codling wind park

Environmental Impact Assessment Report

Volume 4

Appendix 28.1 Representative Scenario and LoD Assessment


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APPENDIX 28.1 REPRESENTATIVE SCENARIO AND LIMITS OF DEVIATION ASSESSMENT

1 Introduction

1. Complex, large-scale infrastructure projects with a terrestrial and marine interface such as the CWP Project, are consented and constructed over extended timeframes. The ability to adapt to changing supply chain, policy or environmental conditions and to make use of the best available information to feed into project design, promotes environmentally sound and sustainable development. This ultimately reduces project development costs and therefore electricity costs for consumers and reduces CO_2 emissions.

2. Case law recognises that the plans and particulars submitted with planning applications can allow for a certain limited flexibility, where this is applied reasonably and, in a context-specific way. In addition, section 287A of the Planning and Development Act (PDA) (as inserted by the Planning and Development, Maritime and Valuation (Amendment) Act 2022) has expanded the flexibility available and allows planning applications to be made and decided before the Applicant has confirmed certain details of the project.

3. Due to the complexity of the Codling Wind Park (CWP) Project, significant and rapid progression in wind farm technology development, potential changes in environmental conditions and in policy and legislation, the Applicant considers that consenting a degree of design flexibility is appropriate and legally compliant.

4. In this regard the approach to the design development of the CWP Project has sought to introduce flexibility where required to enable the best available technology to be constructed, whilst at the same time to specify project boundaries, project components and project parameters wherever possible, whilst having regard to known environmental constraints.

2 Approach to Presenting the Project Design

5. The approach to the design development of the CWP Project considers permanent infrastructure, temporary infrastructure and installation methods.

6. In general, the CWP Project has sought to specify the location, scale and extents of permanent and temporary infrastructure, however in some cases a degree of design flexibility is required. Subject to the detail concerned, this flexibility is presented in three ways:

   - **Options**: Consent is sought for up to two options for certain permanent infrastructure details and layouts, for example, wind turbine generator (WTG) Layout Option A (250 m rotor diameter) or WTG Option B (276 m rotor diameter). Each design option is described in detail in **Chapter 4 Project Description**, which provides the details associated with each option.
   - **Dimensional flexibility**: Dimensional flexibility is described as a limited parameter range i.e. upper (maximum) and lower (minimum) values for a given detail such as cable length.
   - **Locational flexibility**: Locational flexibility of permanent infrastructure is described as Limit of Deviation (LoD) from a specific point or alignment.

7. Installation methods for permanent infrastructure have been identified and described in full, however, as with the design of permanent infrastructure, a degree of flexibility is required as final decisions on

methods and techniques to be employed will not be made until the appointment of the primary contractors closer to the time of construction.

8. Where required, flexibility concerning installation methods is presented by means of options. The details associated with the installation methods are specified, where possible, or otherwise described as a limited parameter range i.e. upper (maximum) and lower (minimum) values for a given detail.

3 Representative Scenario Assessment

9. The CWP Project Environmental Impact Assessment Report (EIAR) will identify, describe and assess all of the likely significant effects of the proposed development on the environment. To achieve this for all options and dimensional flexibility, and at the same time to produce application documents that are concise and readable, each chapter of the EIAR will assess a selection of representative scenarios, rather than assessing every possible scenario. A “representative scenario” is a combination of options and dimensional flexibility that has been selected to represent all of the likely significant effects of the project on the environment. Some topics may require several representative scenarios to be identified to ensure all impacts are identified, described and assessed.

10. For Climate this analysis for construction and operation and maintenance (O&M) phase impacts is presented in **Table 1** and **Table 2**, respectively. Each table identifies one or more representative scenarios for each impact with supporting text to demonstrate that no other scenarios would give rise to new or materially different effects; taking into consideration the potential impact of other scenarios on the magnitude of the impact or the sensitivity of the receptor(s) that is being considered.

11. Where the potential for a new or materially different impact is identified, then further representative scenarios must be assessed in full within the main chapter.

12. This is distinct from the approach to assessing locational flexibility, where differences in impacts are assessed in this Appendix. The difference in approaches arises because there is a much higher degree of confidence in the locations and alignments assessed in the main chapter than there is for the final options and dimensions.

