidated income statements and was not recorded in the results of our Europe segment.

Related Party Transactions

We have related party sales to some of our equity affiliates and joint venture partners as well as other income primarily from fees charged for use of Air Products' patents and technology. Sales to and other income from related parties totaled approximately $300, $225, and $335 for the fiscal years ended 30 September 2022, 2021, and 2020, respectively. Sales agreements with related parties include terms that are consistent with those that we believe would have been negotiated at an arm's length with an independent party. As of 30 September 2022 and 2021, our consolidated balance sheets included related party trade receivables of approximately $55 and $90, respectively.

In addition, refer to Note 14, *Debt*, for information concerning debt owed to related parties.

Facility Closure

During the second quarter of fiscal year 2021, we recorded a charge of $23.2 primarily for a noncash write-down of assets associated with a contract termination in the Americas segment. This charge is reflected as "Facility closure" on our consolidated income statements for the fiscal year ended 30 September 2021 and was not recorded in the results of the Americas segment.

Company Headquarters Relocation Income (Expense)

During the second quarter of fiscal year 2020, we sold property at our former corporate headquarters located in Trexlertown, Pennsylvania. We received net proceeds of $44.1 and recorded a gain of $33.8, which is reflected on our consolidated income statements as "Company headquarters relocation income (expense)" for the fiscal year ended 30 September 2020. The gain was not recorded in the results of the Corporate and other segment.

Supplemental Balance Sheet Information

Other Receivables and Current Assets

30 September	2022	2021
Derivative instruments	**$114.4**	$59.8
Contract fulfillment costs	**84.1**	125.5
Contract assets	**69.0**	119.4
Current lease receivables	**77.8**	84.4
Other	**170.5**	161.8
Other receivables and current assets	**$515.8**	$550.9

Other Noncurrent Assets

30 September	2022	2021
Operating lease right-of-use assets	**$694.7**	$566.2
Pension benefits	**133.9**	219.2
Long-term deposits on plant and equipment	**200.0**	200.0
Deferred tax assets	**135.7**	100.2
Prepaid tax	**17.0**	75.0
Investments other than equity method	**66.7**	66.9
Derivative instruments	**74.7**	23.6
Other	**319.1**	255.4
Other noncurrent assets	**$1,641.8**	$1,506.5

Payables and Accrued Liabilities

30 September	2022	2021
Trade creditors	**$1,120.7**	$736.8
Contract liabilities	**439.1**	366.8
Dividends payable	**359.4**	332.1
Accrued payroll and employee benefits	**249.1**	221.2
Obligation for future contribution to an equity affiliate	**—**	150.0
Current lease obligations	**90.0**	78.6
Derivative instruments	**228.3**	68.8
Pension and postretirement benefits	**11.1**	25.6
Other	**273.9**	238.4
Payables and accrued liabilities	**$2,771.6**	$2,218.3

Other Noncurrent Liabilities

30 September	2022	2021
Operating lease liabilities	**$592.1**	$503.4
Asset retirement obligations	**265.0**	258.0
Pension benefits	**190.0**	255.3
Postretirement benefits	**15.0**	22.1
Derivative instruments	**138.2**	52.7
Long-term accrued income taxes related to U.S. tax reform	**134.6**	157.1
Contingencies related to uncertain tax positions	**95.6**	111.8
Contract liabilities	**67.2**	58.4
Environmental liabilities	**61.8**	68.5
Other	**131.7**	153.6
Other noncurrent liabilities	**$1,691.2**	$1,640.9

23. BUSINESS SEGMENT AND GEOGRAPHIC INFORMATION

During the fiscal year ended 30 September 2022, we managed our operations, assessed performance, and reported earnings under the following reporting segments:

- Americas;
- Asia;
- Europe;
- Middle East and India; and
- Corporate and other

Our reporting segments reflect the manner in which our chief operating decision maker reviews results and allocates resources. We evaluate the performance of our segments based upon reported segment operating income. Except for the Corporate and other segment, each reporting segment meets the definition of an operating segment and does not include the aggregation of multiple operating segments. Our Corporate and other segment includes the aggregation of three operating segments that meet the aggregation criteria under GAAP.

Industrial Gases – Regional

The results of our regional industrial gas businesses are reflected in the Americas, Asia, Europe, and Middle East and India segments. These businesses produce and sell gases to diversified customers in dozens of industries, including those in refining, chemicals, metals, electronics, manufacturing, medical, and food. Our industrial gas portfolio includes atmospheric gases such as oxygen, nitrogen, and argon; process gases such as hydrogen, helium, carbon dioxide (CO_2), and carbon monoxide, as well as a mixture of hydrogen and carbon monoxide, or "syngas;" and specialty gases. Our regional industrial gas businesses also develop, build, and operate equipment such as air separation units and non-cryogenic generators for the production or processing of gases. We offer our industrial gas products through a variety of supply modes as described in Note 4, *Revenue Recognition*.

