



Clachaig Glen Wind Farm

Environmental Impact Assessment Report

Volume 2a

Main Report

Chapter 4: Reasonable Alternatives

4. Reasonable Alternatives

4.1 Introduction

4.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) considers the reasonable alternatives to the Proposed Development studied by the Applicant. It focuses on those alternatives which are relevant to the Proposed Development and its characteristics.

4.1.2 This chapter summarises parts of the Design Statement, which is a separate report submitted with the Section 36 Application that provides detail on the selection of the Development Site and the stages of design leading to the Proposed Development. This chapter does not seek to explain the detailed history of the design evolution of the project, especially prior to the Consented Development (which was assessed by Scottish Ministers as being appropriate) as this detail is set out in the Design Statement.

4.2 Legislation, Policy and Guidance Context

4.2.1 Schedule 4, Paragraph 2 of the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (**‘the EIA Regulations’**) states that 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 development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*”

4.2.2 There are considered to be six criteria which reasonable alternatives should meet (Institute of Environmental Management and Assessment, 2017). These are:

1. *they are considered early in the design process* [see Section 4.5],
2. *they are credible and appropriate for the project* [addressed throughout this chapter],
3. *comparisons have been made between them* [addressed throughout this chapter],
4. *a consultation has been conducted on them* [see Section 4.5],
5. *they include additional forms of mitigation alongside the alternatives* [see Section 4.7], and
6. *the [EIAR] contains information on alternatives and the approach used to select them* [addressed throughout this chapter].

4.2.3 In accordance with the requirements of the EIA Regulations and IEMA criteria above, this chapter of the EIAR explores the following key themes:

- Principle of development,
- Site location,
- Site design,

- Size and scale of Proposed Development, and
- Mitigation.

4.3 Principle of Development

- 4.3.1 As referenced in Chapter 1 of this EIAR: Introduction, the Applicant has a goal to become climate-neutral by 2040 and focuses on producing electricity from renewable energy, in particular wind, as a key element in this strategy. Other energy generation technologies, such as conventional power plants, are being phased out or converted rapidly by the Applicant (RWE, 2019, 2021a, 2021b).
- 4.3.2 Chapter 4 of the Planning Statement, which is a separate report accompanying the Section 36 Application, establishes the need for onshore wind energy. This considers the climate emergencies declared by the Scottish and UK governments, as well as the EU, in 2019. This includes the collective targets of a net zero emissions future (to be achieved by 2045 in Scotland), which in order to be successful requires companies, such as the Applicant, to adopt climate-neutral targets.
- 4.3.3 Chapter 4 of the Planning Statement also examines the backing given specifically to renewable energy generation, and to onshore wind in particular, by the Scottish Government, including the supportive policy direction to further rapid growth in the onshore wind industry including the use of larger turbines.
- 4.3.4 The need for and principal of onshore wind energy in Scotland is therefore established in the Planning Statement.

4.4 Site Location

- 4.4.1 As detailed in the Design Statement, the Applicant was awarded the exclusive rights to investigate the potential for new large-scale wind energy projects within the Scottish National Forest Estate in Argyll and Bute in 2011.
- 4.4.2 At this point, the Applicant assessed the whole region for its suitability for an onshore wind development and took into consideration a range of technical, environmental, planning and commercial factors. This included identifying the areas with the lowest potential visual impact for wind farm development within the region through a viewshed analysis, which was developed by the Applicant. This viewshed analysis visually assessed every square 50m of viable land available for large-scale wind farm development in Argyll and Bute, and then focussed on an assessment of just Landscape Character Type 6. This viewshed analysis has been repeated since to ensure the Development Site remains one of the best locations in the region for a wind energy development of the size proposed. Further detail on this is provided in the Design Statement.
- 4.4.3 The location of the Development Site was therefore selected and retained following a thorough review of the whole region, including the national forestry estate. No other location of this scale in Argyll and Bute was found to be more suitable to a new wind energy development.

