

# LLAN BRYN MAIR WIND FARM

Supplementary Environmental Information  
December 2013

Volume 2 - Main Text and Supporting Appendices



## PREFACE

This Supplementary Environmental Information (SEI) has been prepared in support of an application for Section 36 consent under the Electricity Act 1989 that was submitted by RES UK & Ireland Ltd ('RES') to the Department of Energy and Climate Change (DECC) in March 2009 for a wind energy development on land between the villages of Llanbrynmair and Llanerfyl in Powys.

This SEI is provided to present the findings of additional survey, assessment and design work that has been undertaken since August 2013, together with other information that has been prepared in relation to cumulative effects of the Llanbrynmair Wind Farm together with other wind farms. This SEI comprises further and revised information which is subject to the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 (as amended).

The SEI is contained within three separate volumes:

**Volume I** Non-Technical Summary

**Volume II** Main Document and Supporting Appendices

**Volume III** Supporting Figures: To accompany the text in Volume II

The SEI has been prepared by RES in collaboration with the following specialist consultants:

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Copies of the full SEI will be available at the following locations:

<b>Powys County Council</b> Severn Road Welshpool Powys SY21 7AS	<b>Powys County Council</b> The Gwalia Llandrindod Wells Powys LD1 5LG
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Electronic copies of the SEI are available on CD-ROM for £5.

Hard copies of Volume I, II, and III are available from RES at a charge of £650 per combined copy. Copies of the non-technical summary are available free of charge.

The SEI can also be viewed on the RES web page: [www.llanbrynmairwindfarm.co.uk](http://www.llanbrynmairwindfarm.co.uk)

Requests for documents should be made in writing, including payment if purchase of the full SEI is required. RES has an environmental management system which actively encourages the reduction of paper consumption and recycling where possible.

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## 1. INTRODUCTION

### 1.1 About the Development

- 1.1.1 In March 2009, an application for Section 36 consent under the Electricity Act 1989 was submitted by RES UK & Ireland Ltd ('RES') to the Department of Energy and Climate Change (DECC) for a wind energy development of up to forty-three (43) turbines on land between the villages of Llanbrynmair and Llanerfyl in Powys. The Section 36 application is currently under consideration and is being appraised at the Mid-Wales (Powys) Conjoined Wind Farms Public Inquiry. An Environmental Statement (ES) accompanied the Section 36 consent application.
- 1.1.2 The Proposal has undergone considerable changes since the original submission in 2009. Of particular note, the number of turbines has been reduced from forty three (43) to thirty (30). In order to update and consolidate these changes within the ES, seven rounds of Supplementary Environmental Information (SEI) have been submitted between 2010 and 2013.

### 1.2 The Application

- 1.2.1 The application includes the erection of 30 three-bladed, horizontal axis wind turbines, each up to 126.5m maximum height to tip and associated infrastructure including, on-site tracks, underground cabling and crane hardstandings, a communications mast (25m high), a permanent (80m high) free standing lattice wind monitoring mast, borrow pits, water crossings, electrical transformers, electrical connection works, a substation and control building, for a period of 25 years.
- 1.2.2 Each wind turbine would have a capacity of between 2MW and 3MW, providing an installed capacity of 60MW to 90MW. This would be sufficient to power more than 37,000 homes, or nearly two-thirds of the houses in Powys.
- 1.2.3 Consultation has been ongoing with consultees since 2005. Such discussions offered instrumental advice and input into the detailed site design and mitigation options and therefore enabled development of a wind farm with minimal effect on the environment.

### 1.3 Purpose of this SEI

- 1.3.1 This SEI is provided to present the findings of additional survey, assessment and design work that has been undertaken since August 2013, together with other information that has been prepared in relation to cumulative effects of the Llanbrynmair Wind Farm together with other wind farms. This SEI comprises further and revised information which is subject to the Electricity Works (Environmental Impact Assessment) (England and Wales) Regulations 2000 (as amended).
- 1.3.2 This SEI collates relevant information requested by statutory consultees relating to the grid connection and strategic transport route.
- 1.3.3 The SEI is contained within three separate volumes:
- Volume I: Non-Technical Summary;
  - Volume II: Main Text and Supporting Appendices; and
  - Volume III: Supporting Figures.

