



PENCLOE WIND FARM VARIATION

**Environmental Impact Assessment
Report:**

Non-Technical Summary

Volume I

JUNE 2019

Pencloe Wind Energy Limited

This page is intentionally blank

Preface

This Non-Technical Summary summarises the findings of the Environmental Impact Assessment Report (EIAR) that accompanies the Section 36c application submitted on behalf of Pencloe Wind Energy Limited (PWEL) under The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended).

The EIAR has been prepared by Sweco on behalf of PWEL and comprises:

Variation EIAR Documents:

- Variation Volume I: Non-Technical Summary;
- Variation Volume II: Main Text;
- Variation Volume III: Figures; and
- Variation Volume IV: Appendices.

Original ES Documents:

- Original Volume I: Non-Technical Summary;
- Original Volume II: Main Text;
- Original Volume III: Figures; and
- Original Volume IV: Appendices.

Further Environmental Information:

- Pencloe Updated Cumulative Noise Assessment (July 2017).
- Updated Cumulative Landscape and Visual Impact Assessment (July 2017).
- Plans indicating mitigation on the Afton Road including widening and the provision of passing places, and the results of swept path analysis based on a new topographic survey (June 2016).
- Pencloe Windfarm, Construction Traffic Management Strategy (June 2016).
- Pencloe Windfarm, Further Environmental Information Addendum (September 2015).

The full printed copy of the EIAR may be purchased at a cost of £1000 per copy. Alternatively, full sets of documents are available on CD for £25. Copies of the EIAR may be obtained from:

Rebecca McClenaghan
Principal Consultant (EIA)
Sweco 2nd Floor Quay 2
139 Fountainbridge
Edinburgh
EH3 9QG

Copies of this Non-Technical Summary are available free of charge, one per applicant, from the address above.

The EIAR and planning application will also be available to view on The Energy Consents website: <http://www.energyconsents.scot/>, East Ayrshire Council's eplanning website (<http://eplanning.east-ayrshire.gov.uk/online>), and the Applicant's own website (www.pencloe.com).

The public can also view copies of the EIAR at the following locations:

East Ayrshire Council	Cumnock Library
Planning and Economic	1 Greenholm Road
Development	Cumnock
The Johnnie Walker Bond	KA18 1LH
Strand Street	
Kilmarnock	
KA1 1HU	

