

MASTERS DEGREE ASSIGNMENT SPECIFICATION

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Environmental Impact Assessment (EIA) Review on the Upper Ogmore Wind Farm Project

ABSTRACT

Environmental Impact Assessment (EIA) is a process that identifies and evaluates the anticipated significant ecological consequences of planned development, as well as strategies for reducing or minimizing any substantial detrimental effects on the environment. The EIA for the Project was completed using information gathered by the applicant and designated independent consultants during a site inspection and evaluation, as well as interaction with mandatory selectors and other participants. The goal of this Environmental Impact statement is to offer a comprehensive and impartial analysis of the important environmental consequences that are expected to result from the planned development, as well as enough evidence to validate the results and recognize the source of the data supplied[1].

Keywords:

Environmental Impact Assessment, Environmental Impact Assessment procedure, Environmental Impact Assessment decisions

1. Introduction

The UK and Welsh administrations have made it plain that they are committed to reducing carbon emissions through energy conservation and renewable energy sources. There is a firm policy directive that perhaps more needs to be done through the regulatory system to meet the substantially increased production of renewable energy that is now anticipated. Most recently, in September 2017, Lesley Griffiths, the Cabinet Secretary for Environment, set Wales an aim of producing 70% of its power usage from sustainable power by 2030[1].

The goal of Environmental Impact Assessment is always to safeguard the surroundings in order to ensure that whenever a local authority decides whether it should grant construction permits for a project that is likely to experience major ecological consequences, it does so with a clear awareness of the likely major impacts and tends to take this into consideration in the process for making decisions. The guidelines provide a system for selecting projects that need to be subjected to an Environmental Impact Assessment, as well as for analyzing, consulting on, and making a decision on projects that are anticipated to have substantial environmental consequences[1].

This Environmental Statement (ES) has indeed been developed by RES Limited (RES) to supplement a project proposal submitted to the Planning Inspectorate of Wales (PINS) seeking authority to build, regulate, and decommission the Upper Ogmore Wind Farm, subsequently alluded to as 'the Proposed Development'. The ES's goal is to assist PINS in assessing the potential substantial ecological impacts of the Advancement and determining the necessity for prevention programs to

mitigate such effects.

1.1 The Applicant

Renewable Energy Systems Ltd ('RES') is a subsidiary of the Sir Robert McAlpine group, a British kinship design and construction corporation with over 100 decades of experience. Featuring activities in Europe, North America, and Asia-Pacific, RES is recognized as one of the world's top autonomous renewable energy providers. RES is involved in a variety of renewable power technologies, including that wind generation, offshore wind, and photovoltaic, in addition to the implementation of knowledge like power storage and supply planning. Ever since the early nineties, RES has indeed been engaged in Welsh, developing and/or constructing five inland wind turbines, including that of the recently finished 34MW Garreg Lwyd Hill Wind Farm in Powys[1].

1.2 Background

RES has undertaken an Environmental Impact Assessment (EIA) for renewable energy development ('the Project') on property south of the A4107 in Bridgend County, between Blaengwynfi, Nantymoel, and Blaengarw. The Project's goal is to generate and store renewable power. The project will use onshore wind technologies to create green power[2]. According to preliminary research, the Project might hold as many as eight (8) wind turbines. The Project will also investigate the supply of energy storage systems as a component of the infrastructure in order to correlate on-site power output to energy consumption and to allow the minimization of any prospective grid constraint needs.

1.3 Upper Ogmore Wind Farm ('the Project') Identification

The project was chosen and planned by taking into account the Strategic Search Areas (SSA) defined within TAN8 and in compliance with internal RES processes that

are meant to produce optimum ecological impact with minimal major negative consequences within the project's neighborhood[2]. For site selection, RES develops complex Geographic Information System (GIS) models that attempt to reflect planning, environmental, technological, and economic needs.

RES conducted computer-based research to determine the appropriateness of wind farm sites in Wales. The adoption of GIS technology permitted unbiased and uniform analysis across the entire country. This research has been revised regularly when new information became available or other variables changed. The GIS model integrates public guidance from statutory consultees when accessible and suitable[2].

