



Drumlins Park Wind Farm

Chapter 14:
Interactions of the Foregoing

Drumlins Park Ltd

Galetech Energy Services

Clondargan, Stradone, Co. Cavan Ireland

Telephone +353 49 555 5050

www.galetechenergy.com



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14.1 Introduction

This chapter summarises the critical results and conclusions of each individual chapter of this EIAR and identifies interactions between issues arising under separate factors which might otherwise not be noticed but which need to be assessed to ensure compliance.

The interactions between impacts on different environmental factors are also addressed, as relevant, throughout this EIAR by ensuring that effects are cross-referenced between topics, thus reducing the need to duplicate coverage of such topics. Close co-ordination and management within the EIA project team, and careful read-across editing, ensured that assessors were vigilant for complex interactions (direct, indirect, secondary and cumulative), and where they are likely to arise, they are adequately identified and addressed. This included interactions between impacts and potential cumulative effects arising from the mitigation measures proposed that could magnify effects through the interaction or accumulation of effects.

Reference should also be made to **Chapter 2** which provides an evaluation of reasonable project alternatives and **Chapter 3** which provides a detailed description of the proposed development. The design of a wind farm is an iterative process, the final proposed development integrates numerous mitigation by design measures, and these *a priori* respond directly to many of the likely impacts identified in this EIAR.

14.2 Interactions

It is general practice that interactions are shown by a means of a matrix, as set out in **Table 14.1** below, examining each aspect of the receiving environment which is considered in detail in the respective chapters of this EIAR, and cross-tabulated against all other aspects that have also been considered. This is accompanied by a brief text describing the interactions, including during the construction and operation stage.

Where an interaction is considered to be both likely and significant, it is given a reference number in the matrix and detail of the interaction is discussed below, including whether it is a weak or strong, or whether the interaction is positive or negative. Where there is no number indicated in the matrix, it is assessed there is no likelihood for any significant effects by way of interaction between the environmental factors.

The most common interactions for a proposed wind farm development are between human beings and noise, human beings and shadow flicker, visual perceptions, construction impacts, biological resources and landscape.

Interactions	Population and Human Health	Biodiversity	Land and Soils	Water	Air Quality & Climate	Landscape	Cultural Heritage	Noise & Vibration	Shadow Flicker	Material Assets
Population and Human Health						1		2	3	4
Biodiversity			5	6						
Land and Soils		5					7			
Water		6								
Air Quality & Climate										8
Landscape	1									
Cultural Heritage			7							9
Noise & Vibration	2									
Shadow Flicker	3									
Material Assets	4				8		9			

Table 14.1: Matrix of Interactions

14.2.1 Interaction 1: Population & Human Health and Landscape

The likely effects of the proposed development on landscape, and the interaction with population and human health, have been discussed in **Chapter 9** of this EIAR. In terms of wind farm developments, the landscape and visual impact can be considered the most likely impact. Viewshed Reference Points (VRPs) consisting of views from key prospects and receptors were identified and a detailed analysis of each, accompanied by photomontages, is discussed in **Chapter 9**. Overall, it is concluded that the proposed development will not result in any likely significant landscape or visual effects.

14.2.2 Interaction 2: Population & Human Health and Noise & Vibration

During the construction phase, noise will be generated through a number of typical on-site construction stage activities which will be mitigated through appropriate mitigation and good construction practices. Likely impacts will therefore be short-term and temporary in nature and a perceptible increase in noise, which is sufficient to cause a significant impact to local residential amenity, is not likely given the distance of the existing properties in the area from the subject site.

During the operational phase, noise predictions have been carried out at 123 no. receptors within 10-times overall tip height of the proposed turbines (1,800m) from each proposed turbine location. The noise prediction model confirms that the proposed development will not increase noise levels above the applicable noise limits as set out in the *Wind Energy Development Guidelines for Planning Authorities 2006* (see **Chapter 11**).

Noise which may be generated during the decommissioning phase will be similar to that of the construction phase.

