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## INTRODUCTION

- 5.1 This Chapter discusses the need for Environmental Impact Assessment (EIA). This Environmental Impact Assessment Report (EIA Report) has been prepared in accordance with the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended (the EIA Regulations 2017).
- 5.2 The proposed development is *“a generating station, the construction of which (or the operation of which) will require a section 36 consent but which is not Schedule 1 development”*. In this regard, the proposed development is of a type falling within Schedule 2 of the EIA Regulations 2017, and therefore requires to be screened as to whether or not it constitutes EIA development as envisaged by Regulation 8 of the EIA Regulations 2017.
- 5.3 It was acknowledged at an early stage in the development that, given the nature, location and characteristics of the proposed development, an EIA would be required. It was therefore not considered necessary to seek a screening opinion and this EIA Report is submitted voluntarily as per Regulation 6 of the EIA Regulations 2017.
- 5.4 Establishing which aspects of the environment and associated issues are relevant for a particular project is captured in the EIA scoping process. Scoping is the process of identifying those aspects of the environment and associated issues that need to be considered when assessing the potential effects of a particular development proposal. This recognises that there may be some environmental elements where there would be no significant issues or likely effects resulting from the proposed development, and hence where there is no need for further investigation to be undertaken. The Scoping exercise for the proposed development is covered under Chapter 6 of this EIA Report.
- 5.5 Following the identification of the scope of the EIA, individual environmental disciplines are subject to survey, investigation and assessment, and individual discipline. Chapters are prepared for presentation in an EIA Report to accompany the application for consent and deemed planning permission. The assessment methodologies are based on recognised good practice and guidelines specific to each discipline area as outlined within this document, Chapters 7 to 17.
- 5.6 Regulation 3 of the EIA Regulations 2017 prohibits a planning authority or the Scottish Ministers from granting planning permission for EIA development unless they have first taken the environmental information provided into consideration.
- 5.7 This EIA Report is presented in order to be taken into consideration by the Scottish Ministers in the determination of the consent application under Section 36 of the Electricity Act 1989 for the proposed development.

## REQUIREMENTS OF THE EIA DIRECTIVE AND REGULATIONS

- 5.8 The approach to this EIA has followed the requirements of the EIA Regulations.
- 5.9 Schedule 4 of the Regulations sets out the information that must be included in the EIA Report, as summarised in Table 5-1. This also identifies where the corresponding information can be found in the EIA Report.

**Table 5-1  
EIA Report Required Information**

Required Information	Relevant Section in EIA Report
<p>1. Description of the development, including in particular:</p> <p>(a) a description of the physical characteristics of the whole development and the land-use requirements during the construction and operational phases;</p> <p>(b) a description of the main characteristics of the production processes, for instance, nature and quality of the materials used;</p> <p>(c) an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.</p>	<p>A description of the proposed development and its characteristics is presented in Chapter 3: Proposed Development.</p>
<p>2. A description of the aspects of the environment likely to be significantly affected by the development, including, in particular: population (and human health), fauna and flora (i.e. biodiversity), soil, water, air, climatic factors (i.e. climate), material assets, including the architectural and archaeological heritage, landscape, and the inter-relationship between the above factors.</p>	<p>The predicted individual environmental effects of the proposed development are reported in Chapters 7-17.</p> <p>Effects on population (and human health) are discussed in relation to visual/residential amenity impacts, traffic and noise.</p> <p>Effects on flora and fauna are covered in Chapters 8 and 9, with Forestry covered separately in Technical Appendix 3.2.</p> <p>Material assets are addressed through the effects identified for land use, soil geology and waste, hydrological and cultural heritage.</p>
<p>3. A description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development, resulting from:</p> <p>(a) the existence of the development;</p> <p>(b) the use of natural resources; and</p> <p>(c) the emission of pollutants, the creation of nuisances and the elimination of waste; and</p> <p>(d) the description by the applicant of the forecasting methods used to assess the effects on the environment.</p>	<p>The predicted significant effects of the proposed development are reported as residual effects after relevant mitigation measures in each of the technical Chapters of the EIA Report (Chapters 7-17). The methods used to predict significant effects are explained in Chapter 5: EIA and each individual Chapter as relevant.</p> <p>Effects have been predicted in relation to the construction of the proposed development and its permanent use of the land. The operation and nature of these effects and their duration are reported.</p>
<p>4. A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.</p>	<p>The overall approach to mitigation is discussed in Chapter 5: EIA of this EIA Report.</p> <p>Specific mitigation measures are reported in each relevant technical Chapter and are summarised in Chapter 18: Schedule of Mitigation.</p>

