



Parc Ynni Calon y Gwynt

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# ENVIRONMENTAL STATEMENT

## Chapter 3 Scheme Need, Alternatives and Iterative Design Process





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## 3 SCHEME NEED, ALTERNATIVES AND ITERATIVE DESIGN PROCESS

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### 3.1 NEED FOR THE PROJECT

#### CLIMATE CHANGE

- 3.1.1. The Welsh Government Net Zero Carbon Budget, 2021<sup>1</sup> reports upon past progress and future ambition towards combatting climate change:
- “In the last six years, we have laid the legislative foundations for a cleaner, fairer, stronger Wales, including through the Well-being of Future Generations (Wales) Act 2015 and the Environment (Wales) Act 2016. Wales has consistently followed the science, starting in 2016 with a target for an 80% reduction in our emissions by 2050. In 2019 we accepted the CCC’s recommendation to increase our ambition to 95% shortly after the Senedd became the first Parliament in the world to declare a climate emergency in 2019. On accepting the recommendation, we were clear our ambition should be in line with the spirit of the Paris Agreement in which richer, developed nations should set in law a net zero target by the middle of this century”.*
- 3.1.2. At the time of writing, the Welsh Government has not released the Net Zero Carbon Budget 3, covering the period of 2026-2030. It is anticipated this will be released by the end of 2026.
- 3.1.3. The Climate Change (Wales) Regulations 2021<sup>2</sup> reiterates the dangers posed by climate change and the response of Welsh Government: *“climate science continues to demonstrate that human activity is warming the planet and that the resulting effect on weather patterns is having increasingly negative consequences for ecosystems, economies, and people. The Welsh Government is proposing to increase Wales’s climate targets in response to the latest climate science and the recommendations of the Climate Change Committee (CCC)”*. This includes:
- Carbon Budget 2 (2021-2025): an average of 37% below the baseline with a credit (‘offset’) limit of 0%;
  - Carbon Budget 3 (2026-2030): an average of 58% below the baseline;
  - 2030 target for an emissions reduction of 63% against the baseline;
  - A 2040 target for an emissions reduction of 89% against the baseline; and
  - A 2050 target for an emissions reduction of at least 100% against the baseline (‘net zero’)<sup>2</sup>

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<sup>1</sup> Welsh Government (2021). Net Zero Wales Carbon Budget 2 (2021 to 2025). (c. 1), pp. 10. (Online). Available at: <https://gov.wales/sites/default/files/publications/2021-10/net-zero-wales-carbon-budget-2-2021-25.pdf> [Accessed April 2026].

<sup>2</sup> Welsh Government (2021). The Climate Change (Wales) Regulations 2021: integrated impact assessment. (c1), pp. 3. (Online). Available from: <https://gov.wales/sites/default/files/pdf-versions/2021/7/5/1625823413/climate-change-wales-regulations-2021-integrated-impact-assessment.pdf> [Accessed April 2026]