Overall, it is concluded that while dwellings will likely experience an increase in existing noise levels, predicted noise levels will comply with the required limits and will not result in any likely impact on the local population and human health.

14.2.3 Interaction 3: Population & Human Health and Shadow Flicker

Once the proposed wind farm is operational, there is potential for shadow flicker to occur, depending on certain and highly infrequent conditions, as explained in detail in **Chapter 12**. All properties within 10-times overall tip height of the proposed turbines (1,800m) have been assessed for shadow flicker, with a total of 123 no. properties being identified and assessed.

It is predicted that, under the unlikely 'worst-case' scenario, 39 no. of the 123 no. receptors identified would exceed the 30-minutes per day threshold as set out in the *Wind Energy Development Guidelines for Planning Authorities 2006*. However, this calculation is a 'worst-case' scenario and not representative of actual conditions, and a very significant over-estimation of likely impacts.

A more realistic projection is the 'expected' hours per year. Under this scenario, 1 no. of the 33 no. receptors surveyed is predicted to experience shadow flicker in excess of the 30-hours per annum threshold. Following the implementation of standard technological mitigation measures to fully exclude any exceedances, any likely significant adverse effects on local population and human health can be entirely eliminated.

14.2.4 Interaction 4: Population & Human Health and Materials Assets

The proposed development will generate construction traffic during the initial construction stage. In terms of vehicle movements, it is estimated that approximately 6,537 trips (includes both in and out) of HGVs will be required, including abnormal loads transporting turbine components. Some minor levels of disruption may occur during public road upgrade works and the delivery of wind turbine components; however, traffic management measures will be agreed with the Planning Authority and implemented in full to ensure that any likely significant impacts are avoided.

The increase in traffic volumes on the surrounding road network will be temporary in nature as the expected duration of the construction phase is 12-18 months. Once turbines are in operation, traffic movements to and from the proposed development site will be infrequent, probably averaging 1-2 no. visits per week by a light commercial vehicle for maintenance purposes. All trips to and from the site will be undertaken in accordance with a traffic management plan, which will be prepared and agreed with the Local Authority. Overall, it is concluded that the proposed development will not result in any likely significant interactions between population and human health, and transport and access.

The proposed development will not result in any likely interactions between population and human health, and aviation. As requested by the IAA, aviation

warning lights will be fitted to the wind turbines; the specific requirements of which will be agreed with the IAA prior to the commencement of construction.

Generating electricity from wind energy has the potential to interfere with the quality of radio waves and microwaves used for communication purposes e.g. analogue TV signals, radio signals, aircraft and navigation systems and microwave links. As discussed in **Chapter 13**, a range of bodies were consulted regarding the proposed development. To date, none of the organisations which were consulted have raised any concerns in relation to any likely significant interference or conflict with their existing operations as a result of the proposed development. 2rn have identified a number of areas to the north and west of the proposed development site which are classed as 'low coverage' areas which may be susceptible to some interference. However, mitigation measures have been proposed, including a protocol agreement with 2rn, to ensure the remediation of any likely significant effects, should they arise, which will effectively eliminate any likelihood for significant impacts.

The proposed development will not result in significant interactions between population & human health and renewable & non-renewable resources.

14.2.5 Interaction 5: Biodiversity and Land & Soils

As outlined in **Chapter 6**, excavated ground exposed during the construction phase may lead to the sedimentation of nearby watercourses, although mitigation measures recommended for the management of stockpiles will be implemented in order to minimise the potential for the generation of silt laden runoff and the subsequent adverse impact on water quality and aquatic ecology in surrounding water bodies. Mitigation measure proposed during construction will also ensure that the proposed wind farm development does not result in a noticeable or significant negative impact on soils or the geological environment.

The excavation and removal of soils for the construction of permanent features such as hardstands, access tracks, and substation may potentially lead to habitat loss. However as discussed in **Chapter 5**, the proposed development is generally located within areas of improved agricultural grassland, which is of lower ecological importance, and is not located within an ecologically sensitive area.