## 2. SUPPLEMENTARY ENVIRONMENTAL INFORMATION - VOLUME II

### 2.1 Mid Wales Conjoined Wind Farm Inquiry - Connection Options Review (December 2013)

- 2.1.1 This report was commissioned by RES UK & Ireland Ltd (RES), RWE Npower renewable (RWE), Vattenfall and Fferm Wynt Llaithddu Cyf (FWL) to be produced by Mott MacDonald for submission to the Mid Wales Inquiry following a request by the Inspector for more information on the need for various forms of grid connection. The report provides a technical assessment of the options available for connecting Llanbrynmair, Carnedd Wen, Llanbadarn Fynydd and Llaithddu wind farms to the grid and the infrastructure that these will require. The report also considers the application made by SPEN to connect Celtpower's Llandinam Wind Farm to the grid. The report assesses the likely connection options based on a range of potential decision scenarios as a result of the public inquiry. The report also considers a scenario where all wind farms are awarded consent.
- 2.1.2 The report shows that up to 160MW of wind generation, most probably in SSA C, could be connected to SP Manweb's 132kV network in Welshpool. To connect more generation in SSA C and generation in SSA B would require one or two 132kV circuits from SSA B to Legacy about 70km distant from SSA B, an unusually long way at this voltage for this amount of generation. There are technical issues concerning voltage regulation, summarised in Appendix A of the full report, which are on the limit of acceptability but which can probably be satisfactorily managed. There would also be significantly more power lost in transmission at 132kV compared with 400kV, and the magnitude of this is estimated in Appendix B of the full report.
- 2.1.3 On balance, if all five wind farms are to be connected, the alternative of the 400/132kV hub at Cefn Coch is preferable. It would also allow for the connection of future wind generation without the need for further long 132kV circuits.
- 2.1.4 A full copy of the report can be found at **Appendix 2.1**.

### 2.2 Mid Wales Conjoined Wind Farm Inquiry - Grid Session 4 Evidence Supplementary Environmental Information on Grid Scenarios (December 2013)

- 2.2.1 This document has been prepared by LUC (Land Use Consultants) on behalf of Vattenfall, Fferm Wynt Llaithddu Cyf (FWL), RES UK & Ireland Limited (RES) and RWE Npower Renewables Limited (RWE) in response to questions that have been raised at the Inquiry regarding the environmental effects of the proposed Mid Wales Grid Connection. This report sets out the findings of a high level assessment of environmental effects of the possible alternative grid connection options.
- 2.2.2 The potential environmental issues for each grid connection scenario under the following topic headings have been assessed using existing published environmental information:
- Air Quality and Emissions (incl. dust);
  - Ecology/Biodiversity and Geological Conservation;
  - Climate Change;
  - Electric and Magnetic Fields;
  - Forestry and Woodland;
  - Geology and Soils;
  - Historic Environment;
  - Land Use;
  - Landscape and Visual Amenity;
  - Lighting;
  - Noise and Vibration;
  - Socio Economics (including Tourism and Recreation);
  - Traffic and Transport;
  - Waste Management; and
  - Water Environment.
- 2.2.3 A full copy of the report can be found at **Appendix 2.2**.

