

ACBA 7004 Environmental Planning and Policy

The Penderi Solar Farm EIA

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1. Introduction

The Paris Agreement has set an ambitious target of limiting global warming below 2°C, preferably to 1.5°C (United Nations, 2015). The energy sector has an essential contribution to make in the achievement of net-zero greenhouse gas (GHG) emissions. As requested by the COP26 Presidency, on 18th May 2021 the International Energy Agency (IEA) will publish its road map for the energy sector to reach net-zero GHG emissions by 2050, ahead of the Glasgow hosted COP26 in November 2021 (IEA, 2021). The IEA is anticipating that to meet this target, investment in renewables will need to rise from \$370bn to more than \$1.6 trillion per year by 2030 (Biol, 2021).

Solar energy generation in the form of photovoltaic (PV) installations is the one of the fastest expanding energy technologies globally and accounts for over 50% of the green energy market (REN21, 2020). The Climate Change Act 2008 committed the UK to GHG emissions reduction of 34% by 2020 from 1990 levels and the resulting UK Renewable Energy Roadmap proposed 20 GW of PV could be installed by 2020 (UK Government, 2011). By the end of December 2020, the UK has the solar generational capacity of approximately 13.5GW (Figure1), 44% of that coming from large scale installations of greater than 5MW capacity (UK Government, 2021), however according to the Solar Trade Association, there are currently a further 13GW worth of projects at various stages in the planning process (Solar Energy UK, 2021).

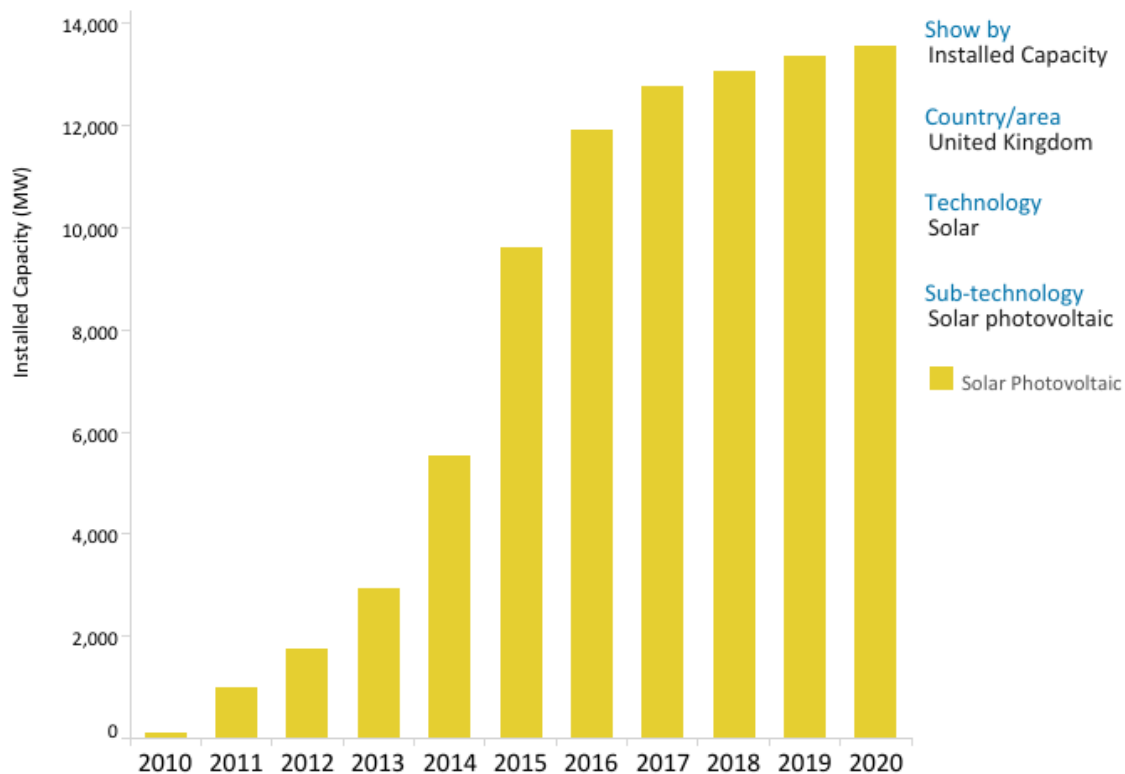


Figure 1. Installed Capacity Trends (IRENA, 2021)

Analysis by the UK Department for Business, Energy and Industrial Strategy calculates that between 2025-2040, solar parks will provide the cheapest electricity ahead of offshore or onshore wind, gas, and nuclear (BEIS, 2020). In September 2017, Cabinet Secretary for the Environment, Lesley Griffiths, announced new energy generation targets to continue carbon reduction efforts and for the benefits

to be shared within Wales. The targets included Wales generating 70% of its electricity consumption by 2030; 1 Gigawatt of renewable energy capacity to be locally owned by 2030 and all new renewable energy projects to have an element of local ownership (Welsh Government, 2017).

The case for a massive expansion in this cheap, low maintenance and clean energy seems overwhelming, however there are drawbacks to large scale PV installations; most obviously the significant use of land, estimated at 2 hectares per MW of capacity (NFU, 2013); the visual impact of the installation; and the potential loss of or impact on agricultural land or habitats. This report will evaluate the current process by which planning authorities use Environmental Impact Assessments (EIAs) to balance the need for large new energy generation schemes against the effects on communities and biodiversity using the proposed Penderi Solar Farm as a case study.

