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MORGAN OFFSHORE WIND PROJECT: GENERATION ASSETS

Environmental Statement

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Image of an offshore wind farm

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Prepared by:

RPS

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MorganOffshore Wind Ltd.

Contents

Glossary

Term	Meaning
Applicant	Morgan Offshore Wind Limited.
Morgan Offshore Wind Project: Generation Assets	This is the name given to the Morgan Generation Assets project as a whole (includes all infrastructure and activities associated with the project construction, operations and maintenance, and decommissioning).
National Policy Statement(s) (NPS)	The current National Policy Statements for energy published by the Department for Energy Security & Net Zero in 2023.
Offshore Substation Platform (OSP)	A fixed structure located within the wind farm sites, containing electrical equipment to aggregate the power from the wind turbine generators and convert it into a more suitable form for export to shore.
Wind turbine generators	The wind turbine generators, including the tower, nacelle, blades and rotor.

Acronyms

Acronym	Description
AIS	Air Insulated Switchgear
CO_2	Carbon Dioxide
EnBW	Energie Baden-Württemberg AG
ESQCR	The Electricity Safety, Quality and Continuity Regulations 2002
EU	European Union
F-gas	Fluorinated gas
GIS	Gas Insulated Switchgear
NPS	National Policy Statement
OEM	Original Equipment Manufacturer
SF_6	Sulphur Hexafluoride
UK	United Kingdom

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1 Sulphur hexafluoride report

1.1 Introduction

1.1.1.1 Morgan Offshore Wind Limited (the Applicant), a joint venture of bp Alternative Energy Investments Ltd. (hereafter referred to as bp) and Energie Baden-Württemberg AG (hereafter referred to as EnBW) is developing the Morgan Offshore Wind Project: Generation Assets (hereafter Morgan Generation Assets). The Morgan Generation Assets is a proposed offshore wind farm located in the east Irish Sea.

1.1.1.2 This document has been produced in accordance with the National Policy Statement (NPS) for Electricity Networks Infrastructure (EN-5) and outlines the Applicant's approach to managing the use of Sulphur Hexafluoride (SF_6) across the Morgan Generation Assets.

1.1.2 Sulphur Hexafluoride (SF_6)

1.1.2.1 SF_6 is a synthetic, odourless gas that is used in the electricity industry to keep networks running safely and reliably. It is highly stable, non-toxic, non-flammable and electronegative, which means it will not form other compounds that will alter its state or effectiveness.

1.1.2.2 SF_6 is one of the most potent greenhouse gases. Its high atmospheric stability and ability to trap infrared radiation means it is far more potent at warming the earth's atmosphere than Carbon dioxide (CO_2) over longer periods of time.

1.1.2.3 SF_6 is primarily used in electricity transmission and distribution. Medium and high-voltage electrical equipment contains SF_6 to insulate the live electrical parts and to switch the flow of electrical current on and off. The same equipment is also used in the transmission and distribution of renewable energy.

1.1.2.4 Electrical equipment is designed to avoid the release of this gas into the atmosphere, however, leaks can occur over its lifecycle as a result of human error or equipment failure. SF_6 can also be released during the equipment's manufacture, installation, maintenance or decommissioning.

1.1.2.5 The energy industry is striving to reduce the use of SF_6 for example, National Grid has an ambition to reduce SF_6 from electricity assets by 2050[1].Solutions to replace SF_6 with greenhouse gas free alternatives are currently being developed by electrical transmission equipment manufacturers, however, currently there are limited options commercially available for the higher voltage levels required for the Morgan Generation Assets.

1.1.3 Policy and legislation

1.1.3.1 NPS for Electricity Networks Infrastructure (EN-5) requires the Applicant to:

'…At the design phase of the process consider carefully whether the proposed development could be reconceived to avoid the use of SF_6-reliant assets (paragraph 2.9.61).

Where the development cannot be so conceived, the applicant must provide evidence of their reasoning on this point. Such evidence will include, for instance an explanation of the alternatives considered and a case why these alternatives are technically infeasible or require bespoke components that are grossly disproportionate in terms of cost (paragraph 2.9.62).

In particular, an accounting of the cost differential between the SF_6-reliant assets and the appropriate SF_6-free alternative should be provided (paragraph 2.9.63).

Where applicants, having followed the above procedure, do propose to put new SF_6- reliant assets onto the electricity system, they should design a plan for the monitoring and control of fugitive SF_6 emissions consistent with the Fluorinated gas (F-gas) Regulations and its successors' (paragraph 2.9.64).

