FEHILY TIMONEY

CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

BEST PRACTICE PLANNING GUIDANCE REPORT FOR LARGE SCALE SOLAR ENERGY DEVELOPMENT IN IRELAND

Best Practice Guidance

Prepared with:

Irish Solar Energy Association (ISEA)

ISEA
Irish Solar Energy Association

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Core House, Pouladuff Road, Cork, T12 D773, Ireland

T: +353 21 496 4133 | E: info@ftco.ie

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie

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Acknowledgements Fehily Timoney and Company would like to thank the Irish Solar Energy Association (ISEA) for their work on the document. The guidelines involved significant input from many members of ISEA who participated in workshops, meetings and telephone conferences and we would like to thank all those involved. We would also like to thank the many Prescribed and Statutory Stakeholders who provided submissions for consideration following consultation

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1. ABOUT THE BEST PRACTICE GUIDANCE FOR LARGE SCALE SOLAR ENERGY DEVELOPMENT

1.1 Best Practice Guidance Report Context

This Best Practice Guidance Report has been prepared by Fehily Timoney and Company (FT) and the Irish Solar Energy Association (ISEA) to assist potential developers, stakeholders and Local Authorities in site selection, preparation of applications for planning consent and considerations relating to construction, associated infrastructure and operational procedures from a planning and environmental perspective. This report will also benefit local communities concerning any solar farm projects that are proposed in their areas.

Fehily Timoney (FT) is a multi-disciplinary engineering, planning and scientific consultancy who specialises in the delivery of energy projects across Ireland and internationally. FT is at the forefront of renewable energy in Ireland, since its inception having been involved in the planning and environmental assessment of well over 1.5 Gigawatt (GW) of renewable energy projects including onshore wind farms, offshore wind farms and solar farms.

The production of this report has been supported from the Sustainable Energy Authority of Ireland (SEAI) National Energy Research, Development and Demonstration Funding Programme 2021; under grant number 21/RDD/651.

Utility scale Solar is a proven technology across the world and an economically viable renewable energy source which is commencing its roll out in Ireland. Stakeholders need to adopt a cohesive approach to the delivery of solar farms from a planning and environmental perspective in Ireland.

1.2 Scoping/Consultation

This Best Practice Guidance Report outlines best practice measures based on feedback from various stakeholders, including Planning Authorities across 2 no. Scoping and Consultation Phases conducted in 2022 & 2023.

The first phase conducted consisted of the issue of a preliminary scoping report (Issued in October 2022). The scoping report was issued to 60 no. stakeholders with fourteen responses received.

The feedback and responses received in the first phase were incorporated within the 'Draft Best Practice Planning Guidance Report' which was then issued to 60 no. stakeholders (Issued in July 2023) as part of the second phase with 12 no. responses received for this phase.

The feedback and responses received from the second phase amended the previously issued Draft Best Practice Planning Guidance Report resulting in this Final 'Best Practice Planning Guidance Report'.

Appendix 2 of this report outlines the consultation carried out in the preparation of this Guidance Report. While every effort is made to ensure the accuracy of each record, the Guidance document aims to highlight key considerations for large-scale solar farm development from pre-planning to operation and aftercare.

2. INTRODUCTION

Solar farms have become a leading form of renewable energy worldwide in recent years. The International Energy Agency (IEA) published its Net Zero by 2050: A Roadmap for the Global Energy Sector in 2021 [1]. The report outlines how to transition to a net zero energy system by 2050 while ensuring stable and affordable energy supplies, providing universal energy access, and enabling robust economic growth. It sets out a cost-effective and economically productive pathway, resulting in a clean, dynamic, and resilient energy economy dominated by renewables like solar and wind instead of fossil fuels

The introduction of Renewable Energy Support Scheme (RESS) Auctions have aided the progression and advancement of solar energy in Ireland. A recent report by AFRY, 'The Value of Solar in RESS-3' (AFRY, 2022)[2] commissioned by ISEA, found that increasing solar capacity will result in a more balanced energy mix.

Another AFRY Report, 'The Speed of Light - The role of solar power in Ireland's energy transition' (AFRY, 2022)[3] also commissioned by ISEA, highlights the significant contribution that a solar industry in Ireland can make to the broader economic recovery of Ireland. This report also outlines that solar projects must face fewer planning hurdles and navigate the planning process promptly to ensure projects have high success rates in receiving grid connection offers and meeting the national 2030 energy targets.

A third AFRY Report, ' The Value of Solar in the Republic of Ireland' (AFRY 2021)[4], found that achieving the 2030 RES-E ambitions through a more balanced mix of new wind and solar would create multiple benefits to society when compared to a scenario that relies more heavily on new wind developments alone.

