



Sporad na Mara Offshore Wind Farm

Offshore Project

Environmental Impact Assessment Report

Appendix 7.1: Climate Change Vulnerability Assessment, Volume 2c

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1 INTRODUCTION

1.1 OVERVIEW

1.1.1.1 This appendix of the Environmental Impact Assessment Report (EIAR) presents the Climate Change Vulnerability Assessment (CCVA) for the proposed Sporad na Mara Offshore Wind Farm (hereafter referred to as the 'Offshore Project'). The CCVA determines the Offshore Project receptors and climate hazards which may be vulnerable to climate change and therefore require further assessment to determine likely significant effects of the climate on the Offshore Project.

1.1.1.2 This appendix should be read in conjunction with the project description provided in **Chapter 3: Project Description, Volume 1a** and the relevant parts of the following chapters:

- **Chapter 7: Climate Resilience, Volume 2a.**

1.1.1 PROJECT BACKGROUND

1.1.1.1 Sporad na Mara Limited (hereafter referred to as 'the Applicant') is proposing to develop the Project. The Project is an offshore wind farm (OWF) that will consist of up to 60 fixed-bottom wind turbine generators (WTGs).

1.1.1.2 The Project will include both offshore and onshore infrastructure. This Offshore EIAR supports the application for the offshore components of the Project as outlined in **Chapter 1: Introduction, Volume 1a**. The offshore components of the Project (the Offshore Project) includes all infrastructure and activities located seaward of Mean High Water Springs (MHWS) within the Array Area and Offshore Cable Area of Search (OCAS) (**Figure 1.2: Offshore Project Location, Volume 1c**). Further detailed information is provided in **Chapter 3, Volume 1a**.

1.1.1.3 The Offshore Project is situated off the northwest coast of Isle of Lewis/*Eilean Leòdhais* and the Array Area is located approximately 5-13 km offshore and is approximately 161 km² in size. It will comprise WTGs, foundations, Offshore Cables, Offshore Substation Platform (OSP) (if required), and Landfall. The Array Area combined with the OCAS is defined as the Offshore Project Boundary. The water depths across the Turbine Area range from 37 m-67 m with the southwest corner of the Array Area reaching 72 m. The proposed WTGs and fixed foundations will be located within a Turbine Area of approximately 140 km², within the Array Area.

1.2 PURPOSE OF THIS APPENDIX

1.2.1.1 This appendix describes the following:

- Climate vulnerability methodology and assessment.

2 VULNERABILITY ASSESSMENT METHODOLOGY

- 2.1.1.1 The Institute of Environmental Management and Assessment (IEMA) EIA Guide to: Climate Change Resilience and Adaptation 2020 (Institute of Environmental Management and Assessment, 2020) outlines that the scoping stage should identify the key climatic hazards relevant to the Offshore Project and likely effects; however, it is not prescriptive in how this is undertaken. Following the identification of in-scope climate hazards, the EIAR will identify potential impacts which may occur as a result of climate change to the Offshore Project receptors. An assessment of the likelihood of the impacts occurring and the consequence if they did occur is then made. The identification of potential impacts, likelihood and consequence assessment is provided in **Chapter 7, Volume 2a**.
- 2.1.1.2 The vulnerability assessment is the outcome of an assessment of sensitivity and exposure of the Offshore Project receptors to the climate trends presented in **Chapter 7, Volume 2a** (see Section 7.6). The vulnerability assessment has been undertaken for the construction, operation and maintenance (O&M), and decommissioning phases of the Offshore Project in order to identify likely significant effects.
- 2.1.1.3 The exposure and sensitivity of the receptor to climate impacts is assigned a level of vulnerability as shown in the matrix in **Table 2.1**.