1.0 Non-Technical Summary

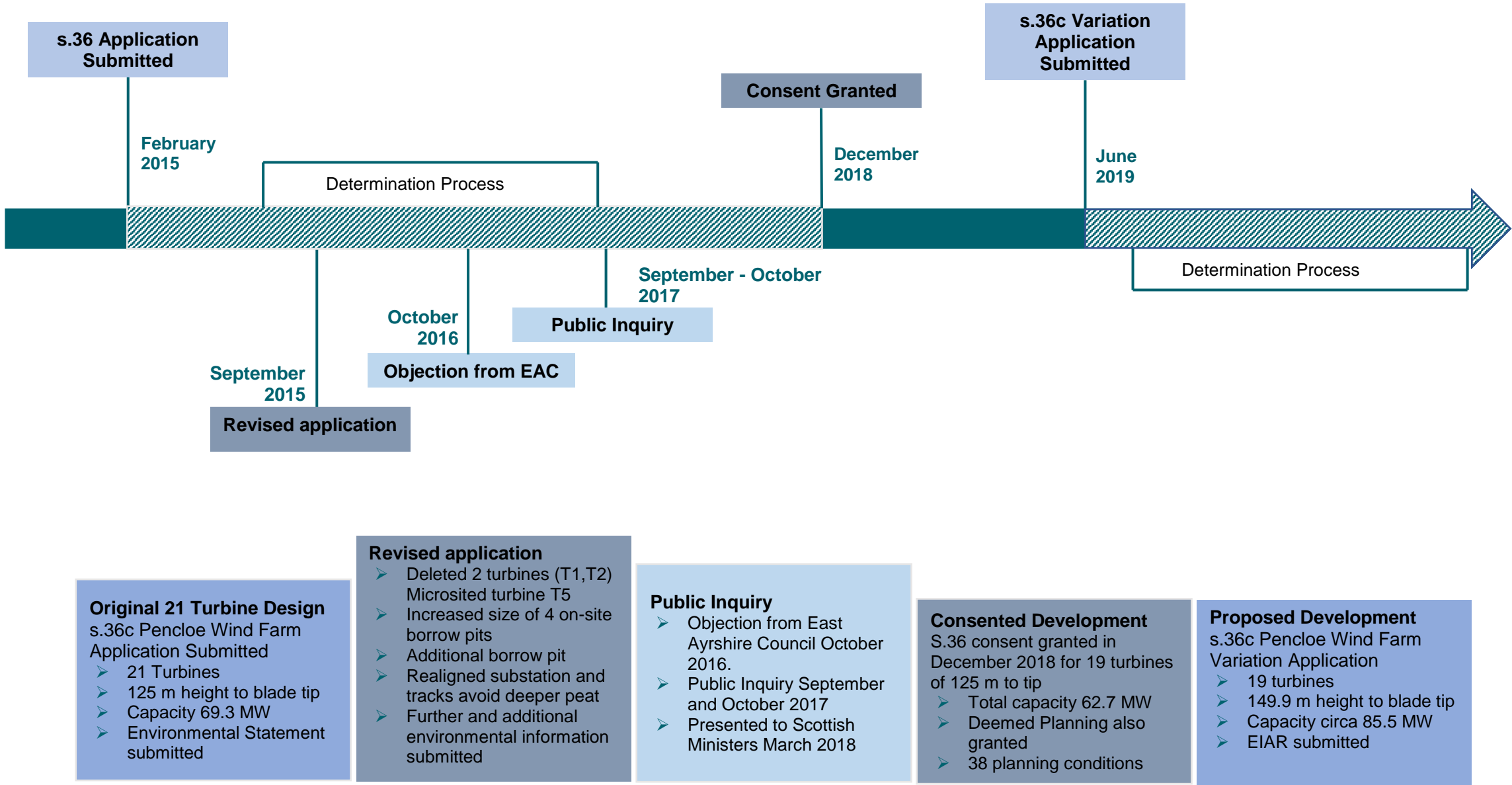
1.1 Introduction

- 1.1.1 This document is the Non-Technical Summary (NTS) of the Environmental Impact Assessment Report (EIAR) which has been prepared to report the results of the proposed variation to the consented Pencloe Wind Farm (hereafter referred to as consented development). This EIAR has been prepared to support an application for Section 36 consent under the Electricity Act 1989 (as amended) by PWEL, to build and operate a wind farm with associated infrastructure for an operational period of 27 years (hereafter referred to as proposed development).
- 1.1.2 The proposed development is located within the East Ayrshire Council area, south of New Cumnock and immediately to the north of the Dumfries & Galloway Council border. The site location is shown in **Figure 1**.
- 1.1.3 The proposed development comprises 19 wind turbines and associated infrastructure. The turbines are each expected to have a generating capacity of around 4.5 megawatts (MW) resulting in a total generating capacity of approximately 85.5 MW.
- 1.1.4 The proposed development has a very low carbon footprint and after an estimated 1.5 years, the electricity generated will be carbon neutral. This is an improvement on the 2 years payback estimated for the consented development. Also, the carbon intensity of the electricity that would be produced by Pencloe Wind Farm is estimated at 0.016 tCO₂ / MWh. This is considerably lower than the consented development, reflecting the increased output of the larger turbines.
- 1.1.5 Scotland has committed to a target of being carbon neutral by 2040 and achieving net-zero greenhouse gas emissions by 2045. Amendments to the Climate Change Bill have been lodged that would mean if the Bill is enacted, these targets would be legally binding.

Consenting History

- 1.1.6 PWEL lodged an application for s.36 consent with the Scottish Government on 26 February 2015 for 21 turbines with a maximum height of 125 m to blade tip, with an installed capacity of around 69.3 MW.
- 1.1.7 On 21 September 2015, PWEL revised the application by deleting two wind turbines (T1 and T2); micro-siting another turbine (T5); increasing the size of four on-site borrow pits; proposed an additional borrow pit and realigned the tracks and substation on site to avoid areas of deeper peat.
- 1.1.8 Due to an objection from East Ayrshire Council in October 2016 a Public Inquiry was held with the sessions taking place within the New Cumnock Community Centre/Town Hall between 25 and 27 September and the final session held on 31 October 2017.
- 1.1.9 In December 2018 the Ministers issued their decision to grant s.36 consent for 19 turbines of up to 125 m to tip with a total capacity of 62.7 MW.
- 1.1.10 The planning history of Pencloe Wind Farm is illustrated in **Image 1** below.

Image 1: Planning History (Pencloe Wind Farm)



1.2 The Proposed Development

- 1.2.1 The proposed development is intended to increase the capacity and yield from that which could be achieved from the consented development. The main design changes proposed are:
- The tip height of the proposed turbines would increase from 125 m to up to 149.9 m;
 - The blade length will increase from around 50 m to up to 67 m; and
 - Turbines 6 and 15 have been relocated (to previous locations T1 and T2 in the Original 21 Turbine Design).
- 1.2.2 Amendments have also been made to the proposed track layout within the Application site, to accommodate the turbine changes as listed above.
- 1.2.3 The proposed development layout is shown on **Figure 2**.
- 1.2.4 The changes made to the consented development are summarised in **Table 1.1** and a comparison showing both the consented and proposed developments are shown on **Figure 3**.

Table 1.1: Wind Farm Components and Summary of Changes to Wind Farm Layout

Component	Change to Consented Layout
19 wind turbines, each with an anticipated maximum rated capacity of around 4.5 MW and up to 149.9 m to tip.	Yes – two of the consented turbines (T6 and T15) have been moved to locations 1 and 2 in the Original 21 Turbine Design.
Permanent foundations supporting the wind turbines and associated crane hardstandings (used during construction, operational repair and decommissioning).	Yes – the diameter of the turbine foundations has increased from c.20 m to c.24 m. The area of crane hardstandings has significantly reduced.
Transformers (one per turbine) which will be housed externally at the base of the turbine.	No change.
One new access bell mouth arrangement at the entrance to Pencloe Farm from the C90 Afton Road.	No change.
Seven water crossings to accommodate the access tracks.	No change.
Permanent access tracks into the application site from the public highway and between turbines, including upgrade to existing tracks.	Yes – Realignment of various sections of track to meet the delivery requirements for the increased blade length. The overall length of track has increased from an estimated 15.53 km to 15.86 km. The width of track for use just by construction vehicles has reduced to 4 m.
A control building and substation compound, including electrical metering, stores, office and welfare facilities.	Yes – The overall dimensions of the compound have reduced from 100 m x 50 m to 75 m x 50 m
Underground cabling between turbines and control building / substation compound, running alongside access tracks.	No change.

Component	Change to Consented Layout
High voltage export cable or overhead line to SPEN Blackhill collector substation immediately to the south of the site.	No change.
Five onsite borrow pits.	No change.
Three permanent free-standing anemometry masts up to 85 m in height with associated foundations and hardstanding.	No change.
Two temporary construction compounds and a temporary security office.	No change.