4.5 Site Design

- 4.5.1 There have been eleven design stages, including eleven different layouts, which have led to the Proposed Development. These are detailed in the Design Statement. The first design stage commenced in 2013 and included consultation with statutory consultees, the establishment of a Community Liaison Group and two Public Information Days. This ensured that consultation formed part of the design process from an early stage and continued to influence the site design throughout the eight-year design process.
- 4.5.2 Environmental assessment, including the completion of two EIAs, has additionally been key to the design of the Proposed Development throughout this process. This is also detailed in the Design Statement and is evident throughout this EIAR, including through the embedded mitigation measures summarised in Chapter 3 of the EIAR: Project Description.
- 4.5.3 Alternatives to the proposed site design have therefore been thoroughly assessed, with the Proposed Development considered to be the optimum layout when considering all necessary factors, from wind yield, to visual impact, to ground conditions, to environmental constraints.

4.6 Size and Scale of Proposed Development

- 4.6.1 The Proposed Development includes 12 wind turbines which are larger in size than the 14 turbines which comprise the Consented Development, where planning permission was granted in 2019 by Scottish Ministers (reference PPA-130-2064). A full comparison between the Consented and Proposed Developments can be found in Chapter 1 of this EIAR: Introduction. As detailed within Chapter 1 and Chapter 3 of this EIAR: Project Description, the Proposed Development comprises 12 turbines with a maximum tip height of either 185m (seven turbines) or 200m (five turbines), in addition to a 30-megawatt (MW) battery storage facility and other supporting infrastructure. Reducing the number of proposed wind turbines from 14 to 12 improved the efficiency of the larger machines and was also assessed as generating a reduced visual impact by the landscape team than replacing all 14 wind turbines of the consented layout with machines of this size.
- 4.6.2 The reason that this wind farm has been subject to further design revisions following consent is due to the advancement of wind turbine technology and the significant changes to the wider economics of onshore wind farms and other renewable technologies in Scotland, including significant increases in the charging regime for any technologies connecting to the grid network in north and west Scotland.
- 4.6.3 The advancement of technology provides the opportunity to improve the energy yield generated within the Development Site and, especially when combined with the addition of a battery storage facility, to make a larger contribution to the Scottish Government's renewable energy targets. The calculated output of the Proposed Development almost doubles when compared to the Consented Development, due to the increases in hub-height, rotor diameter and the ability to harness improved wind speeds at these higher heights. This is achieved due to the larger, highly efficient turbines proposed, as well as the battery storage facility which allows energy generated from the wind farm to be stored for periods of

lower consumption, and released at periods of higher energy consumption or lower wind speeds throughout the year.

- 4.6.4 The significant changes to the economics of renewables technologies in Scotland, which includes National Grid's transmission charging, has led to the Consented Development becoming significantly more challenging. The same would be true of smaller turbines than those proposed, which have therefore been discarded from further consideration. The almost 100% increase in output achieved through the Proposed Development in comparison to the Consented Development results in the project contributing significantly more clean, renewable energy in the fight to reduce the impacts of climate change.
- 4.6.5 As detailed in the Design Statement, other scales of development have been considered and consulted on in the last eight years, starting at 53 turbines with a maximum tip height of 126.5m and leading to 12 turbines with a maximum tip height of either 185m (seven turbines) or 200m (five turbines) with the addition of battery storage. The continued consultation and environmental assessment over this timeframe have led to the size and scale of the Proposed Development. The larger turbines especially have been a focus of the most recent EIA as reported in this EIAR and, due to the EIA being embedded in the design process, has resulted in the Proposed Development having very little adverse environmental effects despite the wind turbines being larger than previously considered (see Chapter 19 of this EIAR: Summary of Effects and Conclusions).
- 4.6.6 Design changes leading to the Proposed Development have included considerations such as the placement and size of the wind turbines in regard to the landscape and visual impacts. AECOM's landscape team have been fundamental to the design process and have advised on even the smallest changes to improving the way the Proposed Development is perceived from a number of different viewpoints in regard to spacing and individual turbine size. For example, the visual impact of all 12 turbines having a tip height of 200m was assessed by the landscape team and ultimately led to seven of the turbines being reduced in size to 185m. Site-specific considerations, including the topography of the Development Site, led to this final design, with the different turbine sizes which comprise the Proposed Development actually providing a more uniform wind farm from most viewpoints assessed. As can be seen from the photomontages (EIAR Volume 2d) associated with Chapter 7 of this EIAR: Landscape and Visual, which provides a detailed assessment of the resulting development, the large turbines have been focused to the eastern, lower lying parts of the site to help reduce the visual impact of the scheme from the wider area.

