

# KEADBY 3 CARBON CAPTURE POWER STATION

---

A collaboration between **SSE Thermal** and **Equinor**

**Document Ref: 5.2**

**Planning Inspectorate Ref: EN010114**

**The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order**

**Land at and in the vicinity of the Keadby Power Station site, Trentside, Keadby, North Lincolnshire**

## Electricity Grid Connection Statement

**The Planning Act 2008**

**The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(p) and 6(1)(a)(i)**

**Applicant: Keadby Generation Limited**

**Date: ~~May~~ April 20221**

## DOCUMENT HISTORY

<b>Document Ref</b>	5.2 Electricity Grid Connection Statement
<b>Revision</b>	VP <del>2.01-0</del>
<b>Document Owner</b>	AECOM

## GLOSSARY

<b>Abbreviation</b>	<b>Description</b>
AGI	Above Ground Installation – compound for ancillary equipment at or near to the point of connection to the natural gas pipeline.
AIL	Abnormal Indivisible Load
CCGT	Combined Cycle Gas Turbine - a highly efficient form of energy generation technology. An assembly of heat engines work in tandem using the same source of heat to convert it into mechanical energy which drives electrical generators and consequently generates electricity.
CCP	Carbon Capture Plant - plant used to capture carbon dioxide (CO <sub>2</sub> ) emissions produced from the use of fossil fuels in electricity generation and industrial processes.
CCUS	Carbon Capture, Usage and Storage - group of technologies designed to reduce the amount of carbon dioxide (CO <sub>2</sub> ) released into the atmosphere from coal and gas power stations as well as heavy industry including cement and steel production. Once captured, the CO <sub>2</sub> can be either re-used in various products, such as cement or plastics (utilisation), or stored in geological formations deep underground (storage).
CEMP	Construction Environmental Management Plan - a plan to outline how a construction project will avoid, minimise or mitigate effects on the environment and surrounding area.
DCO	Development Consent Order - made by the relevant Secretary of State pursuant to The Planning Act 2008 to authorise a Nationally Significant Infrastructure Project. A DCO can incorporate or remove the need for a range of consents which would otherwise be required for a development. A DCO can also include rights of compulsory acquisition.
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction (EPC) contractor
ES	Environmental Statement - a report in which the process and results of an Environment Impact Assessment are documented.
Ha	Hectare
HP	National Grid Gas high pressure (HP) gas pipeline

<b>Abbreviation</b>	<b>Description</b>
HRSG	Heat Recovery Steam Generator - an energy recovery heat exchanger that recovers heat from a hot gas stream. It produces steam that can be used in a process (cogeneration) or used to drive a steam turbine (combined cycle).
kV	Kilo Volt - unit of power.
MW	Megawatt - unit of energy.
NEP	The Northern Endurance Partnership - a partnership between bp, Eni, Equinor, National Grid, Shell and Total to develop infrastructure to transport and store CO <sub>2</sub> emissions.
NGESO	National Grid Electricity System Operator - the electricity system operator for Great Britain.
NGET	National Grid Electricity Transmission - build and maintain the electricity transmission network.
NLC	North Lincolnshire Council
NPS	National Policy Statement - Statement produced by Government under the Planning Act 2008 providing the policy framework for Nationally Significant Infrastructure Projects. They include the Government's view of the need for and objectives for the development of Nationally Significant Infrastructure Projects in a particular sector such as energy and are used to determine applications for such development.
NSIP	Nationally Significant Infrastructure Project - defined by the Planning Act 2008 and cover projects relating to energy (including generating stations, electric lines and pipelines); transport (including trunk roads and motorways, airports, harbour facilities, railways and rail freight interchanges); water (dams and reservoirs, and the transfer of water resources); wastewater treatment plants and hazardous waste facilities. These projects are only defined as nationally significant if they satisfy a statutory threshold in terms of their scale or effect.
PCC	Proposed Power and Carbon Capture (PCC) Site
PINS	Planning Inspectorate
SoS	Secretary of State
ZCH	Zero Carbon Humber - a consortium of energy and industrial companies and academic institutions with a shared vision to transform the Humber region into the UK's first net-zero carbon cluster by 2040

