

# **Proposed Ballynalacken Windfarm Project**

## **Environmental Impact Assessment Report**

### **Chapter 18: Interaction of the Foregoing**

**Chapter Author:**



**March 2025**

## EIAR 18.1 INTERACTION OF THE FOREGOING

All environmental factors are inter-related to some extent. The EIA Coordinators facilitated the sharing of information and evaluations between the environmental topic authors, so that the potential for cross-factor effects could be considered by the various authors regarding their Environmental Factor topic. Where the potential for cross-factor effects was identified, then, the effect was evaluated in the receiving Environmental Factor topic chapter.

The likely cross-factor effects that were examined in the EIAR are identified and summarised below. The potentially affected Sensitive Aspect and cross factor effect is identified along with the relevant EIAR evaluation section for ease of reference.

<b>PRIMARY Environmental Factor: LAND</b>		<b>RECEIVING Environmental Factor (Chapter)</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>			
<u>Forestry Land</u> : Reduction in Land Area available for Commercial Forestry Use	➔	<b>Climate (Ch 12)</b>	<u>Climate Change</u> : Loss of CO <sub>2</sub> uptake. See Sections EIAR 12.3.1.2.
<u>Agricultural Land &amp; Forestry Land</u> : Reduction in Land Area available for Agricultural or Commercial Forestry Use	➔	<b>Biodiversity (Ch 13)</b>	<u>Terrestrial Habitats</u> : Direct disturbance/reduction in Terrestrial Habitats, Landscape level habitat fragmentation, Habitat Degradation Effects. See Section EIAR 13.3.1.2, EIAR 13.3.8.2.2 <u>Fauna</u> : Loss, reduction or degradation of foraging and breeding habitat. See Sections EIAR 13.3.2.2, EIAR 13.3.3.2, EIAR 13.3.4.2, EIAR 13.3.4.2.1, EIAR 13.3.5.2, EIAR 13.3.5.2.2, EIAR 13.3.6.2, EIAR 13.3.6.2.2, EIAR 13.3.7.2.1
<u>Agricultural Land &amp; Forestry Land</u> : Reduction in Land Area available for Agricultural or Commercial Forestry Use; Reduction or loss of productivity due to degradation of soils or reduced growth rates	➔	<b>Population &amp; HH (Ch 17)</b>	<u>Local Economy &amp; Tourism</u> : Loss or reduction in farm incomes, See Section EIAR 17.3.2.2
<b>PRIMARY Environmental Factor: Soils</b>		<b>RECEIVING Environmental Factor (Chapter)</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>			
<u>Local Soils and Subsoils</u> : Soil degradation due to compaction, erosion, weathering	➔	<b>Land (Ch 6)</b>	<u>Agricultural Land</u> : Reduction or loss of productivity due to degradation of soils. See Section EIAR 6.3.1.2