Electricity is the largest cost component in the production of atmospheric gases. Steam methane reformers utilize natural gas as the primary raw material, and gasifiers use liquid and solid hydrocarbons as the principal raw material for the production of hydrogen, carbon monoxide, and syngas. We mitigate energy, natural gas, and hydrocarbon price fluctuations contractually through pricing formulas, surcharges, and cost pass-through and tolling arrangements.

Our regional industrial gas segments also include our share of the results of several joint ventures accounted for by the equity method. The largest of these joint ventures operate in China, India, Italy, Mexico, Saudi Arabia, South Africa, and Thailand.

Each of the regional industrial gases segments competes against global industrial gas companies as well as regional competitors. Competition is based primarily on price, reliability of supply, and the development of industrial gas applications. We derive a competitive advantage in locations where we have pipeline networks, which enable us to provide reliable and economic supply of products to larger customers.

Corporate and other

The Corporate and other segment includes sales of cryogenic and gas processing equipment for air separation that is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. Our Corporate and other segment also includes the results of our liquefied natural gas ("LNG"), turbo machinery equipment and services, and distribution sale of equipment businesses. Competition for our sale of equipment businesses is based primarily on technological performance, service, technical know-how, price, and performance guarantees.

Our Corporate and other segment also incurs costs to provide corporate support functions and global management activities that benefit all segments. These costs include those for product development, research and development, and administrative support. The results of our Corporate and other segment also include income and expense not directly associated with the regional segments, such as foreign exchange gains and losses.

In addition to assets of the global businesses included in this segment, other assets include cash and cash items, short-term investments, deferred tax assets, and financial instruments.

Customers

We do not have a homogeneous customer base or end market, and no single customer accounts for more than 10% of our consolidated sales.

Business Segment Information

	Americas	Asia	Europe	Middle East and India	Corporate and other	Total	
2022							
Sales	$5,368.9	$3,143.3	$3,086.1	$129.5	$970.8	$12,698.6	(A)
Operating income (loss)	1,174.4	898.3	503.4	21.1	(184.7)	2,412.5	(B)
Depreciation and amortization	629.5	436.5	195.2	26.9	50.1	1,338.2	
Equity affiliates' income	98.2	22.1	78.2	293.9	3.9	496.3	(B)
Expenditures for long-lived assets	1,353.1	779.2	312.6	271.6	210.0	2,926.5	
Investments in net assets of and advances to equity affiliates	434.4	268.9	435.0	2,143.3	72.2	3,353.8	
Total assets	8,237.7	6,968.7	3,645.1	2,980.7	5,360.4	27,192.6	
2021(C)							
Sales	$4,167.6	$2,920.8	$2,345.6	$99.3	$789.7	$10,323.0	(A)
Operating income (loss)	1,065.5	838.3	529.4	28.0	(193.4)	2,267.8	(B)
Depreciation and amortization	611.9	444.4	204.5	25.3	35.2	1,321.3	
Equity affiliates' income	112.5	35.9	62.8	76.4	6.5	294.1	(B)
Expenditures for long-lived assets	909.6	792.3	300.3	71.0	391.0	2,464.2	
Investments in net assets of and advances to equity affiliates	383.8	330.4	455.4	409.7	70.0	1,649.3	
Total assets	7,092.5	7,349.4	3,830.3	800.6	7,786.4	26,859.2	
2020(C)							
Sales	$3,630.7	$2,716.5	$1,847.0	$79.3	$582.8	$8,856.3	(A)
Operating income (loss)	1,012.4	870.3	454.8	18.5	(152.2)	2,203.8	(B)
Depreciation and amortization	559.5	399.4	175.9	20.0	30.2	1,185.0	
Equity affiliates' income	84.3	32.1	51.8	51.9	10.9	231.0	(B)
Expenditures for long-lived assets	1,264.7	690.3	295.9	31.7	226.4	2,509.0	

(A) Sales relate to external customers only. All intersegment sales are eliminated in consolidation.

(B) Refer to the *Reconciliations to Consolidated Results* section below.

(C) Segment information presented for fiscal years 2021 and 2020 has been updated to reflect the reorganization of our reporting segments effective 1 October 2021. The reorganization included the separation of our former Industrial Gases – EMEA (Europe, Middle East, and Africa) segment into two separate reporting segments: (1) Europe and (2) Middle East and India. The results of an affiliate formerly reflected in the Asia segment are now reported in the Middle East and India segment. Additionally, the results of our Industrial Gases – Global operating segment are reflected in the Corporate and other segment. The reorganization did not impact the Americas segment.

Reconciliations to Consolidated Results

Operating Income

The table below reconciles total operating income disclosed in the table above to consolidated operating income as reflected on our consolidated income statements:

Fiscal Year Ended 30 September	2022	2021	2020
Total	**$2,412.5**	$2,267.8	$2,203.8
Facility closure	**—**	(23.2)	—
Business and asset actions	**(73.7)**	—	—
Gain on exchange with joint venture partner	**—**	36.8	—
Company headquarters relocation income (expense)	**—**	—	33.8
Consolidated Operating Income	**$2,338.8**	$2,281.4	$2,237.6

Equity Affiliates' Income

The table below reconciles total equity affiliates' income disclosed in the table above to consolidated equity affiliates' income as reflected on our consolidated income statements:

Fiscal Year Ended 30 September	2022	2021	2020
Total	**$496.3**	$294.1	$231.0
Equity method investment impairment charge	**(14.8)**	—	—
India Finance Act 2020	**—**	—	33.8
Consolidated Equity Affiliates' Income	**$481.5**	$294.1	$264.8

Geographic Information

The geographic information presented below is based on country of origin.