## CONTENTS

<u>Executive Summary .....</u>	<u>1</u>
<u>1.0 Introduction.....</u>	<u>1</u>
<u>1.1 Overview .....</u>	<u>1</u>
<u>1.2 The Proposed Development.....</u>	<u>3</u>
<u>1.3 The Proposed Development Site.....</u>	<u>7</u>
<u>1.4 The Development Consent Process.....</u>	<u>8</u>
<u>1.5 The Purpose and Structure of this Document.....</u>	<u>9</u>
<u>2.0 Proposed Grid Connection .....</u>	<u>10</u>
<u>2.1 Overview .....</u>	<u>10</u>
<u>3.0 Contractual Agreements.....</u>	<u>11</u>
<u>3.1 Overview .....</u>	<u>11</u>
<u>4.0 Responsibilities for Designing and Building the Electrical Connection .....</u>	<u>12</u>
<u>4.1 Design .....</u>	<u>12</u>
<u>4.2 Build .....</u>	<u>12</u>
<u>4.3 Operation and Maintenance .....</u>	<u>13</u>
<u>5.0 Land Requirements .....</u>	<u>14</u>
<u>5.1 Overview .....</u>	<u>14</u>
<u>6.0 Consents Required.....</u>	<u>15</u>
<u>7.0 Conclusions.....</u>	<u>16</u>
<u>8.0 References.....</u>	<u>17</u>
<u>Executive Summary .....</u>	<u>1</u>
<u>1.0 Introduction.....</u>	<u>1</u>
<u>1.1 Overview .....</u>	<u>1</u>
<u>1.2 The Applicant .....</u>	<u>1</u>
<u>1.3 What is Carbon Capture, Usage and Storage? .....</u>	<u>2</u>
<u>1.4 The Proposed Development.....</u>	<u>3</u>
<u>1.5 The Proposed Development Site.....</u>	<u>7</u>
<u>1.6 The Development Consent Process.....</u>	<u>8</u>
<u>1.7 The Purpose and Structure of this Document.....</u>	<u>9</u>
<u>2.0 Proposed Grid Connection .....</u>	<u>10</u>
<u>2.1 Overview .....</u>	<u>10</u>
<u>3.0 Contractual Agreements.....</u>	<u>11</u>
<u>3.1 Overview .....</u>	<u>11</u>
<u>4.0 Responsibilities for Designing and Building the Electrical Connection .....</u>	<u>12</u>
<u>4.1 Design .....</u>	<u>12</u>
<u>4.2 Build .....</u>	<u>12</u>
<u>4.3 Operation and Maintenance .....</u>	<u>13</u>
<u>5.0 Land Requirements .....</u>	<u>14</u>
<u>5.1 Overview .....</u>	<u>14</u>
<u>6.0 Consents Required.....</u>	<u>15</u>
<u>7.0 Conclusions.....</u>	<u>16</u>
<u>8.0 References.....</u>	<u>17</u>

## TABLES

Table 1: Special Crossings on the Electricity Connection Corridor ..... 13

## EXECUTIVE SUMMARY

- 1 Keadby Generation Limited (the 'Applicant') is seeking development consent for the construction, operation and maintenance of a new low carbon Combined Cycle Gas Turbine (CCGT) Generating Station ('the Proposed Development'). The Proposed Development is a new gas fired electricity generating station of up to 910 megawatts (MW) of gross electrical output with state-of-the art carbon capture technology and including cooling water, electrical, gas and utility connections, construction laydown areas and other associated works on land to the west of the existing Keadby 2 Power Station, under construction. The Proposed Development will therefore make a significant contribution toward the UK reaching its Net Zero greenhouse gas emissions target by 2050.
- 2 This document sets out who will be responsible for designing and building the proposed electrical connection (the 'Electrical Connection') for the Proposed Development and demonstrates that there is no reason why an electrical connection would not be possible.
- 3 The preferred route for the proposed grid connection has been determined based on technical and environmental considerations. It is anticipated that the Proposed Development will require a direct connection to the 400kV transmission system and therefore the Electrical Connection (**Work No. 3A**) is likely to connect to the existing National Grid 400kV Substation directly to the east of the Proposed Power and Carbon Capture (PCC) Site. The connection between the Low Carbon Electricity Generating Station (**Work No. 1A**) and existing National Grid 400kV Substation would comprise a 400kV single circuit cable route and control system cables which will be installed primarily below ground.
- 4 The indicative route of the cable and substation areas is shown on the Electrical Connection Plans (**Application Document Reference 4.8**). Limits of deviation within which the works would occur are shown on the Works Plan (**Application Document Ref. 4.3**).
- 5 The Applicant has engaged with National Grid Electricity Transmission (NGET) and the National Grid Electricity System Operator (NGESO) as outlined in Section 3.