1.4 Scope of Environmental Statement

EIA is a procedure that collects, evaluates, and incorporates data about a project's ecological effects into its construction to assess whether or not it needs to be accorded planning approval. In an ES, the applicant gives details about the project and its potential environmental implications. This allows decision-makers to evaluate these implications when deciding on the linked planning application[1]. The EIA method has several fundamental characteristics:

- It is methodical, consisting of a series of duties specified both by law and by practice.
- It is analytical, involving the use of expert abilities from the environmental sciences;
- It is objective, with the goal of informing the decision-maker rather than promoting the project;
- It is interactive, with provisions for gathering information and comments from statutory authorities and important stakeholders; and
- It is progressive, with possibilities for ecological issues to be handled throughout project design and development.

If the scope of the EIA is far too narrowly prescribed, a significant area of ambiguity or an unanticipated detrimental effect may surface later in time, with possible ramifications for the concept and timeline for implementation. If the scope is established too broadly, time, money, and energy may be squandered on chasing superfluous detail. The magnitude and characteristics of the Project have been carefully examined in the context of detailed site and environmental baseline circumstances. The objective has been to include topics deemed possibly important in the EIA[1]. When a problem isn't included in the planned scope of the EIA, it does not mean that there won't be any related consequences, but instead that they will be insignificant. It is anticipated that all consultees may agree on a focused scope that will result in a

well-thought-out yet short ES. Following agreement on the scope of the EIA and completion of the requisite surveys, possible 'effects' will be confirmed and evaluated by comparing the detected degree of change to the documented susceptibility of the ecological receiver. This examination will use a common matrix and nomenclature for simplicity of comparison between subject areas, while this may not be applicable across all subject areas.

1.5 Site Characteristics

The 'Site' is defined as the amount of land deemed appropriate for the Proposed project and therefore is depicted by the red border displayed in Figure 1. The Site Location is focused upon the summit of Werfa (568m) and stretches from east to west all over the alpine terrace north of the Garw and Ogmogre basins and south of the Afon Afan valley. Abergwynfi to the northwest, Blaengarw to the southwest, and Nant-y-moel to the southeast are all within 2km of the Site[1]. The Area is occupied by unfenced highland moorland that has been heavily grazed by sheep. Within a walled area, a communication mast and related facilities are positioned in the middle section of the Site.

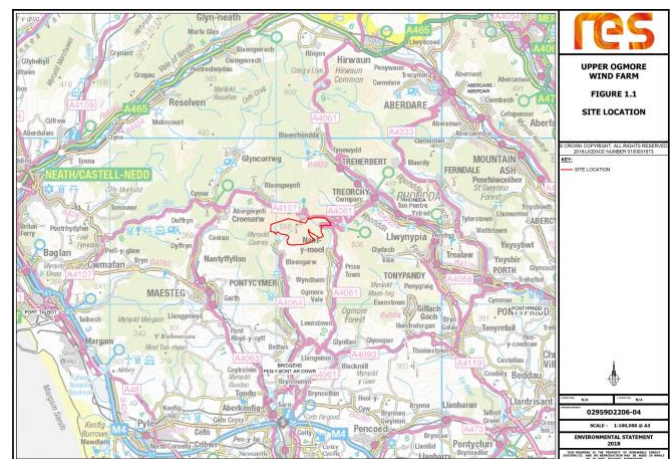


FIGURE 1: SITE LOCATION

2. Proposed Development

The planned Upper Ogmogre Wind Farm and Power Storage Unit, also known as the 'Proposed Development,' is situated on farmland south of the A4107 in Bridgend County, between Blaengwynfi, Nantymoel, and Blaengarw. A tiny component of the proposal border, pertaining to off-site entrance enhancements on a Natural Resources Wales forest management track, is situated in Neath Port Talbot County[2]. The planned project is situated at E29150 N19450.

The planning application includes seven horizontal-axis wind turbines with three blades each. Four turbines (T3, T4, T5, and T7) have a maximal tip height of 149.9m, while three turbines (T1, T2, and T6) have a maximal tip height of 130m. The overall capacity factor of the seven

turbines will be around 25.2 MW. The proposed project would comprise a new sites entrance, additional access paths, crane hardstandings, a supervision construction and substation composite, power inductors, basement wiring, power storage units, drainage systems, and improvements to a forest product path and affiliated plant felling, as well as a potential second deflection of the forest management track[2].