4.7 Mitigation

- 4.7.1 Mitigation measures for the Proposed Development have either been embedded in its design (for a summary, see Chapter 3 of this EIAR: Project Description) or proposed within this EIAR in order to address an adverse effect (for a summary, see Appendix 19.1: Schedule of Mitigation; EIAR Volume 3). As referenced in Paragraph 4.2.2, mitigation should be included in the consideration of reasonable alternatives to the Proposed Development.

- 4.7.2 A number of the embedded mitigation measures incorporated into the design of the Proposed Development were developed earlier in the design process for previous, alternative site designs (see Paragraph 4.5.1 and the Design Statement). This includes measures taken to avoid deep peat, ornithological constraints, known archaeology and areas identified as sensitive through consultation. These embedded measures have therefore shaped the Proposed Development and reflect the outcome of an iterative design process, which has progressed while seeking to minimise adverse significant effects. The design of the Proposed Development is therefore intrinsically linked with a number of embedded mitigation measures. Any site design alternatives may result in the removal of these measures and would likely result in a higher number of adverse significant effects on one or several of the constraints identified above when compared with those effects established within this EIAR for the Proposed Development (for a summary, see Chapter 19 of this EIAR: Summary of Effects and Conclusions).
- 4.7.3 The alternative site designs considered over the last eight years for the Development Site (as detailed in the Design Statement) would be expected to include most of the additional mitigation measures listed in Appendix 19.1: Schedule of Mitigation (EIAR Volume 3). This includes:
- good industry practice construction methods,
 - a Habitat Management Plan,
 - peatland restoration,
 - Ecological and Environmental Clerks of Works,
 - measures taken to reduce bat collision risks,
 - pre-construction species surveys,
 - avoiding all relevant breeding seasons,
 - bird diverters fitted to meteorological mast,
 - a Construction Environment Management Plan,
 - track construction,
 - a species protection plan,
 - a programme of archaeological work,
 - a Construction Traffic Management Plan, and
 - the undergrounding of the overhead line crossing the entrance to the main Development Site.
- 4.7.4 The assessment of any alternative site design has therefore been assumed as including many of the same additional mitigation measures as the Proposed Development, including the Consented Development which included similar mitigation to the above. There may be design-specific mitigation, such as aviation lighting in the case of the Proposed Development, however as the EIA team were involved throughout, known measures to address particular effects were considered.

4.8 Conclusions

4.8.1 This chapter considers the reasonable alternatives considered by the Applicant to the Proposed Development and demonstrates that these have been thoroughly assessed throughout its eight-year design process, with environmental effects and consultation being key to this. The chapter draws largely on detailed information presented in other reports accompanying this Section 36 Application, namely the Design Statement and, to a lesser extent, the Planning Statement.

4.9 References

- Institute of Environmental Management and Assessment (2017) Reasonable alternatives. [Online]. <https://transform.iema.net/article/reasonable-alternatives>. (Accessed 25 September 2021).
- Forestry and Land Scotland (*unpublished*) Updated Carradale Land Management Plan (title yet to be determined).
- Forestry Commission (2017) The UK Forest Standard.
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- RWE (2021b) Press Release: RWE Wins a 2021 S&P Platts Global Energy Award. (Accessed 17 December 2021).
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