## 1.0 INTRODUCTION

### 1.1 Overview

- 1.1.1 This Electricity Grid Connection Statement (**Application Document Ref. 5.2**) has been prepared by AECOM on behalf of Keadby Generation Limited (the 'Applicant') which is a wholly owned subsidiary of SSE plc. It forms part of the application (the 'Application') for a Development Consent Order (a 'DCO'), that has been submitted to the Secretary of State (the 'SoS') for Business, Energy and Industrial Strategy ([BEIS](#)), under section 37 of 'The Planning Act 2008' (the '2008 Act').
- 1.1.2 The Applicant is seeking development consent for the construction, operation and maintenance of a new low carbon Combined Cycle Gas Turbine (CCGT) Generating Station ('the Proposed Development') on land at, and in the vicinity of, the existing Keadby Power Station, Trentside, Keadby, Scunthorpe DN17 3EF (the 'Proposed Development Site').
- 1.1.3 The Proposed Development is a new electricity generating station of up to 910 megawatts (MW) gross electrical output, equipped with carbon capture and compression plant and fuelled by natural gas, on land to the west of Keadby 1 Power Station and the (under [construction/commissioning](#)) Keadby 2 Power Station, including connections for cooling water, electrical, gas and utilities, construction laydown areas and other associated development. It is described in **Chapter 4: The Proposed Development of the Environmental Statement (ES)** (ES Volume I - **Application Document Ref. 6.2**).
- 1.1.4 The Proposed Development falls within the definition of a 'Nationally Significant Infrastructure Project' (NSIP) under Section 14(1)(a) and Sections 15(1) and (2) of the 2008 Act, as it is an onshore generating station in England that would have a generating capacity greater than 50MW electrical output (50MWe). As such, a DCO application is required to authorise the Proposed Development in accordance with Section 31 of the 2008 Act.
- 1.1.5 The DCO, if made by the SoS, would be known as 'The Keadby 3 (Carbon Capture Equipped Gas Fired Generating Station) Order' ('the Order').

### 1.2 The Applicant

- ~~1.2.1 The Applicant, Keadby Generation Limited, is the freehold owner of a large part of the Proposed Development Site and is a wholly owned subsidiary of the FTSE 100 listed SSE plc, one of the UK's largest and broadest based energy companies, and the country's leading developer of renewable energy generation. Over the last 20 years, SSE plc has invested over £20bn to deliver industry-leading offshore wind, onshore wind, CCGT, energy from waste, biomass, energy networks and gas storage projects. The Applicant owns and operates the adjacent Keadby 1 Power Station and is in the process of constructing Keadby 2 Power Station. SSE operates the Keadby Windfarm which lies to the north and south of the Proposed Development Site and~~

~~generates renewable energy from 34 turbines, with a total installed generation capacity of 68MW.~~

~~1.2.2 SSE has produced a 'Greenprint' document (SSE plc, 2020a) that sets out a clear commitment to investment in low carbon power infrastructure, working with government and other stakeholders to create a net zero power system by 2040. This includes investment in flexible sources of electricity generation and storage for times of low renewable output which will complement other renewable generating sources, using low carbon fuels and/ or capturing and storing carbon emissions. SSE is working with leading organisations across the UK to accelerate the development of carbon capture, usage and storage ('CCUS') clusters, including Equinor and National Grid Carbon.~~

~~1.2.3 The design of the Proposed Development demonstrates this commitment. The Proposed Development will be built with a clear route to decarbonisation, being equipped with post combustion carbon capture technology, consistent with SSE's commitment to reduce the carbon intensity of electricity generated by 60% by 2030, compared to 2018 levels (SSE plc, 2020b). It is intended that the Proposed Development will connect to infrastructure that will be delivered by the Zero Carbon Humber (ZCH) Partnership<sup>1</sup> and Northern Endurance Partnership (NEP)<sup>2</sup> for the transport and offshore geological storage of carbon dioxide.~~

### ~~1.3 What is Carbon Capture, Usage and Storage?~~

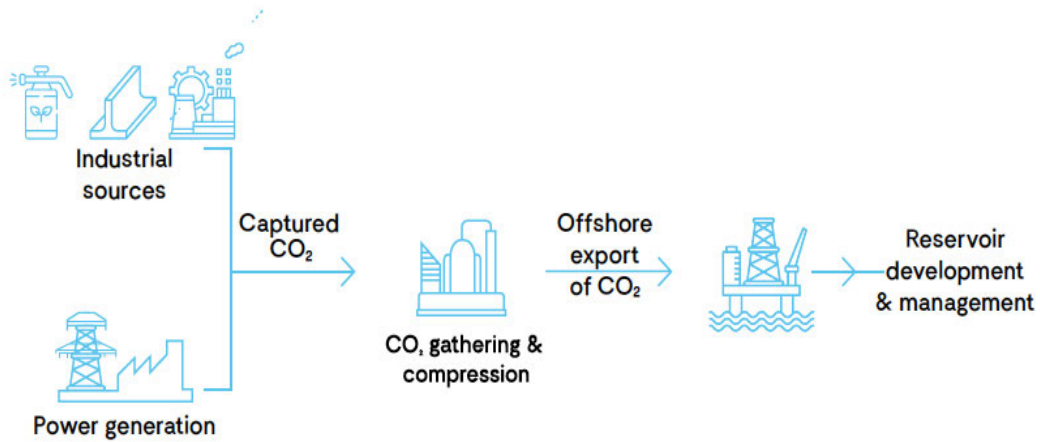
~~1.3.1 CCUS is a process that removes carbon dioxide emissions at source, for example emissions from a power station or industrial installation, and then compresses the carbon dioxide so that it can be safely transported to secure underground geological storage sites. It is then injected into layers of solid rock filled with interconnected pores where the carbon dioxide becomes trapped and locked in place, preventing it from being released into the atmosphere. Plate 1 shows what is involved in the process.~~