13. Overall, this approach will ensure that the EIAR will identify, describe and assess:

- Every impact type that could arise from the proposed development, taking account of the full range of options and dimensional flexibility;
- Every materially different magnitude of impact that could arise from the proposed development within the proposed options and dimensional flexibility; and
- Every materially different sensitivity of receptor that could arise from the proposed development within the proposed options and dimensional flexibility.

Table 1 Representative scenario assessment - construction phase impacts

Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
Impact 1: GHGA emissions associated with the OTI and offshore infrastructure throughout the CWP Project's lifecycle (construction, O&M and decommissioning phases)	Generating station Note – includes WTGs, IACs and interconnectors	WTG Option A (75 no. WTGs, 250 m rotor)	WTG Option B (60 no. WTGs, 276 m rotor)	This impact relates to the GHGA emissions associated with the offshore infrastructure throughout the CWP Project's lifecycle (construction, O&M and decommissioning phases). The level of GHG emissions generated are primarily associated with the size of WTG rotor blades, no. of WTGs, and materials used in the OfTI construction phase. **Generating station** Option A (75 WTGs and 250 m rotor blade) forms the representative scenario as this represents the greatest number of WTGs and monopile foundations, therefore resulting in higher embodied carbon emissions. **Offshore substation structures** Option A (75 WTGs and 250 m rotor blade) forms the representative scenario as this represents the greatest number of WTGs and monopile foundations, therefore resulting in higher embodied carbon emissions. **Summary of representative scenario** For Impact 1, the representative scenario is formed by WTG Option A for both the generating station and the offshore substation structures. This represents the greatest level of GHG emissions generated (from material use and no. of WTGs	Questions to demonstrate assessment has considered all scenarios	Response
	Permanent infrastructure				*1. Are there infrastructure layout options (permanent or temporary) which may introduce new impacts?* *Note - this could be a new impact entirely or the introduction of an existing impact pathway to a new receptor.* *2. Are there infrastructure layout options (permanent or temporary) which may introduce a materially different magnitude of impact?* *3. Are there infrastructure layout options (permanent or temporary) which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)?* *4. Are there alternative installation methods which may introduce new impacts?* *5. Are there alternative installation methods which may introduce a materially different magnitude of impact?* *6. Are there alternative installation methods which may materially alter the sensitivity of the relevant receptor(s) (greater or lesser).*	1. No, with regards to the generating station WTG Option B would not introduce any new impacts. With regards to the offshore substation structures, WTG Option B would not introduce any new impacts. The basis for assessing the significance of effect on climate is whether the project as a whole over the course of its lifetime contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050, not the magnitude of the GHG emissions or savings. All WTG options will result in GHG emissions savings relative to Ireland's existing baseline and targets and will contribute to the net zero by 2050 trajectory. These savings, regardless of WTG option, are the basis for the overall beneficial impact the CWP Project will have on climate, as shown in Table 28.23 and Section 28.15 in Chapter 28. While GHG emissions are highest for WTG Option A due to more materials needed, these emissions do not alter the positive impact determined in **Chapter 28 Climate – Carbon Balance Assessment**. Therefore, WTG Option A at both the generating station and offshore substation structures form the presentational basis for the assessment, with the conclusions for any other combination of options being no different. 2. No, WTG Option B at the generating station and offshore substation structures would not give rise to a materially different magnitude for Impact 1. This can be demonstrated by reference to **Table 28.23 and Section 28.15 in Chapter 28 Climate – Carbon Balance Assessment** which shows that overall CWP will have a beneficial impact on climate. Therefore, WTG Option A at both the generating station and offshore substation structures form the presentational basis for the assessment, with the conclusions for any other combination of options being no different. 3. No, WTG Option B at the generating station and offshore substation structures will not influence the sensitivity of the receptor that is being assessed. As set out in Section 28.4, sensitivity considers the climate as a whole, which is not influenced by details or characteristics of the project. Therefore, WTG Option A at both the generating station and offshore substation structures form the presentational basis for the assessment, with the conclusions for any other combination of options being no different. 4. No, there are no alternative installation methods which may introduce a materially different magnitude of impact.
	Permanent infrastructure					
	Total monopile grout volume (m^3)	1,875	1,590			
	Total monopile steel (tonnes)	76,425	79,140			
	Total transition piece steel (tonnes)	44,325	38,580			
	Total tower steel (tonnes)	88,125	95,220			
	Offshore substation structures	WTG Option A (250 m rotor)	WTG Option B (276 m rotor)			
	Permanent infrastructure					
	Grout volume per monopile (m^3)	25	26.5			
	Offshore substation structures	WTG Option A (75 no. WTGs, 250 m rotor)	WTG Option B (60 no. WTGs, 276 m rotor)			
	Permanent infrastructure					
	Grout volume per monopile (m^3)	75	79.5			

				installed). Any other scenario would not introduce new impacts, or a materially different significance of effect.		5. No, there are no alternative installation methods which may introduce a materially different magnitude of impact . 6. No, there are no alternative installation methods which may materially alter the sensitivity of the relevant receptor(s) (greater or lesser).

