Proposed Ballynalacken Windfarm Project

Environmental Impact Assessment Report

Chapter 4: Alternatives Considered

March 2025

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CHAPTER 4 ALTERNATIVES CONSIDERED

EIAR 4.1 The EIA Directive

This chapter describes the reasonable alternatives studied by the developer, which are relevant to the proposed Ballynalacken Windfarm Project and it's specific characteristics and the main reasons for selecting the chosen options, including a comparison of the environmental effects across the options.

The main alternatives considered for Ballynalacken Windfarm were:

- Alternative locations for the windfarm site;
- Alternative locations for the grid connection point, 110kV substation and cable routes;
- Alternative scale and size of the windfarm in terms of turbine numbers and turbine size;
- 'Do-Nothing' Alternative.

Alternatives were considered with regard to environmental, construction, operational and commercial constraints.

EIAR 4.1.1 Guidance

The consideration of Alternatives was informed by Article 5(1)(d) and Annex IV (2) of the EIA Directive 2011/92/EU (as amended by 2014/52/EU). During this process the EIA practitioners had regard to;

- *Guidance on the preparation of the Environmental Impact Assessment Report* (EU 2017): Section 1.5;
- *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA 2022): Section 3.4.

The EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports* states that the EIA Directive requires an EIAR to contain:

> *'A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*.'

> *'The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.'*

EIAR 4.2 Alternative Site Locations

EIAR 4.2.1 Other Relevant Assessments used during Consideration of Alternative Locations

Article 5 para. 1 (f) of the EIA Directive states that *the developer shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under Union or national legislation, in preparing the environmental impact assessment report*.

The consideration of alternative development locations was carried out in the context of the available results of other relevant assessments namely the identification of suitable wind energy development locations as identified in the Landscape Character Assessment and in the Wind Energy Development Strategy Appendix K in the Kilkenny City & County Development Plan 2021-2027 (KCCDP).

Alternative locations within Landscape Character Areas (Upland Areas; Lowland Areas; River Valleys; and Transitional Areas) have already been compared in the context of the Wind Energy Development Strategy for the County during a Strategic Environmental Assessment process which considered the impact on the receiving environmental sensitivities. Grid connection possibilities were also considered in the Strategy.

EIAR 4.2.1.1 KCCDP Landscape Character Assessment

The developer examined the suitability of alternative elevated sites in the County in the context of the Landscape Character Assessment (LCA) for the County, which is a process that describes, maps and classifies landscapes objectively. The LCA for the County forms the basis of landscape considerations for development control in the Plan.

The LCA describes the character of the landscape and the ability of the different Kilkenny landscapes to accommodate particular types of development. Development Management is set out in *Volume 1: Chapter 9 Heritage, Culture and the Arts: Section 9.2.12. Landscape*. The developer examined the Upland Areas (likely wind resource due to elevation) as identified in *Figure 9.2 Landscape Character Assessment* for suitable locations for a windfarm taking into account landscape sensitivity. The Ballynalacken site is within a Landscape Character Type - Upland Area in *Figure 9.2 Landscape Character Assessment*.

The LCA Development Management Requirements includes the statement that the Council will '*facilitate, where appropriate, developments that have a functional and locational natural resource requirement to be situated on steep or elevated sites (e.g. reservoir, telecommunications or wind energy structures) with reference to the appropriate County strategies currently in place, and to ensure that any residual adverse visual impacts are minimised or mitigated'* (after *Section 9.2.12.6 in Volume 1 KCCDP*).

EIAR 4.2.1.2 KCCDP Appendix K: Wind Energy Development Strategy

The KCCDP Strategic Environmental Assessment (SEA) Statement summarises how environmental considerations were integrated into the KCCDP. In SEA Section 4.4: *Reasons for choosing the Development Plan, as adopted, in light of the other reasonable alternatives dealt with,* it states that, "in relation to wind energy, the best solution is the recognition of areas of highest viability (Alternative 3) whilst taking account of landscape sensitivities (Alternative 1)". Section 4.4 of the SEA Statement also states that the "Adopted Plan includes a wind energy development strategy based on areas of highest viability, taking environmental sensitivities into account, but also designating some additional areas as unsuitable for wind energy developments on the basis of submissions made to the process". It should be noted that the identification of the Castlecomer Plateau area as suitable for wind energy development did not change during the process and adoption of the Development Plan.

The Wind Energy Development Strategy was examined by the developer for guidance on suitable locations for wind energy developments in the County. The Strategy identifies suitable wind energy locations using methodology in accordance with the Wind Energy Development Guidelines 2006. The Strategy investigations deployed a four-step approach to identifying wind energy development areas: 1) areas with wind potential and 2) landscape sensitivity of the areas with wind potential; then 3) overlay of areas 1 & 2 to identify the areas with least sensitive landscape; and finally 4) establish the electricity grid transmission possibilities of these identified areas. The County was thus divided into areas either 'Acceptable in Principle', 'Open for Consideration' or 'Not normally Permissible' for wind energy development. A map of the strategy areas is presented as *Figure 8 in Appendix K: Wind Energy Development Strategy*.