## 2.3 Llanbrynmair Grid Connection Route - Environmental Assessment (December 2013)

- 2.3.1 This document commissioned by RES and produced by Land Use Consultants (LUC) reviews and updates environmental advice relating to the proposed Llanbrynmair Wind Farm grid route following new grid connection information published by National Grid and SPEN during 2013 and the new substation locations determined during this period.
- 2.3.2 The document reviews general grid routing principles, landscape and visual issues and ecological issues, and should be read in conjunction with the original grid connection assessment and ecology assessment contained within *Appendix 4.4 of the CSEI 2013 Volume II A - Supporting Appendices*.
- 2.3.3 The review concludes:
- **Designated Landscapes:** The proposed substation location changes and subsequent grid connection corridor changes will not result in any changes to the advice outlined in the original grid connection assessment in relation to internationally, nationally or locally designated landscapes;
  - **Landscape:** The revised substation locations will not substantially alter the potential landscape change highlighted within the original grid connection assessment. The revised substations are located within close proximity to the broad route corridors identified within the original grid connection assessment; it is judged that the original environmental advice in relation to the identified preferred broad route corridors and potential landscape effects is still current;
  - **Visual:** The revised substation locations will not substantially alter the potential landscape change highlighted within the original grid connection assessment. The introduction of the Llanbrynmair Wind Farm and Tirgwynt Wind Farm will result in significant visual effects across the development sites and the local surrounding areas (as assessed in the CSEI 2013 and the Tirgwynt Wind Farm Environmental Statement). The location of the substations within these areas will not substantially add to the level of visual change experienced across each wind farm development site and the local surrounding areas. The revised substations are located within close proximity to the broad route corridors identified within the original grid connection assessment; it is judged that the original environmental advice in relation to the identified preferred broad route corridors and potential visual effects is still current;
  - **Habitats:** the assessment of the previous report in regard to habitats remains appropriate to the revised locations of substations within Study Areas A and B;
  - It is judged that the chosen National Grid substation location does not alter the findings of the 2010 grid connection assessment study (please refer to *Appendix 4.4 of the CSEI 2013 Volume II A - Supporting Appendices*) and that electricity could be delivered to the 400kV substation location via a technically feasible and environmentally viable 132kV overhead line grid connection from the proposed Llanbrynmair Wind Farm;
  - The identified National Grid substation location west of Cefn Coch does not alter the findings of the 2011 ecology assessment study (please refer to *Appendix 4.4 of the CSEI 2013 Volume II A - Supporting Appendices*) and that electricity could be delivered to the 400kV substation location via a technically feasible and environmentally viable 132kV overhead line grid connection from the proposed Llanbrynmair Wind Farm;
  - It is judged that the identified preferred route corridors F3 and F4 can accommodate the necessary overhead line infrastructure to connect the Llanbrynmair Wind Farm without unacceptable detrimental effects on ecologically designated sites, habitats or species; and
  - It is judged that the landscape of the preferred route corridors from Llanbrynmair and Carnedd Wen wind farms, F3 and F4, could accommodate the necessary steel tower or wood pole overhead line infrastructure.



2.3.4 A full copy of the report can be found at **Appendix 2.3**.

#### **2.4 Mid Wales Wind Farms Transport Route - Environmental Assessment (December 2013)**

2.4.1 This document has been prepared by AMEC on behalf of Vattenfall, Fferm Wynt Llaithddu Cyf (FWL), RES UK & Ireland Limited (RES) and RWE Npower Renewables Limited (RWE).

2.4.2 This document sets out the potential environmental effects arising from proposals for highway works to facilitate the delivery of abnormal loads into mid Wales, for the construction of wind farms in TAN 8 Strategic Search Areas (SSAs) B and C. These works include the creation of lay by areas (passing places) lay down areas and works required as a result of swept path and vertical alignment analysis.

2.4.3 The purpose of the sTMP is to establish a protocol, with associated physical works, to prevent the occurrence of likely EIA significant traffic and transport effects. This will in turn reduce the potential for EIA significant socio-economic effects such that it is considered that there is little or no potential for such effects to arise.