Required Information	Relevant Section in EIA Report
5. A non-technical summary of the information provided under paragraphs 1 to 4 of this Part.	A Non-Technical Summary (NTS) is presented as Volume 4 of this EIA Report.
6. An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.	Assumptions and limitations in the EIA process are reported as required in the relevant technical Chapters.
7. The main alternatives studied by the applicant and the main reasons for his choice, taking into account the environmental effects.	The alternatives considered are covered under Chapter 2: Site Description and Design Evolution of this EIA Report.

## LEGISLATION AND GUIDANCE

5.10 The EIA has been completed in accordance with the latest Regulations and advice on best practice, including the following:

- Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 as amended (the EIA Regulations 2017);
- Scottish Planning Series Planning Circular 1/2017 Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017;
- Scottish Government Web Based Guidance Onshore wind turbines (first published in February 2011 and last updated in May 2014);
- Planning Advice Note (PAN) 1/2013 Environmental Impact Assessment (2013);
- Institute of Environmental Management and Assessment (2016) Environmental Impact Assessment Guide to Delivering Quality Development;
- Scottish Natural Heritage (SNH) (2018) A Handbook on Environmental Impact Assessment: Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland (4th Edition); and
- Environmental Impact Assessment (Forestry) (Scotland) Regulations 2017.

## EIA AND THE DESIGN PROCESS

5.11 The EIA process has treated the design process as an iterative process, rather than a one-off, post design environmental appraisal. This has allowed the findings from the EIA to be fed into the design process, to avoid, reduce and, where possible, mitigate environmental effects as they have been identified. Where potentially adverse environmental effects were identified through preliminary investigations as part of feasibility work, or later in the detailed EIA, consideration was given as to how the scheme design could be modified to design out adverse environmental effects, or where this was not possible, to identify appropriate mitigation. This process is explained further in Chapter 2: Site Description and Design Evolution; Chapter 3: Description of the Development, and in the subsequent technical assessment Chapters (Chapters 7 to 17).

## DETERMINING THE SCOPE OF THE EIA REPORT

- 5.12 The EIA Report is the Applicant's statement on the proposed development, its likely significant environmental effects, and the measures proposed to avoid, reduce and, where possible, mitigate adverse effects.
- 5.13 The scope of the EIA Report has been established through a combination of informal scoping consultation with various stakeholders, and an EIA scoping process that culminated in the preparation of a Scoping request to Scottish Ministers.
- 5.14 The Scoping Report was originally submitted to the Scottish Government Energy and Consents Unit (ECU) on 5 April 2017 to accompany a request for the Scottish Ministers to adopt a Scoping Opinion under Regulation 7 of the EIA Regulations 2000. A Scoping response was received from the ECU on 3 July 2017. In response to the Scoping Opinion from the Scottish Ministers, a Gate Check Stage 1 Report was submitted at the end of July 2017. This outlined how all the key issues raised by consultees would be addressed within the EIA. The scoping layout at the time was for 16 turbines with a tip height of up to 149.9m.
- 5.15 Since the submission of the Gate Check Report, the Applicant has taken the opportunity to review the project and consider the economic viability of the project, and this resulted in the consideration of a number of revised turbine options. This has resulted in a layout of up to 14 turbines with a maximum tip height of 180m. This layout is presented at Figure 3.1.
- 5.16 In October 2018, SLR Consulting prepared a revised Scoping document in response to a request from the Local Energy and Consents Unit for an updated scope for the proposed development, focusing mainly around a proposed increase in tip height to 180m and associated aviation lighting requirements. A revised Scoping Opinion was received from Scottish Ministers on 7 March 2019.
- 5.17 The scoping consultation undertaken as part of the EIA process is detailed in Chapter 6: Scoping and Consultation of this EIA Report. The responses of all consultations collated during the scoping process are addressed in this EIA Report and referred to as appropriate in each technical EIA Report Chapter.
- 5.18 A copy of the Scoping Report, Scoping Opinion, Revised Scoping Report, Revised Scoping Opinion and Gate Check Report are included as Technical Appendices 5.1 to 5.5.

