

3. CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU (the EIA Directive) requires that the Environmental Impact Assessment Report (EIAR) prepared by the developer contains *“a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.”*

Article 5(1)(f) of the EIA Directive requires that the EIAR contains *“any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.”*

Annex IV of the EIA Directive states that the information provided in an EIAR should include 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.”*

This section of the EIAR contains a description of the reasonable alternatives that were studied by the developer, which are relevant to the proposed project and its specific characteristics, in terms of site location and other renewable energy technologies as well as site layout incorporating size and scale of the project, connection to the national grid and transport route options to the site. This section also outlines the design considerations in relation to the wind farm, including the associated substation. It provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the *Draft Guidelines on The Information to be Contained in Environmental Impact Assessment Reports* (Environmental Protection Agency, 2017), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

It is important to re-iterate that the Carnsore Wind Farm is an existing wind farm, first commissioned in 2002, and this EIAR is being prepared in support of a planning application to extend the operational lifespan of the wind farm beyond 2022, by a further 15 years (the Proposed Development).

Hierarchy

EIA is concerned with projects. The Environmental Protection Agency (EPA) draft guidelines (EPA, 2017) state that in some instances neither the applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by a higher authority, such as a national plan, or regional programme for infrastructure, which are examined by means of a Strategic Environmental Assessment (SEA), the higher tier form of environmental assessment.

Non-environmental Factors

EIA is confined to the potential significant environmental effects that influence consideration of alternatives. However, other non-environmental factors may have equal or overriding importance to the

developer of a project, for example project economics, land availability, engineering feasibility or planning considerations.

Site-specific Issues

The EPA guidelines state that the consideration of alternatives also needs to be set within the parameters of the availability of the land, i.e., the site may be the only suitable land available to the developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.1.2

Methodology

The European Commission's *Guidance on the Preparation of the Environmental Impact Assessment Report* (EU, 2017) outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the developer needs to provide the following:

- A description of the reasonable alternatives studied; and,
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a 'reasonable alternative' however the EU Guidance Document (EU, 2017) states that reasonable alternatives "*must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives*".

The guidance also acknowledges that "*the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative*".

The current Draft EPA Guidelines (EPA, 2017) state that "*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.*"

Consequently, taking consideration of the legislation and guidance requirements into account, this section addresses alternatives under the following headings:

- 'Do Nothing' Alternative;
- Alternative Locations;
- Alternative Processes;
- Alternative Technologies;
- Alternative Turbine Layouts and Development Design; and,
- Alternative Mitigation Measures.

Each of these is addressed in the following sub-sections.

When considering a wind farm development, given the intrinsic link between layout and design, the two will be considered together in this chapter.

While environmental considerations have been at the core of the decision-making process for all of the project processes and infrastructure components, it should be noted that the majority of alternative options considered under the headings listed above are unlikely to have had significantly, greater environmental effects than the chosen option.

3.2 ‘Do-Nothing’ Alternative

Article IV, Part 3 of the EIA Directive states that the EIAR should include “an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.” This is referred to as the “do-nothing” alternative. EU guidance (EU, 2017) states that this should involve the assessment of “an outline of what is likely to happen to the environment should the Project not be implemented – the so-called ‘do-nothing’ scenario.”

An alternative land-use option to maintaining the existing wind energy development at the site would be to decommission the wind farm once the current planning permission expires (August 2022) and restore the site to its original use as agricultural lands for pasture and crops.

Condition 9 of the original Planning Application to An Bord Pleanála (ABP) (ABP Ref. PL26.116487) states the following in relation to decommissioning of the wind farm:

‘On full or partial decommissioning of the wind farm or if the wind farm ceases operation for a period of more than one year the masts and turbines concerned (including foundations) shall be dismantled and removed from the site. The site shall be reinstated (including all access roads) and all decommissioned structures shall be removed within three months of decommissioning.’

In implementing the ‘do-nothing’ alternative, however, the opportunity to utilise the significant existing renewable energy infrastructure would be lost. So too would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas (GHG) emissions. The site currently has a generating capacity of 11.9 megawatts (MW) which can provide clean electricity to meet the needs of more than 7,600 homes.

The opportunity to generate local employment, local authority development contributions, rates and investment in the local area would also be lost. The decommissioning of the existing wind farm as set out in the above planning condition may lead to environmental effects due to the potentially extensive groundworks required to remove existing turbine foundations, access roads, cabling and other subgrade elements. A more environmentally sensitive approach to decommissioning is outlined in Chapter 4, Section 4.8 of this EIAR.