2. Literature Review of the EIA

2.1. Legal Framework

Although the first European Union directive on EIAs was enacted in 1985, EIA Directive (85/337/EEC), it has been amended several times since to increase the types of projects covered, establish minimum information requirements, and improve public participation. The current EIA Directive (2014/52/EU) includes amendments to introduce timeframes for the different stages of the process, simplify the screening process, make the EIA reports more understandable to the layperson, increase the transparency of decision-making and ensure the monitoring of mitigation measures (European Commission, 2014).

In Wales, this most recent EU directive was implemented via the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. Although, the directive also required member states to set up an easily accessible portal for registering all EIAs (Jha-Thakur and Fischer, 2016) there is no evidence that this is yet up and running in Wales.

An EIA is required for projects likely to have significant environmental effects on account of their scale, type or location (Orford and Henderson, 2017) and is compulsory for all Schedule 1 and some Schedule 2 developments (dependent on scale) as listed in the 2017 Regulations.

2.1.1 Habitat Regulations Assessment (HRA)

The status of protected/conservation areas within the planning process are further enhanced by EU Nature Directive 92/43/EEC (the Habitats Directive) transposed into UK legislation by the Conservation of Habitats and Species Regulations 2017 and the Conservation of Marine Habitats and Species Regulations 2017 (the Habitat Regulations), included within this are Sites of Community Importance (SCIs), Special Areas of Conservation (SACs), candidate SACs, Special Protection Areas (SPAs) and also Ramsar wetland sites, possible SACs (pSACs) and potential SPAs (pSPAs), commonly known as Natura 2000 or European sites (Davies and Dodds, 2017). Habitat Regulations Assessments (HRAs) are carried out to minimise or avoid a proposed development having an impact on one of these sites. The developer provides the 'competent authority' (usually the local authority) with sufficient information to firstly determine whether a HRA is required and then to make an 'appropriate assessment' (AA) (Planning Inspectorate, 2017). During the assessment process the "statutory nature conservation body (SNCB)", in Wales, Natural Resources Wales (NRW), must be

consulted (The Planning Inspectorate, 2019). According to 2017 Habitat Regulations 63 (5-6) only projects that have been assessed as not having an adverse impact on a Natura 2000 site can be approved. However, under certain circumstances, a derogation, (Article 6(4)) in the Habitats Directive, allows a development to still be approved even if it affects a Natura 2000 site for reasons of over-riding public interest, no feasible alternatives, etc. In this case, the responsibility for the final decision rests with Welsh Government Ministers.

2.1.2 Development of National Significance (DNS)

In 2015, the Planning (Wales) Act 2015 created a new category of project known as Developments of National Significance (DNS). These include large infrastructure projects of national importance such as power stations, airports, etc. The consent for projects that qualify as DNS are considered by the Planning Inspectorate (PI), rather than the local planning authority (LPA), who writes to Welsh Ministers, who make the final decision, recommending planning permission be granted or not. The process is prescriptive with time limits for each stage which gives a certainty to the timescale for both the developer, stakeholders and residents. The DNS thresholds were extended in 2019 to include all energy generation developments between 10MW and 350 MW of capacity (The Planning Inspectorate, 2019), as a result, the Penderi Solar Farm at up to 38 MW capacity qualifies as a DNS and the planning application will be through the Planning Inspectorate. DNS application differ from a standard EIA in that there is an extensive pre-application consultation period as shown in Figure 3. This is submitted as a Consultation Report with the DNS application. This “front-loading” enables issues to be raised and resolved before the application is submitted (Warren-Thomas and Henderson, 2016).