## APPROACH AND METHODS

- 5.19 The assessments that have been undertaken as part of the EIA have been based upon the Site and study areas. The Site is the area contained within the redline boundary, as shown on Figure 1.2. The study areas vary between assessments and are defined in individual Chapters.
- 5.20 The EIA Regulations require *"a description of the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development."*
- 5.21 Unless qualified elsewhere, the following interpretation is applied with regard to effects. Short term effects are those which extend over a short period only and, in the context of the wind farm, are

typically those associated with the construction or decommissioning periods or other limited period. Other temporary effects which persist for less than the life of the wind farm are described as medium term, with those extending to the full lifetime of the wind farm described as long term. Any effects which persist beyond the life of the wind farm are considered permanent. Effects with a duration of up to long term are considered reversible, whereas permanent effects are considered irreversible. Where any effect is identified, its duration is described.

- 5.22 Assessment criteria have been used to evaluate environmental effects. Significance is generally determined through a combination of the sensitivity of a receptor to an effect and the magnitude of the change. This process is outlined below:
- identification of baseline conditions of the Site and its environs, including the sensitivity of receptors which may be affected by changes in the baseline conditions;
  - consideration of the magnitude of potential changes to the environmental baseline;
  - assessment of the significance of effect, taking into account sensitivity of receptors and magnitude of effect;
  - identification of appropriate mitigation measures; and
  - assessment of significance of residual effects, taking account of any mitigation measures.
- 5.23 Where significant environmental impacts are predicted in the EIA process, then the EIA Report provides measures which would be employed to eliminate or ameliorate the impact to acceptable levels. Mitigation measures can be in the form of changes to operational practice, or changes/additions to the design.
- 5.24 The above approach does not, however, apply to all disciplines addressed in the EIA Report, and alternative approaches were therefore developed as appropriate. These are described and justified in the relevant EIA Report Chapter.

## Baseline Conditions

- 5.25 A fundamental aspect of the EIA is to determine the baseline environmental conditions prevailing at the Site. These form the benchmark against which predicted changes resultant from the proposed development are assessed to determine the magnitude of any impact. The baseline conditions have been determined by a number of different methods, including desktop studies, site surveys, use of analytical models and the acquisition of data from third parties.
- 5.26 The assessment of each environmental parameter was undertaken in comparison to baseline conditions. This describes the existing environmental conditions at the Site (and in the wider area as pertinent to the particular environmental parameter).
- 5.27 The sensitivity of the baseline conditions has been defined according to the relative sensitivity of existing environmental features on or in the vicinity of the Site, or by the sensitivity of receptors which would potentially be affected by the proposed development. Criteria for the determination of sensitivity or importance have been established based on prescribed guidance, legislation, statutory designation and/or professional judgement. The criteria for each environmental parameter are outlined in the EIA Report according to the technical subject area.
- 5.28 Relevant wind farms that are under construction, operational and consented are considered to be

part of the baseline for the purposes of this EIA Report, unless specifically stated otherwise within relevant topic Chapters.