<u>Local Soils and Subsoils</u> : Soil degradation due to erosion, weathering, or contamination, Ground Instability; sealing	➡	<b>Water</b> (Ch 8)	<u>River Waterbodies, Groundwater Bodies, Water Supply (local wells), Designated Sites</u> : Reduction in Quality. See Sections EIAR 8.3.1.2.1, EIAR 8.3.1.2.2, EIAR 8.3.1.2.5, EIAR 8.3.1.2.6, EIAR 8.3.2.2.1, EIAR 8.3.2.2, EIAR 8.3.3.2, EIAR 8.3.3.2.1, EIAR 8.3.4.2, EIAR 8.3.4.2.1
<u>Local Soils and Subsoils</u> : Soil degradation due to erosion or weathering	➡	<b>Air Quality &amp; EMF</b> (Ch 9)	<u>Local Residents, Community, Amenities</u> : Increase in Airborne dust, See Section EIAR 9.3.1.2.1
<u>Local Soils and Subsoils</u> : Excavation and Relocation of Soils	➡	<b>Climate</b> (Ch 12)	<u>Climate Change</u> : Greenhouse Gas Emissions, See Section EIAR 12.3.1.2.2
<b>PRIMARY Environmental Factor: Water</b>		<b>RECEIVING</b>	
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>		<b>Environmental Factor</b> (Chapter)	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<u>River Waterbodies, Groundwater Bodies</u> : Changes to Surface Water Quantities due increased site runoff rates and/or changes to drainage patterns; Alteration of groundwater levels and/or flow paths	➡	<b>Land</b> (Ch 6)	<u>Agricultural Land, Forestry Land</u> : Reduced growth rates due to a change in the drainage regime, See Sections EIAR 6.3.1.2, EIAR 6.3.2.2
<u>Water Supply</u> : Reduction in Groundwater Quality or Quantity at local wells <u>within 500m of turbine foundation locations and borrow pits</u>	➡		<u>Agricultural Land</u> : Degradation or loss of farm water supply, See Section EIAR 6.3.1.2.1
<u>River Waterbodies</u> : Changes to Surface Water Quantities due increased site runoff rates and/or changes to drainage patterns	➡	<b>Soils</b> (Ch 7)	<u>Local Soils &amp; Bedrock</u> : Soil degradation due to erosion or weathering, See Section EIAR 7.3.1.2.3
<u>River Waterbodies &amp; Groundwater Bodies</u> : Reduction in Water Quality; Changes to Water Quantities or Drainage Patterns; Hydromorphological effects due to watercourse crossing works (in downstream waterbodies and designated sites)	➡	<b>Biodiversity</b> (Ch 13)	<u>Terrestrial Habitats</u> : Surface or groundwater dependent habitat degradation, See Section EIAR 13.3.1.2
	➡		<u>Amphibians &amp; Reptiles</u> : Loss, reduction or degradation of foraging and breeding habitat, See Section EIAR 13.3.3.2
	➡		<u>Mammals (Otter)</u> : Reduction in aquatic habitat quality and availability of aquatic prey item species; Mortality, injury, disturbance or displacement of Otter, See Section EIAR 13.3.4.2.2, EIAR 13.3.4.2.3
	➡		<u>Birds (Kingfisher)</u> : Reduction in foraging or nesting resource in downstream habitats; Permanent or temporary reduction or loss or fragmentation of suitable foraging habitat, Physical injury/destruction of nests or chicks; Reduction in foraging or nesting resource in downstream habitats; See Section EIAR 13.3.6.2.2, EIAR 13.3.6.2

	➡		<u>Aquatic Habitats &amp; Species:</u> Decrease in water quality in downstream waterbodies; Hydromorphological impacts to downstream waterbodies due to changes to drainage regimes and surface water runoff and due to watercourse/drain crossing works at the Project; Disturbance/displacement/ mortality of species of conservation importance. See Sections EIAR 13.3.7.2, EIAR 13.3.7.2.3, EIAR 13.3.7.2.4
	➡		<u>Designated Sites:</u> Habitat Degradation Effects to downstream Designated Sites (SAC, SPA and pNHA) due to sedimentation and reductions in water quality; Adverse effects to the conservation objectives due to degradation; Changes to drainage regimes and water quantities in all downstream Designated Sites; Reduction in Water Quality. See Sections EIAR 13.3.8.2.1, EIAR 13.3.8.2
<u>Water Supply:</u> Reduction in Water Quality or Quantities for public water supply (Kilkenny, Ballyragget, Castlecomer) or for local supply	➡	<b>Population &amp; HH</b> (Ch 17)	<u>Local Community Health &amp; Wellbeing:</u> Secondary Impact of Water Supply Impacts on Health & Wellbeing, see Section EIAR 17.3.1.2.1
<b>PRIMARY Environmental Factor: Air Quality, EMF</b>		<b>RECEIVING</b>	
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>		<b>Environmental Factor (Chapter)</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<u>Local Residents, Communities, Amenities:</u> Increase in Airborne dust	➡	<b>Land</b> (Ch 6)	<u>Agricultural Lands:</u> Effects on animal health and wellbeing due to increases in airborne dust and deposition of dust on grassland, See Section EIAR 6.3.1.2
<u>Local Residents, Communities, Amenities:</u> Increase in Airborne dust	➡	<b>Water</b> (Ch 8)	<u>River Waterbodies:</u> Reduction in Surface Water Quality, See Section EIAR 8.3.1.2.1, EIAR 8.3.1.2.5, EIAR 8.3.1.2.6
<u>Local Residents, Communities, Amenities:</u> Increase in Airborne dust	➡	<b>Population &amp; HH</b> (Ch 17)	<u>Local Community Health &amp; Wellbeing:</u> Secondary Impact of Air Quality Impacts on Health & Wellbeing, see Section EIAR 17.3.1.2.2
<u>Local Residents, Communities, Amenities:</u> Increase in ambient EMF levels	➡	<b>Population &amp; HH</b> (Ch 17)	<u>Local Community Health &amp; Wellbeing:</u> Secondary Impact of EMF Impacts on Health & Wellbeing, see Section EIAR 17.3.1.2.3