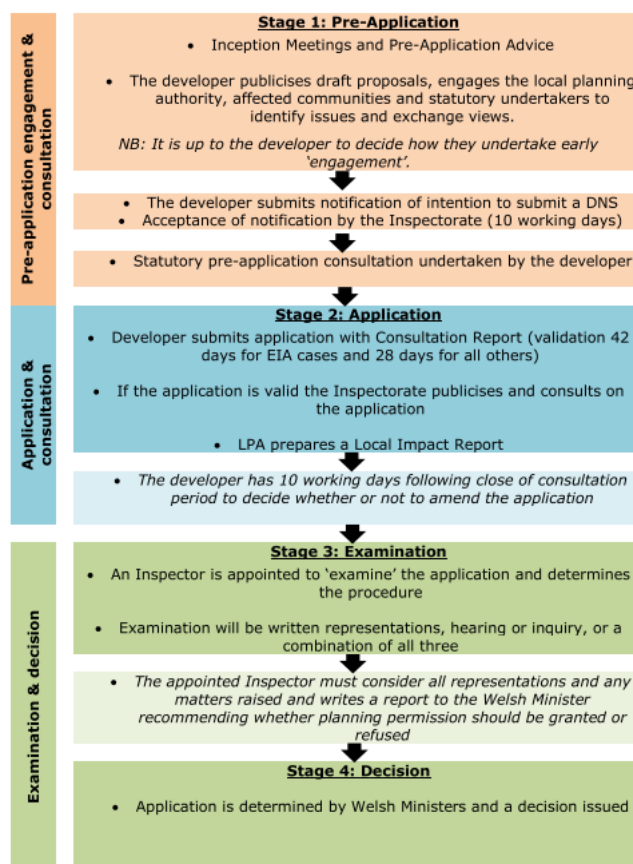


Figure 2: Developments of National Significance (DNS) planning process

2.2 How the EIA operates in practice.

The Environmental Impact Assessment (EIA) is the process by which a planning authority considers the potential positive and negative environmental impacts of a proposed development. In addition to being an aid to decision-making for planners, according to (Glasson and Therivel, 2019), the EIA is also an opportunity for engagement with stakeholders, an aid to the development of project actions and a framework for sustainable development. Since their inception, EIAs have been viewed as a policy tool that, by identifying and mitigating environmental threats and impacts in proposed developments, can enhance environmental protection, particularly of protected areas (Alberts et al., 2021), despite being regarded by critics as an expensive and time-consuming burden for businesses (Morrison-Saunders et al., 2015). The EIA process is vulnerable in times of economic downturn and can be a scapegoat for a lack of investment (Enríquez-de-Salamanca, 2021). Government guidance describes the purpose of the EIA is to ensure that the planning authority knows the full extent of the likely significant impacts of a project on the environment and to take these into account, but that EIA should not be a barrier to growth (UK Government, 2020). Some of the criticisms of the EIA process are that it is inherently a political system and contains value judgements that are not always based on good quality data simply because of time constraints (Glasson and Therivel, 2019). (Enríquez-de-Salamanca, 2021) suggests that the system can be particularly weak when the developer is a government agency or department (compared to a private company) and when there is political pressure on the EIA agency from within the same government or politicians to approve a project and is concerned that the EIA can be used as a political tool to justify projects. As the world attempts to economically recover from the COVID_19 pandemic, there is a chance than even greater pressure will be placed on EIAs to support development ahead of environmental impacts (Enríquez-de-Salamanca, 2021). The EIA is not about whether a project is required but whether there is an alternative location or approach; can it be made more sustainable; and can the worst impacts be mitigated against. It provides the decision maker with a level of discretion during the decision process (Retief et al., 2020). Ultimately, the EIA is a decision-support tool, not the decision maker.

2.3 The EIA Framework

It is the responsibility of the developer to complete the EIA process, the results of which are submitted to the planning authority with the planning application in the form of an Environmental Statement (ES). (Figure 3)

2.3.1 Screening and Scoping

Screening is the process by which the planning authority determines whether or not a proposed development needs an EIA. If an EIA is required, the developer can request from the planning authority formal direction of what needs to be included in the EIA (known as scoping). (Banhalimi-Zakar et al., 2018) highlights inadequate scoping as a cause of impact assessments that are too lengthy, lacking focus and do not address the key issues. The preparation of a scoping report should involve all stakeholders and highlight the resources or concerns, such as, the ecological data that needs to be collected and assessed, for a decision on the development to be made (Canter and Ross, 2014). The required contents of the scoping report are listed in Regulation 33 of the 2017 Regulations, scoping reports submitted to the planning inspectorate result in a formal scoping direction document, for which the inspectorate consults with such statutory bodies as the LPA,

NRW, CADW, etc. (Planning Inspectorate, 2019) Effective and focused scoping can also save the developer time and money by avoiding unnecessary impact assessment of less relevant issues (Morrison-Saunders et al., 2015).

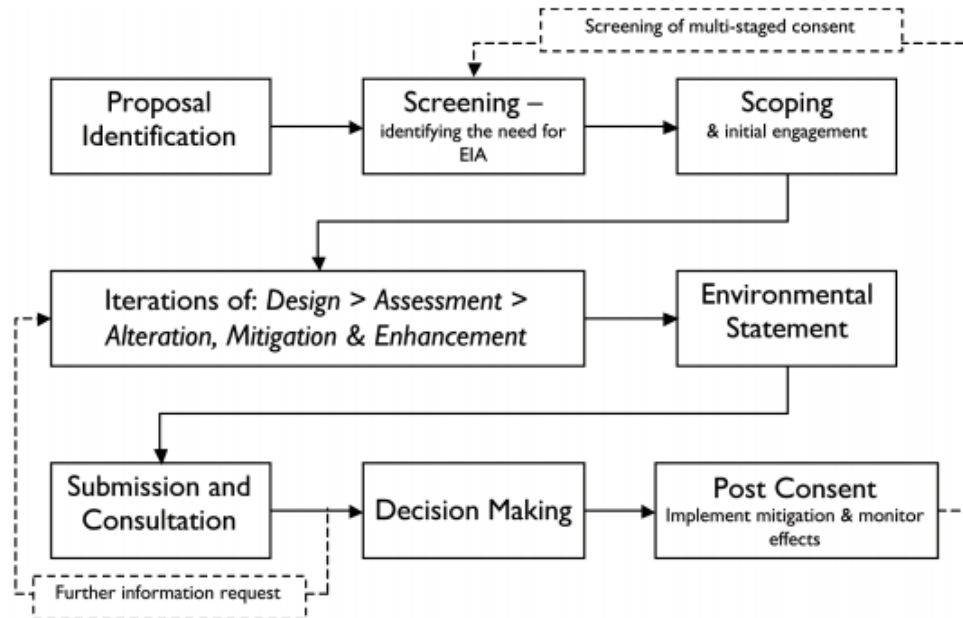


Figure 3: The EIA Process (IEMA, 2011)

2.3.2 Consultation

There are two types of consultation within in the planning process, the pre-application engagement during scoping and the formal consultation period. Unlike onshore wind, there is no obligation for solar project developers to consult the public prior to submitting a planning application during a typical planning process, however, the solar industry bodies highly recommend it (BRE, 2015). Their reasons include reducing opposition, identifying issues, local knowledge, meeting the expectations of local councils, building relationships with those who will potentially neighbours for over 25 years. It can be the periods of consultation during which designs can be refined and concerns answered through engagement with statutory bodies, NGOs and the public, which can really benefit a project, are at most risk by those that want to streamline the process and reduce timeframes (Alberts et al., 2021).