## Consultation

- 5.29 Consultation has formed an integral part of the EIA process, and both the EIA team and the Applicant have contacted a number of interested parties to determine their views on the proposed development, collected baseline information and refined survey methodologies. Replies received in response to scoping are detailed within the relevant technical Chapters of this EIA Report. Consultation has been undertaken with the relevant consultees for the technical disciplines and is reported in Chapter 6: Scoping and Consultation, and in the topic specific Chapters of this EIA Report.
- 5.30 Consultation with the local community was undertaken through a working group set up by the Applicant and Public Exhibitions held in March 2017, June 2017 and September 2018 to gain feedback on the proposals. The information available included plans of the proposed development layout, information boards explaining the key environmental effects, and photomontages to illustrate anticipated views. The responses received through consultation are detailed in the PAC Report submitted as part of the application for the proposed development.

## Assessment of Effects

- 5.31 The assessment of potential effects, using a range of appropriate methodologies, will take into account the construction and operation of the proposed development in relation to the Site and environs. An assessment of the decommissioning of the proposed development will not be undertaken as part of the EIA as at this stage, the future baseline conditions cannot be predicted accurately, and both the proposals for refurbishment/decommissioning and the future regulatory context are unknown.
- 5.32 Methodologies for predicting the nature and magnitude of any potential environmental impacts vary according to the technical subject area. Numerical or quantitative methods of assessment are used to predict values which can be compared against published thresholds and indicative criteria contained in relevant guidance and standards.
- 5.33 Not all technical subject areas are capable of being assessed numerically or quantitatively, and thus qualitative assessments are used in certain cases. Such assessments rely on previous experience of similar projects, environments and professional judgement.

## Sensitivity of Receptors

- 5.34 Criteria for the determination of sensitivity (e.g. 'high', 'medium', or 'low') or of importance (e.g. 'international', 'national', 'regional' or 'authority area') have been established based on prescribed guidance, legislation, statutory designation and/or professional judgement. The criteria for the sensitivity of environmental parameters are provided in the EIA Report Chapters.

## Magnitude of Effects

- 5.35 The magnitude of effects on environmental baseline conditions is identified through detailed consideration of the proposed development, taking due cognisance of any legislative or policy



standards or guidelines, and/or the following factors:

- the degree to which the environment would be affected, e.g. whether the quality is enhanced or impaired;
- the scale or degree of change from the baseline situation;
- whether the effect is temporary or permanent, indirect or direct, short term, medium term or long term;
- any in-combination effects; and
- potential cumulative effects.

5.36 In some cases, the likelihood of effect occurrence may also be relevant, and where this is a determining feature of the assessment this will be clearly stated.

## Mitigation and Environmental Measures

5.37 Mitigation is considered as an integral part of the overall design strategy for the proposed development, including 'embedded' mitigation (e.g. altering and refining the proposed development to reduce landscape and visual impact, watercourse crossings or avoid sensitive species and habitats), rather than relying solely on 'add-on' measures to prevent or reduce significant environmental effects. The Applicant adopts an iterative approach whereby embedded mitigation is assessed and considered at all stages of the project, and the final design of the proposed development has evolved over the project lifetime, systematically being optimised during the EIA process in response to increasing knowledge of the Site and potential environmental effects.

5.38 Where significant environmental effects are predicted in the EIA process, the EIA Report provides measures which would be employed to eliminate or ameliorate the effect to acceptable levels. Mitigation measures are envisaged through the consideration of alternatives, changes/additions to the design of the proposed development, project management or operation to prevent, reduce or, where possible, offset any adverse significant effects.

5.39 Where complete avoidance of potential effects is not feasible during refinement of the Site design, additional measures are identified to reduce effects. These include a range of mitigation proposals such as the use of construction methods, avoidance of sensitive habitats, landscaping and site operation activities. Mitigation measures follow standard techniques and best practice, and are therefore considered to be effective for the purposes of assessment.

5.40 In some cases, environmental mitigation through compensation may be appropriate to provide replacement features or assets (e.g. habitat to replace that which has been disturbed or lost due to the construction of the proposed development). However, compensation may not initially be effective at remedying effects, as compensation may take time to mature sufficiently to enable the effect of the disturbance or loss to be off-set.