In summary, the Strategy identifies key areas where there is significant wind energy potential and grid connection capacity, where, subject to criteria such as design and landscape planning, natural heritage, environmental and amenity considerations, wind energy development will be either acceptable or not.

EIAR 4.2.2 Investigations into alternative site locations in County Kilkenny

The only sites considered Acceptable in Principle for commercial windfarms as identified in the *Wind Energy Development Strategy Figure 8* of the Kilkenny CCDP are in north, northeast and northwest Kilkenny. See Figure 4.1 Alternative Site Locations (extract from Wind Energy Development Strategy Figure 8) at the end of this chapter for these areas (green areas).

The choice of a location already deemed suitable for windfarm development and which has already been examined through Strategic Environmental Assessment in relation to alternative locations in the County in the Wind Energy Development Strategy and the Landscape Character Assessment of the Plan, is in accordance with the EIA Directive requirement to avoid duplication of assessments.

Site assessments were carried out on the potential for these areas to accommodate a windfarm. The following constraints were applied to each potential site;

- 'Acceptable in Principle' in the Wind Energy Development Strategy
- Sufficient elevation and therefore viable wind resource
- Proximity to the National Grid and available grid capacity
- Sufficient set back distances from dwellings
- Absence/proximity of European and National Designated sites
- Site accessibility from the Public Road network
- Land availability and legal title

EIAR 4.2.2.1 Ballynalacken site

The developer investigated the Ballynalacken site in the Castlecomer Plateau. The site was deemed favourable because of it's location within an area 'acceptable in principle', and also viable wind speeds because of its elevation and landform scale, its proximity to the National Grid at Ballyragget Substation and available grid capacity at the Substation; sufficient set back distances from dwellings; absence of Designated Sites; access available from the Regional Road adjacent to the site; and the availability of lands for lease for the windfarm and ancillary works in the area.

EIAR 4.2.2.2 Coon East, Castlecomer

The site is situated in a rural setting and housing density in the vicinity of the site is relatively low. This site had some positive attributes as a potential wind farm location. However, the absence of a grid connection point within a suitable distance, the proximity of dwellings to the site, and the small site area available for turbines made it unsuitable for a large windfarm development.

EIAR 4.2.2.3 Seskin, Ballyragget

The site is situated in a rural setting and housing density in the vicinity of the site is relatively low. This site has potential as a windfarm location but the area is not included as 'acceptable in principle' in the Kilkenny County Development Plan 2021-2027 Wind Energy Development Strategy Appendix K Figure 8. Therefore this site was not investigated further.

EIAR 4.2.2.4 Knocknaguppoge, Brown Mountain

The site is situated in a rural setting and housing density in the vicinity of the site is slightly higher than the other sites. This site has potential as a windfarm location due to wind speed. However, the proximity of dwellings to the site, and as a result the small site area available for turbines, made it unsuitable for a large windfarm development.

EIAR 4.2.2.5 Chosen Windfarm Site Location

Following investigations into alternative locations and in the context of the constraints applied, the **Ballynalacken site on the Castlecomer Plateau was chosen as the windfarm site for the development.**

EIAR 4.3 Alternative Locations - Grid Connection Point

The consideration of alternative locations for the grid connection point for the project was carried out in the context of higher-level plans prepared by the national electricity system operators Eirgrid and ESB Networks for grid infrastructure in the area. As stated in Section 4.2 above, the electricity generated at windfarms must be exported to the National Grid. Two criteria are paramount;

i. For project viability reasons, an available grid connection point within a reasonable distance (within 25km) of the windfarm site at Ballynalacken,
ii. Adequate spare grid capacity – either already available or with upgrades planned.

Other criteria considered in selecting the connection point were as follows:

iii. Environmental constraints such as designated sites, archaeology and cultural heritage;
iv. Minimisation of watercourse crossings;
v. Minimisation of disruption to local residents and road users; and
vi. Having regard to EirGrid's requirement to deliver the grid connection on the basis of the least cost, technically feasible option (which in itself considers environmental constraints).

EIAR 4.3.1 Examination of Grid Connection Points

There are two 38kV substations within 25km – Abbeyleix 38kV and Castlecomer 38kV substations. However, neither of these substations have enough available capacity, and therefore are not suitable as a grid connection point for the electricity from the Ballynalacken Windfarm, and these 38kV substations were not considered further.

Eirgrid's planned upgrades on grid infrastructure in the area were examined. It was established that EirGrid is currently completing the reinforcement of the electricity grid network between Ballyragget and Portlaoise through the Laois-Kilkenny Reinforcement Project. This Project also includes an upgrade of the network between Ballyragget and Kilkenny.