1.2.5 The main components of the proposed development are outlined below:

- 19 wind turbines each with a rated capacity of around 4.5 MW and a height of up to 149.9 m to blade tip.
- Permanent foundations supporting the wind turbines and associated crane hardstandings (used during construction, operational maintenance and decommissioning).
- Transformers (one per turbine) which may be housed externally next to the base of the turbine.
- One new access bell mouth arrangement from the C90 Afton Road.
- 15.86 km of permanent access tracks from the public highway and between turbines, including, 10.27 km of new tracks and 5.59 km of upgrade to existing forestry tracks.
- Seven water crossings to accommodate the access tracks.
- A control building and substation compound (including electrical metering, stores, office and welfare facilities).
- Underground cabling between the turbines and substation, running alongside access tracks where possible.
- Five borrow pits (in total circa 5.0 ha in area).
- Three permanent free-standing anemometry masts (up to 85 m) with associated foundations and hardstanding.
- Two temporary construction compounds and a temporary security office.

1.2.6 The grid connection will be an underground cable to the Blackhill collector substation immediately to the south of the site. The connection will be constructed by the electricity network operator Scottish Power Energy Networks (SPEN).

The Application Site

1.2.7 The Application site is wholly located within the East Ayrshire Council area, immediately north of the Dumfries and Galloway Council border as shown in **Variation NTS Figure 1**. The site lies within part of an extensive area of forestry plantation known as Carsphairn Forest. New Cumnock is the closest settlement, lying to the north some 5.4 km from the nearest turbine with Dalmellington located some 11 km to the west. Afton Reservoir lies about 1.5 km to the south east.

1.2.8 Land cover comprises mature commercial forestry plantation only broken in a number of discreet areas. The whole site is owned and managed by Forestry and Land Scotland (FLS).

The northern most end of the Application site comprises farmland (sheep grazing) adjacent to Pencloe Farm. The landform rises to a series of ridges between 400 m and 526 m Above Ordnance Datum (AOD) and these are separated by relatively steep sided stream valleys. From these valleys the site drains to the north via the Carcow, Glenhastel, Glenshalloch, Lochingerroch and Bolt Burns, which in turn feed into Afton Water.

1.2.9 The Application site occupies an area of approximately 871 ha (2,152 acres).

1.2.10 Beyond the boundary of the Application site there are further conifer plantations to the south and southwest and open agricultural grazing moorland to the north, east and west. Afton Road, which roughly follows the course of Afton Water, runs to the east of the site.

The Applicant

1.2.11 PWEL is an independent private Scottish Company established to develop, build, own and operate the Pencloe Wind Farm.

The EIA Team

1.2.12 Sweco was commissioned as Lead Consultant to co-ordinate the EIA and prepare the EIAR for the proposed development.

1.2.13 Sweco is an independent professional services consultancy firm with about 16,000 staff in Northern Europe and offices throughout the UK. Sweco has considerable experience in the development, construction and operation of wind farm developments, with a team of consultants who have contributed to more than half of all wind farms built today in the UK.

1.2.14 The EIA was co-ordinated by Sweco and Peter Moynan Consulting Limited, with input from the specialist consultants, as presented in **Table 1.2**.

Table 1.2: Contributors to the EIA

Discipline	Author	Qualifications
Lead EIA Consultants	SWECO and Peter Moynan Consulting Ltd.	EIA Quality Mark Registrant (SWECO only); BSc (Hons) Environmental Geography; Chartered Environmentalist; Member of the Institute of Environmental Sciences; and BA Mod Natural Sciences.
Planning and Policy Context	JLL	BLE (Hons) Member of the Royal Town Planning Institute.
Forestry	DGA Forestry	BSc Ecological Science (Hons Forestry); MBA; and Member Institute of Chartered Foresters (MICFor).
Landscape & Visual	Ramboll	Chartered Member of the Landscape Institute (CMLI); Bachelor of Landscape Architecture (BLA); and Bachelor of Arts – Landscape Design BA (Hons).
Non-Avian Ecology	SLR Consulting	BSc (Hons) Environmental Science; MSc Conservation; and Member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

Discipline	Author	Qualifications
Ornithology	SLR Consulting	BSc (Hons) Environmental Science; MSc Conservation; and Member of the Chartered Institute of Ecology and Environmental Management (CIEEM).
Hydrology, Hydrogeology and Geology	Fluid Environmental Consultants	BSc (Hons) Geophysical Sciences; MSc Water Resources Systems Engineering; Chartered Scientist; and Member of the Chartered Institute of Water and Environmental Management.
Archaeology and Cultural Heritage	Headland Archaeology / Peter Moynan Consulting Ltd.	BA (Hons) Medieval History; MA Archaeology; PhD Archaeology; Fellow of the Society of Antiquities of Scotland; and Member of the Institute for Archaeologists.
Noise and Vibration	Sine Acoustics	B.Eng (Hons) Building Services Engineering.
Traffic and Transport	Transport Planning	BEng (Hons) Civil and Transportation Engineering.
Telecommunications, Aviation & Defence	Wind Power Aviation Consultants (WPAC)	Commander RN Ret.
Socio-Economics	Jacobs / JLL	BSc (Hons) Environmental Management and BLE (Hons) Member of the Royal Town Planning Institute.
Climate Change	Carbon Forecast Ltd	BSc (Hons) Ecological Sciences; MIEMA; CEnv and GHG Verification ISO14064-3 CSA.
Peat Slide Risk Assessment, Borrow Pit Assessment and Peat Management Plan	Fluid Environmental Consultants	BSc (Hons) Geophysical Sciences; MSc Water Resources Systems Engineering; Chartered Scientist; and Member of the Chartered Institute of Water and Environmental Management.

1.3 Planning Policy

- 1.3.1 The planning policy framework for the s.36c variation application is set out in the EIAR **Variation Chapter 6: Planning and Energy Policy Framework**. Additional detail is provided within the **Planning Statement** which supports the application.
- 1.3.2 The proposed development is located within the administrative area of East Ayrshire Council (EAC). The Development Plan comprises:
- East Ayrshire Local Development Plan 2017; and
 - Supplementary Guidance: Planning for Wind Energy 2017.
- 1.3.3 The most relevant policy documents published by the Scottish Government include:
- The 2020 Routemap for Renewable Energy in Scotland (2011), as updated in 2013 and 2015;
 - The Electricity Generation Policy Statement 2013;
 - the Scottish Energy Strategy 'The Future of Energy in Scotland' 2017;
 - the Onshore Wind Policy Statement 2017;
 - The National Planning Framework 3 2014; and
 - Scottish Planning Policy 2014.