5.41 Some of the environmental measures described within Chapters 7 to 17 of this EIA Report do not relate just to likely significant adverse effects, but have been included as good practice to reduce the level of adverse effects, or enhance the level of beneficial effects, of the proposed development. This assessment is based on the assumption that these good practice/environmental measures will be adopted so as to produce a 'reasonable worst case.' These environmental

measures are those that are routinely adopted by developers in constructing and operating their assets. They are tried and tested measures that are often defined in good practice guides published by statutory bodies, such as SEPA and SNH. This includes guidelines prepared by relevant professional bodies.

- 5.42 Where relevant, these ‘good practice/environmental measures’ are described in the topic Chapters, but they are also summarised in Technical Appendix 3.1. It is this combination of design and environmental measures that the initial assessment of potential effects is undertaken upon. Following completion of that assessment, a range of other measures may then be proposed which aim to provide mitigation or, in certain circumstances, to compensate for effects (‘compensation’) which cannot be sufficiently mitigated. A Schedule of Mitigation for the proposed development is provided in Chapter 18 of the EIA Report.

### *Monitoring*

- 5.43 Also incorporated, where appropriate, are monitoring measures to ensure that the proposed development and any mitigation measures perform as required.
- 5.44 The EIA Report sets out details of any post-consent monitoring which is proposed. This includes, where appropriate, proposals to measure the effectiveness of the identified mitigation measures.

## STATEMENT OF SIGNIFICANCE

- 5.45 Assessing the significance of effects relies, at least in part, on value judgements, including placing weight or value on the environment likely to experience the change. The significance of effects at the assessment stage relates back to the effects deemed to be significant at the scoping stage.
- 5.46 The significance of an effect is derived from an analysis of:
- the sensitivity of the receiving environment or receptor to change, including its capacity to accommodate the kinds of changes the proposed development may bring about;
  - the amount and type of change, often referred to as the impact magnitude which includes the timing, scale, size and duration of the impact;
  - the likelihood of the impact occurring - which may range from certainty to a remote possibility;
  - comparing the impacts on the environment which would result from the proposed development with the changes that would occur without the proposed development - often referred to as the “do nothing” or “do minimum” comparison; and
  - expressing the significance of the effects of the project, usually in relative terms, based on the principle that the more sensitive the resource, the more likely the changes and the greater the magnitude of the changes, compared with the do nothing comparison, the greater will be the significance of the effect.
- 5.47 As the significance of effects will differ depending on the context and the ‘receptors’ affected by the proposed development, there is no general definition of what constitutes significance. In EIA, the term significance reflects both its literal meaning of ‘importance’ and its statistical meaning where there is an element of quantification. This combination of judgemental/subjective and quantifiable/objective tests has become the standard approach to understanding and applying the

test of 'significance'.

- 5.48 Significant effects are defined in each of the topic specific Chapters. Any effects associated with the proposed development are considered to be negative, except where it is stated that they are positive.

## CONSIDERATION OF CUMULATIVE EFFECTS

- 5.49 In accordance with the EIA Regulations, the assessment has considered 'cumulative effects'. By definition, these are effects that result from incremental changes caused by past, present or reasonably foreseeable projects, together with the proposed development. Likely cumulative effects have been defined as the likely effects that the proposed development may have in combination with other wind farm developments in the local area which are at application stage, consented, under construction or operational (i.e. the incremental effects resulting from the proposed development if all other developments are assumed to be constructed/operated). The extent to which the potential combined effects through that co-existence is considered, is described as appropriate throughout Chapters 7 to 16 of this EIA Report.

- 5.50 The study area for considering cumulative effects varies per technical discipline. In general, most specialisms, with the exception of LVIA, have considered cumulative effects to within approximately 10km from the Site, which includes the following schemes:

- Clashindarroch;
- Dorenell (partially within a 10km radius);
- Cairnborrow;
- Land at Cairnmore;
- Upper Wheedlemont Farm;
- Midtown of Glass; and
- Bailiesward Farm.