2.1 Project Description

The following elements might be continuous characteristics of the Proposal during its lifespan[2]:

Wind Turbines

The wind turbine business is advancing at a rapid pace. Designs are becoming more technically and economically sophisticated. Because the best turbine type for a certain area might vary over time, no definitive decision on a turbine for the Proposal has indeed been made. The most appropriate device would be selected in advance of construction, within the total height restriction reviewed as part of the EIA, and approved as an aspect of the DNS request[1].

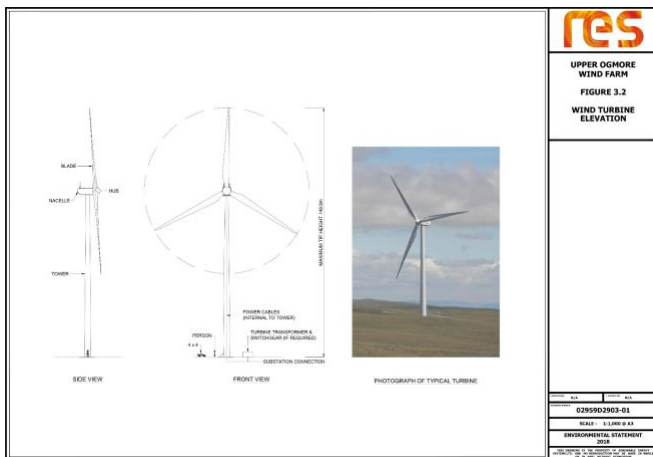


FIGURE 2: WIND TURBINE ELEVATION

Transformers and Controllers for Wind Turbines

Among most modern wind turbine designs, the transformer and switchgear are positioned beside the base of every building, however, for bigger turbines, certain builders embed the transformer in the nacelle or tower base. The transformer's role is to elevate the generating energy from 690 volts (V) to the greater transmission range of 33 kilovolts (kV) required to deliver the power into the grid. However, at this point, it is uncertain whether an internal or an exterior transformer would be employed, although[3] the former has been chosen in order to avoid a worst-case scenario (i.e. from a land-take and visual perspective).

Foundations for Wind Turbines

The wind turbines would indeed be sustained by

steel-enhanced concrete supports[3]. If the soil conditions are adequate, a gravity model framework will be employed. The specific volumes of concrete, reinforcing, dimensions, and levels may differ based on the type of turbine employed. Based on the local soil conditions, alternative turbine bases might also be explored for different blade positions. The size, components, and building methods connected with the turbine bases assessed as part of the EIA will be explicitly defined in the ES[1].

Hardstanding for Cranes

Mobile cranes are used to install the turbines. These need substantial hardstanding areas near turbine positions that can hold the weight of the towers on their outriggers. These usually comprise one primary permanent location near the turbine location, where even the primary turbine construction crane is placed. The ES will explicitly explain the specifications, resources, and construction methods related also with crane hardstanding examined as part of the EIA[1].

Tracks, Entrances, and Exits On-Site

To grant access to every turbine position inside the Project, a complex of entry tracks will be necessary. Current tracks will be used whenever possible and updated as necessary. Tracks will normally be 5m wide, with additional width added at curves and allowing locations as needed. RES will confer with authorized consultees about the placement of additional access tracks that intersect with common property, sensitive ecosystems, and hydrological characteristics. During the iterative planning process, the placement and appearance of every Location entry point as a result of the Project would be considered with the applicable Statutory Consultees. Swept route analysis will identify any off-site mitigating activities necessary to allow the flow of Abnormal Indivisible Loads (AILs).

2.2 Life of the Project

The Wind Turbine and Grid Storage Project are scheduled to operate for 35 years from the moment of commissioning. Once at the conclusion of this time period, a choice is made about whether to renovate, eliminate, or substitute turbines. If renovation or substitution is decided, suitable long-term plans will be submitted. Conversely, if the Development is decommissioned, all turbine elements, transformers, the substation, and accompanying structures would be removed. Particular components of the entrance tracks may stay on-site to guarantee that the proprietors remain able to benefit from better access. To minimize unwanted ground invasion, the cement foundations are often left in place. The polished concrete platform may be excavated to a certain depth, but the entire basis would be leveled over along with dirt and regenerated to return the land to its own previous state[4].