1.4 Environmental Impact Assessment

Methodology

- 1.4.1 A comparative assessment has been undertaken of the likely effects of the proposed development. This assessment has considered the revised development proposals in the context of each environmental discipline, identifying any additional environmental effects when compared with the previous assessment for the consented development.
- 1.4.2 Where the updated design resulted in new or removed potential effects and/or required mitigation, this has been reported in the variation chapters. Existing environmental conditions (baseline), policy and assessment methods were also reviewed to ensure that these were up to date and still relevant. Any required updates are detailed in the respective variation chapters.
- 1.4.3 Each topic provides a summary of the consented development effects and then the proposed development, focusing on what changes have occurred.
- 1.4.4 The environmental topics are presented below.

Landscape and Visual Consented Development

- 1.4.5 The previous landscape and visual assessment identified the following effects based on existing and consented wind farm developments:
- Landscape Fabric: No significant cumulative effects were identified as all impacts would be localised, of relatively short duration and largely reversible.

- Landscape Character: Significant cumulative effects were predicted to be confined to locations within the site and in its close vicinity within the Southern Uplands with Forest LCT (Carsphairn Unit).
- Designated/Classified Landscapes: No significant cumulative effects were predicted on the special qualities of Regional Scenic Areas (RSAs), Sensitive Landscape Character Areas (SLCAs), Special Landscape Areas (SLAs), Wild Land Areas (WLAs) or Inventory Gardens and Designed Landscapes (GDLs).

- 1.4.6 In general, no significant effects were predicted on the visual amenity of settlements, roads, railways and long-distance footpaths/ cycle ways within the Study Area. However, highly localised significant effects were predicted at New Cumnock and at three of the representative viewpoints assessed.

Proposed Development

- 1.4.7 There have been few changes to the landscape and visual baseline context since the 2015 and subsequent assessments.
- 1.4.8 Compared to the consented development, there would be no discernible increase in the viewshed with the proposed development. Of the 23 representative viewpoints assessed, which were based on previously assessed viewpoints, 10 would be subject to an overall increase in the number of visible turbines from the proposed development compared to the consented development. Of these, the increase would be generally be associated with the addition of a small number of blade tips on the horizon as opposed to rotors. This is due, in part, to the repositioning of two turbine locations. Consequently, it can be concluded that any increase in visibility associated would be relatively limited, confined to a small number of localised positions and offset, in part, by improvements in a number of other viewpoints.
- 1.4.9 The proposed increase turbine size would mainly be discernible from a small number of low-lying viewpoints in close proximity to the proposed development. In more distant and/or elevated locations the size difference and changes to the consented developments layout would be barely discernible. As a result, no substantive or material changes to the findings of the original assessment or Further Environmental Information are predicted.
- 1.4.10 With regard to design implications of the proposed development, there is no evidence to suggest that there would be significantly adverse effects relating to overlapping or stacking of turbines or the balance and cohesiveness of the scheme. Indeed, in the case of Viewpoint 1 there would be an improvement resulting from reductions in the apparent fragmentation of the array.
- 1.4.11 The proposed development would result in cumulative effects that are largely consistent with the consented development,

Ecology (Habitats and Non-bird Species)

Consented Development

- 1.4.12 Effects on habitats and non-bird species arising from the consented development are discussed in Sections 8.6-8.9 of the **Original ES (Chapter 8)**. The assessment presented in the ES was based on the 21-turbine layout originally proposed. Following submission of the ES the layout was subsequently reduced to a 19-turbine layout for reasons unrelated to ecology. However,

the removal of two turbines did not result in any addition to the predicted effects and it was therefore not necessary to update the assessment following the removal of two turbines.

- 1.4.13 With the consented development, potentially significant negative effects were identified as a result of loss of wet heath, blanket bog and flush habitats included on Annex 1 of the EC Habitats Directive. A Habitat Management Plan (HMP) was proposed, which would involve the restoration of up to 23.6 ha of heath and bog habitats, the widening of 28.8 ha of riparian corridors and the planting of 181.5 ha of broad-leaved woodland (further details are included in the Outline HMP provided in **Original Appendix 8.5**). The loss and disturbance of Annex 1 habitats would be greatly outweighed by the benefits arising from the HMP.
- 1.4.14 No significant effects were identified on Groundwater Dependent Terrestrial Ecosystems (GWDTEs) during construction following the implementation of mitigation measures, which include the installation of cross track drains upgradient of the area of GWDTE at risk from dewatering, the use of settlement tanks to maintain water quality and minimizing any period of dewatering during the construction of Turbine 5 and the adjacent crane hardstanding.
- 1.4.15 Other mitigation proposed during construction included pre-construction surveys, the employment of an Ecological Clerk of Works, the adoption of standard good practice pollution control measures, the reinstatement of habitats and specific measures aimed at avoiding harm to protected species.
- 1.4.16 Very low levels of bat activity were recorded at the site (see **Original Appendix 8.3**) and no significant effects were predicted in relation to the potential for the operating turbines to cause injury/ death of bats through collision with turbine blades and/ or barotrauma. No significant effects were predicted for any other ecological receptors during wind farm operation.