- 5.51 In the case of landscape, it was agreed to include wind turbine developments out to a radius of 40km from the Site. However, a number of single turbine schemes less than 50m to tip height and greater than 20km from the Site have been omitted from the cumulative assessment as they were perceived as being unlikely to give rise to cumulative effects in combination with the proposed development.

- 5.52 Cumulative wind farm sites within 60km of the Site are identified on Figure 7.7a, and wind farms considered within the landscape assessment and that lie within a 40km radius of the Site are shown on Figure 7.7b. A cut-off date for cumulative assessment was originally taken as 1 August 2017. The updated position was agreed with Aberdeenshire Council and SNH in September 2019. Each EIA Report Chapter refers to the cumulative sites which are considered appropriate to that topic.

## ASSUMPTIONS, LIMITATIONS AND TECHNICAL DIFFICULTIES

- 5.53 The following assumptions have been made during the assessment:

- information provided by third parties, including publicly available information and databases is correct at the time of publication.

5.54 The assessment has been subject to the following limitations:

- baseline conditions have been assumed to be accurate at the time of the physical surveys but, owing to the dynamic nature of the environment, conditions may change during the Site preparation, construction and operational phases; and
- the assessment of cumulative effects has been reliant on the availability of information on other developments.

5.55 It is not considered that any matter has prevented the accurate assessment of potential environmental impacts or the identification of appropriate mitigation measures.

5.56 No technical difficulties were encountered when undertaking the EIA.

## REQUIREMENTS OF THE 2017 EIA DIRECTIVE

### Introduction

5.57 The latest EIA Directive (2014/52/EU) came into effect in mid May 2014 and was transposed into UK law on 16 May 2017. A number of new or amended environmental topics now require consideration within the EIA process if a project has been scoped after 16 May 2017.

5.58 These are:

- population and human health (replaces human beings);
- biodiversity (replaces flora and fauna);
- climate (replaces climatic factors); and
- risks of major accidents and disasters (new).

5.59 Although the proposed development was originally scoped under Regulation 4(1) and Schedule 4 of the 2000 Regulations (the old EIA Regulations), a revised Scoping Report was submitted under the 2017 Regulations and the EIA Report has been undertaken to be recognisant of the 2017 Regulations.

### Population and Human Health

5.60 The 2017 EIA Directive includes a requirement to consider impacts on population and human health. In particular, the Scoping Opinion requested consideration of how traffic and transport impacts might impact upon human receptors as a result of the proposed development.

5.61 Health is influenced by many factors. In the context of this EIA, it is largely focussed on the bio-physical environmental factors of noise, traffic and hydrology/ecology. It is, however, recognised that human health extends beyond bio-physical factors into wider social and economic factors (population factors) such as education, employment, income, housing, social networks, and access to social and public health services. Such factors are considered in Chapter 16: Socio-economics,

Tourism, Recreation and Land Use.

- 5.62 Noise can have an effect on the environment and on the quality of life enjoyed by individuals. The impact of noise during construction and operation of the proposed development on the health of human beings in terms of the quality of life enjoyed by individuals and communities in proximity to the proposed development is considered in detail in Chapter 13: Noise.
- 5.63 The impact of traffic and transport activities in relation to the proposed development on the health and safety of human beings is covered in Chapter 12: Highways and Transport. This chapter also covers the impact of traffic noise on the health of human beings.
- 5.64 Onshore wind farm developments can also potentially impact the hydrological, hydrogeological and ecological environment during construction and operational phases, which could in turn lead to effects on human health. This could be due to changes to the capacity of the environment to deal with flooding, pollution, changes to water quality/private water supplies. These effects are covered in detail in Chapter 11: Hydrology, Hydrogeology and Geology.
- 5.65 Chapter 18: Schedule of Mitigation provides an overview of the mitigation put forward as part of these assessments in order to reduce any negative effects of the proposed development to an acceptable level.
- 5.66 Further to the topics covered in Chapters 7 - 16 and Chapter 18, it is not expected that there will be any other effects from the proposed development which would have significant effects on population and human health.