Sales to External Customers

Fiscal Year Ended 30 September	2022	2021	2020
United States	**$5,230.2**	$3,895.8	$3,359.6
China	**1,989.8**	1,828.0	1,719.7
Other foreign operations	**5,478.6**	4,599.2	3,777.0
Total	**$12,698.6**	$10,323.0	$8,856.3

Long-Lived Assets[A]

30 September	2022	2021	2020
United States	**$6,022.0**	$5,187.8	$4,633.9
China	**3,886.0**	4,137.7	3,719.4
Other foreign operations	**4,252.5**	3,929.1	3,611.4
Total	**$14,160.5**	$13,254.6	$11,964.7

[A] "Long-lived assets" represents plant and equipment, net.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

We maintain a comprehensive set of disclosure controls and procedures (as defined in Rules 13a-15 (e) and 15d-15(e) under the Exchange Act). Under the supervision of the Chief Executive Officer and Chief Financial Officer, our management conducted an evaluation of the effectiveness of our disclosure controls and procedures as of 30 September 2022. Based on that evaluation, the Chief Executive Officer and Chief Financial Officer concluded that, as of 30 September 2022, the disclosure controls and procedures were effective.

Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act). Management has evaluated the effectiveness of our internal control over financial reporting as of 30 September 2022 based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Based on that evaluation, management concluded that, as of 30 September 2022, our internal control over financial reporting was effective. Management's Report on Internal Control over Financial Reporting is provided under Part II, Item 8, of this Form 10-K.

There was no change in our internal control over financial reporting during the fourth quarter of fiscal year 2022 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Deloitte & Touche LLP, our independent registered public accounting firm, has audited our internal control over financial reporting as of 30 September 2022. The Report of the Independent Registered Public Accounting Firm is provided under Part II, Item 8, of this Form 10-K.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this item relating to our directors and nominees is incorporated herein by reference to the section captioned “The Board of Directors” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023. The information required by this item relating to our executive officers is set forth in Part I, Item 1 of this Form 10-K.

The information required by this item relating to our Audit and Finance Committee and our Audit and Finance Committee Financial Expert is incorporated herein by reference to the sections captioned “Board Structure–Standing Committees of the Board” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023.

The information required by this item relating to our procedures regarding the consideration of candidates recommended by shareholders and a procedure for submission of such candidates is incorporated herein by reference to the section captioned “The Board of Directors–Selection of Directors” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023.

The information required by this item relating to Section 16(a) Beneficial Ownership Reporting Compliance is incorporated herein by reference to the section captioned “Section 16(a) Beneficial Ownership Reporting” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023.

We have adopted a Code of Conduct that applies to all employees, including the Chief Executive Officer, the Chief Financial Officer, and the Principal Accounting Officer. The Code of Conduct can be found at our website at www.airproducts.com/company/governance/code-of-conduct.

Item 11. Executive Compensation

The information required by this item is incorporated herein by reference to the sections captioned “Executive Compensation” and “Compensation of Directors” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this item is incorporated herein by reference to the sections captioned "Information About Stock Ownership" and “Equity Compensation Plan Information” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by this item is incorporated herein by reference to the sections captioned “The Board of Directors–Director Independence” and “Board Practices, Processes and Policies–Transactions with Related Persons” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023.

Item 14. Principal Accountant Fees and Services

The information required by this item is incorporated herein by reference to the section captioned “Fees of Independent Registered Public Accounting Firm” in the Proxy Statement for the Annual Meeting of Shareholders to be held on 26 January 2023.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The documents below are filed as a part of this report:

(1) *Financial Statements.*

The following is a list of the Consolidated Financial Statements of Air Products and Chemicals, Inc. and its subsidiaries included in Part II, Item 8. Financial Statements and Supplementary Data:

(2) *Financial Statement Schedules.*

Financial statement schedules are omitted as they are either not required or the information is otherwise included in the consolidated financial statements or notes thereto.

(3) *Exhibits.*

The exhibits filed as a part of this report as required by Item 601 of Regulation S-K are listed in the Index to Exhibits beginning on page 120.

Item 16. Form 10-K Summary

None.