---

<sup>1</sup> <https://www.zerocarbonhumber.co.uk/the-vision/>

<sup>2</sup> <https://www.zerocarbonhumber.co.uk/news/northern-endurance-partnership/>





### **Plate 1: Illustration of the Carbon Capture, Usage and Storage**

~~1.3.2 The technologies used in CCUS are proven and have been used safely across the world for many years. Geological storage sites are located far underground and are subject to stringent tests to ensure that they are geologically suitable. It is expected that the storage sites will be located offshore, in areas such as the North Sea. The NEP has been formed to develop the offshore infrastructure to transport and store carbon dioxide emissions in the North Sea.~~

~~1.3.3 CCUS is crucial to reducing carbon dioxide emissions and combatting global warming. The UK Government has committed to achieving Net Zero in terms of greenhouse gas emissions by 2050. This is a legally binding target. UK Government policy further states that the 'deployment of power CCUS projects will play a key role in the decarbonisation of the electricity system at low cost' (HM Government, 2020a, page 47).~~

~~1.3.4 The Proposed Development will provide up to 910MWe (gross) of dispatchable capacity and capture some 2 million tonnes of carbon dioxide per annum, dependent upon the turbine equipment chosen and the running hours of the plant. The Proposed Development could be up and running by the mid 2020s and will facilitate the timely development of a major CCUS cluster in the Humber region, making an important contribution towards the achievement of Net Zero by 2050.~~

## **1.41.2 The Proposed Development**

~~1.4.11.2.1 The Proposed Development will work by capturing carbon dioxide emissions from the gas-fired power station and connecting into the Humber Low Carbon Pipelines project pipeline network, being promoted by NGCL, for onward transportation to the Endurance storage site under the North Sea-ZGH Partnership export pipeline and gathering network for onward transport to the Endurance saline aquifer under the North Sea.~~

**1.4.21.2.2** The Proposed Development would comprise a low carbon gas fired power station with a gross electrical output capacity of up to 910MWe and associated buildings, structures and plant and other associated development defined in ~~the~~ Schedule 1 of the draft DCO (**Application Document Ref. 2.1**) **[APP-005]** as **Work No. 1 – 11** and shown on the Works Plans (**Application Document Ref. 4.3**) **[APP-012]**.

**1.4.31.2.3** At this stage, the final technology selection cannot yet be made as it will be determined by various technical and economic considerations and will be influenced by future UK Government policy and regulation. The design of the Proposed Development therefore incorporates a necessary degree of flexibility to allow for the future selection of the preferred technology in ~~the~~ light of prevailing policy, regulatory and market conditions once a DCO is made.

**1.4.41.2.4** The Proposed Development will include:

- a carbon capture equipped electricity generating station including a CCGT plant (**Work No. 1A**) with integrated cooling infrastructure (**Work No. 1B**), and carbon dioxide capture plant (CCP) including conditioning and compression equipment, carbon dioxide absorption unit(s) and stack(s) (**Work No. 1C**), natural gas receiving facility (**Work No. 1D**), supporting uses including control room, workshops, stores, raw and demineralised water tanks and permanent laydown area (**Work No. 1E**), and associated utilities, various pipework, water treatment plant, wastewater treatment, firefighting equipment, emergency diesel generator, gatehouse, chemical storage facilities, other minor infrastructure and auxiliaries/ services (all located in the area referred to as the 'Proposed Power and Carbon Capture (PCC) Site' and which together form **Work No. 1**);
- natural gas pipeline from the existing National Grid Gas high pressure (HP) gas pipeline within the Proposed Development Site to supply the Proposed PCC Site including an above ground installation (AGI) for National Grid Gas's apparatus (**Work No. 2A**) and the Applicant's apparatus (**Work No. 2B**) (the 'Gas Connection Corridor');
- electrical connection works to and from the existing National Grid ([National Grid Electricity Transmission](#)) 400kV Substation for the export and import of electricity (**Work No. 3A**) (the 'Electrical Connection Area to National Grid 400kV Substation');
- electrical connection works to and from the existing Northern Powergrid 132kV Substation for the supply of electricity at up to 132kV to the Proposed PCC Site, and associated plant and equipment (**Work No. 3B**) (the 'Potential Electrical Connection to Northern Powergrid 132kV Substation');
- Water Connection Corridors to provide cooling and make-up water including:
  - underground and/ or overground water supply pipeline(s) and intake structures within the Stainforth and Keadby Canal, including temporary cofferdam (**Work No. 4A**) (the 'Canal Water Abstraction Option');