## Biodiversity

- 5.67 Biodiversity is defined by the European Environment Agency as “*the variety of ecosystems (natural capital), species and genes in the world or in a particular habitat*”<sup>1</sup>.
- 5.68 Impacts on biodiversity are routinely assessed within the EIA framework for onshore wind developments by looking at the ecological and ornithological interests that could potentially be affected by the proposed development. This covers the current nature conservation interest of the Site and surrounding area and the important species and habitats in the area. In this EIA Report, further detail can be found in Chapter 8: Ornithology and Chapter 9: Ecology. Forestry impacts are considered separately in Technical Appendix 3.2.

## Climate

- 5.69 Onshore wind farms by their very nature tackle the issue of climate change. Chapter 4: Renewable Energy and Planning Policy contains further details.
- 5.70 In terms of carbon footprint, the ‘carbon calculator’ is the Scottish Government’s tool provided to support the process of determining the carbon impact of wind farm developments in Scotland, which in turn establishes any effect on climate. This is done by comparing the carbon costs of wind farm developments with the carbon savings attributable to the wind farm which is covered in detail

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<sup>1</sup> <http://www.eea.europa.eu/themes/biodiversity/intro>

in Chapter 12: Carbon.

## Risk of Accidents and Other Disasters

- 5.71 The vulnerability of the proposed development to major accidents and natural disasters such as flooding, sea level rise, or earthquakes is considered to be low due to its geographical location and the fact that one of its key purposes is to ameliorate some of these issues.
- 5.72 In addition, the nature of the proposals and remoteness of the Site means there would be negligible risks on the factors identified by the EIA Regulations. For example:
- population and human health – the Site is remote with low population density and the required safety clearances around turbines has been a key consideration throughout the design process;
  - biodiversity – receptors and resources would be unaffected as there would be little risk of polluting substances released or loss of habitat in a turbine failure scenario (highly unlikely);
  - land, soil, water, air and climate – there would be little risk of polluting substances released or loss of habitat in a turbine failure scenario (highly unlikely); and
  - material assets, cultural heritage and the landscape – there would be no adverse effects on these features in a turbine failure scenario (highly unlikely).
- 5.73 In addition, the construction works for the proposed development will be undertaken in accordance with primary health and safety legislation, including the Health and Safety at Work Act 1974 and the Construction (Design and Management) (CDM) Regulations 2015, which will include a requirement to produce emergency procedures in a Construction Phase (Health & Safety) Plan in accordance with the Regulations.

## Public Safety and Access

- 5.74 The RenewableUK Onshore Wind Health and Safety Guidelines (2015) note that wind farm development and operation can give rise to a range of risks to public safety, including:
- traffic (especially lorries during construction, and abnormal loads for the transport of wind turbine components, including beyond the Site boundary);
  - construction site hazards (particularly to any people entering the Site without the knowledge or consent of the site management);
  - effects of catastrophic wind turbine failures, which may on rare occasions result in blade throw, tower topple or fire; and
  - ice throw, if the wind turbine is operated with ice build-up on the blades.
- 5.75 The RenewableUK guidance (2015) states that *“Developers should ensure that risks to public safety are considered and managed effectively over the project lifecycle, and should be prepared to share their plans for managing these risks with stakeholders and regulators; effective engagement can both build trust, and help to reduce the level of public safety risk by taking account of local knowledge.”*
- 5.76 Site security and access during the construction period would be governed under the Health and

Safety at Work Act 1974 and associated legislation. There would be no public access to the Site during construction. However, the Land Reform (Scotland) Act (2003) which came into effect in February 2005 establishes statutory rights of responsible access on and over most land. The legislation offers a general framework of responsible conduct for both those exercising rights of access and for landowners. Once the construction period and commissioning of the wind farm is complete, no special restriction on access is proposed.