Proposed Development

- 1.4.17 Due to the changes to the consented development, habitat loss calculations have been revised to reflect the proposed development.
- 1.4.18 The updated calculations show that the loss of Annex 1 habitats is lower for the proposed development than for the consented development. This is primarily due to the relocation of T6 but also due to the avoidance of areas of deeper peat in the revised track alignment.
- 1.4.19 The conclusions of the previous assessment (Original ES) therefore remain unchanged, i.e. habitat loss and disturbance will be greatly outweighed by the gains resulting from the implementation of the Habitat Management Plan.
- 1.4.20 The proposed development results in very little change to the effects on GWDTEs, with two locations removed from the at-risk list and one location added, when compared with the consented development. No significant effects on GWDTEs are therefore predicted as a result of the proposed development, with the implementation of mitigation measures as described above.
- 1.4.21 Bats were not predicted to be significantly affected by the consented development during operation, and this remains the case with the proposed development. This conclusion was based on the very low levels of bat activity recorded during surveys to inform the original EIA.

1.4.22 In summary, the proposed changes to the consented development do not affect the conclusions of the previous assessment. The predicted loss and disturbance of Annex 1 habitats has been slightly reduced and will still be greatly outweighed by the benefits arising from the implementation of the HMP. There will be no significant effects on other habitats or non-avian faunal species resulting from the proposed development.

1.4.23 No significant cumulative effects were predicted

Ornithology

Consented Development

1.4.24 Effects on bird species arising from the consented development are discussed in the **Original ES (Chapter 9)**. Following the removal of two turbines in the design, this did not result in any addition to the predicted effects and it was therefore not necessary to update the assessment following the removal of two turbines for the consented development.

1.4.25 A range of ornithological surveys were undertaken to inform the ornithological impact assessment for the consented development. These included a desk study, general breeding bird surveys, raptor surveys, breeding wader surveys, black grouse surveys and vantage point watches.

1.4.26 The Original ES concluded that the upland forested location proposed for Pencloe Wind Farm was of low importance for birdlife in the context of East Ayrshire or the Southern Uplands. It also did not coincide with frequently used or regular migratory or winter flight routes. It also noted that the site is set back from local or nationally designated sites for bird conservation by significant distances.

1.4.27 The Original ES stated that specially protected or conservation-sensitive birds such as merlin, peregrine falcon, hen harrier and black grouse were present occasionally, but do not breed within the confines of the Application site. The ES noted that the nearest peregrine falcon eyrie is regularly occupied but is set back by a sufficient distance to preclude disturbance or displacement effects.

1.4.28 The Original ES predicted that construction work, which includes enabling forest clearance, would cause localised disturbance impacts that will be most significant for birds nesting or foraging close to borrow pits, site compounds, operating machinery and other wind farm infrastructure. No species of high ornithological importance were anticipated to be adversely affected by construction disturbance.

1.4.29 The Original ES predicted that the increased area of open habitats and forest edges during the operation of the wind farm is likely to favour a variety of songbird species and increase their availability to predators such as hen harrier and merlin. At the regional level these impacts were considered to be negligible to small in magnitude and not significant.

1.4.30 The Original ES went on to state that there would be habitat loss which could affect peregrine falcon prey species. However, these impacts would not preclude or compromise continued breeding by peregrine falcon in the wider locality.

1.4.31 The Original ES highlighted that some breeding territories of buzzards, sparrowhawk, tawny owls and kestrels were located in areas where habitat loss will result in adverse impacts (premature felling of c. 15% of the conifer crop). However, the impacts were predicted to be low

to negligible magnitude and were not considered to be significant.

- 1.4.32 The estimated collision risk for species such as peregrine falcon was very low and unlikely to result in a measurable change to the regional population. The consented Pencloe Wind Farm was also assessed as contributing a cumulative minor effect, which was not considered to be significant, with other proposals in the local area on the regional population of this and the other key bird species.

Proposed Development

- 1.4.33 The proposed changes to the consented development do not affect the previous assessment in terms of disturbance or habitat loss, either during construction, operation or decommissioning and no significant residual effects are predicted.
- 1.4.34 The changes to the turbine layout and the use of larger turbines, with larger blades, has the potential to change the previously modelled collision risk for certain bird species. Collision risk modelling (CRM) has therefore been revised to reflect the changes to the proposed turbine dimensions and proposed turbine layout.
- 1.4.35 The updated CRM confirms that the proposed development does not affect the conclusions of the previous assessment in that there will be no significant residual effects on birds due to collision during wind farm operation.
- 1.4.36 No significant cumulative effects were predicted during construction on the basis that standard good practice mitigation measures would be employed at all other sites.

Hydrology, Hydrogeology and Geology

Consented Development

- 1.4.37 This assessment considered geologically important or water dependent environmentally designated sites, water quality, fisheries, flood risk, bedrock and superficial geology (including peat), groundwater dependent terrestrial ecosystems (GWDTEs), and both public and private water supplies.
- 1.4.38 The Application site drains into two catchments; predominantly to the River Nith catchment via Afton Water and the south of the Application site drains to the Water of Deugh in the River Dee (Solway) catchment. The water quality of Afton Water is classified by SEPA as 'Good' and is therefore considered to have high sensitivity to impact from development. Sensitivity of the Water of Deugh to the south is lower, however an overall sensitivity of high is adopted for the purpose of this assessment.
- 1.4.39 Several site visits were undertaken to determine baseline conditions within and in the catchments immediately downstream of the Application site, including:
- hydrological site walkover;
 - watercourse crossing survey; and
 - peat.
- 1.4.40 The groundwater environment and associated receptors are considered to be of low sensitivity due to the lack of significant groundwater flow. As there is limited groundwater at the Application site there are only small areas of possible GWDTE identified within the Application site boundary. In addition, no private water supplies reliant on groundwater have been

identified.

- 1.4.41 There are shallow deposits of peat across the Application site with average depths approximately in the 0.5 m range. The peat is degraded having been significantly modified through forestry and drainage. A Peat Slide Hazard and Risk Assessment found that the great majority of the Application site has a low risk of peat slide.
- 1.4.42 The main likely potential impacts determined from the Original ES assessment relate to sediment release, fuel/oil/chemical spills or concrete release. The level of these potential impacts and the mitigation requirements have not changed with the proposed development.