On the basis of the positive environmental effects arising from the Proposed Development, when compared to the ‘do-nothing’ scenario, the ‘do-nothing’ scenario was not the chosen option.

It is noted that of the total current wind farm development lands (approximately 78.7 hectares [ha]), the development footprint accounts for approximately 1.72ha, or 2% of the total area. The remainder of the site is currently either used for agricultural pasture and rough grazing or remains undeveloped. The existing agricultural uses can, and will, continue in conjunction with this proposed use of the site.

A comparison of the potential environmental effects of the ‘Do-Nothing’ Alternative when compared against the chosen option of developing a renewable energy project at this site are presented in Table 3-1 below.

Table 3-1 Comparison of environmental effects when compared against the chosen option (maintaining the existing wind farm at this site)

Environmental Consideration	'Do-Nothing' Alternative
Population and Human Health (including Shadow Flicker)	<p>Short-term increase in local employment due to decommissioning works, followed by long-term loss of local employment, and loss of long-term financial contributions towards the local community.</p> <p>Long-term loss of community recreational amenity (site roads/tracks currently used for walking/running).</p> <p>No potential for shadow flicker to affect sensitive receptors.</p>
Biodiversity and Ornithology	Slight negative impact upon locally important habitat
Land, Soils and Geology	Neutral
Geotechnical	Neutral
Water	Short-term, slight negative impact upon local surface water quality.
Air and Climate	Will not provide the opportunity for an overall increase in air quality or reduction of greenhouse gases. Will not assist in achieving the renewable energy targets set out in the Climate Action Plan.
Noise and Vibration	Potential short-term, negative noise impacts on nearby sensitive receptors.
Landscape and Visual	No landscape and visual effects related to the turbines, once removed.
Cultural Heritage and Archaeology	Slight potential for long-term negative impacts on recorded monuments and subsurface archaeology.
Material Assets	Likely greater traffic volumes during decommissioning phase. Potential generation of significant quantities of construction and demolition (C&D) waste.

3.3 Alternative Locations

3.3.1 Site Selection Process

It is considered appropriate to extend the operational phase of the existing wind energy development at the current site for the following reasons:

- Carnsore Wind Farm has been operated successfully at its current location since 2002, when it was first commissioned. It has proven to have reliably good wind speeds and maintained a good generating capacity.
- While the turbine technology on the site is dated it has been demonstrated by Hibernian Wind Power Limited (Hibernian) that the existing 14 no. Vestas V52 850 kilowatt (kW) model turbines can continue to operate efficiently for a further 15 years without a significant loss in the total generating capacity of 11.9 megawatts (MW). Hibernian have provided details of technical feasibility assessments undertaken concerning the lifetime extension of the Carnsore Wind Farm turbines. Hibernian concluded based on the results of these assessments that the existing turbines at the wind farm have the ability to operate for an additional 15 years. A letter from Hibernian outlining the findings of these performance assessments is included as Appendix 3-1 to this report.
- The existing wind farm infrastructure on the site, including the substation, site roads and met mast, can continue to be used for the extended operational period, which reduces environmental effects when compared to an undeveloped greenfield site, particularly in relation to landscape and visual effects and effects on locally important habitats.
- The existing wind farm site entrance, via a local road on the northern site boundary, can continue to be used without any alterations or road works required.
- The development can comply with the policies and principles outlined in Chapter 1: Introduction (of this EIAR) in terms of the need for additional renewable energy in Ireland.
- Hibernian has collected a significant amount of site-specific data relating to the characteristics of the site and the local area, and this information was used during the development's operational review process, in particular in considering the feasibility of alternative renewable technologies, such as solar energy.
- The Development can contribute to the achievement of national energy targets and can continue to provide significant social and economic benefits for the local area (direct and indirect employment, community development fund, recreational amenity) and the wider region.
- Repowering of the existing site (replacement of old turbines with new turbines to increase generating capacity) would likely require the use of a smaller number of significantly larger turbines. Repowering of the site with considerably larger turbines was not deemed feasible due to existing site constraints, primarily the close proximity of existing residential dwellings to the site, and therefore increased potential impacts from noise, shadow flicker and landscape and visual impacts.
- Having been previously permitted under ABP Ref. PL26.116487 the principle for wind energy development at this site is already well established and has been proven to be in accordance with the proper planning and sustainable development of the area. Chapter 2, Section 2.4 of this EIAR outlines the strategic planning context and provides further

details of the Proposed Development’s alignment with national, regional and local policies, frameworks, guidelines and plans.