- 5.77 Informal recreational access would benefit from the presence of the turbines within the Site by providing a feature of interest. Appropriate warning signs would be installed concerning restricted areas such as the substation compound, transformers, switchgear and metering systems. All onsite electrical cables would be buried underground with relevant signage.

## Traffic

- 5.78 Accident data for the roads local to the Site (the A920 and the A96) has been reviewed and is presented in Chapter 12: Highways and Transport. An assessment of the potential effects on road safety has been undertaken. In summary, the proposed development result in limited traffic flow increases, with the largest increase on the A920 east of the Site which would experience during the construction period a 9% increase to all traffic and a 10% increase to HGVs. The A96 would experience very low increases above the baseline levels, with less than a 1% increase to the total traffic flows during both cases and less than a 3% increase in HGVs.
- 5.79 The accident records for the study area are low, with only 22 accidents occurring over the five year study period.

## Construction

- 5.80 With regard to risks and accidents during the construction phase, the construction works for the proposed development would be undertaken in accordance with primary health and safety legislation, including the Health and Safety at Work Act 1974 and the Construction (Design and Management) (CDM) Regulations 2015, which will include a requirement to produce emergency procedures in a Construction Phase (Health & Safety) Plan in accordance with the Regulations.
- 5.81 Nonetheless, the risk of accidents and other disasters is covered, where relevant, in individual topic Chapters, for instance, the potential for environmental incidents and accidents such as spillages are considered in Chapter 8: Ornithology, Chapter 9: Ecology and Biodiversity, and Chapter 11: Hydrology, Hydrogeology and Geology. Flood risk is also assessed within Chapter 11.

## Extreme Weather

- 5.82 As far as the risk of turbine failure during high winds is concerned, the turbines would cut-out and automatically stop as a safety precaution in wind speeds over 25 m/s.
- 5.83 Wind turbines can be susceptible to lightning strike due to their height, and appropriate measures are taken into account in the design of turbines to conduct lightning strikes down to earth and minimise the risk of damage to turbines. Occasionally however, lightning can strike and damage a wind turbine blade. Modern wind turbine blades are manufactured from a glass-fibre or wood-epoxy composite in a mould, such that the reinforcement runs predominantly along the length of the blade. This means that blades will usually stay attached to the turbine if damaged by lightning and in all cases turbines will automatically shut down if damaged by lightning.

- 5.84 Ice build-up on blade surfaces occurs in cold weather conditions. Wind turbines can continue to operate with a very thin accumulation of snow or ice, but will shut down automatically as soon as there is a sufficient build up to cause aerodynamic or physical imbalance of the rotor assembly. Potential icing conditions affecting turbines can be expected two to seven days per year (light icing) in Scotland (WECO, 1999). The potential for ice throw to occur after start-up following a turbine shutdown during conditions suitable for ice formation is high. There are monitoring systems and protocols in place to ensure that turbines that have been stationary during icing conditions are restarted in a controlled manner to ensure public safety. The risk to public safety is considered to be very low due to the few likely occurrences of these conditions along with the particular circumstances that can cause ice throw.

## *Seismic Activity*

- 5.85 No fault lines are present on or in the immediate vicinity of the Site, and there are no records of any earthquakes occurring in the vicinity of the Site within the last 39 years (Earthquake Track, 2017). Earthquakes in Scotland are typically no greater than 3 on the Richter Scale and, therefore, minor and unlikely to cause significant damage to buildings and infrastructure.
- 5.86 It is very unlikely that an earthquake would occur on the vicinity of the Site resulting in any damage to the proposed development. Should a wind turbine be damaged, the risk to public safety is considered to be negligible due to the remote location and careful design layout of the infrastructure.

## REFERENCES

- Ref. 5.1: Scottish Government (2017), Guidance on The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 <https://www.gov.scot/publications/planning-circular-1-2017-environmental-impact-assessment-regulations-2017/> [accessed 11/11/2019]