2.3.3 Mitigation and Monitoring

(IEMA, 2011) identifies three types of mitigation; inputs during the EIA process which influence the design; practices during construction which reduce or avoid impacts; these might be stated in a separate Construction Environmental Management Plan (CEMP) and actions to be taken following consent and completion, e.g., measures to improve habitats; these will often be included in a Landscape & Ecological Management Plan (LEMP).

Monitoring the impacts of developments and compliance with conditions has arguably been the weak link in the EIA and there has been little research done on the follow-up of EIAs (Jones and Fischer, 2016) and it is often difficult to establish direct causes between a development and a resulting effect within a dynamic environment. Often once a project is completed, the team involved moves on; there is then a lack of knowledge accumulation as to whether mitigation measures are successful or not (Wood, 2000). Responses collated by (Jha-Thakur and Fischer, 2016) suggest that both EIA consultants and academics felt that more importance should be placed on the monitoring which was often weakened by changes in the project teams over time or by simply not being a priority for the developer post-construction, who may have passed responsibility for the project on to a client. Practitioners often focus on mitigation measures that can be completed during construction rather than measures that need managing over time which reduces the opportunity for monitoring (IEMA, 2011). There is a sense that as more businesses wish to highlight their green credentials, monitoring can be used as a way of demonstrating environmental progress but members of IEMA surveyed believe that legislation is the key to increasing emphasis on monitoring (IEMA, 2011). The most recent European EIA Directive (2014/52/EU) indeed obliges member states to monitor projects that have significant environmental impacts and their mitigation responses.

3. Environmental impacts of solar farms

A review by (Lovich and Ennen, 2011) highlights multiple effects on wildlife during the development and operation of solar farms, the loss and fragmentation of habitat; increase in invasive species; noise; mortality due to collisions; physical barriers to movement and therefore gene flow; impacts on the microclimate. There is also the impact on soil, such as increased erosion following the removal of vegetation; soil-shading and sealing; impacts on soil carbon cycling and seedbanks (Agha et al., 2020; Delfanti et al., 2016). Depending on the species, solar farms can attract or deter and they can be imperceptible or mistaken for a habitat, such as a waterbody, causing death, injury or stranding (Kagan et al., 2014; Smith and Dwyer, 2016). Migratory birds seem to be disproportionately impacted by solar farms which highlights the potential impact of siting solar farms near to breeding or over-wintering sites (Walston et al., 2016). Studies also show that renewable energy facilities can have a negative impact on species diversity, richness and distribution within their boundaries with increased non-indigenous or invasive plants and less rare species (Agha et al., 2020).

The primary mitigation strategy to reduce impacts on wildlife population is using data to support the siting of developments and this decision making could be improved by ensuring suitable monitoring and data collection, both pre and post construction (Conkling et al., 2020). (Beck et al., 2012) suggested restricting solar farms to low-quality land, such as brownfield sites or near major roads and railway lines or degraded and contaminated land (Weinzettel et al., 2013). (Rehbein et al., 2020) estimates that so far 17.4% of large renewable energy farms (larger than 10 MW) have already been built in conservation areas and that this is set to expand to 42% when facilities in the pipeline are included. Different regions have developed models using GIS to identify suitable locations for solar sites using factors such as slope of the land, proximity to electrical connections and good access whilst avoiding protected areas, sites of species richness, historical landscapes, etc., (Palmer et al., 2019; Thomas et al., 2018) This can be an attempt to overcome the fact that energy and conservation policies and frameworks are often not integrated leading to conflicts (Kim et al., 2021). The Welsh Government is currently developing an Energy Atlas for Wales to identify the most suitable locations for siting both onshore wind and solar energy sites considering a range of constraints such as

European protected sites, National Parks, urban areas, high quality agricultural land, etc (Ove Arup & Partners, 2019). The aim is to assist regional and cross-authority planning, the development of local development plans (LDPs) and the coordination of investment with the National Grid and local distribution network operators. This will also help with mitigation of the cumulative effect of the development of several small or medium sized solar farms within areas of agricultural or natural habitats that may have the same environmental impact, or even greater in terms of habitat fragmentation and visual impact, as the development of one very large solar farm which may face a more challenging approval process ((Kim et al., 2021).