Table 2.1: Vulnerability matrix

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

- 2.1.1.4 Sensitivity refers to the degree of response of the receptor to a change and its capacity to accommodate and recover from a change should it be affected. The typical 'sensitivity' of receptors to climate variables considers the impact of the climate on the specific receptors. The assessment of sensitivity is based on literature review and professional judgement and sensitivity is rated as high, moderate, or low. As such, 'high sensitivity' implies that the receptor will lose much of its original form and function, 'moderate sensitivity' implies that the receptor is able to tolerate some climatic conditions without being fully altered though remains susceptible to be altered to some extent and 'low sensitivity' implies that projected changes in the climatic factors have little influence on the receptor.
- 2.1.1.5 Exposure is the nature and degree to which climate variations may pose a risk to the Offshore Project. The 'exposure' of receptors to projected change in climate variables based on the current climate and the future projections identified in the baseline information and rated as high,

medium, or low. Climate projection data is provided in 29 year timeframes, and the construction phase is assessed as exposure to the climate trends of the '2030s' (2020–2049), the O&M phase considers the climate trends for the 2050s (2040–2069) and 2080s (2070–2099), and the decommissioning phase considers the climate trends for the 2080s (2070–2099). To align with EIA practice, assessing a worst-case scenario the operation and decommissioning phases will be assessed against the climate projections of the 2080s.

2.1.1.6 On completion of the vulnerability assessment, climate variables in the construction, O&M, and decommissioning phase to which the Offshore Project is likely to have a low vulnerability to are scoped out of further assessment as no potential for likely significant effects is identified. Climate variables in the construction, O&M, and decommissioning phase to which the Offshore Project is likely to have a medium or high vulnerability to, are scoped in and taken forward for further assessment at the next stage as these variables are identified as having the potential for likely significant effects. This is a qualitative assessment informed by expert opinion and supporting literature.

2.1.1.7 **Table 2.2** presents the vulnerability assessment for the Offshore Project.