2.4.4 The sTMP is presented in modular format to enable different sections of the route to be considered separately. The six sections of the report are as follows:

- Section 1: Overview Report
- Section 2: Ellesmere Port to Welshpool
- Section 3: Welshpool to SSA B (north)
- Section 4: Welshpool to Newtown
- Section 5: Newtown to SSA B (south)
- Section 6: Newtown to SSA C

2.4.5 It should be noted that only sections 1, 2 & 3 are applicable to Llanbrynmair. These sections are contained within the *Llanbrynmair August 2013 SEI, Volume II - C, Appendix 10.1 - D*.

2.4.6 AMEC was commissioned by Renewable UK Cymru (ReUK) to produce this environmental assessment, based on information provided to Grontmij and Aecom consultants (acting on behalf of ReUK) for the production of the strategic Traffic Management Plan (sTMP) for Mid Wales Wind Farms.

2.4.7 The report concludes that:

- In EIA terms significant effects on ecological receptors are unlikely to occur;
- No direct effects on known or recorded heritage assets have been identified. Where general potential for prehistoric, medieval and later archaeological remains to be encountered exists, given the location of the proposed works mostly in the highway verge or in some cases small areas of adjacent land this potential is generally low, and no likely significant EIA effects have been identified;
- No EIA significant landscape effects have been identified owing to the relatively small scale of the proposed works, in conjunction with the close connection in spatial and landscape terms between proposed work locations and existing busy trunk roads. The magnitude of cumulative landscape effects is also reduced by the relative spatial infrequency of works over quite extensive routes, where landscape effects will remain localised even when considered cumulatively; and
- No EIA significant visual effects will occur on residential or recreational receptors along parts of the route covered by Sections 2-5 of the sTMP, whilst the magnitude of cumulative visual change would be negligible due to the separation distances between the individual works.

2.4.8 In summary no EIA significant effects were identified as a result of works set out in the sTMP for the proposed transport of wind turbine components into Mid Wales SSAs.

2.4.9 A full copy of the report can be found at **Appendix 2.4**.

## **2.5 Road Safety Audit (RSA) for Sections 2-5 of the Strategic Traffic Management Plan (sTMP) for Mid Wales Wind Farms (December 2013)**

- 2.5.1 This document has been prepared by gm Traffic Consultants Ltd on behalf of Vattenfall, FWL, RES and RWE. This report results from a Stage 1 Road Safety Audit (RSA) carried out on the various off-site highway works to enable the transportation of Abnormal Indivisible Loads (AIL's) from Ellesmere Port to Mid Wales (Sections 2-5).
- 2.5.2 Gm Traffic Consultants Ltd carried out the Audit between 13th June 2013 and 3<sup>rd</sup> September 2013. The Audit consisted of a desktop study and a site visit, which was carried out between 15th June 2013 and 18th June 2013.
- 2.5.3 The RSA produced three issues that could occur as a result of the movement of AILs along the proposed route, and offered recommendations on how to deal with these (Section 4). These issues related to overhanging branches, misuse of passing place lay-bys and forward visibility to back of traffic queues.
- 2.5.4 A full copy of the report can be found at **Appendix 2.5**.

## **2.6 Addendum to Strategic Traffic Management Plan (sTMP) for Mid Wales Wind Farms (July 2013)**

- 2.6.1 The addendum was produced by Grontmij in July 2013. This addendum is an amendment to Table 3-5 of Section 3, Chapter 6, of the Strategic Traffic Management Plan (sTMP) for Mid Wales Wind Farms. The document was produced to clarify the survey requirements at the B4381 Severn Street Howell canal bridge.
- 2.6.2 A full copy of the addendum can be found at **Appendix 2.6**.