Despite the scale of the expansion in solar farm development, there is limited understanding of the direct impacts on wildlife and changes to wildlife behaviour (Chock et al., 2020) with a surprisingly low number of studies. This suggests there is a lack of monitoring of sites following completion and little assessment of the effectiveness of mitigation strategies such as the design of the development. There are concerns that the relentless expansion without ongoing research into environmental impacts could lead the industry vulnerable to some of the legal and environmental problems that beset the early days of the wind industry (Bailey et al., 2014; Brown and Escobar, 2007)

(Semeraro et al., 2018) are much more positive about the potential of solar farms as green infrastructure that can create a conservation gain, particularly when built on previously intensively managed farmland. They suggest that actively managed solar farms can become a site of enhanced biodiversity by developing wild-flower meadows between panel arrays, creation of ponds and micro-habitats, imposing bans on pesticide use and becoming a source of pollinators for surrounding farmland. Their project in Italy demonstrated that solar farms could be used to introduce “photo-ecological gardens” with educational, recreational and economic, as well as environmental benefits as green infrastructure in urban areas. In the UK, (Montag et al., 2016) survey of 11 solar farms showed that wildlife-focused management regimes improve biodiversity compared to surrounding farmland. Where plant biodiversity is improved using species rich seed mixes when reseeding the site and conservation grazing regimes, there is an increase in insect biodiversity providing pollinators for surrounding farmland and that solar sites can be particularly important for birds of conservation concern. They suggest that there are few higher value crops (in this case, solar power) that a landowner can supply, earning a significant income whilst leaving most of the land available for biodiversity and habitat creation. Cleve Hill, what will be the UK’s biggest solar farm, providing 350MW from a 900-acre site, is due to start construction in 2021. Approved by the UK Minister for Business, Energy & Industrial Strategy against objections from conservation bodies (the site is surrounded on three sides by a Ramsar, a SPA and a SSSI); it has included or had to include a dedicated Habitat Management Area of 138 acres for lapwing, brent geese, golden plover and marsh harrier. The company are advertising an estimated net biodiversity uplift of 65% to mitigate against the environmental impact (Cleve Hill Solar Park, n.d.; Wright, 2021).

4. Review of the Penderi Solar Farm EIA

The Penderi Solar Farm development is located at Blaenhiraeth Farm, Llangennech, Llanelli, SA14 8PX. The development covers approximately 143.6 hectares (ha) in size, of which 79ha will be used for the siting of the arrays of photovoltaic panels and associated infrastructure.

4.1 Scoping

As the Penderi Solar Farm (PSF) is a DNS application, the developer submitted a scoping report to the Planning Inspectorate, including all the information required by the 2017 Regulations. Of the listed factors likely to be affected by the development, in their report PSF 'scoped in' biodiversity & nature; landscape & visual; human beings and 'scoped out' with justifications, agriculture; air quality; cultural heritage & archaeology; traffic & transport; hydrology & ground conditions. The resulting scoping direction, containing responses from statutory consultees, largely agreed with the scoping decisions, except for hydrology & ground conditions which were required to be 'scoped in' based on the hydrological link afforded by the Afon Morlais and Afon Dafen tributaries which directly links the development to European sites as shown by the location map (Appendix 1). The applicant was corrected in their assumption that there was only one European site affected (the Carmarthen Bay and Estuaries SAC) and was required to additionally reference European sites, the Burry Inlet SPA and Ramsar and the Burry Inlet and Loughor Estuary SSSI. Although PSF had proposed substantial buffer zones around the tributaries, including hydrology in the ES would enable pollution risks to be highlighted and mitigated against. The PI also suggested the applicant consider input into the ecology chapter from non-statutory consultees, reference the cumulative effects of this development together with others locally and requested several additional reports to be submitted with the application that although outside the scope of the ES (which should focus on significant effects) provide evidence to support the EIA or mitigation of the development. These included a Landscape and Ecological Management Plan (LEMP), Glint and Glare Assessment, Detailed Landscape Design Statement, Transport Statement and Construction Ecological Management Plan (CEMP).

This scoping exercise was thorough and detailed. It streamlines the ES to the specific information that the planning authority and statutory consultees require to assess the significance of the project's environmental impacts whilst preventing unnecessary work. The PSF has clear guidance of what exactly what information they are expected to provide within the ES which is a benefit of this formal process of scoping direction but relies on well-funded and staffed public bodies who have a clear understanding of the potential impacts of different types of development and comprehensive knowledge of the sensitivities within their spatial area.

4.2 The Consultation Process

During the PSF application process there were a number of statutory and non-statutory consultation periods as shown in Figure 4. The original non-statutory phase included consultation with the local community, Carmarthen County Council, including an EIA screening request prior to the project's later capture within DNS legislation. Community consultation included meetings with affected community councils, leaflet drop to surrounding homes and businesses and two public presentations/exhibitions advertised in the local press, over 40 people attended the presentations which considering the location of the development is surrounded by farmland and isolated houses, suggest that a significant proportion of potentially affected residents took part or were aware of the development and had the opportunity to take part.

The Statutory Pre-application consultation met all the requirements of the Article 8 of The Developments of National Significance (Procedure) (Wales) Order 2016 (Appendix 2) and exceeded the minimum length of the consultation period by 9 days. All the relevant application documents were and still are available on the development's website <https://www.penderisolarfarm.co.uk/> with contact details.