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<b>PRIMARY Environmental Factor: Noise &amp; Vibration</b>		<b>RECEIVING</b>	
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>		<b>Environmental Factor (Chapter)</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
Noise and Vibration emissions from works, process and vehicles/machinery	➔	<b>Biodiversity (Ch 13)</b>	<u>Fauna</u> : Disturbance/displacement from works and activities, See Section EIAR 13.3.2.2, EIAR 13.3.3.2, EIAR 13.3.4.2, EIAR 13.3.4.2.3, EIAR 13.3.4.2.4, EIAR 13.3.7.2
Noise emissions from operational turbines	➔		<u>Bats</u> : Disturbance or displacement of bats; Disturbance of roosting bats as a result of operating turbines, Disturbance of roosting bats during operational phase maintenance and decommissioning works; Disturbance of foraging bats, See Section EIAR 13.3.5.2, EIAR 13.3.5.2.3, EIAR 13.3.5.2.4
	➔		<u>Birds</u> : Disturbance and/or displacement; Disturbance and/or displacement from maintenance activities, turbine noise; Disturbance/displacement from operational turbines, See Section EIAR 13.3.6.2, EIAR 13.3.6.2.5
Noise emissions from operational turbines	➔	<b>Population &amp; HH (Ch 17)</b>	<u>Local Community Health &amp; Wellbeing</u> : Secondary Impact of Noise Impacts on Health & Wellbeing, see Section EIAR 17.3.1.2.4
<b>PRIMARY Environmental Factor: Shadow Flicker</b>		<b>RECEIVING</b>	
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>		<b>Environmental Factor (Chapter)</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
Shadow flicker occurrence	➔	<b>Population &amp; HH (Ch 17)</b>	<u>Local Community Health &amp; Wellbeing</u> : Secondary Impact of Shadow Flicker on Health & Wellbeing, see Section EIAR 17.3.1.2.5
<b>PRIMARY Environmental Factor: Climate</b>		<b>RECEIVING</b>	
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>		<b>Environmental Factor (Chapter)</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<u>Climate Change</u>	➔	<b>Land (Ch 6)</b>	Climate change identified as a driver of change in the Evolution of the Environment – <u>Agricultural Land, Forestry Land</u> , see Sections EIAR 6.3.1.1.4, EIAR 6.3.2.1.4
<u>Climate Change</u>	➔	<b>Water (Ch 8)</b>	Climate change identified as a driver of change in the Evolution of the Environment – <u>River Waterbodies, Groundwater bodies, Designated Sites</u> . See Sections EIAR 8.3.1.1.10, EIAR 8.3.2.1.6, EIAR 8.3.4.1.4
<u>Climate Change</u>	➔	<b>Biodiversity (Ch 13)</b>	Climate change identified as a driver of change in the Evolution of the Environment – <u>Terrestrial Habitats, Invertebrates, Amphibians &amp; Reptiles, Terrestrial Mammals (Otter), Bats, Birds, Aquatic Habitats &amp; Species, Designated Sites</u> . See Sections EIAR