2.3 Maintenance Programme

Wind turbines and wind farms are intended to run mostly unsupervised. The planned design's turbine would indeed be outfitted with an automated system developed to monitor and manage a multitude of factors to guarantee good operation effectiveness (for example, begin, close, rotary orientation, blade inclinations, and so on) as well as to keep an eye on the situation (e.g. generator temperature). The command and management mechanism the necessity arises, the turbine will immediately shut down. In some instances, the turbines may come into full (if the shut-down was due to high gusts, for example). or that the power system had varied outside of the acceptable range), but then other closures (e.g. Overheating of the generator) would necessitate an examination and manual restart[5].

The construction essentially would include a comprehensive general Supervisory Control and Data Acquisition system (SCADA) which would constantly probe every one of the turbines and the high voltage (HV) connector. If a failure occurred that necessitated the intervention of an operator, the SCADA system would alert duty personnel through a mobile messenger service. The operational power system may be remotely controlled. The SCADA system would include a capability that would enable a distant controller to close down all or some of the wind turbines[7]. This is examined 24 hours a day, seven days a week.

3. Landscape and Visual

The baseline for the examination comprises landscape and visual receptors. The topography of the place and research region is characterized using observation methods as well as existing ecosystem feature evaluations and the LAND MAP database. People living in communities, visiting the local region for enjoyment, and commuting throughout the area on roadways are examples of visual receptors. Exemplary perspectives were chosen to measure the spectrum of visual receptors, and these perspectives were decided upon during dialogue[2].

The installation of seven big turbines beside access tracks, a powerhouse, a control tower, and the Energy Storage Facility (ESF) will have a substantial (major) impact on the scenery of the site as well as the Mynydd Llangeinwyr Uplands LCA throughout the operation. Substantial influences on terrain features are anticipated to be observed within a 2 km radius of the projected turbines, and even farther toward the north and west. The region in which important impacts will indeed occur is roughly constrained to the east even by the crest of Craig Ogwr, the summit of Mynydd William Meyrick, the settlers of Price Town, the south end of the primary crest of Mynydd Llangeinwyr, the peace deal of Blaengarw, the peak of Mynydd Caerau, as well as the sharp corner bend on the A4107. Further than

this radius, the impacts on terrain features would've been limited or insignificant, if not non-existent[1].

3.1 Legislation and Policy Planning

The UK Government has established a range of national policy statements, one of the most important among which are the overall National Policy Statement for Energy and the National Policy Statement for Renewable Energy Infrastructure. Several declarations were put before Council in June 2011 for authorization and then were approved on July 19, 2011[8]. Even though the main objective of the NPSs was to establish a legislative framework for decision-making on national level massive infrastructure installations in the power sector, they are not constrained to initiatives that are serious conditions by the UK State Secretary (including a wind turbine in Britain with more than 50MW of generation capacity). "In Britain and Wales, this NPS is expected to be a substantial element in making decisions on proposals that come under Town and Country Planning Act 1990 (as modified)," it is said. Additionally, "the power NPSs should accelerate the shift towards a low-carbon economy, allowing the UK to meet its goals for climate change faster compared to the present planning process". There is a clear concern and requirement to accelerate the transition to a low-carbon business (through the adoption of renewable energy technology).

3.2 National Planning Policy

The Welsh Government's land use development policies are outlined in Planning Policy Wales (PPW, Edition 9, November 2016). It sets the administration's aims for natural and historic preservation and enhancement, particularly the safeguarding of native ecosystems, trees and woods, and landscapes through legislative declarations (such as National Parks). The LAND MAP framework has been recommended as a valuable resource for landscape evaluation. PPW is supported by Technical Advice Notes (TANs), and TAN 8: Renewable Energy (2005) is relevant to this evaluation[1].