The Grid Connection Points are identified on Figure 4.2: Grid Connection Points within the surrounding area *(included at the end of this Chapter).* An examination of the suitability of each substation is provided below:

- **Ballyragget Substation**: A new 110/38kV substation which replaced the 38kV substation at Moatpark, Ballyragget was commissioned in late 2023. Once the Laois-Kilkenny Reinforcement Project is completed, this substation will have sufficient capacity to take in the Ballynalacken electricity generation, and because it is within a reasonable distance (4–6km) from the windfarm site, the **Ballyragget Substation is considered to be a viable connection point**.
- **Coolnabacky Station**: A new 400/110kV substation situated to the south-east of Portlaoise, at Coolnabacky. Work commenced on the new substation in Q2 2024 and is currently ongoing. Due to the separation distance (c.25km) between the windfarm and this station, it is considered that the Coolnabacky Station is not within a reasonable distance, and as a result is not considered further.
- **Scart Substation**: the upgrade works involved a new 110kV OHL and upgrades to the existing substation at Scart, to the east of Kilkenny City. Due to the separation distance (c.25km) between the windfarm and this station, it is considered that the Kilkenny-Dunbell Station is not within a reasonable distance, and as a result is not considered further.
- **Knockardagur Substation:** Part of the EirGrid upgrade also includes a new 110kV line between Coolnabacky and Ballyragget. This line will pass through Knockardagur townland where a 110kV

substation is already consented as part of the Pinewood Windfarm project. It is planned to integrate this 110kV substation as a loop-in station on the new Eirgrid 110kV line. As a result, this new substation (called **Knockardagur Substation** herein) when constructed would become available as a connection point and because it is within a reasonable distance (6–9km) from the windfarm site, the **Knockardagur Substation is considered to be a viable connection point**.

Following the examination of available and viable grid connection points, **both the existing Eirgrid Ballyragget Substation and the consented Pinewood Windfarm's Knockardagur Substation were identified as viable grid connection points** for the Ballynalacken Windfarm Project. A comparison of their environmental effects has been carried out, and the main reasons for selecting the chosen grid connection point are outlined below.

EIAR 4.3.2 Comparison of Alternative Grid Connection Points

EIAR 4.3.2.1 Overhead Line v. Underground Cabling

Grid connection methods utilizing overhead lines and underground cabling were considered as part of the grid connection alternatives.

There are a number of high voltage overhead lines in the area – the Ballyragget – Coolnabacky 110kV overhead line which crosses agricultural lands under and to the north of the windfarm site, and the 38kV Moatpark-Coan overhead line, which crosses through the windfarm site. It was considered that the addition of another 110kV OHL through this landscape could result in significant adverse cumulative impacts to the landscape and visual amenity, and for this reason underground cables were considered to be the most appropriate as they would likely have negligible impact on the landscape.

EIAR 4.3.2.2 Potential Underground Routes Considered

In theory, both grid connection points could be constructed across either private lands and along public roads, or along a mixture of both, and the comparison below considers the effects of installing the grid connection through private farm/forestry land as well as along public roads.

A grid connection to the Ballyragget Substation would be shorter, between 4 and 6 kilometres in length, than a grid connection to Knockardagur Substation – which would be between 6 and 9 kilometres in length. And therefore, the effects of a connection to the Knockardagur Substation would be spread over a larger area (longer route) than a connection to the Ballyragget Substation. Also, as required by EirGrid, in private lands - new access tracks may need to be constructed to access joint bays (every c.800m along a grid connection route) where an existing track is not available.

See Figure 4.3: Alternative Grid Connection Points

Routes to Ballyragget Substation considered a route along the public road (marked A on Figure 4.3), and through private lands (B); while routes to Knockardagur Substation considered a road route (C), along with two routes through private lands (D, E).

The potential for these alternative grid connection points to significantly affect the receiving environment is evaluated below. Non-significant impacts are presented first, then the potentially significant impacts follow.

Effects which are not expected to be Significant

No Significant effects expected to Land, Soils, Water (groundwater), Landscape, Biodiversity (terrestrial habitats, terrestrial fauna and birds), Air, Material Assets, Population & Human Health. Either Grid Connection Point is acceptable as it is considered that **significant adverse impacts are not likely from either route option** due to:

- the linear nature of both routes means that any effects to land availability, visual amenity, noise, disturbance or displacement, air quality, dust or traffic emissions, or to journey times will generally be brief to temporary in duration and will be reversible upon the completion of the works;
- the spread of works/excavations over a linear route avoids the concentration of effects in any one area;
- the relatively small volumes of soils excavated and the shallow nature of excavations; the reuse of soils from private lands to reinstate cable trenches on the land; the absence of geological heritage sites and the absence of sensitive soils (e.g. blanket peat) on lands between the windfarm and the Grid Connection Points;
- for sections of grid connection which may be routed through private land (B, D, E), any new access tracks will be similar to existing farm and forestry roads in the area; and these new tracks will be available to the landowner for their farming/forestry use;
- for sections of grid connection which may be routed through private land (B, D, E), the landcover between the windfarm and the grid connection points is dominated by improved grassland and the second most common land cover is commercial forestry plantation, both of which are considered of low biodiversity value to many species of terrestrial mammals, invertebrates, amphibians, reptiles and bird species. In addition, any loss of habitat will be negligible in the context of the abundance of similar habitat type in the surrounding area;
- for sections of grid connection which may be routed along public roads (A, C) – travel and access to properties would be maintained by stop/go systems or diversions (standard work practice) and damage to underground or overhead services would be avoided through the application of standard best practice construction methods;
- levels of EMF from the underground cables would be below the ICNIRP international limits; and
- with the exception of Ballinakill village (along a potential road route C to Knockardagur), the area is sparsely populated and the number of local residents along road routes who could be affected by temporary increases dust, noise or traffic emissions would be low.
- Although significant adverse effects are not expected, it is considered that a road route C to Knockardagur through Ballinakill has potential to affect a greater number of people such as road users and local residents than the Ballyragget alternative (route A), and also has potential to adversely affect a mature beech treeline which is located along a demesne boundary wall between Ballinakill and the Knockardagur site.

Effects which have Potential to be Significant

It is considered that a connection to **Knockardagur Substation** has the **potential** to result in **Significant effects to Cultural Heritage, Water and Biodiversity (aquatic habitats and species)**. In contrast, a connection to **Ballyragget Substation not expected to result in significant adverse impacts.**

In relation to **Cultural Heritage**, the higher risk associated with the Knockardagur connection (Route C) is due to the potential for works in the deck of the NIAH-listed Loughill Bridge and works in proximity to built heritage within Ballinakill village and to the demesne wall along a road route to Knockardagur. In contrast, a connection to the Ballyragget Substation (Route A or B) would avoid settlements and associated built heritage.

In relation to **Water and Biodiversity (aquatic habitats and species)**, the higher risk associated with the Knockardagur connection is due to the greater number of watercourses along Knockardagur routes (C, D, E). Furthermore, when road route C is considered for a connection to Knockardagur Substation, that route would involve a crossing of the Owveg River at Loughill Bridge, which is within the boundary of the SAC and also two further crossings of this river between Ballinakill and the Knockardagur Substation site. When an off-road route through private lands (D, E) is considered – that route to the Knockardagur Substation site would likely involve crossing the Moneycleare or Ironmills rivers in addition to the Kilcronan stream, with these works taking place a short distance upstream of the SAC. In contrast, a grid connection route to the Ballyragget Substation, whether wholly on the road (A), wholly off-road (B) or a mixture of both would involve the crossing of c.2 small streams, one of which is dry part of the year. As a result, it is considered that a grid connection point at Ballyragget Substation poses less risk to water quality in downstream waterbodies and designated sites.

EIAR 4.3.2.2.1 Chosen Grid Connection Point

For the reasons aforementioned, the **Ballyragget Substation option was chosen as the preferred environmental alternative for the grid connection point**.

EIAR 4.4 Alternative 110kV Substation and Cable Routes

Following the selection of Ballyragget as the preferred connection point, three locations were considered for the windfarm 110kV substation along with alternative cable routes between the 110kV substation and the chosen Grid Connection Point at the Eirgrid Ballyragget Substation.

A number of matters needed to be taken into consideration – (a) because the windfarm would be connected to the national electricity system, the rating of the underground grid connection cabling would be 110kV and the windfarm substation would also be 110kV; (b) the 110kV design for both the underground grid connection cabling and the substation would have to be according to Eirgrid specifications, as Eirgrid would take over these assets once they are constructed and commissioned; (c) a large level area would need to be provided for the substation compound; (d) Eirgrid may require that any lengths of the underground grid connection through private lands include an access track over/adjacent to the underground cables to facilitate access to joint bay locations.

EIAR 4.4.1 Alternative Windfarm Substation Locations

Three locations for the windfarm 110kV substation were considered – at the windfarm site on top of the hill in agricultural grassland to the south of Ballymartin Crossroads (identified as A on Figure 4.4) and two locations (B, C) nearer to the Eirgrid Ballyragget Substation at the bottom of the hill in agricultural grassland in Tinnalintan townland.

See Figure 4.4: Alternative Windfarm Substation Locations

A comparison of the environmental effects was carried out:

Landscape (visual impact): Due to the elevation of the windfarm site, a 110kV substation at the windfarm site (A) was considered likely to have a greater visual impact on the local and surrounding wider area. In contrast, a location on low lying ground (B, C), at the bottom of the hill, would be considerably less visible, with views of the substation likely to be limited to the immediate surrounding area.