INDEX TO EXHIBITS

Exhibit No.	Description
(3)	Articles of Incorporation and Bylaws.
3.1	Restated Certificate of Incorporation of the Company. (Filed as Exhibit 3.2 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 1987.)*
3.2	Amendment to the Restated Certificate of Incorporation of the Company dated 25 January 1996. (Filed as Exhibit 3.3 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 1996.)*
3.3	Amendment to the Restated Certificate of Incorporation of the Company dated 28 January 2014. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 30 June 2014.)*
3.4	Amended and Restated Bylaws of the Company. (Filed as Exhibit 3.1 to the Company's Current Report on Form 8-K dated 26 November 2019.)*
(4)	Instruments defining the rights of security holders, including indentures. Upon request of the Securities and Exchange Commission, the Company hereby undertakes to furnish copies of the instruments with respect to its long-term debt.
4.1	Indenture, dated as of 10 January 1995, between the Company and The Bank of New York Trust, N.A. (formerly Wachovia Bank, National Association and initially First Fidelity Bank Company, National Association), as Trustee. (Filed as Exhibit 4(a) to the Company's Registration Statement on Form S-3 filed 19 January 1995, File No. 033-57357.)*
4.2	Indenture, dated as of 30 April 2020, between the Company and The Bank of New York Trust Company, N.A., as Trustee. (Filed as Exhibit 4.1 to the Company's Current Report on Form 8-K filed 30 April 2020.)*
4.3	Description of Securities. (Filed as Exhibit 4.3 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2021.)*
(10)	Material Contracts.
10.1	Amended and Restated Long-Term Incentive Plan of the Company effective 1 October 2014. (Filed as Exhibit 10.1 to the Company's Current Report on Form 8-K filed on 23 September 2014.)*†
10.2	Air Products and Chemicals, Inc. 2021 Long-Term Incentive Plan. (Filed as Exhibit 4.5 to the Company's Registration Statement on Form S-8 (File No. 333-252722) filed on 4 February 2021.)*†
10.2(a)	Form of Restricted Stock Unit Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2021 awards. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2020.)*†
10.2(b)	Form of Performance Share Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2021 awards. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2020.)*†
10.2(c)	Form of Restricted Stock Unit Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2022 awards. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2021.)*†
10.2(d)	Form of Performance Share Award Agreement under the Long-Term Incentive Plan of the Company, used for FY2022 awards. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2021.)*†
10.3	Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 January 2022. (Filed as Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2021.)*†
10.3(a)	Amendment No. 1 to the Air Products and Chemicals, Inc. Retirement Savings Plan as amended and restated effective 1 January 2022. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 30 June 2022.)*†

INDEX TO EXHIBITS

Exhibit No.	Description
10.4	Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.10 to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2014.)*†
10.4(a)	Amendment No. 1 dated as of 30 September 2015 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.10(a) to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2015.)*†
10.4(b)	Amendment No. 2 dated as of 30 September 2016 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2014. (Filed as Exhibit 10.7(b) to the Company's Annual Report on Form 10-K for fiscal year ended 30 September 2016.)*†
10.4(c)	Amendment No. 3 dated as of 26 July 2017 to the Supplementary Pension Plan of Air Products and Chemicals, Inc. as Amended and Restated effective 1 August 2017.(Filed as Exhibit 10.7(c) to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2017.)*†
10.5	Deferred Compensation Plan as Amended and Restated effective 1 January 2018. (Filed as Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 December 2017.)*†
10.6	Air Products and Chemicals, Inc. Executive Separation Program as amended effective as of 1 October 2022.†
10.7	Air Products and Chemicals, Inc. Senior Management Severance Plan and Summary Plan Description effective 1 August 2022. (Filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q for the quarter ended 30 June 2022.)*†
10.8	Form of Change in Control Severance Agreement for an Executive Officer. (filed as Exhibit 10.2 of the Company's Current Report on Form 8-K dated 23 September 2014.)*†
10.9	Amended and Restated Employment Agreement dated 14 November 2017, between the Company and Seifollah Ghasemi. (Filed as Exhibit 10.1 to the Company's Current Report on Form 8-K filed 14 November 2017.)*†
10.9(a)	Amendment to Employment Agreement, dated 21 May 2020, between Air Products and Chemicals, Inc. and Seifollah Ghasemi. (Filed as Exhibit 10.1 to the Company's Current Report on Form 8-K filed 21 May 2020.)*†
10.10	Compensation Programs for Nonemployee Directors effective 22 November 2022.
10.11	Deferred Compensation Program for Directors, effective 7 October 2019. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for quarter ended 31 December 2019.)*†
10.12	Revolving Credit Agreement dated as of 31 March 2021 for $2,500,000,000. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 March 2021.)*
10.12(a)	Amendment to the Revolving Credit Agreement dated as of 29 September 2021. (Filed as Exhibit 10.13(a) to the Company's Annual Report on Form 10-K for the fiscal year ended 30 September 2021.)*
10.12(b)	Amendment No. 2 to the Revolving Credit Agreement dated as of 31 March 2022. (Filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q for the quarter ended 31 March 2022.)*
(21)	Subsidiaries of the Registrant.
21.1	Subsidiaries of the Registrant.
(23)	Consents of Experts and Counsel.
23.1	Consent of Independent Registered Public Accounting Firm.
(24)	Power of Attorney.
24.1	Power of Attorney.
(31)	Rule 13a-14(a)/15d-14(a) Certifications.

