East Anglia TWO Offshore Windfarm

Outline National Grid Substation Design Principles Statement

Applicant: East Anglia TWO Limited
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Applicable to
East Anglia TWO

Revision Summary				
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01	02/11/2020	Brian McGrellis	Lesley Jamieson	Rich Morris

Description of Revisions			
Rev	**Page**	**Section**	**Description**
01	n/a	n/a	First draft for submission at Deadline 1

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Glossary of Acronyms

AIS	Air Insulated Switchgear
AOD	Above Ordanance Datum
DCO	Development Consent Order
EMP	Environmental Management Plan
GIS	Gas Insulated Switchgear
LMP	Landscape Management Plan
NPS	National Policy Statement
OLEMS	Outline Landscape and Ecological Management Strategy

Glossary of Terminology

Applicant	East Anglia TWO Limited.
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia TWO project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO project Development Consent Order.

1 Introduction

1.1 Background

1. This Outline National Grid Substation Design Principles Statement details the design principles which underpin the design of the proposed National Grid substation to be developed as part of the East Anglia TWO project. This outline document will be used as the foundation for developing the final National Grid Substation Design Principles Statement post-consent, as part of the discharging of requirements of the Development Consent Order (DCO).

2. This document should be read in conjunction with the ***Outline Landscape and Ecological Mitigation Strategy*** (OLEMS) (APP-584). Principles relating to "overall site design" are dealt with in the OLEMS and would be delivered via either the Ecological Management Plan (EMP) or Landscape Management Plan (LMP).

3. The ***draft DCO*** (APP-023) states that certain details of the National Grid substation design must be submitted to and approved by the relevant Local Planning Authority prior to the commencement of construction. This document sets out the principles which could be included in that submission.

4. Requirement 12 of the ***draft DCO*** (APP-023) relates to the detailed design parameters onshore, and states:

   "(6) No stage of the national grid substation comprised within Work No. 41 may commence until details of the layout, scale and external appearance of the national grid substation (which accord with the outline national grid substation design principles statement) have been submitted to and approved by the relevant planning authority. Work No. 41 must be carried out in accordance with the approved details.

   (7) Buildings comprised within the national grid substation must not exceed—

   (a) where AIS substation arrangement is used, a height of 6 metres above finished ground level; and

   (b) where GIS substation arrangement is used, a height of 16 metres above finished ground level.

   (8) External electrical equipment comprised within the national grid substation must not exceed a height of 16 metres above finished ground level.

   (9) The fenced compound area (excluding its accesses) for the national grid substation must not exceed—

(a) where AIS substation arrangement is used, 44,950 m²; and

(b) where GIS substation arrangement is used, 16,800 m².”[1]

[1] The wording of Requirement 12 presented includes the update required to paragraph (6) to secure compliance with this outline national grid substation design principles statement. This wording will be reflected in the next version of the ***draft DCO*** (APP-023) which will be submitted at Deadline 3.

2 Design Principles

2.1 National Design Policies

5. Existing policy set out within the Overarching National Policy Statement for Energy (NPS-EN-1) makes clear the requirements of good design in energy projects. The Planning Inspectorate is to be satisfied that "*developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable (including taking account of natural hazards such as flooding) as they can be."*

6. EN-1 NPS also states that *"Virtually all nationally significant energy infrastructure projects will have effects on the landscape. Projects need to be designed carefully, taking account of the potential impact on the landscape. Having regard to siting, operational and other relevant constraints the aim should be to minimise harm to the landscape, providing reasonable mitigation where possible and appropriate."*

7. EN-3 NPS for Renewable Energy Infrastructure states that "*Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology*."

3 Outline Design Principles

8. The following principles will be used as the foundation for developing the final National Grid substation design principles post-consent, as part of the discharging of requirements of the DCO.

9. The outline design principles are as follows:

- Continued engagement with Parish Councils, local residents and relevant authorities (Suffolk County Council and East Suffolk Council) on design and landscape proposals. Opportunity will be provided through the development of the final design and landscape proposals to seek feedback from local communities who will be directly affected by the development.
- The landscape and building design proposals be subject to design review, in consultation with the relevant local authorities. This could involve the Design Council or Shape East. The output of this design review, if it is appropriate to do so, will form part of the onshore substation procurement or detailed design process.
- Consideration of 'Good Design' in line with the requirements of Overarching National Policy Statement for Energy (NPS-EN-1).
- Appropriate building design and materials will be sought as part of the procurement process. The visual impact of the National Grid substation will be sought to be minimised as far as possible by the use of design, building materials, shape, layout, coloration and finishes, as appropriate.
- On-site mitigation planting proposals will be undertaken in the area surrounding the National Grid substation, in order to minimise its visual effect and maximise screening opportunities from key viewpoints/receptors, while also responding to local landscape character, pattern and growing conditions. Planting proposals will be considered along with the National Grid substation building design and layout of ancillary structures.
- The overall site design should have regard to the potential for embedded ecological mitigation and enhancement in accordance with the ***OLEMS*** (APP-584) as delivered via either the EMP or LMP.
- The overall site design will maximise the opportunity for site won topsoil and subsoil materials to be reused on site within landscape earthworks 'bunds'. Any bunds should support the visual screening of the substation while having a gradual external slope gradient that appears natural and complements the existing terrain (when looking towards the National Grid substation).

- The overall site design will seek to deliver gains for public amenity, including enhanced access through Public Rights of Way proposals and areas for landscape planting.
- Species rich grassland areas will be established to provide a low maintenance ground cover which will also enhance local biodiversity in areas that are not to be returned to agricultural use or planted as woodland in accordance with the ***OLEMS*** (APP-584) as delivered via either the EMP or LMP. The overall site design will identify land around the National Grid substation that will be returned to agricultural use during the operational period.

4 Finished Ground Level

10. The maximum heights specified for buildings and external electrical equipment relate to heights above finished ground level in the immediate area surrounding buildings and external electrical equipment.

11. Based on preliminary engineering design undertaken, the maximum finished ground level in respect of the National Grid substation is in the region of 20.1m AoD, falling to a low point in the region of 16.8m AoD. The final finished ground level will be established during detailed design post consent.

12. There are however a number of factors that could influence the maximum finished ground level, including:

- Surface water drainage design requirements, to ensure adequate surface water run-off from the National Grid substation and a suitable connection to the existing surface water drainage system at Church Road;
- Existing ground levels and practicable cut and fill requirements, to optimise the cut and fill balance of the substation and minimise the need to import or export spoil material during the substation construction; and
- Groundwater constraints, to ensure appropriate management and control of groundwater interactions in the design of the substation.

13. Details of the layout, scale and external appearance of the National Grid substation (including finished ground levels) will be submitted to the Local Planning Authority for approval prior to commencement of construction of the National Grid substation.

5 References

Department of Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). July 2011