1.2 Morgan Generation Assets approach to SF_6

1.2.1 What is SF_6 used for

1.2.1.1 Across an offshore wind farm, SF_6 is typically used in the switchgear which protects electrical equipment against overloads and short-circuits and makes it possible to supply electricity reliability and without interruption. Switchgear will form part of the wind turbines and offshore substation platforms installed as part of the Morgan Generation Assets.

1.2.2 Use of SF_6 on Morgan Generation Assets

1.2.2.1 The wind turbines and offshore substation platforms installed as part of the Morgan Generation Assets will use Gas Insulated Switchgear (GIS) technology, as it is not commercially favourable or as practical to use Air Insulated Switchgear (AIS) offshore due to the limited electrical clearances (i.e. AIS takes up considerably more space than GIS and there is not adequate space to install AIS equipment within the offshore structures).

1.2.2.2 Despite the limitations, the Applicant is actively consulting with Original Equipment Manufacturers (OEMs) and designers of all project switchgear (in wind turbines and offshore substation platforms) to explore the use of SF_6-free switchgear. Where opportunities arise the Applicant will complete an evaluation during the detailed design phase, post-consent, to assess if these are suitable for use on the Morgan Generation Assets.

1.2.3 Cost differential

1.2.3.1 SF_6-free equipment is an emerging market for OEMs and as a novel technology SF6-free equipment is currently more expensive than traditional SF_6-reliant equipment. However, the market continues to develop, and therefore, until the project-specific tenders are available, post-consent, it is not possible to foresee what the cost differential will be.

1.3 SF_6 control

1.3.1 Regulations and Standards

1.3.1.1 Assuming a worst-case scenario where the Morgan Generation Assets installs SF_6-reliant assets, the control of SF_6 gas will be in line with the following regulations and standards:

- EU Regulation No.517/2014 (Retained) and the UK Fluorinated Greenhouse Gases Regulations 2015 working with fluorinated gases
- BS EN 62271-4:2013 High-voltage switchgear and control gear. Handling procedures of sulphur hexafluoride (SF_6) gas and its mixtures

- Energy Networks Association 2013 ER G69 Guidance on working with sulphur hexafluoride
- BS EN 60376:2018 Specification of technical grade sulphur hexafluoride (SF_6) for use in electrical equipment
- BS EN IC 60480:2019 Guidelines for the checking and treatment of sulphur hexafluoride (SF6) taken from electrical equipment and specification for is re-use
- The Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR)
- Health and Safety Executive guidance document HSG230 – keeping electrical switchgear safe.

1.3.1.2 Further information on the use and management of SF_6 will be provided in the Construction Method Statement and offshore Environmental Management Plan, which will be developed post consent and agreed prior to construction. The offshore Environmental Management Plan and Construction Method Statement are both secured for development/approval within the deemed Marine Licences of the draft Development Consent Order (DCO)

1.3.2 Equipment operation and maintenance

1.3.2.1 As is standard for the operation of GIS, to prevent leaks (and hence minimise risk of damaging the environment), all equipment will be maintained in line with OEM's instructions. Only personnel trained and competent as required by EU Regulation No.517/2014 (Retained) and the UK Fluorinated Greenhouse Gases Regulations 2015, will be allowed to operate and maintain equipment containing SF_6.

1.3.2.2 In the rare event of a leak occurring, automatic monitoring systems will be used to identify the leak. Any leaks will be repaired as soon as reasonably practicable after discovery. In line with the above regulations and guidance, appropriate safe systems of work will be used to ensure employees are protected from the hazards associated with this type of work.

1.3.2.3 To avoid a risk to public health, only competent persons will be permitted to access areas where equipment containing SF_6 is located. These areas will be secured in such a way as to prevent unauthorised access in compliance with the ESQCR Regulations 2002.

1.3.3 Records and auditing

1.3.3.1 Locations that have equipment containing SF_6 will hold a register, recording the equipment containing and the quantity of SF_6 used. The location SF_6 register will also keep records of any leaks and repairs including the amount of SF_6 used during the operational life. Any repairs or leaks will be managed to ensure equipment leakage rates remain under the maximum rates per year, in accordance with relevant regulations as outlined above. Leakage rates per year will be linked to the gas volume contained in equipment as stated by the OEM.

1.3.4 Disposal and end of life plan

1.3.4.1 During the decommissioning phase of the Morgan Generation Assets any SF_6 will be removed in accordance with the legislation and best practice measure in place at the time. This is likely to include re-using SF_6 where possible and where it is not re-usable it will be recovered and either recycled or destroyed by licensed companies. During

decommissioning, gas will be recovered from equipment by trained and competent personnel. A Decommissioning Plan will be developed and implemented during the decommissioning phase.