Table 2 Representative scenario assessment - operational phase impacts

Impact	Relevant project details			Representative scenario(s) and notes / assumptions	Rationale for representative scenario(s)	
Impact 1: GHGA emissions associated with the OTI and offshore infrastructure throughout the CWP Project's lifecycle (construction, O&M and decommissioning phases)	Generating station Note – includes WTGs, IACs and interconnectors	WTG 250 m rotor	WTG 276 m rotor	This impact relates to the GHGA savings associated with the operation of the WTGs and their maximum export capacity. **Generating station** Both the 250 m rotor and 276 m rotor are capable of producing the target 1300 MW MEC. There is therefore no materially different significance of effect between the two options. Both WTG Option A and Option B m are capable of producing the target 1300 MW MEC. There is therefore no materially different significance of effect between the two options. **Summary of representative scenario** All WTG options are of producing the target 1300 MW MEC. There is therefore no materially different significance of effect between any of the options.	*1. Are there infrastructure layout options (permanent or temporary) which may introduce new impacts?* *Note - this could be a new impact entirely or the introduction of an existing impact pathway to a new receptor.* *2. Are there infrastructure layout options (permanent or temporary) which may introduce a materially different magnitude of impact?* *3. Are there infrastructure layout options (permanent or temporary) which may introduce a material change in the sensitivity of the receptor(s) (greater or lesser)?*	1. No, with regards to the generating station both rotor blade length options and both WTG Options A and B are capable of producing the target MEC of 1300 MW. The basis for assessing the significance of effect on climate is whether the project as a whole over the course of its lifetime contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050, not the magnitude of the GHG emissions or savings. All WTG options will result in GHG emissions savings relative to Ireland's existing baseline and targets and will contribute to the net zero by 2050 trajectory. These savings, regardless of WTG option, are the basis for the overall beneficial impact the CWP Project will have on climate, as shown **Table 28-23** and **Section 28.10** in **Chapter 28 Climate – Carbon Balance Assessment**. 2. No, there is no difference in magnitude for Impact 1 from either rotor blade length options and or WTG Options A and B at the generating station. The basis for assessing the significance of effect on climate is whether the project as a whole over the course of its lifetime contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050, not the magnitude of the GHG emissions or savings. All WTG options will result in GHG emissions savings relative to Ireland's existing baseline and targets and will contribute to the net zero by 2050 trajectory. These savings, regardless of WTG option, are the basis for the overall beneficial impact the CWP Project will have on climate, as shown in **Table 28-23** and **Section 28.15** in **Chapter 28 Climate – Carbon Balance Assessment**. 3. No, there is no difference in the sensitivity of the receptor that is being assessed for either rotor blade length options and or WTG Options A and B at the generating station. As set out in **Section 28.4,** sensitivity considers the climate as a whole, which is not influenced by details or characteristics of the project.
	Permanent infrastructure					
	Maximum export capacity (MEC) (MW)	1300	1300			
	Generating station Note – includes WTGs, IACs and interconnectors	WTG Option A (75 no. WTGs)	WTG Option B (60 no. WTGs)			
	Permanent infrastructure					
	Maximum export capacity (MEC) (MW)	1300	1300			
Impact 2: CCRA – CWP Project OTI and	There are no project variations which affect the climate change vulnerability of the CWP Project, in terms of its permanent onshore and offshore infrastructure. The CWP Project assets which may be impacted by climate change hazards and which have been assessed as part of the CCRA, detailed in **Section 28.4** and **Section 28.10** of **Chapter 28 Climate – Carbon Balance Assessment**, are the same regardless of permanent onshore and offshore infrastructure variations.					

offshore infrastructure vulnerability to climate change (construction, O&M and decommissioning phases)	

4 Limit of Deviation Assessment

14. As described in Section 1 of this document, locational flexibility of permanent and temporary infrastructure is described as a LoD from a specific point or alignment.