- in the event that the eCanal Water aAbstraction eOption is not available, works to the existing Keadby 1 power station cooling water supply pipelines and intake structures within the River Trent, including temporary cofferdam (**Work No. 4B**) (the 'River Water Abstraction Option'); and
- works to and use of an existing outfall and associated pipework for the discharge of return cooling water and treated wastewater to the River Trent (**Work No. 5**) (the 'Water Discharge Corridor');
- towns water connection pipeline from existing water supply within the Keadby Power Station to provide potable water (**Work No. 6**);
- above ground carbon dioxide compression and export infrastructure comprising an above ground installation (AGI) for the undertaker's apparatus including deoxygenation, dehydration, staged compression facilities, outlet metering, and electrical connection (**Work No. 7A**) and an AGI for National Grid Carbon's apparatus (**Work No. 7B**);
- new permanent access from the A18, comprising the maintenance and improvement of an existing private access road from the junction with the A18 including the western private bridge crossing of the Hatfield Waste Drain (**Work No. 8A**) and installation of a layby and gatehouse (**Work No. 8B**), and an emergency vehicle and pedestrian access road comprising the maintenance and improvement of an existing private track running between the Proposed PCC Site and Chapel Lane, Keadby and including new private bridge (**Work No. 8C**);
- temporary construction and laydown areas including contractor facilities and parking (**Work No. 9A**), and access to these using the existing private roads from the A18 and the existing private bridge crossings, including the replacement of the western existing private bridge crossing known as 'Mabey Bridge' over Hatfield Waste Drain (**Work No. 9B**) and a temporary construction laydown area associated with that bridge replacement (**Work No. 9C**);
- temporary retention, improvement and subsequent removal of an existing Additional Abnormal Indivisible Load Haulage Route (**Work No. 10A**) and temporary use, maintenance, and placement of mobile crane(s) at the existing Railway Wharf jetty for a Waterborne Transport Offloading Area (**Work No. 10B**);
- landscaping and biodiversity enhancement measures (**Work No. 11A**) and security fencing and boundary treatments (**Work No. 11B**); and
- ~~minor associated development associated development including: surface water drainage systems; pipeline and cable connections between parts of the Proposed Development Site; hard standings and hard landscaping; soft landscaping, including bunds and embankments; external lighting, including lighting columns; gatehouses and weighbridges; closed circuit television~~

~~cameras and columns and other security measures; site preparation works including clearance, demolition, earthworks, works to protect buildings and land, and utility connections; accesses, roads, roadways and vehicle and cycle parking; pedestrian and cycle routes; and temporary works associated with the maintenance of the authorised development.~~

~~1.4.5 The Applicant will be responsible for the construction, operation (including maintenance) and eventual decommissioning of the Proposed Development, with the exception of the National Grid Gas compound works (**Work No. 2A**), the works within the National Grid Electricity Transmission 400kV substation (part of **Work No. 3A**), the works within the Northern Powergrid 132kV substation (part of **Work No. 3B**), and the National Grid Carbon compound works (**Work No. 7B**), which will be the responsibility of those named beneficiaries.~~

~~1.4.61.2.5 The Proposed Development includes the equipment required for the capture and compression of carbon dioxide emissions from the generating station so that it is capable of being transported off-site. NGCL will be responsible for the development of the carbon dioxide pipeline network linking onshore power and industrial facilities, including the Proposed Development, in the Humber Region. The carbon dioxide export pipeline does not, therefore, form part of the Proposed Development and is not included in the Application but will be the subject of separate consent application(s) to be taken forward by NGCL. The Proposed Development includes the equipment required for the capture and compression of carbon dioxide emissions from the generating station so that it is capable of being transported off site. ZCH Partnership will be responsible for the construction, operation and decommissioning of the carbon dioxide gathering network linking onshore power and industrial facilities including the Proposed Development in the Humber Region. The carbon dioxide export pipeline does not, therefore, form part of the Proposed Development and is not included in the Application but will be the subject of separate consent applications by third parties, such as the Humber Low Carbon Pipeline DCO Project by National Grid Carbon<sup>3</sup>.~~

~~1.4.71.2.6 The Proposed Development will operate 24 hours per day, 7 days per week with programmed offline periods for maintenance. It is anticipated that in the event of CCP maintenance outages, for example, it will be necessary to operate the Proposed Development without carbon capture, with exhaust gases from the CCGT being routed via the Heat Recovery Steam Generator (HRSG) stack.~~

~~1.4.81.2.7 Various types of associated and ancillary development further required in connection with and subsidiary to the above works are detailed in Schedule 1 'Authorised Development' of the draft DCO (**Application Document Ref. 2.1**).~~

<sup>3</sup> ~~<https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/humber-low-carbon-pipelines/>~~

This along with **Chapter 4: The Proposed Development** (ES Volume 1 - **Application Document Ref. 6.2**) provides further description of the Proposed Development. The areas within which each numbered Work (component) of the Proposed Development are to be built are defined by the coloured and hatched areas on the Works Plans (**Application Document Ref. 4.3**).