CONSULTATION PHASE	KEY DATES	DESCRIPTION
Non-Statutory engagement and consultation	From 2015 to July 2019	Non-statutory discussion with public and statutory consultees through extensive informal consultations. Public exhibitions over the preliminary designs were held in 2015.
Environmental Impact Assessment Scoping Direction	12 March 2019 to 3 May 2019	Applicant submitted request for a Scoping Direction under Regulation 33 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 on 12 March 2019. The Planning Inspectorate issued their Scoping Direction on 3 May 2019.
Notification	June 2019	In June 2019, the applicant gave formal notification to the Planning Inspectorate of its intention to submit a planning application.
Acceptance Period	From 27 June 2019 to 26 June 2020	Notice of Acceptance provided by Planning Inspectorate on 27 June 2019. Notice of acceptance is valid for 12 months and the statutory consultation and submission of application must be made by 26 June 2020.
Statutory pre-application consultation	From 7 August 2019 to 27 September 2019	The statutory pre-application consultation was carried out for 51 days, starting on Wednesday 7 August 2019 and finishing on Friday 27 September 2019.
Post-Statutory Engagement	September 2019 to January 2020	Consultation and continued engagement undertaken between September 2019 and December 2019 to keep stakeholders informed of progress and to keep consultees informed on final minor refinements to schemes.

Figure 4: Penderi Solar Farm consultation process (Volitalia Ltd, 2020a)

As a result of the consultation phase and in response to feedback from both the public and consultees, the plan of the development went through several design iterations mainly to reduce the visual impact of the development from local roads, a public footpath, individual dwellings and to enhance biodiversity. These design refinements suggest that the consultation phase worked as it should with the developer taking on board suggestions and criticisms. The process showed that solar farms in rural areas tend to have a very significant visual impact on a small number of individuals who have the misfortune to have properties in a direct sight-line due to their position or elevation, unlike other developments for example, which may impact on air or noise quality and where the impact is potentially shared more evenly through a community. The concerns of these residents were taken seriously, demonstrated by responses by the LPA and resulted in additional research and reporting on the visual impact of the development later in the process.

4.3 Environmental Statement (ES)

The submitted ES contained the following chapters and a Non-Technical Summary: -

1. Introduction
2. Assessment Scope and Methodology
3. The Development Site and its Environs
4. The Development
5. Climate Change, Energy, Planning Policy & Guidance
6. Landscape and Visual
7. Ecology and Nature Conservation
8. Hydrology and Ground Conditions

The full contents listing detailing included plans, surveys, reports and management plans are included as Appendix 3.

This report will focus on chapters 6 & 7 which form the main assessments of the potential negative environmental impacts, the key environmental hydrological links to the European sites are covered within the Ecology chapter and with mitigation measures during construction addressed in the CEMP.

4.3.1 Landscape and Visual

There is minimal impact on the landscape elements because there will be no significant excavation or soil displacement at the site, field pattern and existing trees will remain in place and when the solar arrays are removed in 30 years' time the physical landscape will be largely unaltered.

The solar arrays will have a significant impact on visual amenity of the landscape. There are several locations such as from a public footpath where the impact will be noticed and others where due to the undulating landscape the site will be hidden. The mitigation measures such as planting new sections of hedgerows and managing existing hedgerows to increased heights will go some way to disguising the site but these measures will take time to establish. The developer has also attempted to mitigate the visual impact by taking on board comments from consultees and the design of the site has changed several times with the removal of arrays from the prominent areas of the site and from proximity to a sensitive area of fen. Because of the particular impact on a number of residential properties and objections both formal and informal by residents, a Residential Visual Amenity Assessment was undertaken which further refined the design. The consideration of the visual impact on residents within the vicinity of the farm does not appear to be fully resolved and it will be ultimately a value judgement by the Inspectorate as to how the impacts on them are balanced against the viability of the development needed for cheap, clean energy.

It is within this chapter that the cumulative effects are discussed but only in relation to the visual amenity effects of further solar farms within the landscape not in relation to, for instance, the behavioural impact on bird species as discussed previously. This seems a very narrow interpretation of the term cumulative effects but is reflected in a recent report commissioned by Carmarthenshire County Council on Solar Farms (Anthony Jellard Associates LLP, 2019).

4.3.2 Ecology and Nature Conservation

The development's appointed ecologists undertook a series of habitat, bird and species surveys as shown in Figure 5.

Date of Survey	Type of Survey
20 th October 2014 updated 26 th April 2018	Extended Phase 1 Habitat survey
13 th & 28 th January, 3 rd February, 12 th February 2015 updated 28 th November, 18 th December 2017, 16 th January, 27 th February 2018	Wintering Birds survey
13 th & 28 th January, 4 th July 2018	Dormouse survey
16 th April, 24 th April, 19 th May, 5 th June 2015 updated 26 th April, 9 th May, 31 st May, 4 th July 2018	Breeding Birds Survey

Figure 5: Penderi Solar Farm Ecological Surveys (Votalia Ltd, 2020b)

Data was acquired from the West Wales Biodiversity Information Centre, including data on protected and red data book species, Species of Principle Importance, LBAP species and invasive species within 1 Km radius of the site. The surveys and data identified a number of ecological features of the site (Figure 6).