Soils, Water, Biodiversity (aquatic habitats and designated sites); because of its rating at 110kV, the windfarm substation is large in area. The magnitude of effects resulting from the construction of the substation can be lessened through the selection of a level site area for the compound which would minimise the extent of cut and fill and the extent of the excavations footprint (large footprint of works associated with achieving appropriately stable side-slopes around cut and fill areas). The reduction of cut and fill requirements would reduce the volumes of excavations (Soils), reduce the risk of sediment runoff as a result of erosion of overburden or excavated area and reduce the risk to groundwater where substantial cut and fill is required (Water, Biodiversity). Due to the undulating or sloping characteristics of lands at, or along, the top of the hill (A), and also found during site investigations at site B – it was considered that locating the substation at the windfarm (site A) or in Tinnalintan (at site B) would result in larger cut and fill requirements, and therefore larger risk of direct and indirect impacts to Soils, Water and Biodiversity. In contrast, due to the level/gently sloping nature of lands at the bottom of the hill in Tinnalintan at Site C, it was possible to secure a site for the substation with a more level profile, which minimises the extent of cut and fill and as a result reduces impacts on Soils, Water or Biodiversity.

It is acknowledged that locating a substation at the bottom of the hill also brings its location closers to the SAC/SPA along the River Nore, however, the absence of hydrological pathways at the Tinnalintan substation site locations (B,C) and the extent of the vegetative buffer between these locations (B,C) and the SAC/SPA boundaries mitigates the potential for significant effects.

Other Considerations: It is noted that the construction of the 110kV substation at the bottom of the hill would require that a control building is built at the windfarm site in order to collect all the cables from the

turbines so that the generated electricity can be transported to the substation more efficiently. The site for the control building is much smaller than the substation compound, and a relatively level area has been identified at the windfarm site for this building within an existing farmyard.

EIAR 4.4.1.1 Chosen 110kV Substation Location

While the construction of the 110kV substation in Tinnalintan at Site C at the bottom of the hill, would result in the construction of a small control building (at the wind farm site), this control building would have a small footprint and require minor cut and fill, and it is considered that on balance, due to the level/gently sloping nature of lands at Tinnalintan (C), this location would have less cut and fill overall and therefore a smaller footprint than a substation site at the windfarm (A) or further north in Tinnalintan (B).

It is also considered that locating the 110kV substation at the bottom of the hill at Site C would also result in less visual impacts. Tinnalintan site C has acceptable separation from local residents and there are no watercourses or drains at the Tinnalintan (C) location. Overall, it is considered that Tinnalintan Site C would result in less adverse effects on the receiving environment.

Therefore, **a location at the bottom of the hill in Tinnalintan townland (site C) was selected as the chosen location for the 110kV substation. This substation is called the Tinnalintan Substation herein.**

EIAR 4.4.2 Alternative Connection Routes

EIAR 4.4.2.1 Consideration of Overhead and Underground connection types

An existing 38kV overhead line mounted on double wood poles from Ballyragget Substation passes over the Ballynalacken ridge through the windfarm site, continuing onto the 38kV Castlecomer substation at Loan. The recently constructed Ballyragget-Coolnabacky 110kV overhead line, also mounted on (larger) double wooden polesets and lattice towers, is routed through the local area of the windfarm, crossing agricultural and forestry lands to the west and north of the windfarm site. It was considered that an additional 38kV and/or 110kV overhead line in the area could result in unacceptable cumulative visual impact. In contrast, underground cables would have no impact on landscape and visual amenity. In addition, underground cabling is a more acceptable method of crossing under the existing 110kV overhead line. For these reasons, underground cabling was the chosen method of connecting the windfarm control building to the 110kV substation at Tinnalintan, and for connecting the Tinnalintan Substation to the Eirgrid Ballyragget Substation.

EIAR 4.4.2.2 Cable routes between the Windfarm and Tinnalintan Substation (Internal Cable Link)

Following the selection of Tinnalintan (Site C) as the preferred location for the 110kV substation, two main routes were considered for the underground cables between the windfarm (control building) and the Tinnalintan Substation. These underground cables are called the Internal Cable Link herein.

The area between the windfarm and the Tinnalintan Substation is characterized by predominantly agricultural grassland landuse with once-off housing and farmsteads located off local roads which include the L5845, L5844, R432 and L58442.

Routes for the Internal Cable Link along the public road network (marked as A on Figure 4.5: Alternative Cable Routes) and through private agricultural lands (marked B and C) were considered.

EIAR 4.4.2.2.1 Route selected for the underground Internal Cable Link

Route B is the preferred route. Route B is routed through agricultural lands as far as the Local Road L5845, and then along the L58442 for 0.95km, with the final section of the route through agricultural lands and site access road to the Tinnalintan Substation

The preferred route is based on the following key considerations:

- Route B avoids the narrow public road L5844 and thereby substantially reduces construction noise, dust and traffic effects to local residents and road users (in contrast to Route A which would involve construction works over c.8 weeks on this road);
- Route B also avoid works in close proximity to the zone of notification of an RMP site (in contrast to route C which would involve works just beyond the zone of notification of an Enclosure),
- Route B also avoids instream works in the Rathduff_15 stream and the cables will cross this stream over an existing public road culvert (in contrast to route C which would involve instream works to cross this stream in agricultural lands).
- While it is noted that this Route B involves cable works on the public road L58442 with a small number of residences potentially affected by road works, and therefore presents more challenges regarding disrupted access to their properties than Route C, standard mitigation measures and construction methodologies can be implemented to ensure local residents and property owners are not significantly affected by the works (which take c.2 weeks).
- The lands on Route B were available to the Promoter, in contrast – the lands along Route C were not.