### **4.51.3 The Proposed Development Site**

**4.5.11.3.1** The Proposed Development Site (the ‘Order Limits’) is located within and near to the existing Keadby Power Station site near Scunthorpe, Lincolnshire and lies within the administrative boundary of North Lincolnshire Council (NLC). The majority of land is within the ownership or control of the Applicant (or SSE associated companies) and is centred on national grid reference 482351, 411796.

**4.5.21.3.2** The existing Keadby Power Station site currently encompasses the operational Keadby 1 and (under construction) Keadby 2 Power Station sites, including the Keadby 2 Power Station Carbon Capture and Readiness reserve space.

**4.5.31.3.3** The Proposed Development Site encompasses an area of approximately 69.4 hectares (ha). This includes an area of approximately 18.7ha to the west of Keadby 2 Power Station in which the generating station (CCGT plant, cooling infrastructure and CCP) and gas connection will be developed (the Proposed PCC Site).

**4.5.41.3.4** The Proposed Development Site includes other areas including:

- ~~a high pressure gas pipeline to supply the CCGT including a gas compound for NGG apparatus and a gas compound for the Applicant's apparatus previously developed land, along with gas, towns water and other connections, and access routes, within the Keadby Power Station site;~~
- the National Grid 400kV Substation located directly adjacent to the Proposed PCC Site, through which electricity generated by the Proposed Development will be exported;
- Emergency Vehicle Access Road and Potential Electrical Connection to Northern Powergrid Substation, ~~the routes of which utilise an existing farm access track towards Chapel Lane and land within the existing Northern Powergrid substation on Chapel Lane;~~
- Water Connection Corridors:
  - Canal Water Abstraction Option which includes land within the existing Keadby Power Station site with an intake adjacent to the Keadby 2 Power Station intake and pumping station and interconnecting pipework;
  - River Water Abstraction Option which includes a corridor that spans Trent Road and encompasses the existing Keadby Power Station



pumping station, below ground cooling water pipework, and infrastructure within the River Trent; and

- a Water Discharge Corridor which includes an existing discharge pipeline and outfall to the River Trent and follows a route of an existing easement for Keadby 1 Power Station;
- an existing river wharf at Railway Wharf (the Waterborne Transport Offloading Area) and existing temporary haul road into the into the existing Keadby 1 Power Station Site (the 'Additional Abnormal Indivisible Load (AIL) Route');
- a number of temporary Construction Laydown Areas on previously developed land and adjoining agricultural land; and
- land at the A18 Junction and an existing site access road, including two existing private bridge crossings of the Hatfield Waste Drain lying west of Palfrey Farm (the western of which is known as Mabey Bridge, to be replaced, and the eastern of which is termed Skew Bridge) and an existing temporary gatehouse, to be replaced in permanent form.

4.5.51.3.5 In the vicinity of the Proposed Development Site the River Trent is tidal, therefore parts of the Proposed Development Site are within the UK marine area. No harbour works are proposed.

4.5.61.3.6 Further description of the Proposed Development Site and its surroundings is provided in **Chapter 3: The Site and Surrounding Area (ES Volume I -Application Document Ref. 6.2)**.

#### **4.61.4 The Development Consent Process**

4.6.11.4.1 As a NSIP project, the Applicant is required to obtain a DCO to construct, operate and maintain the generating station, under Section 31 of the 2008 Act. Sections 42 to 48 of the 2008 Act govern the consultation that the promoter must carry out before submitting an application for a DCO and Section 37 of the 2008 Act governs the form, content and accompanying documents that are required as part of a DCO application. ~~These requirements are implemented through the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended) ('APFP Regulations') which state that an application must be accompanied by an ES, where a development is considered to be 'EIA development' under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations).~~

4.6.21.4.2 An application for development consent for the Proposed Development has been submitted to the Planning Inspectorate (PINS) acting on behalf of the ~~Secretary of State~~SoS. Subject to the Application being accepted (which will be decided within a period of 28 days following receipt of the Application), PINS will then examine it and make a recommendation to the ~~Secretary of State~~SoS, who will then decide whether to make (grant) the DCO.

## **4.7.1.5 The Purpose and Structure of this Document**

**4.7.1.5.1** The purpose of this document is to meet the requirements of Regulation 6(1)(a)(i) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (APFP Regulations) (UK Government, 2009), which requires the Applicant to provide a statement setting out who will be responsible for designing and building the proposed electrical connection to the Proposed Development. This document has been updated to reflect the additional capability to import electricity to the Proposed Development from the National Grid. The previous version of this document only considered export of electricity.

**4.7.21.5.2** The document is structured as follows:

- Section 2 sets out the proposed electrical route and points of connection, including the route and points of connection;
- Section 3 outlines the contractual agreements for the proposed Electrical Connection;
- Section 4 provides details on the design-build responsibilities for the proposed Electrical Connection;
- Section 5 outlines land ownership in respect of the land required for the proposed Electrical Connection;
- Section 6 provides information on the consents required for the proposed Electrical Connection works; and
- Section 7 provides the summary and conclusions to the Statement.