Designated sites	Habitats	Species
Burry Inlet SPA and Ramsar	Hedgerow	Badgers
Burry Inlet and Loughor Estuary SSSI	Semi-improved grassland	Bats
Carmarthen Bay and Estuaries SAC	Fen	Dormice
Rhos Cefn Bryn Wildlife Trust Reserve	Streams/rivers	Otter
	Woodland	Breeding birds – open habitat
	Marshy grassland	Breeding birds – boundary habitat
	Improved grassland	Wintering birds – open habitat
	Wet ditches	Wintering birds – boundary habitats
		Reptiles
		Polecat
		Common toad
Key: Important ecological feature (included in further assessment and mitigation) Not important ecological feature Not important ecological feature (Included due to legal protection)		

Figure 6: Penderi Solar Farm Ecological Features

The majority of significant impacts were anticipated to occur during the construction phase with some habitat loss and fragmentation due to the removal of some sections of hedgerows to allow access, disturbance and mortality due to construction activities; degradation of habitats due to pollution and dust from construction activities. It is expected that during the operational phase impacts will be minimal apart from uncertainty over the impact of the arrays on ground nesting birds. Following mitigation measures described in the Construction Ecological Management Plan and Landscape and Ecological Management Plan (LEMP), the ES concluded that adverse impacts of the development are largely non-significant and that from a baseline of relatively low existing ecological value the solar farm would actually enhance biodiversity on the site and in the surrounding area.

The Welsh Government advises planning authorities to look for biodiversity enhancement or net benefit within new developments (Welsh Assembly Government, 2009). The Penderi LEMP attempts to deliver this through mitigation and enhancement measures, for example, by creating new habitats through planting appropriate local native species within new and existing hedgerows and re-seeding of bare ground with appropriate wildflower mixes with species added to benefit moth Species of Principal Concern. The plan will also create habitats and shelters, by way of the installation of a variety of bird, dormouse and bat boxes, the creation of scrapes for snipe and hibernacula for invertebrates, reptiles and amphibians. The grasslands will be subject to conservation management with sheep grazing and late summer hay cuts with field margins managed as for rough tussocks and hedgerows will be managed on a three-year rotation to increase their

height to 3m to increase biodiversity and provide visual screening of the solar arrays. The site will also be subject to a monitoring strategy with botanical surveys in June/July in years 1, 5, 10, 15 & 20, breeding and over-wintering bird surveys in years 2, 5 & 20 with inspections of bird, bat and dormouse boxes at each survey visit. Reports will be sent to the LPA following each visit and the LEMP will be reviewed annually by a steering group. Whilst this generic type of monitoring will assess changes in populations, it does not address, as neither does the EIA as a whole, the specific impacts of solar arrays on bird behaviour and mortality as discussed in Chapter 3 and its mitigation.

Due to the distances of the hydrological link from the development site to the European sites 5.1km and 10km and the resulting unlikelihood of sediment or pollution reaching that far before being deposited; the lack of disturbance at this distance; the lack of shared habitat type and resulting habitat fragmentation or degradation associated with the European sites; the Habitats Regulation Assessment Screening Matrix also concluded that there would be no significant effect.

The conclusion of the ecologists is in line with research from other solar farms, in that even moderate management of these sites for biodiversity quickly improves the ecological value of the site to above that of the surrounding conventionally managed land (Montag et al., 2016). The comprehensive monitoring planned will go some way to addressing concerns within the academic literature discussed previously about the lack of knowledge accumulation from the success or not of mitigation measures within EIAs.

4.3.3 Community Benefits

Community Benefit Arrangement (CBAs) describes the arrangement between a developer and host community as an attempt to rectify the disproportionate impact on local communities of particularly, energy developments which are deemed in the national interest (Glasson, 2017). The developer can provide new community infrastructure or financial support in recognition of the impact. Potential community benefits were mentioned briefly by Carmarthen County Council within the scoping document as something that PSF might consider but was not referenced within the application documents, including the economic benefit report. A CBA is now under discussion with the 3 affected community council prompted by Policy 17 of the Future Wales plan which states "Proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental and cultural improvements to local communities" (Welsh Government, 2020). A sum of £100,000 over 10 years has been proposed but is felt by the county council to be insufficient and does not compare with the going rate of £5000 per MW per year for recent wind power projects or the £1000 per MW per year used as a minimum benchmark for solar farms in Dorset (Glasson, 2017). At the Dorset rate the communities local to PSF would be in line for benefits of £38,000 per year for reparations.

5. Conclusion

The Penderi Solar Farm EIA highlights some good practice within the EIA process and in theory the formal process surrounding scoping should ensure that all the relevant information is available and that the decision-making process is concluded in a timely manner. However, this has not been the case and post application there have been delays due to the COVID19 pandemic, amendments to the original planning application, resulting in a further consultation period, a need to consider a new Welsh Government policy document (Welsh Government, 2020) and a series of hearings in March 2021 to address remaining areas of concern (Carmarthenshire County Council, 2021). The final decision is now due (April 2021). This extended process is either the EIA system working as it should

with a resulting decision that can be trusted to have weighed up all the evidence available or it is a costly process that holds up much needed green energy projects, depending on which side of the fence you are viewing the project from.