Table 2.2: Vulnerability assessment

Climate hazard	Vulnerability Assessment	Receptor								Justification
		Construction site, materials and equipment (Offshore Project and Landfall below MHWS)	Construction workers (Offshore Project and Landfall below MHWS)	WTGs (including option for OSP)	Offshore Cable	Landfall (below MHWS)	Maintenance workers (Offshore Project and Landfall below MHWS)	Decommissioning site, materials and equipment (Offshore Project and Landfall below MHWS)	Decommissioning workers (Offshore Project and Landfall below MHWS)	
Change in average temperature	Exposure	Low	Low	Low	Low	Low	Low	Low	Low	Human receptors have the ability to respond to gradual changes in temperature. Assets and infrastructure will not be susceptible to harm or damage from changes in average temperatures.
	Sensitivity	Low	Low	Low	Low	Low	Low	Low	Low	
	Vulnerability	Low	Low	Low	Low	Low	Low	Low	Low	
Heat stress	Exposure	N/A	Low	N/A	N/A	N/A	Low	N/A	Low	Heat stress affects people and not assets and infrastructure. Heat effects on assets and infrastructure is considered in heatwaves. The potential for significant impacts from heat stress is considered unlikely based on the future climate projection data for the study area.
	Sensitivity	N/A	Low	N/A	N/A	N/A	Moderate	N/A	Moderate	
	Vulnerability	N/A	Low	N/A	N/A	N/A	Low	N/A	Low	
Heatwave	Exposure	Low	N/A	Low	Low	Low	N/A	Low	N/A	Heatwaves occur when temperature over 25°C are met for at least three consecutive days. Infrastructure and assets can be adversely affected by prolonged extreme temperatures. Personnel have been excluded as the effects of heat stress would address this climate hazard. Based on the future climate projection data, the number of heatwave events within the study area are not anticipated to result in significant impacts.
	Sensitivity	Moderate	N/A	Moderate	Low	Moderate	N/A	Moderate	N/A	
	Vulnerability	Low	N/A	Low	Low	Low	Low	N/A	Low	
Cold wave	Exposure	Low	Low	Low	Low	Low	Low	Low	Low	Occurrences of cold waves and frost days are projected to reduce over time as temperatures increase. As such significant impacts from cold waves are considered unlikely.
	Sensitivity	Low	Moderate	Low	Low	Low	Low	Low	Low	
	Vulnerability	Low	Low	Low	Low	Low	Low	Low	Low	
Wildfire	Exposure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Wildfire events are not applicable to offshore activities and assets.
	Sensitivity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Climate hazard	Vulnerability Assessment	Receptor								Justification
		Construction site, materials and equipment (Offshore Project and Landfall below MHWS)	Construction workers (Offshore Project and Landfall below MHWS)	WTGs (including option for OSP)	Offshore Cable	Landfall (below MHWS)	Maintenance workers (Offshore Project and Landfall below MHWS)	Decommissioning site, materials and equipment (Offshore Project and Landfall below MHWS)	Decommissioning workers (Offshore Project and Landfall below MHWS)	
High winds and storms	Exposure	Medium	Medium	High	Medium	Low	High	High	High	High winds and storms can cause damage to infrastructure, assets and personnel. High winds and storms can cause changes in sediment transport and scour impacting infrastructure on the sea bed. The Landfall cable exit and entry points are not anticipated to be impacted by high winds and storms, given the construction on concrete chambers, linking to below ground infrastructure.
	Sensitivity	Moderate	Moderate	Moderate	Moderate	Low	Moderate	Moderate	Moderate	
	Vulnerability	Medium	Medium	Medium	Medium	Low	Medium	Medium	Medium	
Change in average precipitation	Exposure	Low	Low	Low	Low	Low	Low	Low	Low	Human receptors are not impacted by changes in precipitation rates. Assets and infrastructure will not be susceptible to harm or damage from changes in average precipitation.
	Sensitivity	Low	Low	Low	Low	Low	Low	Low	Low	
	Vulnerability	Low	Low	Low	Low	Low	Low	Low	Low	
Ocean acidification	Exposure	N/A	N/A	Medium	Medium	N/A	N/A	N/A	N/A	Ocean acidification comprises a reduction of the acidity of the ocean over time. Ocean acidification is a chronic (long-term) climate impact.
	Sensitivity	N/A	N/A	Moderate	Moderate	N/A	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	Medium	Medium	N/A	N/A	N/A	N/A	
Saline intrusion	Exposure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Saline intrusion is a chronic (long-term) climate impact affecting groundwater and freshwater habitats as saltwater moves into freshwater bodies. The Offshore Project does not require abstraction of groundwater.
	Sensitivity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Sea level rise	Exposure	N/A	N/A	Medium	N/A	Medium	N/A	N/A	N/A	Sea level rise is a chronic climate impact. It may affect the offshore array height and Landfall interface.
	Sensitivity	N/A	N/A	Moderate	N/A	Moderate	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	Medium	N/A	Medium	N/A	N/A	N/A	
Heavy precipitation	Exposure	Low	Low	Low	Low	Low	Low	Low	Low	Human receptors have the ability to respond to changes in precipitation rates. Assets and infrastructure will not be susceptible to harm or damage from changes in average precipitation. Below ground infrastructure or infrastructure on the seabed will not be impacted by heavy precipitation.
	Sensitivity	Low	Low	Low	Low	Low	Low	Low	Low	
	Vulnerability	Low	Low	Low	Low	Low	Low	Low	Low	
Flood – fluvial/pluvial	Exposure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Offshore activities and assets will not be affected by fluvial or pluvial flooding.
	Sensitivity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Climate hazard	Vulnerability Assessment	Receptor								Justification
		Construction site, materials and equipment (Offshore Project and Landfall below MHWS)	Construction workers (Offshore Project and Landfall below MHWS)	WTGs (including option for OSP)	Offshore Cable	Landfall (below MHWS)	Maintenance workers (Offshore Project and Landfall below MHWS)	Decommissioning site, materials and equipment (Offshore Project and Landfall below MHWS)	Decommissioning workers (Offshore Project and Landfall below MHWS)	
Coastal erosion	Exposure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Offshore activities and assets will not be affected by coastal erosion.
	Sensitivity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Soil erosion	Exposure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Offshore activities and assets will not be affected by soil erosion.
	Sensitivity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
Landslide	Exposure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Offshore activities and assets will not be affected by landslide.
	Sensitivity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	Vulnerability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