3.3 Renewable Energy TAN 8

TAN 8 Framework for Sustainable Energy outlines relevant government policies and guidelines on onshore renewable energy systems."Onshore wind energy has the highest potential for an increase in electricity produced from sustainable power within the short to medium term. To attempt to achieve the goal of wind energy manufacturing, the Construction Government appointed substantial technical tasks, which resulted in the decision that, for effectiveness and environmental purposes, a massive amount (over 25MW) of wind energy advancements should indeed be focused in particular places characterized as Strategic Search Areas (SSAs)[2]."

Bridgend County Borough Council, Neath Port Talbot County Borough Council, Rhondda Cynon Taf County Borough Council, and Natural Resources Wales have all been surveyed on the method for assessing the impacts on environmental features an optical attractiveness. RES and its advisers will keep working with every enterprise on LVIA-related issues all across the Environmental assessment[1].

Consultee	Date and Summary of response
BCBC	08 Dec 2017 The proposed technique of assessing landscape features and optical amenities, in addition to the creation of photomontages, was fully endorsed.
RCTCBC	09 Nov 2019 References to relevant details about local landmarks and the Planning Guidelines for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements (2014). RCTCBC has indicated that it endorses the project, despite the fact that it hasn't been accepted.
NPTCBC	05 Oct 2017 Clarification that providing guidance on perspective identification and reviewing the LVIA methodology would result in a non-statutory fee. This issue was not overtaken since NPTCBC will be able to provide feedback through the legal consultation procedure.
Planning Inspectorate Wales EIA Scoping Direction	May 2018 Recommended that now the landscape and visual

consequences of the Planned Project be studied and that every feature be incorporated in representations to the greatest extent possible. It was stressed that the control building, transformer, and storage facility, in furthermore to any structural elements, must be represented in just about any nearer representations.

The construction will strive for a cohesive and organized form in accordance with Welsh Government and SNH guidance. The ES will explain the reasoning for the ultimate design plan. The goal in planning the wind turbine intends to create a structure that is compatible with its surroundings in aspects of landform and structure, and that offers a simple visual impression, preventing the grouping of turbines as well as the separation of distant turbines in perspectives from critical sites. All aspects of the planned wind farm architecture will be addressed in terms of position and layout, and the LVIA will detail how well the layout of supplementary components has developed to reduce the visual effects, particularly from adjacent and vulnerable visual receptors[1].



Enhanced Phase 1 habitat surveys including the whole Site were conducted on July 24th and September 2nd-4th, 2014. On October 7, 2016, a study of the Bwlch forestry

track was conducted, from the track intersections with the A4107 to the southern end of the Pen-y-Cymoedd wind farm Site. The studies included recording habitats using conventional methodologies (JNCC, 2010) 17, and detecting any indicators of endangered or critically endangered, as well as the availability of adequate habitat for these kinds of species, in accordance with the IEA[2].

Honey Buzzard Surveys

There seem to be recordings of honey buzzard *Pernis apivorus* nest sites in the Neath Valley (about 10 km north-west of the Site), nevertheless, the particular sites are proprietary and have not been discussed in details. Consultees proposed a honey buzzard study to support the neighbouring Llynfi Afan (REP) proposal[2].

Merlin Surveys

Following the conclusions of merlin during the 2014 migratory bird surveys, merlin surveys were undertaken in 2015. Merlin breeding was thought to be extremely improbable inside the Site. The Area has no plants, and much less heavily cropped, dry grassland ecosystems predominate on the hillsides that define it. Considering this, it was assumed that merlin, if extant in the area, would reproduce elsewhere. Furthermore, mating bird walkover studies of the Site and its 500m boundary conducted during April and June 2014 yielded no reports of breeding merlin[2].

Bat Surveys

Regarding Bat Conservation Trust (BCT) study regulations, a daylight evaluation of a construction site within the Werfa mast substance, as well as a solitary onset survey (following an evaluation of the building's low likelihood of supporting roosting bats), was conducted as a security precaution in August 2016. Around 200m of the Site, there are no additional buildings or trees ideal for roosting bats. The expanded Phase 1 study of the suggested access route found no trees that may sustain a bat roost[2].