15. The project components for which a LoD has been defined are presented in **Table 3**. These are further described in EIAR **Chapter 4 Project Description** and have been presented on the planning drawings that accompany the planning application.

Table 3 Defined limits of deviation

Project component	LoD
Offshore project components	
WTGs	100 m from the centre point of each WTG location
WTG monopile locations	Same as WTGs
WTG monopile scour protection	Same as WTGs
OSSs	100 m from the centre point of each OSS location
OSS monopile locations	Same as OSSs
OSS monopile scour protection	Same as OSSs
IACs and interconnector cables	100 m either side of the preferred alignment of each IAC and interconnector cable 200 m from the centre point of each WTG location
Offshore export cables	250 m either side of the preferred alignment within the array site. The offshore export cable corridor (OECC) outside of the array site
Landfall	
TJBs	0.5 m either side (i.e. east / west) of the preferred TJB location
Landfall cable ducts (and associated offshore export cables within the ducts)	Defined LoD boundary with 30 – 55 m horizontal width
Intertidal cable ducts (and associated offshore export cables within the ducts)	The OECC
Intertidal offshore export cables (non ducted sections)	The OECC
Onshore substation	
Location of onshore substation revetment perimeter structure	Defined LoD for sheet piling at toe of the revetement with 0.5 – 1.0 m horizontal width

16. For the purposes of the EIAR, the main chapter for Climate assesses the specific preferred location for permanent and temporary infrastructure. However, this document provides further analysis to determine if the proposed LoD for permanent and temporary infrastructure may give rise to any new or materially different effects, taking into consideration the potential impact of the proposed LoD on the magnitude of the impact.

17. For Climate this analysis for construction and O&M phase impacts is presented in **Table 4** and **Table 5**, respectively. Where the potential for a LoD to cause a new or materially different effect is identified, then this is noted in the tables below and is considered in full within the main chapter.

Table 4 Limit of deviation assessment – construction phase impacts

Impact	Relevant project element	Limit of deviation	Questions to demonstrate assessment has considered all scenarios	Response
Impact 1: GHGA emissions associated with the OTI and offshore infrastructure throughout the CWP Project's lifecycle (construction, O&M and decommissioning phases)	Offshore project components		*1. Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).* *2. Does the proposed LoD (locational flexibility) introduce a materially greater magnitude of impact?*	1. No, the implementation of the LoD does not introduce any new impact receptor pathways that have not already been considered as part of the assessment. 2. No, the climate impacts from GHG emissions associated with the construction phase have been assessed based on the climate as a sensitive receptor. The location of project infrastructure is immaterial and therefore the implementation of the LoD does not alter the assigned magnitude of the impact.
	WTGs	100m buffer from the centre point of each WTG location		
	WTG monopile locations	Same as WTGs.		
	WTG monopile scour protection	Same as WTGs.		
	OSS monopile locations	100m buffer from the centre point of each OSS location		

Table 5 Limit of deviation assessment - operational phase impacts

Impact	Relevant project element	Limit of deviation	Questions to demonstrate assessment has considered all scenarios	Response
Impact 1: GHGA emissions associated with the OTI and offshore infrastructure throughout the CWP Project's lifecycle (construction, O&M and decommissioning phases)	n/a	n/a	*1. Does the proposed LoD (locational flexibility) introduce new impacts? (i.e. the introduction of an existing impact pathway to a new receptor).* *2. Does the proposed LoD (locational flexibility) introduce a materially different magnitude of impact?*	1. No, the implementation of the LoD does not introduce any new impact receptor pathways that would alter the GHG emissions. 2. No, for the GHG emissions, the LODs would not introduce a materially different magnitude of impact. For the GHG emissions, the final location of project infrastructure is immaterial and therefore the implementation of the LoD does not alter the assigned magnitude of the impact.
Impact 2: CCRA – CWP Project OTI and offshore infrastructure vulnerability to climate change (construction, O&M and decommissioning phases)	n/a	n/a		1. No, the implementation of the LoD does not introduce any new impact receptor pathways that would alter the CCRA. 2. No, for the CCRA, the level of locational deviation proposed is not of a scale that would introduce a materially different magnitude of impact.