RWE Renewables UK Dogger Bank South (West) Limited

RWE Renewables UK Dogger Bank South (East) Limited

Dogger Bank South Offshore Wind Farms

Environmental Statement

Volume 7

Appendix 30-3 Climate Change Resilience Assessment Methodology

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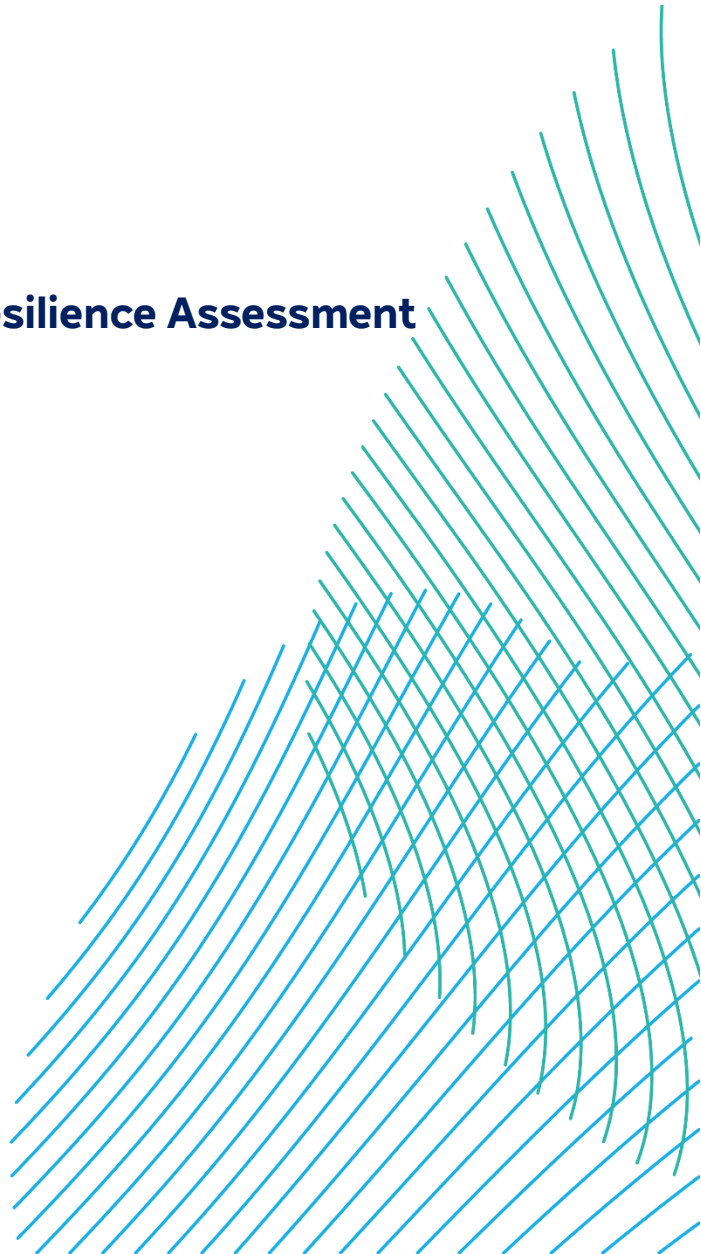

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Glossary

Term	Definition
Dogger Bank South (DBS) Offshore Wind Farms	The collective name for the two Projects, DBS East and DBS West.
The Applicants	The Applicants for the Projects are RWE Renewables UK Dogger Bank South (East) Limited and RWE Renewables UK Dogger Bank South (West) Limited. The Applicants are themselves jointly owned by the RWE Group of companies (51% stake) and Masdar (49% stake).
The Projects	DBS East and DBS West (collectively referred to as the Dogger Bank South Offshore Wind Farms).
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of Receptors include species (or groups) of animals, plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.

Acronyms

Term	Definition
CCRA	Climate Change Resilience Assessment
DBS	Dogger Bank South
DESNZ	Department for Energy Security and Net Zero
RCP	Representative Concentration Pathways
IEMA	Institute of Environmental Management & Assessment
GHG	Greenhouse Gas

30.3 Climate Change Resilience Assessment Methodology

30.3.1 Introduction

1. This appendix presents the climate change resilience assessment (CCRA) methodology to determine the potential effects of climate change on the Projects. The methodology for the CCRA is informed by the Institute of Environmental Management & Assessment (IEMA) guidance, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (IEMA, 2020).

30.3.2 Approach

2. A four-step methodology is adopted for the CCRA. The initial stages of the assessments aim to identify the climate variables to which the Projects could be vulnerable to during its lifetime. If deemed necessary, a more detailed risk assessment is then undertaken following the identification of influencing climate variables. This comprises an assessment of the level of risk associated with hazards posed by the predicted changes in climate variables.

3. This approach carried out for each step of the CCRA is set out below.

30.3.2.1 Step 1: Identifying Receptors, Climate Variables and Hazards

4. The first step of the CCRA is to identify the receptors which may potentially be impacted by climate variables and associated hazards. The identified receptors include those known to have already experienced a climate related event (i.e., flooding), and unknown receptors which are yet to be impacted according to available data and literature.

30.3.2.2 Step 2: Climate Vulnerability Assessment

5. The second step consists of a qualitative assessment, informed by professional judgement and support literature, of the Projects to changes in the climate variables. Vulnerability is considered to be a function of:

   - The sensitivity of the Projects to climate change; and
   - The exposure (both spatially and temporally) of the Projects to climate variables.