- 3.1.4. The ‘sustainable development principle’ established by the Welsh Government in the Well-being of Future Generations (Wales) Act (2015)<sup>3</sup> was introduced to ensure public bodies act in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs. A key element of this is stated as *“tackling climate change by reducing the greenhouse gas emissions that cause climate change and ensuring that places are resilient to the consequences of climate change”*.
- 3.1.5. In 2021, Future Wales: The National Plan 2040 (Future Wales) was introduced as a national development framework to combat the *“climate emergency which is actively changing our environment and directly affecting communities”*. Future Wales aims to help plan new development and manage land use through enhancing the economic, social, environmental, and cultural well-being of Wales. Future Wales builds on the well-being goals set out in the Future Generations (Wales) Act (2015) to create a Prosperous, Resilient, Healthier, More Equal, Cohesive, Globally Responsible and Vibrant and Thriving Wales.
- 3.1.6. Future Wales also specifies:  
*“It is vital that we reduce our emissions to protect our own well-being and to demonstrate our global responsibility. Future Wales together with Planning Policy Wales will ensure the planning system focuses on delivering a decarbonised and resilient Wales through the places we create the energy we generate, the natural resources and materials we use and how we live and travel”*.<sup>4</sup>
- 3.1.7. Future Wales identifies renewable energy generation as key to the delivery of its carbon budgets. Policy 17 and 18 set out Future Wales’s approach to renewable energy with Policy 17 stating that the Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet future energy needs.
- 3.1.8. The latest version of Planning Policy Wales (Edition 12)<sup>5</sup> (PPW12) acknowledges Wales has been set a 95% net zero target for 2050 by the CCC and how nationally, the intention is to go beyond this to become fully net zero. PPW12 outlines:  
*“Climate change is a global challenge, with impacts felt at the local level presenting a significant risk to people, property, infrastructure and natural resources. We need to plan for these impacts, reducing the vulnerability of our natural resources and build an environment which can adapt to climate change. The planning system plays a significant role in managing this risk. Development allowed today will be around for decades to come. The most important decision the planning system makes is to ensure the right developments are built in the right places”*.
- 3.1.9. National policy and legislation is drafted in recognition of the need to tackle climate change, with renewable energy developments seen as a key means by which present and future carbon budgets can be achieved.

<sup>3</sup> Welsh Government (2015). Well-being of Future Generations (Wales) Act 2015. (c. 1). (Online). Available at: <https://www.futuregenerations.wales/wp-content/uploads/2017/01/WFGAct-English.pdf> [Accessed April 2026].

<sup>4</sup> Welsh Government (2021). Future Wales the National Plan 2040. (c. 2), pp. 45. (Online). Available at: <https://gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf> [Accessed April 2026].

<sup>5</sup> Welsh Government (2024). Planning Policy Wales 12<sup>th</sup> Ed. (c. 3), pp. 31. (Online). Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> [Accessed April 2026].

- 3.1.10. In September 2024, the Welsh Government announced its commitment to driving progress across four priority areas, including *'creating green jobs that tackle the climate crisis and restore nature, while making families better off; accelerating planning decisions to grow the Welsh economy.'*<sup>6</sup>

## RENEWABLE ENERGY AND ENERGY SECURITY

- 3.1.11. "Renewable energy" refers to energy, which is produced from natural, non-finite sources, without burning fossil fuels that release greenhouse gases such as CO<sup>2</sup> and contribute to climate change. Renewable energy also provides a new and alternative energy source to tackle energy security issues. Increased use of renewable energy is therefore a key part of European, UK and Welsh energy strategy.
- 3.1.12. In September 2017, the Welsh Government Cabinet Secretary for Environment and Rural Affairs announced to the Welsh Assembly that it was setting a target of Wales generating 70 per cent of its electricity consumption from renewable energy by 2030 and a target for one Gigawatt of renewable electricity capacity in Wales to be locally owned by 2030<sup>7</sup>. In January 2023, The Welsh Government released a consultation document for the review of Wales's renewable energy targets<sup>8</sup>, which proposed updating the target from 70 per cent to 100% by 2035 and with 1.5GW to be locally owned within this timescale. These targets have now been adopted<sup>9</sup>.
- 3.1.13. Future Wales (page 48) also maintains *'Wales can become a world leader in renewable energy technologies. Our wind and tidal resources, our potential for solar generation, our support for both large and community scaled projects and our commitment to ensuring the planning system provides a strong lead for renewable energy development, mean we are well placed to support the renewable sector, attract new investment and reduce carbon emissions'*.
- 3.1.14. Key targets for renewable energy are set out below in **Table 3-1**

**Table 3-1 - Key Renewable Energy Targets**

| Consideration                      | Target                                                                               |
|------------------------------------|--------------------------------------------------------------------------------------|
| Greenhouse gas reduction           | 34% by 2020, 60% by 2030, 100% (previously 80% <sup>10</sup> ) by 2050 <sup>11</sup> |
| CO <sub>2</sub> reduction          | 26% by 2020 <sup>8</sup>                                                             |
| Electricity from renewable sources | 70% by 2030 <sup>5</sup> and 100% by 2035 <sup>12</sup>                              |

<sup>6</sup> Welsh Government (2024). Press Release: First Minister announces Welsh Government priorities. Available at (online): <https://www.gov.wales/we-have-listened-we-have-learned-and-we-will-deliver-fm-announces-welsh-government-priorities#:~:text=Green%20jobs%20and%20growth%20%E2%80%93%20creating,to%20grow%20the%20Welsh%20economy> [Accessed April 2026].