For the reasons outlined above Route B is the chosen route for the Internal Cable Link.

EIAR 4.4.2.3 Cable route between Tinnalintan and Ballyragget substations (Grid Connection route)

The area between the Tinnalintan Substation and the Eirgrid Ballyragget Substation is characterized by agricultural grassland landuse with once-off housing and farmsteads located off public roads which include the L58442, and the R432. It is noted that there are more residences located along these roads, than along the roads closer to the windfarm site, and that these roads are also wider than the roads in the vicinity of the windfarm site. The underground cables between the Tinnalintan Substation and the Eirgrid Ballyragget Substation is called the Grid Connection herein.

Routes for the Grid Connection along the public road network (marked D on Figure 4.5) and through private agricultural lands (E) were considered.

See Figure 4.5: Alternative Cable Routes Considered

EIAR 4.4.2.3.1 Route selected for the underground Grid Connection route

Preferred Route D which is routed along the new access road at Tinnalintan, and then along the public roads (L58442 and R435) to the Ballyragget Substation.

The preferred route is based on the following key considerations:

- While Route D will involve works on a regional road and in close proximity to Uisce Eireann assets, standard construction methods will be implemented to avoid significant adverse effects to these assets, and all road works will be carried out under a Road Opening License.
- Route D would involve crossing a small historic bridge over the Rathduff_15, the effects to cultural heritage can be avoided by using directional drilling technique to install the cables, and in contrast to Route E where a number of sub-surface features were identified during geophysical surveys on the private lands, the road route D avoids this sub-surface archaeology;
- While Route D is located closer to the SAC sites on the River Nore, it avoids instream works in the Rathduff_15 stream and the cables will cross this stream over/under the existing road bridge along the R432 (in contrast to route E which would involve instream works to cross this stream in agricultural lands).
- The lands on Route D were available to the Promoter, whereas in contrast – the lands along Route E were not.

For the reasons outlined above Route D is the chosen route for the Ballynalacken Grid Connection.

EIAR 4.5 Alternative Size & Scale of the Wind Turbines

As outlined in Section 4.3, the available grid connection points in the area are at 110kV capacity, therefore the wind farm development would need to be c.50-70MW in size, in order to cover the costs associated with a 110kV grid connection. In contrast, a smaller windfarm would not be viable due to the absence of 38kV connection potential in the area and was not considered further.

Landowners within Upland Area B: Castlecomer Plateau were approached by the developer to establish if a sufficient area of land could be leased for the wind farm. The developer aimed to involve as many local landowners as possible in the project as part of ensuring that those living nearest to the development, directly experience the long-term benefits from the project. Over time, through a series of consultations and meetings with local landowners, an area of land sufficient to develop a viable wind farm was identified and secured at Loughill, Ballyouskill, Ballymartin, Commons and Byrnesgrove.

EIAR 4.5.1 Alternative Sizes and Scales Considered

The capacity and performance of wind turbines is related to their scale. Raising the height of the wind turbine and increasing the rotor diameter increases the performance of the turbine. Identifying an appropriate scale for turbines on a windfarm is a balance between maximising performance and maintaining an acceptable level of environmental effects relative to the site constraints and surrounding context. A number of different turbine types with varying hub heights and rotor diameters were explored as part of the early project design.

The trend in the wind industry has moved towards larger turbines. Modern on-shore turbines are now reaching heights of 200m blade tip height, and smaller turbines are becoming increasingly hard to procure.

A number of different turbine sizes were considered with varying tip heights;

(i) **7-8 turbines** with **185m - 200m tip height** and a capacity of c.7MW each;

(ii) **9-14 turbines** with **150m - 180m tip height** and a capacity of between 4 and 6MW each;

(iii) **18-22 turbines** with **120m - 150m tip height** and a capacity of c.3MW each.

The 185m - 200m tip height size turbines would be the most financially profitable to the developer. However, the developer was cognisant of the scale of these turbines in this particular landscape setting, and took into consideration members of the local community, such as the nearest local residents. Consequently, the developer did not pursue a windfarm using 185m-200m tip height turbines for the Ballynalacken Windfarm. Consequently, **turbines with a tip height of 185m- 200m are not considered further herein**.

EIAR 4.5.2 Size/Scale Combination Selected for the Windfarm

During the early design of the windfarm site, a site design using 9 Turbines - 150m - 180m tip height versus 18 Turbines - 120m - 150m tip height was compared regarding environmental effects, and construction, operational and commercial constraints.