## **2.7 Strategic Transport Technical Review of Alternative Routes Around Welshpool (December 2013)**

- 2.7.1 This report was prepared by Stuart Michael Associates Ltd. for submission as SEI to the mid Wales Public Inquiry on behalf of Renewable UK Cymru, RWE, RES, Vattenfall and Celtpower.
- 2.7.2 This report affirms the appropriateness and suitability of the A483 trunk road corridor, south of Oswestry (as proposed in sTMP Section 2) for AIL convoys in preference to the use of the A458 from Shrewsbury to Welshpool (not reported upon in the sTMP). Whilst this section of the A458 is used by heavy goods vehicles it is not considered to be appropriate for AILs. This concurs with the views expressed by Welsh Government (Transport).
- 2.7.3 In addition, this report also examines the appropriateness of a number of alternative routes for the transportation of AILs towards and around Welshpool. It is demonstrated that the route via Welshpool Town Centre is the least constrained and most direct corridor and affirms the suitability of this corridor (as proposed in sTMP Section 3).
- 2.7.4 This report sets out the findings of the route assessments carried out during February 2013 for the following route options:
  - Strategic Traffic Management Plan (Section 2)
    - A5/A458 Shrewsbury to Welshpool
  - Strategic Traffic Management Plan (Section 3)
    - Route Assessment 1: A495 from A483 at Llynclys to A458
    - Route Assessment 2: A458 from A483 at Arddleen via B4392 and A490
    - Route Assessment 3: Alternative Routes through Welshpool Town Centre



- 2.7.5 The report reviewed route options including the A458 trunk road from Shrewsbury, the A495, A490 and various B-roads (B4392, B4381). This review examined the appropriateness of each route for accommodating AIL movements. Numerous constraints along each route were identified along with potential highway modifications that could be required to facilitate AIL convoys.
- 2.7.6 The report demonstrated that there are potential impacts associated with each of the routes assessed that raise doubts about the feasibility or desirability of using such corridors. It was concluded that the route selected as part of the sTMP is the most appropriate to ensure the safe delivery of turbine components. Delivery of AILs by police escort will ensure that each delivery is undertaken with minimal disruption to other road users.
- 2.7.7 A full copy of the report can be found at **Appendix 2.7**.

## **2.8 Non-AIL Cumulative Transport Assessment (December 2013)**

- 2.8.1 This document details the process of appraising and modelling the impact on the strategic road network of non-AIL construction traffic for the proposed Mid Wales wind farm schemes. This has been done through the use of a Cumulative Impact Model and the Institute of Environmental Assessment (IEA) Guidelines for the Environmental Assessment of Road Traffic. The model has been produced with the purpose of modelling the impact of construction traffic on the trunk road and principal road network in Mid Wales during the construction periods of the proposed wind farms in the area.
- 2.8.2 The report concludes that:
- Overall Cumulative Impact of Construction Traffic
    - In terms of overall construction traffic it is evident that the daily cumulative impact of the wind farm proposals on the strategic road network does not exceed the 30% increase in overall traffic identified by IEA Guidelines as the screening threshold for assessment of potential significance.
    - Whilst many of the road network links are classed as medium sensitivity receptors, the assessment of significance leads to values of no impact or neutral or slight in all cases. This conclusion applies to both of the scenarios evaluated such that even considering the non-Section 36 applications, as well as the Section 36 applications at inquiry and consented development, the overall cumulative impact is satisfactory.
  - Cumulative HGV Impact of Construction Traffic
    - In terms of HGV construction traffic levels contained within overall construction traffic levels, it is evident that the daily cumulative impact of the wind farm proposals on the majority of the strategic road network does not exceed the 30% increase in overall traffic identified by IEA Guidelines as the screening threshold for assessment of potential significance. This conclusion applies to both scenarios considered in the report, including Section 36 and non-Section 36 applications.
    - The A483 south of Newtown and Dolfor in the vicinity of the SSA C application sites of Llandinam, Llaithddu and Llanbadarn Fynydd is the one exception, requiring further consideration for 2016.
- 2.8.3 A full copy of the report can be found at **Appendix 2.8**.