<sup>7</sup> Welsh Parliament (2017). Lesley Griffiths high on ambition for clean energy. Available at: <https://record.senedd.wales/Plenary/4644#C26839> [Accessed April 2026]

<sup>8</sup> Welsh Government (2023). Consultation Document Review of Wales' Renewable Energy Targets (Online). Available at: [https://www.gov.wales/sites/default/files/consultations/2023-01/consultation-document-review-of-renewable-energy-targets\\_0.pdf](https://www.gov.wales/sites/default/files/consultations/2023-01/consultation-document-review-of-renewable-energy-targets_0.pdf) [Accessed April 2026]

<sup>9</sup> Welsh Parliament (2023). Written Statement: Publication of Summary of Responses to the Consultation on Wales' Renewable Energy Targets (Online). Available at: [Written Statement: Publication of Summary of Responses to the Consultation on Wales' Renewable Energy Targets \(14 July 2023\) | GOV.WALES](https://www.gov.wales/sites/default/files/consultations/2023-01/consultation-document-review-of-renewable-energy-targets_0.pdf) [Accessed April 2026].

<sup>10</sup> UK Government (2008). Climate Change Act 2008. (online) Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents> [Accessed April 2026].

<sup>11</sup> The Environment (Wales) Act 2016 (Amendment of 2050 Emissions Target) Regulations 2021 which change the statutory target within the Environment Act from 80% to 100% came into force on 19 March 2021.

<sup>12</sup> Welsh Government (2023). Press Release: Wales aims to meet 100% of its electricity needs from renewable sources by 2035 Available at (online): <https://www.gov.wales/wales-aims-meet-100-its-electricity-needs-renewable-sources-2035> [Accessed April 2026].

- 3.1.15. PPW12<sup>5</sup> states that *‘Local authorities should facilitate all forms of renewable and low carbon energy development and should seek cross-department co-operation to achieve this. In doing so, planning authorities should seek to ensure their area’s full potential for renewable and low carbon energy generation is maximised and renewable energy targets are achieved. Planning authorities should seek to maximise the potential of renewable energy by linking the development plan with other local authority strategies, including Local Well-being plans and Economic/Regeneration strategies’.*
- 3.1.16. Onshore wind power is recognised as being a deliverable, mature technology. Wind power is one of the few energy technologies that is low in CO<sub>2</sub> emissions (including short carbon pay-back times<sup>13</sup>), helping to tackle climate change, yet can also be delivered quickly, affordably and is domestically secure thereby addressing the key energy security challenges. It is this critical ability to address both issues that makes wind power a central feature in Welsh Energy policy.
- 3.1.17. PPW12 reaffirms the Welsh Government renewable energy targets and also states *‘The benefits of renewable and low carbon energy, as part of the overall commitment to tackle the climate emergency and increase energy security, is of paramount importance.’* It sets out eight bullet points for the planning system to achieve:
- *‘Integrate development with the provision of additional electricity grid network infrastructure;*
  - *Optimise energy storage;*
  - *Facilitate the integration of sustainable building design principles in new development;*
  - *Optimise the location of new developments to allow for efficient use of resources;*
  - *Maximise renewable and low carbon energy generation;*
  - *Maximise the use of local energy sources, such as district heating networks;*
  - *Minimise the carbon impact of other energy generation; and*
  - *Move away from the extraction of energy minerals, the burning of which is carbon intensive.’*
- 3.1.18. Wales has one of the windiest climates in the UK, giving the country great potential to use this resource to generate electricity.