INDEX TO EXHIBITS

Exhibit No.	Description
31.1	Certification by the Principal Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification by the Principal Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
(32)	Section 1350 Certifications.
32.1	Certification by the Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.††
(101)	Interactive Data Files.
101.INS	Inline XBRL Instance Document. The XBRL Instance Document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
104	Cover Page Interactive Data File, formatted in Inline XBRL (included in Exhibit 101).

* Previously filed as indicated and incorporated herein by reference. Exhibits incorporated by reference are located in SEC File No. 001-04534 unless otherwise indicated.

† Indicated management contract or compensatory arrangement.

†† The certification attached as Exhibit 32.1 that accompanies this Annual Report on Form 10-K, is not deemed filed with the SEC and is not to be incorporated by reference into any filing of Air Products and Chemicals, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Form 10-K, irrespective of any general incorporation language contained in such filing.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

AIR PRODUCTS AND CHEMICALS, INC.
(Registrant)

By: /s/ Melissa N. Schaeffer

Melissa N. Schaeffer
Senior Vice President and Chief Financial Officer
(Principal Financial Officer)

Date: 22 November 2022

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature and Title	**Date**
/s/ Seifi Ghasemi (Seifi Ghasemi) Director, Chairman, President, and Chief Executive Officer (Principal Executive Officer)	22 November 2022
/s/ Jeffrey J. Kutz (Jeffrey J. Kutz) Vice President, Corporate Controller, and Principal Accounting Officer	22 November 2022
* (Tonit M. Calaway) Director	22 November 2022
* (Charles I. Cogut) Director	22 November 2022
* (Lisa A. Davis) Director	22 November 2022
* (David H. Y. Ho) Director	22 November 2022

Signature and Title	Date
* (Edward L. Monser) Director	22 November 2022
* (Matthew H. Paull) Director	22 November 2022
* (Wayne T. Smith) Director	22 November 2022

* Sean D. Major, Executive Vice President, General Counsel and Secretary, by signing his name hereto, does sign this document on behalf of the above noted individuals, pursuant to a power of attorney duly executed by such individuals, which is filed with the Securities and Exchange Commission herewith.

/s/ Sean D. Major

Sean D. Major

Executive Vice President, General Counsel and Secretary

Date: 22 November 2022

SHAREHOLDERS' INFORMATION

Common stock information

Ticker Symbol: APD
Exchange Listing: New York Stock Exchange
Transfer Agent and Registrar:
Broadridge Corporate Issuer Solutions, Inc.
P.O. Box 1342
Brentwood, NY 11717
Phone: 844-318-0129
International: 720-358-3595
Fax: 215-553-5402
shareholder.broadridge.com/apd

Publications for shareholders

In addition to this Annual Report and the accompanying Annual Report on Form 10-K, Air Products informs shareholders about Company news through:

Notice of Annual Meeting and Proxy Statement—made available to shareholders on December 9 and posted to the Company's website at investors.airproducts.com/shareholder-info.

Earnings information—shareholders and investors can obtain copies of earnings releases, periodic and current reports, and news releases by visiting investors.airproducts.com. Shareholders and investors can also register for e-mail updates at that website.

Direct investment program

Current shareholders and new investors can conveniently and economically purchase shares of Air Products' common stock and reinvest cash dividends through Broadridge Corporate Issuer Solutions. Registered shareholders can purchase shares on Broadridge Corporate Issuer Solutions, shareholder.broadridge.com/airproducts. New investors can obtain information on the website or by calling:
Phone: 844-318-0129
International: 720-358-3595

Annual meeting

The 2023 annual meeting of shareholders will be held on Thursday, January 26, 2023.

Annual certifications

The most recent certifications by our Chief Executive Officer and Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 are filed as exhibits to our Form 10-K. We have also filed with the New York Stock Exchange the most recent Annual CEO Certification as required by Section 303A.12(a) of the New York Stock Exchange Listed Company Manual.

Additional information

The forward-looking statements contained in this Annual Report are qualified by reference to the section entitled "Forward-Looking Statements" beginning on page 3 of the accompanying Annual Report on Form 10-K.

For more information, please contact us at:

Corporate Headquarters
Air Products
1940 Air Products Boulevard
Allentown, PA 18106-5500
T 610-481-4911

Corporate Secretary's Office
Sean D. Major, Executive Vice President,
General Counsel and Secretary
T 610-481-4880

Investor Relations Office
Sidd Manjeshwar, Vice President,
Treasury and Investor Relations
T 610-481-4426

AIR PRODUCTS

tell me more
airproducts.com

Appendix 3

27-Feb-2023 | 21:03 EST

Annual Review For Air Products and Chemicals Inc.

This publication does not constitute a rating action.

S&P Global Ratings has performed annual reviews of the credit ratings of this issuer. When applicable, this review would include the review of the issuer's subsidiaries or associated entities.

In an annual review, S&P Global Ratings reviews current credit ratings against the latest issuers/issues performance data as well as any recent market developments. Annual reviews may, depending on their outcome, result in a referral of a credit rating for a committee review, which may result in a credit rating action. This publication is not an indication of whether or not a credit rating action is likely in the near future.