			13.3.1.1.6, EIAR 13.3.2.1.4, EIAR 13.3.3.1.4, EIAR 13.3.4.1.4, EIAR 13.3.5.1.7, EIAR 13.3.6.1.4, EIAR 13.3.7.1.9, EIAR 13.3.8.1.6
<u>Climate Change</u>	➡	<b>Cultural Heritage</b> (Ch 15)	Climate change identified as a potential adverse future effect in Evolution of the Environment, see Section EIAR 15.3.1.4 Effect of Climate Change on <u>Cultural Heritage</u> examined in Section EIAR 15.3.2.4
<u>Climate Change</u>	➡	<b>Material Assets</b> (Ch 16)	Climate change identified as a potential adverse future effect in Evolution of the Environment – <u>Public Road Networks, Other Built Services</u> , See Section EIAR 16.3.1.1.7, EIAR 16.3.2.1.6
<u>Climate Change</u>	➡ ➡	<b>Population &amp; HH</b> (Ch 17)	Climate change identified as a driver of change in the Evolution of the Environment – <u>Local Community Health &amp; Wellbeing</u> : Secondary Impact of Climate Impacts on Health & Wellbeing, see Section EIAR 17.3.1.2.7 <u>Local Economy &amp; Tourism, Local Community Health &amp; Wellbeing</u> , See Section EIAR 17.3.2.1.4, EIAR 17.3.2.2.4
<u>Climate Action</u> : Generation of RE-E Electricity	➡	<b>Air Quality &amp; EMF</b> (Ch 9)	Climate Action identified as a driver of change (positive) to <u>Air Quality</u> , see Section EIAR 9.3.1.1.7
<u>Climate Action</u> : Generation of RE-E Electricity	➡	<b>Population &amp; HH</b> (Ch 17)	<u>National Economy</u> : The generation of RE-E will help avoid part of the EU climate fine which will result in the scenario that Ireland does not meet its 2030 targets, see Section EIAR 17.2.5
<b>PRIMARY Environmental Factor: Biodiversity</b>		<b>RECEIVING</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>		<b>Environmental Factor</b> (Chapter)	
<u>Terrestrial Habitats</u> : Introduction or spread of invasive species	➡	<b>Land</b> (Ch 6)	<u>Agricultural Land, Forestry Land</u> : Increased management costs due to spread of invasive species, See Section EIAR 6.3.1.2, EIAR 6.3.2.2
<b>PRIMARY Environmental Factor: The Landscape</b>		<b>RECEIVING</b>	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>		<b>Environmental Factor</b> (Chapter)	
Visual Impact on Tourism, & Heritage Features	➡	<b>Cultural Heritage</b> (Ch 15)	<u>Visual Impacts</u> on cultural heritage sites, See Sections EIAR 15.3.2.2, EIAR 15.3.2.3

Visual Impact on Tourism, Recreation & Heritage Features	➡	<b>Population &amp; HH</b> (Ch 17)	<u>Local Community Health &amp; Wellbeing</u> : secondary impact of Landscape impacts on Local Community Wellbeing, See Section EIAR 17.3.1.2.6
Visual Impact on Local Community Views	➡		<u>Local Economy &amp; Tourism</u> : secondary impact on tourism from presence of a windfarm in the landscape, See Section EIAR 17.3.2.2, EIAR 17.3.2.2.5, EIAR 17.3.2.2.6, EIAR 17.3.2.2.7
<b>PRIMARY Environmental Factor: Cultural Heritage</b>		<b>RECEIVING Environmental Factor</b> (Chapter)	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>			
<u>Visual Impacts</u> on cultural heritage sites at Heywood/Ballinakill	➡	<b>Population &amp; HH</b> (Ch 17)	<u>Local Economy &amp; Tourism</u> : secondary impact on tourism from presence of a windfarm in the landscape, See Sections EIAR 17.3.2.2.5, EIAR 17.3.2.2.6
<b>PRIMARY Environmental Factor: Population &amp; Human Health (HH)</b>		<b>RECEIVING Environmental Factor</b> (Chapter)	<b>Sensitive Aspect &amp; Cross-Factor Effect</b>
<b>Sensitive Aspect &amp; Primary/Initial Effect</b>			
<u>Local Economy</u> : Improvements in County Budget due to Commercial Rates	➡	<b>Material Assets</b> (Ch 16)	<u>Road Users</u> : Improvements in the public road network, See Section EIAR 16.3.1.2

**In Conclusion:** as outlined in the table above, some of the effects of the Ballynalacken Windfarm Project on the Environmental Factors will interact and cause secondary (cross-factor) impacts to other Factors.

Having considered and assessed the main interaction of potential impacts during the construction, operational and decommissioning phases it has been determined that no additional significant effect is anticipated.

It is also noted that the proposed development will have some positive effects in terms of helping to achieve renewable energy targets and achieving climate action goals, with secondary positive effects to many of the Environmental Factors.