3.3.2 Review of Alternative Sites

Hibernian has undertaken a review of their operational wind farm portfolio on sites approaching 20 years of operation with a view to determining if they should be decommissioned, the operational life extended, or if they were suitable for repowering. It was then decided which of the sites should be taken forward for extension of operation first.

The existing Carnsore Wind Farm was considered suitable for extension of operation due to the success of the existing site, the good condition and performance of the existing turbines and site infrastructure (see Appendix 3-1 for turbine performance assessment details), the wind regime on the site and the existing grid connection infrastructure.

The existing wind farm development lands are under the ownership of ESB, the parent company of Hibernian, and the Proposed Development is for an extension of life of the operational Carnsore Wind Farm and therefore, further detailed assessment of alternative locations is not considered to be applicable in this instance.

3.3.3 Sustainability Strategy

ESB are the parent company of Hibernian Wind Power and as such, the ESB’s Brighter Future Strategy applies to the Proposed Development. This sustainability strategy outlines ESB’s commitments and approach to ‘leading the transition to reliable, affordable, low-carbon energy’. There is a clear focus on generation of renewable energy and a move away from traditional fossil fuel-based (coal and peat) generation within the strategy.

Key commitments under this clean energy approach include:

- Reducing carbon intensity by 50% by 2030;
- Increase share of renewables to 50% of generation capacity (generating 40% electricity) by 2030; and,
- Meet customers energy needs through diverse businesses across the energy value chain.

Onshore wind projects, such as the Carnsore Wind Farm, are therefore viewed as critical infrastructure supporting the ESB’s stated transition to renewables. Currently the ESB’s onshore wind asset portfolio has a generation capacity of approximately 720MW throughout Ireland and the UK.

ESB’s strategy is in line with National policies such as the Climate Action Plan 2019, for example in terms of reducing carbon dioxide equivalent (CO₂ eq.) emissions from the energy sector by 50-55% and increasing electricity from renewables to 70% of the total share by 2030.

3.4 Alternative Processes

The management of processes that affect the volumes and characteristics of emissions, residues, traffic and the use of natural resources has formed part of the alternative’s considerations through the development of the proposed extension of operation of the existing wind farm development.

During the operational phase the processes required at the site are relatively benign. There are no manufacturing processes per se with the potential for the generation of significant emissions to any environmental media, the use of finite natural resources or the generation of wastes or traffic volumes. On this basis, alternative processes designed to reduce emissions and use of resources during the operational stage are not required.

The limited operation and maintenance (O&M) activities required at the site will require the use of relatively low levels of raw materials in the form of energy to supply plant and machinery, standard building materials including stone, metals, pipework, concrete, electrical and plumbing. Raw materials are also utilised in the manufacture of wind turbine components and electrical infrastructure that may require replacement. The use of these resources will be controlled by the employment of best practice O&M techniques including waste management practices.

The purpose of the Proposed Development is to generate electricity from an infinite renewable source which will offset the use of finite fossil fuels. The baseline scenario without implementation of the Proposed Development is to not provide a renewable energy source at this eminently suitable location, therefore failing to contribute to climate change and energy policy objectives. Such an approach would neither be optimal nor appropriate.

3.5 Alternative Technologies

The current site is developed as a wind farm capable of generating up to 11.9MW of renewable energy. The Proposed Development, through extending the operational lifespan of the wind farm, will maintain this level of renewable energy generation with little additional capital investment required and no significant increases in operating costs.

The existing site could potentially be redeveloped with an alternative renewable energy technology, with a solar photovoltaic (PV) array, or a solar / wind energy mix deemed the most suitable to this location.

Redevelopment of the site as a large-scale solar farm capable of generating enough energy to be economically viable would drastically change the existing character of the land, as it would have a significantly larger footprint, and therefore greatly reduce the area currently available for agricultural use. According to the Sustainable Energy Authority of Ireland (SEAI) approximately 1.6 - 2.0ha of a solar array area is required for each megawatt generated. Therefore, in order for a solar farm to deliver at least 11.9MW (current wind farm generating capacity) a footprint area of approximately 21.6ha of solar array would be required. The current wind farm turbine footprint in comparison (turbines and hardstanding areas) is approximately 0.34ha.