## 3.2 SITE SELECTION PROCESS AND CONSIDERATION OF ALTERNATIVES

- 3.2.1. The Site is entirely located within a Pre-Assessed Area (PAA) for Wind Energy as defined in Policy 17 of the National Development Framework (NDF) – Future Wales: The National Plan 2040<sup>4</sup>, where there is a presumption in favour of large-scale wind energy development, subject to the criteria of Policy 18. All turbines are located within PAA 3. The PAAs acted as outline search areas within which the local environment has been deemed capable of accommodating large scale wind energy development. Although revoked in February 2021 following publication of Future Wales: The National Plan 2040, the Site is also located in a Strategic Search Area (SSA) identified in Technical Advice Note (TAN) 8: Planning for Renewable Energy<sup>14</sup>. This is reflected by the pattern of existing onshore wind development in proximity to the Site.

<sup>13</sup> Geururaga, B., Zauner, R., and Polz, W. (2012). Life cycle assessment of two different 2MW class wind turbines. Available at (online): <https://www.sciencedirect.com/science/article/abs/pii/S0960148111002254> [Accessed April 2026].

<sup>14</sup> Welsh Government (2017) Technical Advice Note 8: Planning for Renewable Energy – Strategic Search Areas (TAN 8 indicative). Available at: [https://datamap.gov.wales/layers/inspire-wg-tan8\\_indicative](https://datamap.gov.wales/layers/inspire-wg-tan8_indicative) (Accessed: April 2026).



- 3.2.1. Following the identification of potential sites within PAAs, the Applicant commissioned further desk-based assessments to understand potential constraints and opportunities including a high level aviation assessment, physical constraints review and ownership identification.

## **DESIGN PRINCIPLES**

- 3.2.2. Wind turbines convert the kinetic energy of the wind into electrical energy. Air passing over the blades of a wind turbine causes them to rotate. This low speed rotational motion is stepped up via a gearbox and converted into electrical energy at a voltage of approx. 690V by a generator located inside the nacelle, which is then converted to a high voltage (typically 33kV) by a unit transformer, located either at the base of the turbine or within the nacelle, for transmission across the wind farm. A diagram showing the structure of a typical wind turbine is shown in **Figure 3.1**.
- 3.2.3. Underground cables link all the turbine unit transformers to a dedicated substation on the Site where the electricity generated by the wind farm is metered and transformed to the same voltage as the electricity grid system to which the wind farm will be connected.

## **DESIGN CRITERIA**

- 3.2.4. Once a site has been selected, the design of the wind farm is optimised to produce a design which maximises the use of the land available for wind power generation whilst minimising the overall environmental impact of the development. The optimal layout of a wind farm depends on a range of technical, economic, and environmental criteria as follows:
- Ground conditions – ground conditions must be suitable for the installation of wind turbines, access tracks and cables;
  - Energy yield – it is important that wind turbines are sited to capture the best available wind resource. This means maximising exposure to the prevailing winds;
  - Site topography – the site topography is computer modelled to establish the wind flow on and around the site to provide guidance on the best locations for the wind turbines;
  - Proximity to occupied dwellings – wind turbines have to be located sufficiently far away from houses to protect local amenity;
  - Environmental constraints – features and areas of local environmental sensitivity (ecology, heritage/archaeology, peat, hydrology etc.) are identified and their implications considered;
  - Landscape and visual design considerations are taken into account and the layout modified accordingly;
  - Existing land use – whilst the wind turbines and their associated infrastructure typically occupy no more than 2% of the site, the existing use of the land (including any public rights of access) is considered in the layout of tracks and turbines. For example, existing track lines are used where practicable;
  - The presence and magnitude of woodland is also important, as these can reduce energy production from wind turbines;
  - Proximity to obstructions – such as tall trees or buildings;
  - Available spare capacity of the electricity grid to take power from the wind farm; and
  - Proximity to a road network suitable to allow the transport of construction plant, equipment and wind turbine components to the site.

- 3.2.5. In addition to the above considerations, planning guidance and discussions with statutory and non-statutory consultees and the landowners have an influence over the evolution of the design.