## 2.0 PROPOSED GRID CONNECTION

### 2.1 Overview

- 2.1.1 The Applicant has included within this Statement the proposed route and connection point for the Electrical Connection to the Low Carbon Electricity Generating Station (**Work No. 1A**) located within the Proposed PCC Site.
- 2.1.2 The existing electrical infrastructure in the area comprises extensive 132kV and 400kV overhead lines as well as underground cables that serve existing substations. In order to export electricity from the Proposed Development, engagement is ongoing with National Grid to identify the preferred 400kV connection option, including any upgrades to existing switchgear or other existing equipment that may be required, ~~as well as identify the preferred option for import of electricity for auxiliary power~~. It is anticipated that the Electrical Connection (**Work No. 3A**) will comprise a direct connection to the 400kV transmission system and is therefore likely to connect to the existing National Grid 400kV substation directly to the east of the Proposed PCC Site. The connection between the Proposed Development and existing 400kV substation would comprise 400kV single circuit electrical cables (or suitable alternative) and control system circuits and is referred to as the 'Electrical Connection Area to National Grid 400kV Substation' (as shown on **Figure 3.3** (ES Volume III – **Application Document Ref. 6.4**)). The circuits would be installed primarily below ground but some sections may be above ground.
- 2.1.3 ~~Work 3A will be capable of importing electricity for auxiliary power.~~ A 132kV electrical connection is also proposed for the import of electricity for the proposed CCP (**Work No. 3B**). ~~It is expected that both the 400kV and 132kV import connections would be developed for resilience reasons. As this Statement relates to the export of electricity from the Proposed Development, Work No. 3B is not discussed further within this document.~~
- 2.1.4 The proposed Electrical Connection corridor, which includes the working areas and space required, is shown on the Electrical Connection Plans (**Application Document Ref. 4.8**).
- 2.1.5 Environmental effects associated with the construction of the Electrical Connection are assessed as part of the Environmental Impact Assessment (EIA), which is reported in the ES (**Application Document Ref. 6.2 - 6.4**).



## 3.0 CONTRACTUAL AGREEMENTS

### 3.1 Overview

- 3.1.1 Engagement has been ongoing with NGENSO and NGET throughout 2020 to identify and agree the selected Electrical Connection point. NGENSO has confirmed to the Applicant that there is sufficient capacity at the Keadby 400kV Substation and transmission system to accommodate the export from the Low Carbon Electricity Generating Station, located within the Proposed PCC Site.
- 3.1.2 A signed Bilateral Connection Agreement is in place between the Applicant and NGENSO for the required export capacity.
- 3.1.3 The Applicant is currently in discussions with NGENSO and a formal Modification Application ~~will be applied for in due course to alter timeline and any update to requirements has been applied for to increase the electrical import capacity (no changes to the contracted export capacity). A formal offer is due in Spring 2022, with NGENSO and NGET anticipating no change to the physical works outlined in the current Bilateral Connection Agreement and summarised in Document 5.2.~~

## 4.0 RESPONSIBILITIES FOR DESIGNING AND BUILDING THE ELECTRICAL CONNECTION

### 4.1 Design

- 4.1.1 The chosen Engineering, Procurement and Construction (EPC) contractor will undertake detailed design of the Electrical Connection.
- 4.1.2 NGET will be responsible for enabling works and facilitation of the connection bay commissioning, reusing an existing bay at the existing 400kV Substation (currently connecting Keadby 1 Power Station via overhead line connection). Discussions are ongoing with National Grid ESO (NGESO) to confirm the progress with regard to the minor upgrades that are required on the existing infrastructure connecting the existing 400kV Substation at Keadby to the wider electricity transmission network, to connect the Low Carbon Electricity Generating Station located within the Proposed PCC Site. These upgrades are expected to be completed ahead of commissioning.
- 4.1.3 The EPC Contractor will undertake the design and installation of the 400kV cable connection to the Electricity Generating Station.
- 4.1.4 The detailed design of the Electrical Connection will be secured by DCO Requirement 5 in Schedule 2 of the draft DCO (**Application Document Ref. 2.1**).

### 4.2 Build

- 4.2.1 As the Electrical Connection is likely to comprise a 400kV single circuit cable route and control system cables installed primarily below ground, it is envisaged that installation will be through the use of an 'open-cut' method, whereby a trench will be excavated, and the cables laid below ground. This method will be applied where there is sufficient space and the work area is relatively flat. These works will generally be as follows:
- fence off works area and fit safety signage;
  - strip and store topsoil (if required);
  - a working area approximately 10-15m wide to allow for temporary trackway, and soils storage;
  - excavation of a trench (the EPC contractor will be responsible for providing all necessary trench supports and for maintaining the trenches in a safe condition and free of water); and
  - cables laid at a depth of at least 1.1m on a bed of cement bound sand overlain by protective tiles and backfilled to reinstate to original state (appropriate safety measures including warning tape will be used).
- 4.2.2 The cable connection will be required to cross under several existing 400kV and 132kV overhead lines. Co-ordination with the asset owners will be required to

confirm availability of outages to allow the installation of cables beneath these lines using the ‘open cut’ method. If outages cannot be secured, alternative construction methods such as thrust-bore or pipe-jacking will be used for these crossings. The construction area required for this method can be accommodated within the construction working widths identified in the Electrical Connection Corridor.