There are also existing environmental site constraints which would severely limit potential for solar development at the site. These include the proximity to two designated EU sites, Lady's Island Lake SAC and Carnsore Point SAC, and the potential for negative impacts to protected bird species.

Given the existing site constraints, significant capital investment required in order to redevelop the current wind farm site as a solar farm, the increased development footprint, and the ability of the existing wind turbines to perform for a further 15 years, it was not deemed suitable to further pursue this alternative land use option.

Table 3-2 Comparison of environmental effects when compared against the chosen option (maintaining use of wind turbines)

Environmental Consideration	Solar PV Array (with a 12MW output)
Population and Human Health (incl. Shadow Flicker)	No potential for shadow flicker to affect sensitive receptors. Potential for glint and glare impacts to local residents and road users.
Biodiversity and Ornithology	Larger development footprint would result in greater habitat loss. Potential for glint and glare impacts on birds.
Land, Soils and Geology	Larger development footprint would result in greater volumes of soil/rock/spoil to be excavated and managed.
Geotechnical	Shallower excavations involved in solar PV array developments. Neutral impact due to relatively level site topography and shallow underlying granite bedrock suitable as foundation anchor.
Water	Larger development footprint, therefore, increasing the potential for silt laden runoff to enter receiving watercourses. Large-scale solar PV array has the potential to alter drainage patterns in the immediate vicinity.
Air and Climate	Reduced capacity factor of solar PV array technology would result in a longer carbon payback period.
Noise and Vibration	No potential for noise impacts on nearby sensitive receptors.
Landscape and Visual	Potentially less visible from surrounding area due to screening from vegetation and topography. Alters landscape character and potential negative effect on coastal views.
Cultural Heritage and Archaeology	Potential for negative effects on cultural heritage sites due to larger development footprint of solar.
Material Assets	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials.

Alternative Turbine Layouts and Development Design – Repowering Option

The Proposed Development consisting of 14 no. wind turbines will each have a potential power output of 850kW delivering a total generating capacity of up to 11.9MW. It is proposed to extend the operational lifespan of the 14 existing turbines of 75m blade tip-height at the site. A similar generating capacity could also be achieved on the existing site by using significantly larger turbine technology (for example 2.5MW machines). This would necessitate the installation of at least 5 new turbines of approximately 125m total height to achieve a similar output.

The use of significantly larger turbines at the site, while likely to reduce the development footprint, would be problematic in terms of potential negative noise impacts, shadow flicker, ornithology/biodiversity impacts, and landscape and visual impacts to the surrounding residential receptors.

Adopting a smaller number of larger turbines at the existing site may be challenging to achieve in line with the current Wind Energy Guidelines (2006), particularly as several residential dwellings have been constructed in close proximity to the wind farm since it was first developed.

The construction of larger turbines at the site would necessitate significant road upgrades and potential realignments, in order to accommodate delivery of larger turbine components, increasing the potential for negative environmental impacts to occur on biodiversity, hydrology and traffic and transportation.

Furthermore, the increased use of materials, new foundation excavations, movement of excavated materials and increased visual impacts associated with significantly larger turbines (up to 125m in height) would result in a higher level of negative environmental effects than the proposed option (extension of existing wind farm operation).

It should be noted that no alterations to the pre-existing turbine model installed on the site is proposed as part of this application. The maximum height of the turbines is 75m when measured from ground level to blade tip. For the purposes of this EIAR this is the turbine size which has been assessed (e.g. existing turbine dimensions used for visual impact, shadow flicker etc.). The EIAR therefore provides a robust and accurate assessment of the turbines considered within the overall development description.

A comparison of the potential environmental effects of the installation of a smaller number of larger wind turbines when compared against the chosen option of maintaining a larger number of smaller wind turbines are presented in Table 3-3 below.

Table 3.3 Comparison of environmental effects when compared against the chosen option (smaller wind turbines)