See Figure 4.6: Alternative Turbine Sizes and Scales Considered

9 Turbines- 150m - 180m tip height turbines was chosen as the preferred size/scale for the windfarm, based on the following key considerations:

- Although of a smaller scale and therefore less visually dominant locally, it was considered that 18 Turbines - 120m - 150m tip height would cause greater visual clutter and complexity when viewed from the wider surrounding area. In contrast, the 9 Turbines - 150m - 180m tip height size/scale combination presents a simpler cleaner layout.

- Due to the greater number of turbines resulting in a larger overall footprint of construction works, the 18 Turbines - 120m - 150m tip height would result in larger magnitude/extent of effects to Soils (excavations), Water (risk of sediment runoff), Air Quality (dust), Noise (construction works and traffic), Climate (vehicular emissions), Land (landtake), Biodiversity (habitat loss), Material Assets (construction traffic) and Cultural Heritage (increased risk of damage to previously unknown subsurface archaeology). In contrast, 9 Turbines - 150m - 180m tip height would have a smaller overall footprint and therefore a smaller extent and magnitude of construction related effects.
- Regarding operational phase impacts, the smaller *number* of turbines (i.e. 9 Turbines - 150m - 180m tip height) presents less risk to birds and bats, and less potential for noise emissions from the windfarm as a whole. In addition, the developer found the level of noise constraints which may be required for 22 turbines at the site to be unacceptable from a project viability viewpoint.
- It is noted that both Size/Scale combinations would result in likely significant positive impact to Irelands achievement of its Climate targets, through the substantial amount of renewable energy generated.
- Indications from the main turbine manufacturers is that turbines in the 120m - 150m tip height range will be taken off the market over the next few years. This is already is case for some models.

For the reasons outlined above Turbines with a tip-height of 150m-180m was the chosen size/scale for the Ballynalacken Windfarm Site.

EIAR 4.5.3 Further Alternatives Considered for Turbines - 150m - 180m tip height following Public Feedback

During the site design and landowner consultation phase, additional lands became available and the final landholding accommodated 12 Turbines 150m-180m tip height.

A windfarm comprising 12 Large turbines, 170m tip height (with a rotor diameter of 150m) and 6MW each was designed, which was predicted to generate c.150million kilowatt hours (kWhs) of electricity per annum, enough to power 33,237 homes.

The Promoter considered that this turbine size/number combination was suitable for the wind farm site due to the ridgeline topography, and separation distance from houses.

The Promoter, Rowanmere Limited, held a Public Information Day in Ballyouskill Community Centre on 25th July, 2024 and presented the chosen size/scale – i.e. 12 Turbines with 170m tip height to the local community.

On display were a representative selection of photomontage visualisations from locations in the local and wider area. Also available was a digital copy of the full set of photomontages with the expert who prepared these images on hand, to guide the attendees through the visualisation database.

Concerns expressed by members of the local community about the size of the proposed turbine, was considered by the developer and used to further inform the project design.

EIAR 4.5.3.1 Final Chosen Turbine Size/Number

The final proposed layout and turbine size has taken account of issues raised during the public consultation process. A wind turbine with an overall tip height of 155m (reduction of 25m tip height) and with a smaller rotor diameter of 117m (reduction of 33m) was selected as the turbine size for the site and was considered acceptable from a project viability, environmental acceptability and climate action perspective, while reducing visual impacts in the local area. This size turbine has the same rotor diameter as the consented Pinewood Windfarm (also 117m rotor diameter) which is the closest (c.4km) other wind energy development to the Ballynalacken site. **In this context 12 Large Turbines with a 155m Tip Height and 117m rotor diameter is the chosen Turbine Size/Number combination for the location for the Ballynalacken Windfarm development.**

EIAR 4.6 'Do-Nothing' Alternative

The 'do-nothing' alternative examines trends currently occurring in the environment and the effects caused by not proceeding with the development.

The proposed Ballynalacken Windfarm is predicted to generate 140 million kWh of electricity from the power in the wind blowing over the site. If Ballynalacken Windfarm is not built the opportunity cost of not building an indigenous renewable energy electricity generation station in the area include;

Locally, in the 'Do-Nothing' Alternative there will be no long-term economic gain locally during the operation phase of Ballynalacken Windfarm represented by;

- Annual community benefit payments of c.**€280,000 per annum** to local organisations representing a **positive contribution to Population**.
- Annual commercial rates payments of c.**€800,000** per annum representing a positive contribution to Material Assets.
- **In the 'Do-Nothing' Alternative there will be no improvement to balance of payments** through the substitution of an indigenous energy source (wind) for an imported energy source (fossil fuels) representing a lost opportunity cost to Material Assets.

Nationally, the most significant impact of a 'Do-Nothing' scenario is the consequence of inaction in relation to climate change remediation.

The Climate Action and Low Carbon Development (Amendment) Bill 2021 was signed into law in July 2021. One of the key measures of Ireland's Climate Action Plan 2024 is to increase reliance on renewables for the generation of electricity (RE-E) to 80% over the period 2021 to 2030, which a target of the addition of 9,000MW capacity for electricity generation from onshore wind.