- 4.2.3 Access arrangements during construction of the Electrical Connection are presented in **Chapter 5: Construction Programme and Management (ES Volume I – Application Document Ref. 6.2)**. No significant effects on local roads have been identified given the route of the electrical connection corridor and the location of the existing 400kV Substation directly adjacent to the proposed Electricity Generating Station.
- 4.2.4 Overall construction of the Electrical Connection is likely to take around 12 months.
- 4.2.5 These Electrical Connection works would be undertaken in accordance with the measures outlined in a Construction Environmental Management Plan (CEMP) to be prepared by the EPC Contractor(s) in accordance with the Framework CEMP (**Application Document Ref. 7.1**) which accompanies the DCO Application.
- 4.2.6 The route will also require a special crossing from the Proposed Development into the existing National Grid 400kV Substation. This is outlined in Table 1, below, and shown in the Electrical Connection Plans (**Application Document Ref. 4.8**).

**Table 1: Special Crossings on the Electricity Connection Corridor**

<b>CROSSING NAME</b>	<b>GRID REFERENCE</b>	<b>DESCRIPTION</b>	<b>EXISTING/ UPGRADED/ NEW</b>
Existing 400kV Keadby Substation Boundary	482234.380, 412055.704	Keadby Substation boundary	New

### 4.3 Operation and Maintenance

- 4.3.1 The Applicant will be responsible for the operation and maintenance of all on-site plant and apparatus over the life of the Proposed Development.
- 4.3.2 NGET would be responsible for the operation and maintenance of the existing 400kV Keadby Substation and their equipment.

---

## 5.0 LAND REQUIREMENTS

### 5.1 Overview

- 5.1.1 The Applicant has agreed the land rights within parts of the Proposed Development Site, as described in the Statement of Reasons (**Application Document Ref. 3.2**).
- 5.1.2 The Applicant has the freehold interest in all of the land on which the Electrical Connection will be made, up to the boundary of the existing 400kV Keadby Substation as shown on the Land Plans (**Application Document Ref. 4.2**) and Book of Reference (**Application Document Ref. 3.1**). NGET PLC owns the freehold of the land on which the existing 400kV Keadby Substation is situated, [subject to a lease to Keadby Generation Limited and British Telecommunications Public Limited Company]. The connection agreement with NGET and the DCO will provide the necessary rights for all purposes connected with the laying, installation and operation of the grid connection and associated apparatus within the existing 400kV Keadby Substation.
- 5.1.3 **Work No. 3A** in Schedule 1 of the draft DCO (**Application Document Ref. 2.1**) covers the construction and operation of the Electrical Connection.

## 6.0 CONSENTS REQUIRED

- 6.1.1 All of the works associated with the Electrical Connection where they are within the Order Limits are included within the DCO Application and therefore no separate planning permission is required. This includes the Electrical Connection works (**Work No. 3A**) between the Low Carbon Electricity Generating Station located within the Proposed PCC Site (**Work No. 1**) and NEGTS existing 400kV Keadby Substation, which are specified in Schedule 1 of the DCO (**Application Document Ref. 2.1**) and which cover the construction and operation of the Electrical Connection. These are assessed in the ES topic chapters of ES Volume I (**Application Document Ref. 6.2**).

## 7.0 CONCLUSIONS

- 7.1.1 This Electricity Grid Connection Statement has been prepared to satisfy the requirements of Infrastructure Planning (Applications: Prescribed Forms and Procedures Regulations 2009 Regulation 6(1)(a)(i) and to demonstrate that there is no reason why an electrical grid connection would not be possible for the Proposed Development, in accordance with National Policy Statement (NPS) EN-1 (Department of Energy & Climate Change, 2011).
- 7.1.2 The Statement has demonstrated that the proposed Electrical Connection and associated cables included within the Application (and assessed as part of the associated EIA reported in the ES (**Application Document Ref. 6.2 - 6.4**) are feasible, that the necessary agreements are being/ have been secured, and appropriate powers are included in the draft DCO to facilitate the delivery of the Electrical Connection.

## 8.0 References

Department of Energy & Climate Change (2011). *National Policy Statement (NPS) EN-1*. Available online:

[REDACTED]

SSE (2020). *A Greenprint for a Cleaner Resilient Economy*. Available online:

[REDACTED]

UK Government (2009). Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (APFP Regulations) (SI 2009 No. 2264). Available online:

[REDACTED]