Proposed Development

- 1.4.43 Following the implementation of mitigation measures, no significant effects on hydrology, hydrogeology and geology receptors are predicted from the proposed development. However, a number of minor residual effects have been predicted relating to potential sediment input to surface water during tree felling and other construction work, and the potential for accidental releases of concrete, oil or fuel in the water environment. The likelihood of these predicted effects is linked to periods of very high rainfall when surface water runoff across the Application site could be high. Measures will be in place and implemented as required based on the principles outlined in the Construction Environmental Management Plan (**Original Appendix 10.7**).
- 1.4.44 The alterations to the layout generally improve the avoidance of peat and avoid groundwater dependent terrestrial ecosystems as far as possible. All excavated peat is able to be reused on site for peat restoration.
- 1.4.45 Water quality monitoring will also be undertaken of watercourses down gradient of the Application site. This will establish a more detailed understanding of baseline water chemistry prior to construction. This baseline will form a benchmark for monitoring water quality during the construction and early operational phases of the wind farm, to assess the effectiveness of mitigation and control measures and to highlight areas of concern where intervention may be required in order to prevent, reduce or control impacts to downstream receptors.

Archaeology and Cultural Heritage

Consented Development

- 1.4.46 The area around the Application site contains evidence of man's presence in the environment relating mainly to farming in this upland landscape, marked largely by the remains of sheepfolds of post-medieval or later date. In contrast there is little evidence of activity from the prehistoric and medieval period.
- 1.4.47 Glen Afton, which runs to the north and east of the Application site, is associated with a number of key characters from Scottish history; William Wallace, Robert the Bruce, Mary Queen of Scots and Robert Burns. The consented development will be visible from some areas within Glen Afton. However, the character of the glen will not be lost. The different characteristics of beauty, isolation, safety and a route southward will still be readily appreciated
- 1.4.48 The assessment concludes that one cultural heritage asset, a post-medieval to modern shepherds' cairn, will be affected by the construction of one wind turbine, Turbine 4. This turbine, and its adjacent access track, will lead to the removal of the shepherd's cairn. This is a

relatively modern cairn, built as a navigation aid. Such cairns are common site types throughout rural upland Scotland. It is not considered to be a valuable cultural heritage asset and its removal is not considered to be significant.

- 1.4.49 There is also a low to moderate potential for there to be unknown assets of post-medieval to modern age which could be affected by the proposed development. However, beneath areas of forestry plantation most surface features are likely to have been removed due to forestry activities. Any impacts to unrecorded assets are not therefore considered to be significant.
- 1.4.50 There are no designated assets of national importance surrounding the proposed development. There are designated assets (Category B and C listed buildings) in New Cumnock. These buildings include a Parish Church, the ruins of an old church and graveyard, a bridge and a town hall and police station (HB50128). The nearest turbine is more than 6 km to the south of these listed buildings and will not impact on the views of cultural significance to these assets.
- 1.4.51 No significant effects were identified on designed landscapes.
- 1.4.52 No decommissioning or cumulative effects are predicted.

Proposed Development

- 1.4.53 The conclusions of the previous assessment for the consented development are still applicable and the proposed development changes will not result in any significant adverse effects on the Archaeological or Cultural Heritage assets of the area.

Noise and Vibration

Consented Development

- 1.4.54 This assessment has been conducted in accordance with guidance presented in ETSU-R-97 and 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (the GPG), as well as current Scottish Government policy on wind farm noise.
- 1.4.55 An assessment of the noise impacts that are predicted to occur during the construction, operation and decommissioning of the proposed development has been undertaken. A baseline noise survey has been undertaken to characterise the existing background noise levels at residential receptors in the vicinity of the proposed development. Noise monitoring was undertaken at two locations, which were judged to adequately represent the noise environments at local receptors where the preliminary noise modelling identified potential turbine noise levels in excess of 35 dB(A).
- 1.4.56 The noise assessment for the consented development demonstrated that the development would meet operational noise guidance limits during both day and night periods at all of the receptors considered, and that no noise mitigation is required. Therefore, no significant operational noise effects were predicted.

Proposed Development

- 1.4.57 An assessment was undertaken on the revised layout and the potential types of turbines, which have changed since the consented development. The assessment also takes account of any changes to the cumulative baseline (the existing and proposed wind farms in the area). This assessment has been conducted in accordance with guidance presented in ETSU-R-97 and 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind

Turbine Noise' (the 'IoA Good Practice Guide'), and current Scottish Government policy on wind farm noise.

- 1.4.58 Since the original development was consented there have been some changes to other wind farm proposals in the area, these include:
- Proposals for the 50 turbine Sanquhar II Community Wind Farm were submitted in March to the Scottish Government. This proposed wind farm would be located to the southeast of Pencloe Wind Farm.
 - Lorg and South Kyle wind farms have both been consented.
- 1.4.59 Indicative predictions of construction noise have been undertaken using methodology outlined in British Standard 5228. Nearest residential receptors to construction noise sources are approximately 800 m. At this distance it is not anticipated for noise levels to be likely to cause disturbance.
- 1.4.60 By applying good practice measures for the management of construction noise no significant residual effects from noise on residential properties is predicted.
- 1.4.61 The operational noise assessment is based on noise predictions undertaken in accordance with ISO standard 9613-2 1996. ISO 9613 is the primary standard used in the UK and much of Europe for the calculation of environmental sound propagation. This calculation method, and the choice of suitable input data, are recommended in the IoA Good Practice Guide.
- 1.4.62 It is concluded that there will be no significant adverse noise impacts at nearby residential properties due to the operating wind turbines. The assessment found that the operational noise levels at all residential properties would meet ETSU-R-97 individual and cumulative noise limits during both quiet daytime and night time periods. Consequently, it is concluded that the proposed development will have no significant adverse effects in relation to operating noise.
- 1.4.63 No other projects are close enough to the proposed development that would cause cumulative noise impacts during either construction or operation.