6. Both sensitivity and the exposure of the Projects to climate variables were considered in the vulnerability assessment. This approach attributes either a high, moderate, or low sensitivity /exposure categorisation to each vulnerability.

7. Overall vulnerability is determined by considering the interrelationships between the exposure and the receptor sensitivity, as set out in **Table 30-3-1.**

Table 30-3-1 CCRA Sensitivity/Exposure Matrix for Determining Vulnerability Rating

Sensitivity	**Exposure**		
	Low	**Medium**	**High**
Low	Low vulnerability	Low vulnerability	Low vulnerability
Moderate	Low vulnerability	Medium vulnerability	Medium vulnerability
High	Low vulnerability	Medium vulnerability	High vulnerability

8. Climate change projection data was obtained from the UKCP18 database, which was used to identify the climate variables within the study area for two representation concentration pathways (RCP) (RCP 2.6, and RCP8.5). RCP scenarios are recent assumptions about future population, economy, and global targets to cut GHG emissions. The RCP scenarios are defined in Table 30-18 in **Volume 7, Chapter 30 Climate Change (application ref: 7.30)**. Data was obtained for the 10th, 50th and 90th percentiles for each RCP, in accordance with the requirements for the National Policy Statements.

9. Further information related to the vulnerability of the Projects to the projected effects of climate change were obtained from other topic chapters include **Volume 7, Chapter 20 Flood Risk and Hydrology (application ref: 7.20)** and **Volume 7, Chapter 21 Land Use (application ref: 7.21)**.

10. For those vulnerabilities categorised as medium or high risk, the risk of climate change to the design and infrastructure of the Projects, and consequently to its operation is determined through Steps 3 to 4 of the assessment process.

30.3.2.3 Step 3: Risk Assessment

11. For those vulnerabilities categorised as medium or high, climate hazards were identified through professional judgement. The risks of the Projects and its associated infrastructure to the occurrence of a hazard event were qualitatively identified through a hazard likelihood and consequence matrix, The descriptors of likelihood and consequence are provided in **Table 30-3-2** and **Table 30-3-3**. The matrix is detailed in **Table 30-3-4**.

Table 30-3-2 Descriptors of likelihood for climate hazards

Likelihood	Description
Almost certain	The climate hazard is likely to occur numerous times during the anticipated operational lifetime of the Projects.
Likely	The climate hazard is likely to occur on several occasions during the anticipated operational lifetime of the Projects.
Moderate	The climate hazard will occur on limited occasions during the anticipated operational lifetime of the Projects.
Unlikely	The climate hazards will occur infrequently during the anticipated operational lifetime of the Projects.
Very unlikely	The climate hazard may occur once during the anticipated operational lifetime of the Projects.

Table 30-3-3 Descriptors of consequences as a result of climate hazards

Consequence	Description
Catastrophic	Permanent damage to infrastructure, resulting in a severe lasting effect to the Projects to function. Very significant adverse effect to the surrounding environs requiring remediation and restoration.
Major	Extensive damage to infrastructure requiring major repairs and maintenance, resulting in a severe effect to the Projects to function. Significant adverse effect to the surrounding environs.
Moderate	Limited damage to infrastructure requiring maintenance or minor repair, resulting in a potential effect to the Projects to function. Adverse effect to the surrounding environs.
Minor	Small and localised damage to infrastructure and a minor effect to the Projects to function. Potential for slight adverse effect to the surrounding environs.
Insignificant	No damage to infrastructure or the ability of the Projects to function. No adverse effect to the surrounding environs.

Table 30-3-4 Likelihood/Consequence Matrix for Determining Risk Rating

Likelihood	Consequence				
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Almost certain	Low	Medium	High	Extreme	Extreme
Likely	Low	Medium	Medium	High	Extreme
Moderate	Low	Low	Medium	High	Extreme
Unlikely	Low	Low	Medium	Medium	High
Very unlikely	Low	Low	Low	Medium	Medium

30.3.2.4 Step 4: Mitigation and resilience rating

12. For climate risks identified as 'medium' or 'high' in the likelihood/ consequence matrix in Step 3 (see **Table 30-3-4**), secondary mitigation measures are identified. With the proposed mitigation measures taken into consideration, a residual risk rating is then assessed. For each hazard, a resilience rating is identified as one of the following:

- High – strong degree of climate resilience. Remedial action or adaptation may be required but is not a priority.
- Moderate – a moderate degree of climate resilience. Remedial action or adaptation is recommended.
- Low – a low level of climate resilience. Remedial action or adaptation is required as a priority.

30.3.3 Definition of Significance

13. The significance of the CCRA was determined through consideration of the climate risk (identified in Step 3) and resilience rating (identified in Step 4), applied to each climate hazard identified. **Table 30-3-5** presents a matrix used to identify the overall significance of the CCRA. The risk and resilience matrix are obtained from best practice for risk assessment procedures in relation to the consideration of climate resilience.

Table 30-3-5 Significance criteria

Risk rating	Resilience rating		
	High	**Minor**	**Low**
Extreme	Significant	Significant	Significant
High	Not significant	Significant	Significant
Medium	Not significant	Not significant	Significant
Low	Not significant	Not significant	Not significant

References

Institute of Environmental Management & Assessment (IEMA) (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation.

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