### 3.3 DESIGN EVOLUTION OF THE PROPOSED DEVELOPMENT

- 3.3.1. The Applicant and its consultants have undertaken a number of discussions with statutory and non-statutory consultees, the local community (see **Chapter 2** and **Chapters 5-15**) and the landowners, with the accumulated findings all having an influence over the evolution of the design of the Proposed Development and the scope of the EIA process.

- 3.3.2. **Table 3-2** sets out the significant design and layout assessments that were undertaken by the Applicant to identify the best layout for energy generation and minimising any potential effects.

**Table 3-2 - Energy Park Design Iterations**

| Design Iteration                                                            | Rationale / Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Layout A</b><br><b>11 Turbine Scoping Layout</b><br><b>February 2025</b> | Initial layout based on known information and understanding of constraints. This layout served as a starting point for the Proposed Development. All turbines considered in this layout were up to 200m in tip height and the inclusion of solar PV panels was also under consideration as part of the Proposed Development.                                                                                                                                                                                                                                                                                                                                  |
| <b>Layout B-E</b><br><b>11-12 Turbine Layout</b>                            | Following an in-depth engineering review, the design underwent several layout iterations to include the on-site access tracks, solar PV, crane pads, substation, BESS and temporary construction compounds. All turbines considered were up to 200m in tip height.<br><br>The possibility to introduce a 12 <sup>th</sup> turbine was investigated but was subsequently dropped due a design concerns around the proximity to other turbines and the environmental constraints present on Site.<br><br>The non-turbine infrastructure required on site was designed and arranged in such a way as to avoid the identified on-site constraints where possible. |
| <b>Layout F</b><br><b>11 Turbine Layout</b>                                 | A design review was undertaken on the basis of completed surveys to date, including ecology, ornithology and peat. Whilst further accounting for the influence of Landscape and Visual Receptors and potential sensitive noise receptors. This included numerous iterations of layouts and removal, addition and movement of turbines to balance the layout of the Proposed Development to maximise renewable energy development and minimise potential environmental effects.                                                                                                                                                                                |
| <b>Layout G</b><br><b>11 Turbine Layout</b>                                 | Turbine 7 was subsequently reduced to 180m tip height to reduce residential visual amenity impacts on nearby residential receptors. A preferred location for Turbine 1 was identified on the balance of advice to minimise landscape, peat, ecology and PRoW impacts.<br><br>Turbine 6 was repositioned away from a ridge edge on the western portion of the Site to avoid turbulence effects.<br><br>Following further review of the environmental and technical constraints on Site, the Applicant confirmed the decision to remove the intention to include a Solar PV arrangement as part of the Proposed Development.                                    |

| Design Iteration                                                                                       | Rationale / Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Layout H</b><br><b>11 Turbine Layout</b>                                                            | <p>A preferred location for onsite infrastructure including the substation, BESS and control building compound was confirmed following an option appraisal to avoid known areas of peaty soils, priority habitats and proximity to PRowS.</p> <p>The temporary construction compound was relocated to an area closer to the entry point of the Site for constructability benefits and as confirmed to be clear of mapped constraints.</p> <p>The access road alignment was amended further west to avoid direct impacts to an area of Ancient Woodland at Coed Neuadd-newydd, and the site boundary underwent minor extensions to account for identified areas of oversail and overrun and the necessary visibility splays for Abnormal Indivisible Loads (AIL) entering the Site. Further detail in relation to the delivery of AILs to Site is presented in <b>Appendix 12C Initial Route Survey Report</b>.</p> |
| <b>Layout H.1</b><br><b>11 Turbine Layout</b><br><b>Design Freeze for Pre-Application Consultation</b> | <p>Following further Phase 2 Peat surveys, Turbine 3 was moved 49m east, Turbine 6 was moved 27m east and Turbine 7 was moved 32m east to avoid impacts on peaty soils as far as practicable. The corresponding access tracks were realigned to account for these turbine moves. Furthermore, the access tracks leading to Turbines 5, 9 and 10 were also realigned to avoid impacts to peaty soils.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |



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