Overall the conclusion of the biodiversity study is that the residual impacts on the key ecological receptors including designated sites, habitats, flora and fauna are reduced down to slight negative at most, and are not considered to be significant.

14.2.6 Interaction 6: Biodiversity and Water

As outlined in **Chapter 6**, excavated ground exposed during the construction phase may lead to the sedimentation of nearby watercourses and downstream impacts on habitats and species. A suite of substantial mitigation measures is proposed which will be fully implemented in order to exclude the potential for the generation of silt laden runoff and ensure that adverse impacts on water quality do not occur. Mitigation measures proposed during the construction phase will also ensure that the proposed development does not result in a noticeable or significant negative impact on soils or the geological environment. The interaction between biodiversity and water is also closely related to the interaction between biodiversity and land & soils and this interaction should also be read in conjunction with **Interaction 5**.

14.2.7 Interaction 7: Land & Soils and Cultural Heritage

The excavation of soils raises the potential for previously unrecorded subsurface cultural heritage features to be discovered. To limit any likely adverse effects or significant interactions, as is normal practice on construction sites, archaeological

monitoring of all excavations will be undertaken under licence from the Department of Culture, Heritage and the Gaeltacht to ensure that any features uncovered are appropriately recorded and managed. Overall, it is concluded that the excavation of soils will not result in any likely significant interactions with cultural heritage.

14.2.8 Interaction 8: Air Quality & Climate and Materials Assets (Transport & Access)

There will be no likely significant interaction between Material Assets (Transport & Access) and Air Quality and Climate during the construction and decommissioning phases of the proposed development, with the exception of exhaust emissions from construction vehicles. This is a short-term, temporary impact and is fully addressed at **Chapter 8**. As the potential traffic associated with the operational phase of the proposed development will be very low, there will be no likely significant interaction between Air Quality, Climate and Material Assets (Transport and Access).

14.2.9 Interaction 9: Cultural Heritage and Materials Assets (Transport & Access)

As discussed in **Chapter 10**, there are no recorded archaeological, architectural or cultural heritage features within the land take of the proposed upgrade works to the turbine component haul route. As a result there will be no likely significant impact on the recorded archaeological resource.

The removal of all topsoil and overburden within the proposed land take, including all junction improvement works identified in **Chapter 13** will be monitored under licence from the Department of Culture, Heritage and the Gaeltacht. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed. Overall, it is concluded that excavations, associated with the transportation of turbine components to the proposed development site will not result in any likely significant interactions with cultural heritage.

14.3 Summary of Interactions & Impacts

All environmental factors are interrelated to some degree. Assessment of these interactions is an important requirement of the EIAR process. The most common interactions in proposed wind farm developments are between population, human health and landscape, noise, vibration, shadow flicker and materials assets. Having assessed the interaction of likely impacts during the construction, operational and decommissioning phases, the interaction of impacts is not assessed as likely to result in any impacts that could magnify effects through the interaction or accumulation of effects. All interaction of impacts are assessed as have been fully considered in the relevant chapters of this EIAR. The proposed development will have result in positive international, national, regional and local level particularly in relation to population, human health, air quality and climate. During the operational phase, the development will result in a long term positive effect on both air quality and climate and, in turn, on human health. The generation of electricity from the proposed development will lead to a net saving in terms of greenhouse gas emissions. The production of this renewable electricity results in the proposed development having a net positive annual impact on GHG emissions of the order of 0.091% of the Total Greenhouse Gas Emissions in Ireland in 2017.

Overall, it is concluded that the impact of the proposed development on the receiving environment is not likely to be significant. Likely effects from the proposed development vary in significance but are generally in the minor to negligible range. A number of positive impacts have also been identified such as community benefits; a reduction in the use of fossil fuels; and a significant contribution towards achieving Ireland's national and European targets for energy production from renewable

sources.

Overall, the likely impacts which have been identified in this EIAR demonstrate that the proposed development will not result in any likely significant negative impact on the environment, and will result in a likely significant positive impact on the environment by providing additional capacity for the production of energy from renewable sources at an appropriate location.