Environmental Consideration	Smaller Number of Larger Turbine Models
Population and Human Health (incl. Shadow Flicker)	Greater potential for shadow flicker impacts on nearby sensitive receptors due to the increased height and overall size of turbines.
Biodiversity and Ornithology	<p>Likely impacts from construction (excavations, rock-breaking, increased traffic volumes) required to install larger turbines on the site present an increased potential to negatively impact biodiversity. The development footprint would likely be significantly increased due to the requirement to space larger turbines further apart from one another and increased foundation size and hardstanding areas, potentially resulting in greater habitat loss.</p> <p>There is a greater potential collision risk for birds due to the presence of turbines up to 60% higher than those currently existing, typically encompassing a larger blade length and swept area.</p>
Land, Soils and Geology	Larger development footprint would result in greater volumes of soil/rock/spoil to be excavated and managed.
Geotechnical	Neutral impact due to relatively level site topography and shallow underlying granite bedrock suitable as foundation anchor.
Water	Larger development footprint, therefore, increasing the potential for silt laden runoff to enter receiving watercourses.
Air and Climate	Increased potential for vehicle emissions and dust emissions due to an increased volume of construction material and turbine component deliveries to the site.
Noise and Vibration	Potential for increased noise impacts on nearby sensitive receptors due to reduced separation distance between residential dwellings and turbine locations.
Landscape and Visual	Although a smaller number of turbines would be present, the significantly greater turbine height would have a greater landscape and visual impact.
Cultural Heritage and Archaeology	Larger development footprint likely to increase the potential for impacts on recorded monuments, and also upon any unrecorded, subsurface archaeology.
Material Assets	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials and turbine components.

3.6.1 Location of Ancillary Structures

The ancillary infrastructure required for the operation of the Proposed Development includes an electricity substation, associated grid connection (underground cable and overhead line) and meteorological mast. No alterations are proposed to the locations of the existing site structures, as detailed in Chapter 4: Description of the Proposed Development and Figure 4-1. These structures were initially situated based upon the constraints of the site when first developed in 2002, and these have not changed significantly in the intervening period.

It should be noted that the existing grid connection from Carnsore Wind Farm to the Killinick 38kV substation consisting of approximately 1.2km of buried 38kV transmission line and approximately 11.2km of overhead line, does not form part of this EIAR, other than its inclusion as a project considered cumulatively, and is subject to a separate planning permission, as detailed in Chapter 4, Section 4.1 of this report.

3.6.1.1 Electricity Substation

The existing wind farm substation is located adjacent to the northern site boundary and main site entrance, with good access via the existing local road network. There is a parking area on the north side of the substation. The substation compound is surrounded by agricultural lands, with one residential dwelling located approximately 85m to the northwest.

The selection of the location of the on-site 38kV substation with associated development footprint of approximately 575m² has had regard to the constraints of the site, such as proximity to the existing road network, location of nearest grid connection point, location of protected habitats, and limiting visual and landscape impacts. Ease of access and ensuring a suitable setback from turbine locations was also taken into consideration.

It should also be noted that while the extended operational lifespan of the Proposed Development is expected to be 15 years the electricity substation and associated infrastructure will remain an ESB asset and will be a permanent feature of the proposal as it will continue to form part of the electrical infrastructure of the area, in the event of the remainder of the site being decommissioned.

Due to the significant capital costs required to alter the pre-existing substation location (and associated grid/turbine cabling and related infrastructure) alternative locations were not considered feasible by Hibernian and have not been further assessed as part of the Proposed Development. No concerns (current or future) regarding the impact of the current substation location were identified.

3.7 Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the Proposed Development's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas of the site, any areas of the site potentially prone to flooding, as well as avoidance of existing archaeological monuments, limits the potential for environmental effects on these receptors. The Proposed Development will not involve disturbance or loss of existing habitat, and the Applicant has confirmed a number of biodiversity enhancement initiatives are planned, such as implementing pollinator-friendly management practices, in line with the recent Wind Energy Ireland's pollinator guidance document¹. This will likely lead to an overall increase in available local habitat and species diversity. An alternative to this approach is to encroach on the environmentally sensitive areas of the site and accept the potential environmental effects and risk associated with this.

¹ Wind Energy Ireland (2021) Pollinator-friendly management of Wind Farms, National Biodiversity Data Series No. 25.

The detailed ornithological assessment provided in Chapter 7 of this report, concluded that the extended operation of the existing wind farm is unlikely to cause a significant effect on bird species. For this reason, no additional bird monitoring or secondary mitigation measures e.g., shutting down turbine operation at key times of the year, were considered to be required.

Due to the nature of the Proposed Development (existing wind farm with no construction works, groundworks or significant land-use change proposed), the greatest potential for environmental effects exists during the operational phase. During the operational phase there are no significant ongoing emissions to any environmental media (water, air, soil etc.) and the general environmental risk associated with the existing infrastructure is low. Further alternative mitigation measures for this phase are therefore not necessary for further consideration.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the site and any identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective, and neither of these options are sustainable.