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3 GLOSSARY OF TERMS AND ABBREVIATIONS

3.1.1.1 A list of key terms and acronyms used in this appendix are provided in **Table 3.1** and **Table 3.2**.

Table 3.1 Acronyms and abbreviation

Term	Definition
CCVA	Climate Change Vulnerability Assessment
IEMA	Institute of Environmental Management and Assessment
MHWS	Mean High Water Springs
OSP	Offshore Substation Platform
WTG	Wind Turbine Generators

Table 3.2 Glossary

Term	Meaning
the Applicant	Spiorad na Mara Limited (the Project owner).
Climate hazard	The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.
Climate impact	"Impact" is used primarily to refer to the effects on natural and human systems of extreme weather and climate events and of climate change. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services and infrastructure due to the interaction of climate change or hazardous climate events occurring within a specific time-period and the vulnerability of an exposed society or system. Impacts are also referred to as consequences and outcomes. The impacts of climate change on geophysical systems, including floods, droughts and sea level rise, are a subset of impacts called "physical impacts".
Climate trend	Climate trends refer to the pattern of climate change over decades to understand how the climate is changing. Trends indicate potential climate hazards that may arise in a climate parameter.
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria
EIAR	The Environmental Impact Assessment Report (EIAR) prepared to assess the likely significant effects of the Project on the environment.
Embedded or 'Designed-in' Mitigation	Mitigation measures to avoid or reduce environmental effects that are directly incorporated into the preferred design for the Project. This can include standard practice in accordance with or without guidance. Embedded Mitigation is considered as part of the impact assessment, before effect significance is identified.
Offshore Application	The application for a marine licence under the Marine (Scotland) Act 2010 (between 0 and 12nm) and a Section 36 consent under the Electricity Act 1989.

Term	Meaning
Offshore Cables	Electrical and communication cables located within the Array Area and Offshore Cable Area of Search. The Offshore Cables consist of Array Cables, Array Cables to Landfall, and Export Cables.
Offshore Cable Area of Search (OCAS)	The area within which the offshore cable infrastructure between the Array Area and Landfall up to Mean High Water Springs (MHWS) will be located.
Offshore Landfall Area	The area seaward of Mean High Water Springs (MHWS) within the Offshore Cable Area of Search (OCAS) that includes works associated with the Horizontal Directional Drill (HDD) installation, including HDD exit pit(s) (located below MLWS) and offshore cable connection to the onshore (TJB) (located above MHWS).
Offshore Project	The offshore components of the Sporad na Mara offshore wind farm (the Project) located seaward of Mean High Water Springs (MHWS).
Offshore Project Boundary	The 'red line boundary' encompassing the Offshore Project.
Offshore Substation Platform (OSP)	The optional offshore substation located within the Turbine Area. Includes the platform and associated components which allows the voltage to be increased to meet onward transmission requirements.
Resilience	The capacity of systems and its component to anticipate and cope with a hazardous event or trend or disturbance, and accommodate, or recover from the effects of a hazardous event or trend in a timely and efficient manner.
Vulnerability	Propensity or predisposition to be adversely affected.
Western Isles	Also known as the Outer Hebrides/ <i>Na h-Eileanan Siar</i> , they are the islands situated to the Northwest of Scotland/ <i>Alba</i> .
Turbine Area	A reduced area within the Array Area where above water surface infrastructure would be located i.e. wind turbine generators (WTG) or Offshore Substation Platform (OSP) (if required). This area has been developed and refined through stakeholder consultation and environmental assessment.
Wind Turbine Generator (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment

3.2 REFERENCES

Institute of Environmental Management and Assessment (2020) *IEMA EIA Guide to: Climate Change Resilience and Adaptation*. [Online] Available at: <https://www.iema.net/media/mabhqino/iema-eia-climate-change-resilience-june-2020.pdf> [Accessed January 2026].