4.2 The Site

The property covers 362 acres and also is located on Werfa's peak (568m). The plain dips slowly down over all sides from this pinnacle, but only significantly to the northern edge, which parallels the official borderline over the highland. The plateau dips dramatically toward the valley borders on the opposite sides. The site encompasses the top hills of the source of the Garw Valley in the

southwest, falling to an altitude of roughly 300m. The steep terrain continues further than the area to the south all along the lengthy slope of Mynydd Llangeinwyr[9]. The eastern section of the site is made up of the small cwms just at top of the Ogmore Valley and the thin highland peaks that connect them. Small streams flow the property to the southeast and southwest.

There seem to be various public routes of access that cross the property, along with a bridle route that connects Cwmparc to the Garw Valley and walkways that connect with the other adjacent valleys and trace the Mynydd Llangeinwyr mountain south. In addition to the fenced meadows in the east,[4] the rest of the property is a freely accessible area due to the unfenced highland grazing. The A4107 joins the Afan Valley well with A4106, which unites the Ogmore Valley further with Rhondda Valley mostly in the northeast. Both routes go through the high slopes via a succession of hairpin turns. The intersection between the two roadways at Bwlch has a parking space and is indicated as a lookout on OS maps, with a sight northeast beyond Treorchy and distant from the area.

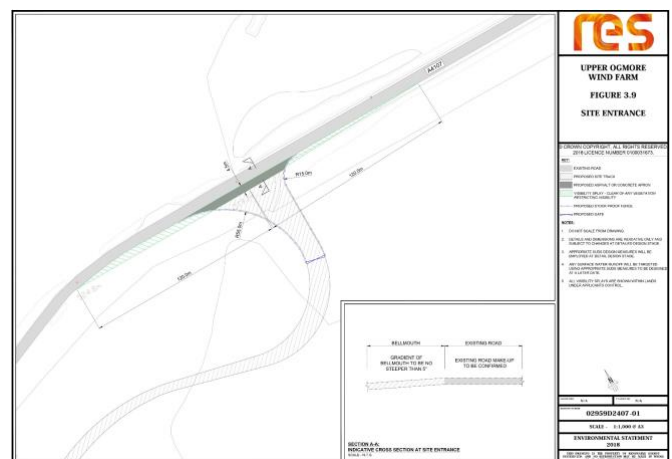


FIGURE 4: STE ENTRANCE

4.3 LAND MAP

LAND MAP is a GIS that stands for Geographical Information System based landscape service that records and evaluates landscape traits, attributes, and effects into a nationally uniform data collection. LAND MAP divides data through five 'perspective levels,' which are as specified: Geological Landscape, Landscape Habitats, Visual and Sensory Landscape, Historic Landscape, and Cultural Landscape are all examples of landscapes. Aspect levels are subdivided into[10] 'aspect regions,' which serve as LAND MAP methods with respect. Almost every feature region is indeed assigned a score that ranges from 'Excellent' (essential at such a global or national scale), 'Good' (significant at a local or city level), 'Medium' (significant at a community scale), or 'Low' (less or no relevance).