The very high impact of Climate Change to biodiversity and to our human wellbeing, is reflected in the Irish Oireachtas declaring a climate and biodiversity emergency on the 9th May 2019. The consequence of Ballynalacken Windfarm not being constructed would be a **Significant lost opportunity** to contribute to Irelands action on **Climate Change remediation**.

In the '**Do-Nothing' alternative** (i.e. if Ballynalacken Windfarm is not built) there will be a **consequential loss of the installation of c.50.4MW of renewable generation capacity** which would make a significant contribution to the Climate Action Plan targets. The carbon offset potential would be lost from the generation of **140 million kWh of renewable energy per annum from Ballynalacken Windfarm, which would avoid the emission of 35,700 tonnes of greenhouse gases per annum** which would result from generating the same amount of electricity by fossil fuel plant. 140million kWh of renewable electricity (RE-E) is enough to supply 31,021 homes in the counties of Kilkenny and Laois with clean, green electricity.

EIAR 4.7 List of Figures for Alternatives Considered

EIAR 4.8 List of Appendices for Alternatives Considered

No Appendices for Chapter 4

Figures for Alternatives Considered

EIAR Chapter 4: Alternatives Considered

Figure 4.1 - Alternative Windfarm Site Locations *(extract from Wind Energy Development Strategy Figure 8)*

Legend:

- Ballynalacken Windfarm Site
- Alternative Windfarm Site Locations

Ballynalacken Windfarm Site

Seskin

Coon East

Knocknaguppoge

Extract from Appendix K - Wind Energy Development Strategy - Figure 8

Kilkenny City and County Development Plan 2021-2027

Figure 8: Wind Strategy Areas

Date: September 2021

- Acceptable in Principle
- Not Normally Permissible
- Open for Consideration

N

EIAR Chapter 4: Alternatives Considered

Figure 4.2 - Grid Connection Points within the surrounding area

Legend:

- Ballynalacken Windfarm Site
- Laois - Kilkenny Grid Reinforcement Project
- Ballyragget Substation
- Coolnabacky Substation
- Scart Substation
- Knockardagur Substation
- Castlecomer Substation
- Abbeyleix Substation

Extract from Appendix K - Wind Energy Development Strategy - Figure 8

Coolnabacky Substation
TIMAHOE
Laois-Kilkenny Grid Reinforcement Project
ABBEYLEIX
Abbeyleix Substation
Knockardagur Substation
BALLINAKILL
Ballynalacken Windfarm Site
DURROW
BALLYOUSKILL
ATTANAGH
Castlecomer Substation
CASTLECOMER
Ballyragget Substation
BALLYRAGGET
KILKENNY
Scart Substation
N

EIAR Chapter 4: Alternatives Considered

Figure 4.3 - Alternative Grid Connection Points

Legend:

- Ballynalacken Windfarm Site
- River Barrow & River Nore SAC
- Ballyragget Substation
- Knockardagur Substation
- Routes A & B
- Routes C, D & E
- EPA Watercourse
- NIAH Sites

Knockardagur Substation
Route C
Route E
Route D
BALLINAKILL
Haywood Demesne Wall
NIAH Sites
Owveg
Loughill Bridge
Moneycleare
Kilcronan
Ironmills or Kilrsuh
BALLYOUSKILL
Route A
Route B
Rathduff_15
Rathduff_15
Existing Eirgrid Ballyragget Substation
CASTLECOMER
N

EIAR Chapter 4: Alternatives Considered

Figure 4.4 - Alternative Windfarm Substation Locations

Legend:

- Substation A
- Substation B
- Substation C
- Ballynalacken Windfarm Site

Substation A

Substation B

Substation C

N

EIAR Chapter 4: Alternatives Considered

Figure 4.5 - Alternative Cable Routes Considered

Legend:

- Ballynalacken Windfarm Site
- Routes A, B & C
- Routes D & E
- Tinnalintan Substation
- Ballyragget Substation
- River Barrow and River Nore SAC
- River Nore SPA
- EPA Watercourse

Route A

Nicholastown 15 stream crossing

Route B

Route C

Windfarm Control Building

L5845

Rathduff 15 stream crossing

Route B

L58442

River Barrow and River Nore SAC

Route C

Rathduff 15 stream crossing

Tinnalintan Substation

Route D

Route E

River Nore SPA

R432

Ballyragget Substation

N

18 turbines with 120m - 150m tip height

9 turbines with 150m - 180 tip height

EIAR Chapter 4: Alternatives Considered

Figure 4.6 - Alternative Turbine Sizes and Scales Considered

Loughill
Ballyoskill
313
Cromwell's Road
Firoda Upper
Ballynalacken
314
303
Ballymartin Cross Rds
Ballymartin
Commons
Byrnesgrove
Garrannaguilly
253
262
286
R694
N