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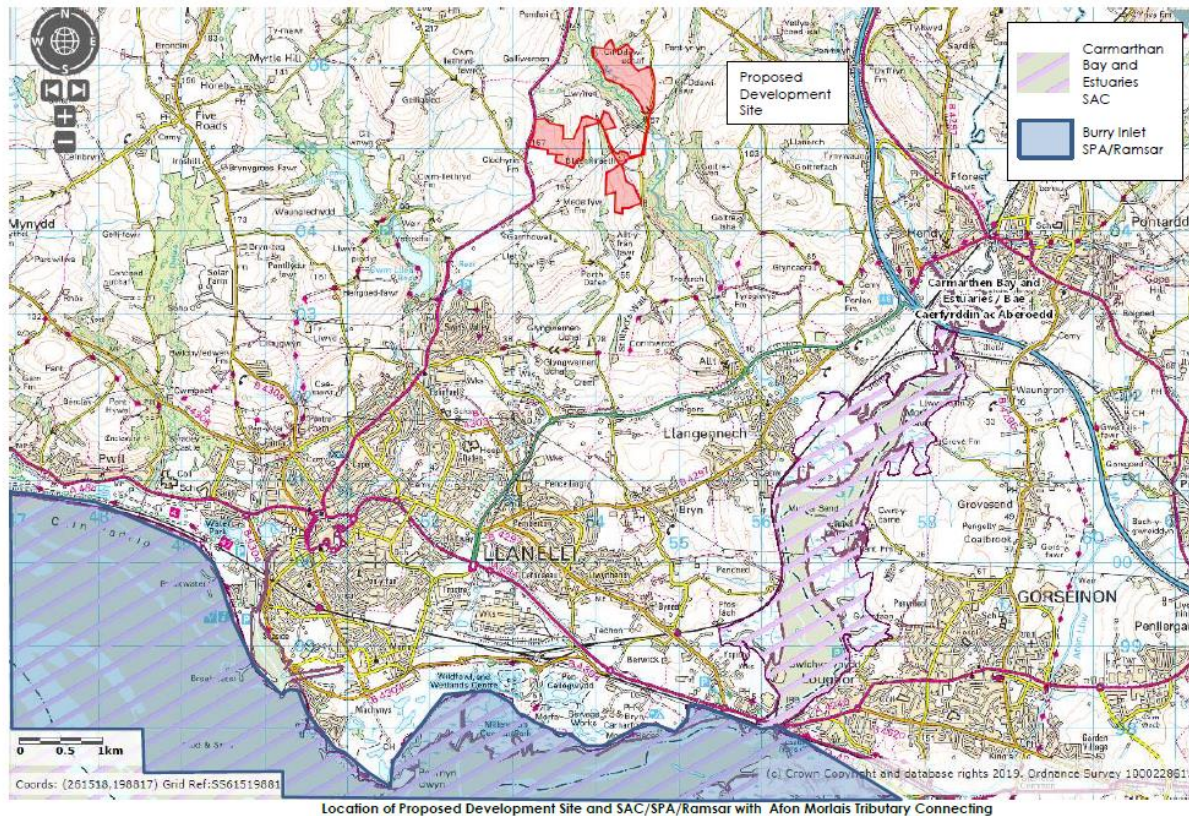
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Appendix 1

Location of development and European sites



Appendix 2

Article 8 of the Developments of National Significance (Procedure) (Wales) Order 2016

Publicity before applying for planning permission

(1) The applicant must publicise the proposed application by—

(a) giving requisite notice—

(i) by site display in at least one place on or near the land to which the proposed application relates for not less than 42 days;

(ii) in writing to any owner or occupier of any land adjoining the land to which the proposed application relates: and

(iii) by publication of the notice in a newspaper circulating in the locality in which the land to which the proposed application relates is situated; and

(b) publishing the following information on a website maintained by the applicant, for not less than 42 days beginning with each day on which each of the notices referred to in subparagraph (a) or article 9(2) are given—

(i) the draft application form published by the Welsh Ministers under article 12(1)(a) (or a form substantially to the like effect), including the particulars specified in or referred to in the form;

(ii) a plan which identifies the land to which the proposed application relates;

(iii) any other plans, drawings and information necessary to describe the development which is the subject of the proposed application;

(iv) a copy of the notice required by article 6 which has not lapsed under paragraph (3) of that article;

(v) the design and access statement required by article 14;

(vi) subject to article 12(3), the particulars or evidence required by the Welsh Ministers under section 62(3) of the 1990 Act (applications for planning permission);

(vii) where applicable, a statement referred to as the environmental statement for the proposed development;

(viii) a written statement about any secondary consent connected with the proposed application in respect of which the applicant considers a decision on that consent is to be made or should be made by the Welsh Ministers, together with the draft application form and documents associated with such consents

(ix) in the case of development within regulation 3(1)(ab) of the Criteria Regulations, a written statement about the length of the proposed line and its nominal voltage.

Appendix 3. Environmental Statement contents

ENVIRONMENTAL STATEMENT

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	APPENDIX 1.2 PENDERI SOLAR FARM SCREENING DIRECTION		✓
2.	ASSESSMENT SCOPE AND METHODOLOGY	✓	
3.	THE DEVELOPMENT SITE AND ITS ENVIRONS	✓	
4.	THE DEVELOPMENT	✓	
	FIGURE 4.1 DRAWING PACK	✓	
	APPENDIX 4.1 OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		✓
5.	CLIMATE CHANGE, ENERGY, PLANNING POLICY & GUIDANCE	✓	
6.	LANDSCAPE AND VISUAL	✓	
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ENVIRONMENTAL STATEMENT**CONTENTS**

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8.	HYDROLOGY AND GROUND CONDITIONS		✓	
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