Traffic and Transport

Consented Development

- 1.4.64 An assessment of the effects of the predicted increase in traffic associated with the construction programme for the Original 21 Turbine Design was undertaken. The assessment considered the effects of the increase in traffic on the road network and on sensitive receptors such as schools, hospitals and villages. The access route for the delivery of turbine components is based on a route from Ayr, routes from Glasgow are also considered viable.
- 1.4.65 While no major works are required, there are a number of instances along this recommended route, at certain junctions, where the temporary removal of street furniture will be required as well as localised road widening in order to accommodate the successful passage of the turbine components.
- 1.4.66 Consultation was undertaken with East Ayrshire Council and Transport Scotland who both had no major issues with regards to the development.
- 1.4.67 The predicted increases in traffic, during the construction of the proposed development, have

not identified any significant effects with respect to accidents, driver delay, pedestrian fear or severance of pedestrian routes. Nevertheless, a Construction Traffic Management Plan will be prepared prior to construction which will identify to all staff the appropriate and safe routes to and from the Application site and will be agreed through consultation with East Ayrshire Council. The Plan will seek to promote the safe and efficient transportation of components and materials to the Application site in order to minimise congestion and disruption.

- 1.4.68 Vehicle movements associated with the operation of the development are uncertain at this stage, however, previous experience indicates it is unlikely that vehicle movements would exceed 10 movements per day, which is considerably below the appropriate guidance thresholds.

Proposed Development

- 1.4.69 The proposed development, similar to the consented development, will have no significant effect on the surrounding traffic and transport network. Any potential cumulative effects can be addressed by appending planning condition 16 of the consented development to any consent for the proposed development. Condition 16 States:

“(1) There shall be no use of the C90 Afton Road by construction traffic involved in the construction of the development unless and until the Planning Authority has given written approval that either:

a) No other wind farm has commenced development, is under construction and construction traffic is also taking access/egress from the C90 Afton Road; or

b) Commencement of Development whilst another wind farm has commenced development, is under construction and construction traffic is also taking access/egress C90 Afton Road is acceptable.

(2) Unless development commences within 2 months from the date of written approval under Part 1 (or within 2 months from any further written approval), the development shall be required to see the further written approval of the Planning Authority under Part 1.”

- 1.4.70 The proposed development will likely require a lower volume of construction material to be delivered to the Application site compared to that required to be delivered to the consented development. The construction of the proposed development will therefore, at worst, generate no more general construction vehicle movements on the road network surrounding the proposed development than envisaged during the assessment of the consented development and may generate fewer.

Socio-economics

Consented Development

- 1.4.71 The assessment predicted that the development will generate short term employment opportunities during the construction phase. It is estimated that over an approximate 18 month construction period, the onsite construction workforce will average 40 individuals. Various construction activities will take place, including civil engineering, turbine installation, electrical and commissioning studies. The levels of employment will vary according to the phase of the project, with the highest levels at the point where civil works are nearing completion and

turbines and electrical systems are being installed, followed by the initial testing of turbines for commissioning.

- 1.4.72 There is also the potential for indirect employment to occur due to Pencloe Wind Farm as local businesses may benefit from the presence of the construction workforce. The workforce involved in the project will also lead to spending in the local economy and supply chain development. In this case this would result in a typical project spend of the order of £4.8 million in the local area and £19.9 million within the region. The types of local businesses that might benefit from this could include fencing contractors, local civil engineering contractors, timber and aggregate suppliers. These positive effects were considered to be significant.
- 1.4.73 There is a Public Right of Way which crosses the site, which although not currently accessible due to forestry, will need to be temporarily diverted during the construction phase and reinstated during operation. Any required diversion will be agreed with East Ayrshire Council and ScotWays.
- 1.4.74 The closest recreational facility is the Afton Dam Route, a walk around the Afton Reservoir. During construction, no significant effects upon users of the route are predicted, as there will be limited visibility of the construction activities and with the distance to the site, noise levels will be minimal. Other off-site tourism and recreational activities are not predicted to be significantly affected with only some minor traffic disruption during construction.
- 1.4.75 In summary, the consented development was not predicted to result in any significant adverse effects. Effects predicted were found to be both positive and negative, all either minor or negligible and in all cases non-significant.

Proposed Development

- 1.4.76 The proposed development will remain as having no significant adverse effects on socio-economics and tourism resources of the area, with a number of positive effects.
- 1.4.77 As committed to by PWEL at the Public Inquiry, a community/shared ownership for part of the Pencloe Wind Farm has been offered to:
- New Cumnock Community Council; and
 - Cumnock Action Plan, who are a Scottish Charitable Incorporated Organisation (No. SC047436) whose objective is to deliver projects and initiatives to enhance Cumnock identified by residents and business people through consultation undertaken in 2015. Website: <http://www.cumnockactionplan.org/>.
- 1.4.78 The offer is for 2.5 - 5% of the development on the basis of the shared revenue model.

Aviation and Defence

Consented Development

- 1.4.79 The EIA considered the potential effects that the Pencloe Wind Farm may have on existing telecommunications, aviation and defence facilities and systems. Effects on television reception have also been assessed.
- 1.4.80 The Application site lies within the UK Military Low Flying System but due to the topography of the wind farm site it is predicted that this site will not be used by low flying aircraft.