Please refer to the below information for the key elements considered during this review and underlying the current credit rating.

Rating Component Scores

Business risk	Excellent

Country risk	Low Risk
Industry risk	Low Risk
Competitive position	Excellent
Financial risk	Intermediate
Cash flow/leverage	Intermediate
Anchor	a
Diversification/portfolio effect	Neutral (no impact)
Capital structure	Neutral (no impact)
Financial policy	Neutral (no impact)
Liquidity	Strong (no impact)
Management and governance	Satisfactory (no impact)
Comparable rating analysis	Neutral (no impact)
Stand-alone credit profile	a

Current Credit Rating	
Foreign currency issuer credit rating	A/Stable/A-1
Local currency issuer credit rating	A/Stable/A-1

Regulatory Disclosures (PCRs)

S&P Global Ratings' regulatory disclosures (PCRs) can be accessed by clicking on the link above or they can also be found on www.spglobal.com/ratings by searching for the issuer name and clicking on the Regulatory Disclosure link that appears below its rating. PCRs are published as of a point-in-time, which is current as of the date a Credit Rating Action was last published.

S&P Global Ratings, part of S&P Global Inc. (NYSE: SPGI), is the world's leading provider of independent credit risk research. We publish more than a million credit ratings on debt issued by sovereign, municipal, corporate and financial sector entities. With over 1,400 credit analysts in 26 countries, and more than 150 years experience of assessing credit risk, we offer a unique combination of global coverage and local insight. Our research and opinions about relative credit risk provide market participants with information that helps to support the growth of transparent, liquid debt markets worldwide.

responsible for any errors or omissions (negligent or otherwise), regardless of the cause, for the results obtained from the use of the Content, or for the security or maintenance of any data input by the user. The Content is provided on an "as is" basis. S&P PARTIES DISCLAIM ANY AND ALL EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, FREEDOM FROM BUGS, SOFTWARE ERRORS OR DEFECTS, THAT THE CONTENT'S FUNCTIONING WILL BE UNINTERRUPTED OR THAT THE CONTENT WILL OPERATE WITH ANY SOFTWARE OR HARDWARE CONFIGURATION. In no event shall S&P Parties be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special or consequential damages, costs, expenses, legal fees, or losses (including, without limitation, lost income or lost profits and opportunity costs or losses caused by negligence) in connection with any use of the Content even if advised of the possibility of such damages.

Credit-related and other analyses, including ratings, and statements in the Content are statements of opinion as of the date they are expressed and not statements of fact. S&P's opinions, analyses and rating acknowledgment decisions (described below) are not recommendations to purchase, hold, or sell any securities or to make any investment decisions, and do not address the suitability of any security. S&P assumes no obligation to update the Content following publication in any form or format. The Content should not be relied on and is not a substitute for the skill, judgment and experience of the user, its management, employees, advisors and/or clients when making investment and other business decisions. S&P does not act as a fiduciary or an investment advisor except where registered as such. While S&P has obtained information from sources it believes to be reliable, S&P does not perform an audit and undertakes no duty of due diligence or independent verification of any information it receives. Rating-related publications may be published for a variety of reasons that are not necessarily dependent on action by rating committees, including, but not limited to, the publication of a periodic update on a credit rating and related analyses.

To the extent that regulatory authorities allow a rating agency to acknowledge in one jurisdiction a rating issued in another jurisdiction for certain regulatory purposes, S&P reserves the right to assign, withdraw or suspend such acknowledgment at any *time and in its sole discretion. S&P Parties disclaim any duty whatsoever arising out of the assignment, withdrawal or suspension of an acknowledgment as well as any liability for any damage alleged to have been suffered on account thereof.*

S&P keeps certain activities of its business units separate from each other in order to preserve the independence and objectivity of their respective activities. As a result, certain business units of S&P may have information that is not available to other S&P business units. S&P has established policies and procedures to maintain the confidentiality of certain non-public information received in connection with each analytical process.

*S&P may receive compensation for its ratings and certain analyses, normally from issuers or underwriters of securities or from obligors. S&P reserves the right to disseminate its opinions and analyses. S&P's public ratings and analyses are made available on its Web sites, **www.spglobal.com/ratings** (free of charge), and **www.ratingsdirect.com**(subscription), and may be distributed through other means, including via S&P publications and third-party redistributors. Additional information about our ratings fees is available at **www.spglobal.com/usratingsfees**.*

*Any Passwords/user IDs issued by S&P to users are single user-dedicated and may ONLY be used by the individual to whom they have been assigned. No sharing of passwords/user IDs and no simultaneous access via the same password/user ID is permitted. To reprint, translate, or use the data or information other than as provided herein, contact S&P Global Ratings, Client Services, 55 Water Street, New York, NY 10041; (1) 212-438-7280 or by e-mail to: **research_request@spglobal.com**.*

Contact the analysts:

Paul J Kurias

Primary Contact, New York

P. 1-212-438-3486

E. [redacted]@spglobal.com

Moody's

Rating Action: Moody's rates Air Products' new green bonds at A2; outlook stable

27 Feb 2023

New York, February 27, 2023 -- Moody's Investors Service ("Moody's") assigned A2 ratings to Air Products and Chemicals, Inc.'s ("Air Products") new senior unsecured US Dollar green bonds due 2033 and Euro bonds due [2034 or 2035]. Proceeds from the new notes will be used to finance green eligible projects. Air Products' other A2 senior unsecured debt ratings and Prime-1 commercial paper rating are unchanged. The outlook remains stable.