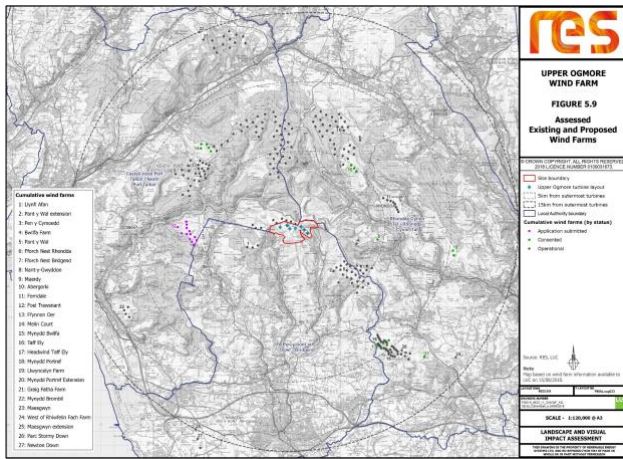


FIGURE 5: LANDMAP DESIGNATIONS

4.4 Baseline Assessment

Noise may have an impact on the surroundings as well as the level of well-being experienced by people and communities. The influence of noise, both during development and operation, is thus a substantial issue in the evaluation of planning permission. Wind turbine operational noise is caused by two categories of sound sources: aeronautical sources generated by the flow of wind from over turbine blades and mechanical sources caused by the gearbox, generator, and other sections of the powertrain. Baseline noise readings and their placement have previously been discussed with Bridgend County Borough Council's Environmental Health Department. In February 2018, an ambient sound survey was launched, as well as the results will be utilized to improve the acoustic evaluation[6]. Measures will be done to reduce the influence of existing programs on survey findings. The findings of measured values in 2013 to provide an acoustic evaluation of the Llynfi Afan Renewable Energy Park will also be utilized to provide a more comprehensive picture of the baseline ecosystem when applicable. Following the completion of the background sound measurement, an evaluation shall be conducted to identify the effect of development and operating sound in accordance with the appropriate recommendations.

4.5 Mitigation

It is well known that standard measures of landscapes and visual mitigation, including screen planting, are useless for wind turbine construction. Wind farm mitigation is typically restricted to the avoidance of possible immediate consequences through thorough placement and the avoidance of unwanted aesthetic effects by wind farm design. As a part of the planning process, the landscape and aesthetic goals for the Planned Project drew on the overall and LCA-specific criteria offered in the BCBC SPG on Renewable sources in the Landscape[7]. The turbines

and accompanying facilities would be built in accordance with agreed-upon Building Project Specifications, which might include plans for implementing different components of the operations to assist avoid potential negative consequences. These will be included in Construction Environment Management Plan (CEMP), which will be followed throughout the project[4].

5. Results

The advantages connected with the planned project's building phase (employment, salaries, Gross value added, and financial) are shown as a scale. This interval is the outcome of the use of two distinct methodologies for assessing direct building phase effects. The first method makes advantage of the projected value of an investment in Wales. We may predict GVA levels, employment, and salaries by allocating this to different economic sectors (using current and/or predicted statistics). The second method uses full-time job annual comparable statistics derived from previous RES wind farm operations. The input-output model is employed to determine the direct and induced effects of the investment/activity. In Wales, corporate rates are calculated using the Rateable Value (RV) of a building as well as the non-domestic factor ("poundage," or non-domestic rate (NDR)), less any relevant reliefs[1]. The RV is established by the Valuations Office Agency (VOA), whereas the NDR is established annually by the Welsh Government. As of 2018-19, the NDR, or "poundage," is the same in all 22 Welsh Council regions. Individual governments acquire all NDR income and submit them to the Welsh Government, which apportions them among city council areas according to their proportion of residents aged 18 and over. This is true irrespective of the amount of money raised by any county council. This money is utilized to finance the expenditures of local governments.

In relation to economic advantages, the sector of renewable energies provides environmental benefits while adding to the total energy supply. The development plan has 7 turbines, with each having an estimated capacity of 3.6 MW[2]. According to an estimated generating capacity of 38%, the quantity of energy generated by the Planned Project is enough to cover the demands of about 22,00014 residences per year. This is more than a third of the existing (2016) existing homes in Bridgend County Borough.

6. Conclusion

The planning application would provide ecological and economic advantages to the surrounding community and area. Considering the social and financial demand for additional job possibilities, private enterprise development should be welcomed[1]. Implementation of the Planned

Project would provide employment that matches the regional area's skill set. Corporation tax payable to regional and local governments will rise during the Planned Project's operating phase. The planning application will also contribute to the Welsh and UK government's attempts to meet energy objectives. During the planning stage of the Proposed Site, RES conversed with the owners of the two communications towers at Werfa. As a consequence, the turbines have indeed been placed at appropriate setback ranges so that they do not conflict with the poles. Additional monitoring access to the poles is necessary through a tiny existing route that traverses the projected wind energy track at one point. RES shall retain access to the masts throughout implementation and for the duration of the Proposed Site. In accordance with Western Power Systems, the 11 kV overhead line that supplies the communications towers will be rerouted and undergrounded at T7 to guarantee adequate clearance distances.

7. References

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