- 1.4.81 A BT-operated microwave radio link runs through the Application site. The wind farm will affect this microwave link, which acts as a supervisory control and data acquisition (SCADA) control link for the operational Windy Standard Wind farm. This effect will be mitigated prior to construction and the details of this are being discussed with BT and the operator of the Windy Standard Wind Farm.
- 1.4.82 There are no domestic properties located in the areas where there is potential for television reception to be affected by the wind farm. Therefore, no impact is predicted on television reception.
- 1.4.83 The cumulative effects of nearby wind farms with Pencloe could lead to an increase in air traffic controller workload, increase the risk of loss of radar identity of aircraft due to the presence of clutter and increase the frequency and duration with which radar data labels are obscured. However, these cumulative impacts will be reduced as a result of radar mitigation schemes already agreed for other schemes in the area. No cumulative effects on air traffic safety are therefore predicted.
- 1.4.84 Cumulative impacts on low flying aircraft would be unlikely to occur because the other existing and consented wind farms are either inside the area defined by the MoD as "low priority" (Windy Standard, Whiteside Hill), or are, like the proposed development, located on top of ridges and high ground away from the valleys where the bulk of low flying takes place (Hare Hill, Sanquhar).
- 1.4.85 There would be no cumulative impacts on telecommunications or television reception.

Proposed Development

- 1.4.86 The only significant changes to the baseline are in relation to Glasgow Prestwick Airport (GPA) and NATS En Route Ltd (NERL). GPA has now installed an additional radar, a Terma Scanter 4000 radar specifically to mitigate the effects of wind turbines that will affect the performance of their existing air traffic control primary surveillance radar (referred to as the 'PSR').
- 1.4.87 The proposed increase in turbine size for the proposed development (from 125 m to tip to up to 149.9 m to tip) will have an effect on two aviation stakeholders, GPA and NERL. In the case of GPA the turbines from the consented development would all have been visible to the existing PSR and clearly the larger turbines will be more visible, however, any increase in the effect of the new layout on the GPA PSR will be insignificant. The radar mitigation scheme agreed for the consented development is the same scheme required for the proposed development.
- 1.4.88 For the proposed development, the Applicant commissioned a Technical and Operational Assessment (TOPA) from NERL. The TOPA showed that the only significant additional effect resulting from the increased turbine size will be in the case of the NERL 'en route' radar at Lowther Hill. NERL did not object to the original application, however by increasing the turbine tip height to 149.9 m, the turbines are more exposed to the radar as there is less terrain screening and NERL require this to be mitigated.
- 1.4.89 Discussions with NERL have indicated that the effect of the turbines on the performance of the Lowther Hill radar could be mitigated by blanking out the turbines and infilling with a feed from the Prestwick Terma Radar or another unaffected radar.

- 1.4.90 Discussions are ongoing with NERL to agree the wording of a planning condition and for a suitable legal agreement to be drawn up between the developer, GPA and NERL.
- 1.4.91 Once mitigation is in place there will be no residual or cumulative effects.

Climate Change

Consented Development

- 1.4.92 The consented development was assessed using the Scottish Government's Carbon Calculator for wind farms on Scottish Peatlands.
- 1.4.93 The assessment considers greenhouse emissions resulting from disturbance of carbon rich soils at the site as well as from the manufacturing and delivery of turbines, mining of metals for the turbines and quarrying of stone for aggregate.
- 1.4.94 The baseline of the quantity of stored carbon in soils within the application site was based on an average of peat depth across the site and the parameters of organic carbon content and bulk density which were measured in samples taken from the site.
- 1.4.95 The EIA undertaken for the proposed Pencloe Wind farm has considered the greenhouse gas (GHG) emissions reduction benefits from the proposed development from displacing conventionally generated electricity (e.g. coal or gas fired power stations) in the grid, compared to the predicted direct and indirect emissions of GHG resulting from construction, operation and decommissioning of the proposed development.
- 1.4.96 A range for carbon payback is presented to reflect uncertainty in the assessment. There is likely to be an overestimate of the site-based soil carbon losses and an underestimate of potential restoration gains. The soil carbon losses relate to both excavated and drained peat. The assessment has not accounted for the restoration of peat alongside track verges, drainage ditches and for reinstating the borrow pits thus retaining soil carbon on the application site.
- 1.4.97 The gains from site restoration are recognised as minimal, although areas of degraded bog have been identified for improvement in the Outline Habitat Management Plan.
- 1.4.98 Predicted carbon payback for the consented development was 2 years.

Proposed Development

- 1.4.99 A revised assessment using the Scottish Government's updated calculator, which is now a web-based application and central database, has been undertaken for this variation application to inform this comparative assessment.
- 1.4.100 The baseline of the current percentage of renewable electricity generation in Scotland has changed significantly since the original ES was written. The latest figures for renewables generation in 2018 show that Scotland currently generates 75% of gross electricity consumption from renewable sources, compared to 50% in 2014. However, the renewables target of 100% of gross electricity consumption in Scotland has not yet been met.

- 1.4.101 Overall the effects of the proposed development compared to the consented development have changed. The proposed development will have a more positive effect on climate change mitigation, as evidenced by the decreased payback and reduced carbon intensity ratio. The impact of the proposed development on meeting the Scottish 2020 Renewable Electricity target is more positive due to the increased output. The percentage of stored carbon on site that would be lost as a result of the construction has also reduced and is a very small percentage of the soil carbon on the site.
- 1.4.102 The results of the carbon assessment for the proposed development has shown that the development is estimated to produce annual GHG savings in the region of 87,000 tonnes of CO₂ per year through the displacement of grid electricity. This represents the saving from displacing grid electricity at the average grid emission factor and therefore includes a variety of sources including nuclear and renewables as well as fossil fuels.
- 1.4.103 The assessment of the GHG losses and gains has estimated an overall net loss of 131,000 tonnes of CO₂e, mainly due to embodied losses from the manufacture of the turbines, provision of backup power to the grid and loss of carbon-fixing potential from forestry felling during the construction of the wind farm. It will therefore take around 1.5 years for the wind farm to save (referred to as 'carbon payback') the equivalent of these GHG losses, after which the electricity generated is carbon neutral.

1.5 Commenting on the Planning Application

1.5.1 If you wish to comment on this application, representations should be made to the Scottish Government:

- through the website: www.energyconsents.scot/
- via email: representations@gov.scot
- or by writing to:

Energy Consents Unit
Scottish Government
5 Atlantic Quay
150 Broomielaw
Glasgow
G2 8LU