"Air Products is increasing its investment in green and blue hydrogen and ammonia projects, and we expect additional projects and investments to be announced over the next several years," stated John Rogers, Senior Vice President at Moody's and lead analyst on Air Products and Chemicals, Inc.

Assignments:

..Issuer: Air Products and Chemicals, Inc.

....Senior Unsecured Regular Bond/Debenture, Assigned A2

RATINGS RATIONALE

Air Products' A2 ratings are supported by the company's size and scale, strong profitability, relatively stable cash flow generation through economic cycles compared to most rated chemical and industrial companies. Air Products benefits from a strong business model and a higher proportion of on-site business compared to rated peers (i.e., Air Liquide , Linde , Messer), with a significant portion of take-or-pay contracts that has reduced earnings volatility. Moreover, Moody's believes that the company's end market diversity also reduces any downside risk to credit metrics over the near term.

Air Products' fiscal first quarter 2023 results demonstrated a solid improvement, despite relatively weak conditions in most chemical and industrial markets. Moody's expects Air Products' will continue to benefit from revenue and EBITDA growth in FY 2023 through favorable pricing actions and modestly higher volumes, despite the slowdown in global growth in 2023. Key credit metrics are appropriate for the rating, including adjusted financial leverage of 2.0x (Debt/EBITDA) and retained cash flow-to-debt of 25% (RCF/Debt) for the twelve months ended 31 December 2022. While gross debt metrics are moderately weaker pro forma for the new debt issuance, the company will have elevate cash balance of over $3 billion even assuming that all the new debt is used to fund capital and investments in 2023, which is a conservative assumption. Moody's tolerance for capital deployment within the current rating and stable outlook is contingent on the company maintaining appropriate credit metrics for the rating category, including adjusted Debt/EBITDA below 2.5x and RCF/Debt above 25%, with some flexibility for metrics to marginally weaken beyond these thresholds as long as net debt metrics remain appropriate.

Moody's expects that the new capital will be deployed toward assets that generate additional earnings and cash flow. While the company has maintained very strong credit metrics for the rating over the past few years, the rating is tempered by an expectation for significant capital deployment over the next two years and that credit metrics will weaken due to the delay between these investments and the startup of these projects. Over the next two years commitments for large capital projects are expected to outpace free cash flow generation. A number of these larger projects will be joint ventures with substantial non-recourse financing. As the proportion of earnings and cash flow from these ventures increase, it could prompt a re-dimensioning of the appropriate credit metrics and liquidity to support the A2 rating.

Air Products will use proceeds from the new green bonds to fund eligible projects including investments in green and blue hydrogen/ammonia projects, renewable energy and sustainable aviation fuel. Air Products has obtained a second party opinion from a consultant with recognized environmental and social expertise to provide an opinion on the environmental benefits of its investment framework and that it is aligned with the ICMA 2021 Green Bond Principles and the Loan Market Association (LMA) 2021 Green Loan Principles. Air Products will annually publish the details of the eligible investments that it has made with the proceeds from this new debt and obtain an assurance report from its external auditor.

Air Products has excellent liquidity. The company's Prime-1 short-term rating, which applies to the company's commercial paper program, is backstopped by an undrawn $2.75 billion revolving credit facility due in March 2026. In addition, the company has maintained sizeable cash balances ($3.1 billion at 31 December 2022). Air Products has significant headroom under the financial covenant in its facility – a debt to capitalization ratio set at 70 %. However, the company had $400 million of notes mature in February of 2023 and $133 million of debt payable to affiliates in 2023. The company foreign subsidiaries have credit facilities totaling $1,320, of which $752 was borrowed and outstanding as of 31 December 2022.

The stable outlook assumes that the company will maintain a healthy cash balance and appropriate credit metrics while deploying capital aggressively toward major projects.

FACTORS THAT COULD LEAD TO AN UPGRADE OR DOWNGRADE OF THE RATINGS

Moody's could upgrade the ratings with expectations for adjusted financial leverage to be sustained below 2.0x (Debt/EBITDA), retained cash flow-to-debt sustained above 35% (RCF/Debt), and a public commitment to a higher rating. Moody's could downgrade the rating with expectations for adjusted financial leverage sustained above 2.5x (Debt/EBITDA) or retained cash flow-to-debt sustained below 25% (RCF/Debt). Given the lag between cash outflows and cash inflows from major projects, the rating incorporates some flexibility for gross debt credit metrics to weaken slightly beyond established thresholds with continued strength in net debt-based credit metrics, clear line of sight regarding EBITDA and cash flow contributions from major projects, and continued clear and public commitment to the A2 rating. Any material escalation in risks related to joint ventures or projects in emerging markets or a sustained weakening of financial metrics could also have negative rating implications.