## **2.9 Llanbrynmair Non-AIL Transport Traffic on Strategic Network (December 2013)**

- 2.9.1 This technical note, produced by AECOM, assesses the impact of the Llanbrynmair Wind Farm on the strategic road network and should be read in conjunction with the report produced by AECOM, *Mid Wales (Powys) Wind Farms - Cumulative Impact Assessment of non-AIL Construction Traffic on the Strategic Road Network*. This note identifies the impact associated with the Llanbrynmair Wind Farm on the strategic road network.

2.9.2 The document outlines the predicted traffic impact associated with the Llanbrynmair Wind Farm in actual vehicle numbers, and also in terms of a percentage increase in traffic for each month of the construction programme and as a yearly average.

2.9.3 The technical note concludes that:

- The construction traffic impact of Llanbrynmair wind farm on the adjacent strategic road network is not discernible and has no significance in accordance with IEA guidelines;
- The HGV construction traffic impact is not discernible and has no significance apart from the A470 in the vicinity of the site which has negligible traffic impact and neutral significance during 2017 overall and within a number of specific months in both 2016 and 2017; and
- In all cases, for both construction traffic overall and HGV construction traffic, the impact does not exceed the 30% increase in overall traffic identified by the IEA Guidelines as the screening threshold for assessment of potential significance.

2.9.4 A full copy of the report can be found at **Appendix 2.9**.

### 3. SUPPLEMENTARY ENVIRONMENTAL INFORMATION - VOLUME III

#### 3.1 sTMP Figures Sections 1-3 (December 2013)

3.1.1 This document includes Figures from Sections 1-3 of the Strategic Traffic Management Plan submitted as SEI in August 2013. These Figures were omitted from the original SEI submission in error.

3.1.2 Please refer to **Volume III, Section 3.1**.

#### 3.2 Conjoined Cumulative Graphics (December 2013)

3.2.1 This report was commissioned by RES UK & Ireland Ltd (RES), RWE npower renewable (RWE), Vattenfall, Scottish Power Renewables and Fferm Wynt Llaithddu Cyf (FWL) to be produced by LUC (Land Use Consultants) to produce conjoined cumulative landscape and visual graphics and visualisations. The information contained within this document forms the baseline of cumulative landscape and visual evidence for Session Four - Matters in Common/Cumulative Effects at the Mid Wales (Powys) Conjoined Wind Farms Public Inquiry.

3.2.2 A study area of 20km radius from the outer extents of SSA-B and SSA-C has been used, to encompass the maximum extent of which significant cumulative landscape and visual effects are predicted.

3.2.3 Eight Conjoined Cumulative Viewpoints (CCVPs) were identified. Each of the viewpoints was chosen to illustrate the theoretical combined and successive visibility of wind energy developments located in both SSA-B and SSA-C.

3.2.4 CZTVs (Cumulative Zones of Theoretical Visibility) have been produced to illustrate the potential visibility of wind energy developments and their associated grid connection infrastructure within both SSA-B and SSA-C, and the contribution each of the five applicant wind farms has to the overall pattern of theoretical visibility of wind energy development across this region of Mid Wales.

3.2.5 Please refer to **Volume III, Section 3.2**.

#### 3.3 Landscape and Visual Impact Assessment - Residential Amenity Section 4.1 (August 2013)

3.3.1 This document assesses residential visual amenity impacts of the proposed Llanbrynmair and Carnedd Wen wind farms. The document includes figures showing the zone of theoretical visibility (ZTV) of the turbines associated with the Proposed Development, and a cumulative assessment along with the proposed Carnedd Wen Wind Farm. The document also includes a series of wireframes from a range of viewpoints, representing the potential residential amenity impact as a result of the proposed Llanbrynmair and Carnedd Wen wind farms.

3.3.2 This appendix was due to be submitted as part of SEI submitted in August 2013, however, was omitted in error. Its inclusion in this SEI is intended to be viewed in conjunction with the appropriate sections of *CSEI August 2013 - Volume II, Chapter 4 - Landscape and Visual Amenity*.

3.3.3 Please refer to **Volume III, Section 3.3** and *Chapter 4 of SEI August 2013* for further information.