ESG CONSIDERATIONS

Environmental, social, and governance factors are important considerations in Air Products' credit quality but not a factor in today's action. ESG factors have a net positive credit impact on the rating due to conservative financial policies that offset high environmental risks and moderate social risks. High environmental risks are due to the level of GHG emissions and power usage relative to other industrial companies. Both social and environmental risks could decline over time as the company increases its sourcing of renewable power and green and blue hydrogen/ammonia projects become a larger portion of the company's portfolio and profitability.

Headquartered in Allentown, Pennsylvania, Air Products and Chemicals, Inc. is the third largest global supplier of industrial gases by revenue. The company's industrial gases business produces and sells atmospheric gases such as oxygen, nitrogen and argon; process gases; and specialty gases. Air Products serves a number of industries, including refining, chemicals, metals, electronics, manufacturing, medical and food. For the twelve months ended 31 December 2022, Air Products' sales were roughly $13 billion.

The principal methodology used in these ratings was Chemicals published in June 2022 and available at https://ratings.moodys.com/api/rmc-documents/389870. Alternatively, please see the Rating Methodologies page on https://ratings.moodys.com for a copy of this methodology.

REGULATORY DISCLOSURES

For further specification of Moody's key rating assumptions and sensitivity analysis, see the sections Methodology Assumptions and Sensitivity to Assumptions in the disclosure form. Moody's Rating Symbols and Definitions can be found on https://ratings.moodys.com/rating-definitions.

For ratings issued on a program, series, category/class of debt or security this announcement provides certain regulatory disclosures in relation to each rating of a subsequently issued bond or note of the same series, category/class of debt, security or pursuant to a program for which the ratings are derived exclusively from existing ratings in accordance with Moody's rating practices. For ratings issued on a support provider, this announcement provides certain regulatory disclosures in relation to the credit rating action on the support provider and in relation to each particular credit rating action for securities that derive their credit ratings from the support provider's credit rating. For provisional ratings, this announcement provides certain regulatory disclosures in relation to the provisional rating assigned, and in relation to a definitive rating that may be assigned subsequent to the final issuance of the debt, in each case where the transaction structure and terms have not changed prior to the assignment of the definitive rating in a manner that would have affected the rating. For further information please see the issuer/deal page for the respective issuer on https://ratings.moodys.com.

For any affected securities or rated entities receiving direct credit support from the primary entity(ies) of this credit rating action, and whose ratings may change as a result of this credit rating action, the associated regulatory disclosures will be those of the guarantor entity. Exceptions to this approach exist for the following disclosures, if applicable to jurisdiction: Ancillary Services, Disclosure to rated entity, Disclosure from rated entity.

The ratings have been disclosed to the rated entity or its designated agent(s) and issued with no amendment resulting from that disclosure.

These ratings are solicited. Please refer to Moody's Policy for Designating and Assigning Unsolicited Credit Ratings available on its website https://ratings.moodys.com.

Regulatory disclosures contained in this press release apply to the credit rating and, if applicable, the related rating outlook or rating review.

Moody's general principles for assessing environmental, social and governance (ESG) risks in our credit analysis can be found at https://ratings.moodys.com/documents/PBC_1288235.

The Global Scale Credit Rating on this Credit Rating Announcement was issued by one of Moody's affiliates outside the EU and is endorsed by Moody's Deutschland GmbH, An der Welle 5, Frankfurt am Main 60322, Germany, in accordance with Art.4 paragraph 3 of the Regulation (EC) No 1060/2009 on Credit Rating Agencies. Further information on the EU endorsement status and on the Moody's office that issued the credit rating is available on https://ratings.moodys.com.

The Global Scale Credit Rating on this Credit Rating Announcement was issued by one of Moody's affiliates outside the UK and is endorsed by Moody's Investors Service Limited, One Canada Square, Canary Wharf, London E14 5FA under the law applicable to credit rating agencies in the UK. Further information on the UK endorsement status and on the Moody's office that issued the credit rating is available on https://ratings.moodys.com.

Please see https://ratings.moodys.com for any updates on changes to the lead rating analyst and to the Moody's legal entity that has issued the rating.

Please see the issuer/deal page on https://ratings.moodys.com for additional regulatory disclosures for each credit rating.

John Rogers
Senior Vice President
Corporate Finance Group
Moody's Investors Service, Inc.
250 Greenwich Street
New York, NY 10007

U.S.A.
JOURNALISTS: 1 212 553 0376
Client Service: 1 212 553 1653

Karen Nickerson
Associate Managing Director
Corporate Finance Group
JOURNALISTS: 1 212 553 0376
Client Service: 1 212 553 1653

Releasing Office:
Moody's Investors Service, Inc.
250 Greenwich Street
New York, NY 10007
U.S.A.
JOURNALISTS: 1 212 553 0376
Client Service: 1 212 553 1653