This Best Practice Planning Guidance Report provides practical planning advice regarding how large solar farms are developed, setting out planning considerations, statutory requirements and relevant international experiences with solar farms. For the purposes of this report, a large-scale solar development is defined as a development which meets the threshold of producing 5 megawatts (MW) or more of energy. Typically, a solar farm producing 5 MW would require a land area of approximately 8 - 10 hectares.

This Best Practice Guidance will inform Stakeholders in outlining what 'Good' solar farm design is and the criteria and considerations for the respective planning application for such a development. These guidelines will also provide clarity and encourage a consistent approach for planning applications relating to solar farms. This will complement and work in tandem with the existing national, regional, and local policies and objectives.

[1] IEA (2021), 'Net Zero by 2050', IEA, Paris, https://www.iea.org/reports/net-zero-by-2050

[2] AFRY, (2022) 'The Value of Solar in RESS-3', Irish Solar Energy Association Commissioned Reports, https://www.irishsolarenergy.org/resources

[3] AFRY, (2022) 'The Speed of Light - The role of solar power in Ireland's energy transition', Irish Solar Energy Association Commissioned Reports, https://www.irishsolarenergy.org/resources

[4] AFRY, (2021), 'The Value of Solar in the Republic of Ireland', Irish Solar Energy Association Commissioned Reports, https://www.irishsolarenergy.org/resources

2.1 Solar Energy in Ireland

A secure, sustainable, and competitive energy sector is central to Ireland's economic growth in terms of the State's ability to attract and retain Foreign Direct Investment and sustain Irish enterprise. Solar is one of the fastest-growing sources of electricity globally, with emerging trends in the renewable energy market identifying solar energy as making a notable contribution to Ireland's renewable energy targets. One of the fundamental driving forces for the increased scale of solar farm projects in Ireland is the requirement to maximise the use of existing electrical infrastructure and gain economies of scale.

The continued development of the solar industry in Ireland will result in new sources of jobs in rural areas. The Institute for Sustainable Futures estimates that 0.7 jobs are created per MW for a solar project's operational/maintenance lifetime. The global average is 30 jobs per MW for the construction, manufacturing and installation of solar farms.[5] It is considered that developing a significant quantum of solar farms in Ireland would realise substantial direct and indirect employment opportunities, many of which in rural locations with limited alternative employment opportunities outside agriculture.

In addition to the provision of employment the further development of solar farms will provide rural communities with a range of other benefits, including:

- New revenue sources – landowners would generate an additional and stable income source by diversifying their existing business by integrating energy production into their core business.
- Once in place, solar farms will allow agricultural activities to continue and give the site a dual usage alongside generating renewable electricity. Typically, only 2% - 5% of grass is removed. Wide field margins, gaps between the panel rows, and the area beneath the panels allow small livestock, such as sheep or chickens, to graze on the solar farm site.
- Solar farms can also incorporate specific biodiversity enhancement such as hedgerow enhancement and new hedgerow planting along with designated biodiversity enhancement areas.

2.1.1 Planning Decisions in Ireland

Planning applications for such projects only entered the planning domain in the last years (2014 - 2021). Since then, many factual trends have helped shape the status and perspective of solar farms within the planning system. Generally, solar farm planning applications are considered in a favourable light by Planning Authorities when compared with other forms of renewable energy developments. Only a limited number of Planning Authority decisions were appealed to An Bord Pleanála (the Appeals Board) in the early stage of solar applications within the planning domain.

In this initial period (2014 - 2021), following an appeal to An Bord Pleanála, An Bord Pleanála overturned 26% and upheld 12% of all refusals by Local Authorities. 58% of decisions were modified in their grant of permission. In total, 84% of solar farm applications which An Bord Pleanála determined on appeal were granted up to 2021.
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[5] Rutovitz and Harris (2012). "Calculating Global Energy Sector Jobs: 2012 Methodology". Institute for Sustainable Futures

2.1.2 Scale and Extent

Solar farms are flexible, as such projects' scale fluctuates to meet the demands and grid capacity availability appropriately. Between the years 2018-2020 most solar farms average in size between 20-40 hectares. More recently, during the 2021-2023 period, projects of over 100 hectares have entered the planning system across the country.

The larger projects typically connect to the national grid using a 110kV or 220kV grid connection by either an underground electrical cable to the most viable substation or directly looping into an overhead transmission line.

2.1.3 Pipeline and Built Solar Farms

The electricity system on the island of Ireland is transforming due to the growing integration of renewable energy and the implementation of broader technological innovation. The electricity sector will play a key role in shaping a sustainable energy future for Ireland.

In the coming years, solar energy will undoubtably become a significant component in the generation of Irish electricity. Ireland has recently seen the construction and energising of the first solar farm, the Millvale solar farm located in Co. Wicklow. An additional eight large-scale solar farms (Ballycullane, Blusheens, Curraghmartin, Davidstown, Gallanstown, Hortland, Knockglass, Rosspile) have also been constructed and energised since taking the first steps into solar power. These are highlighted below in Figure 2-1:

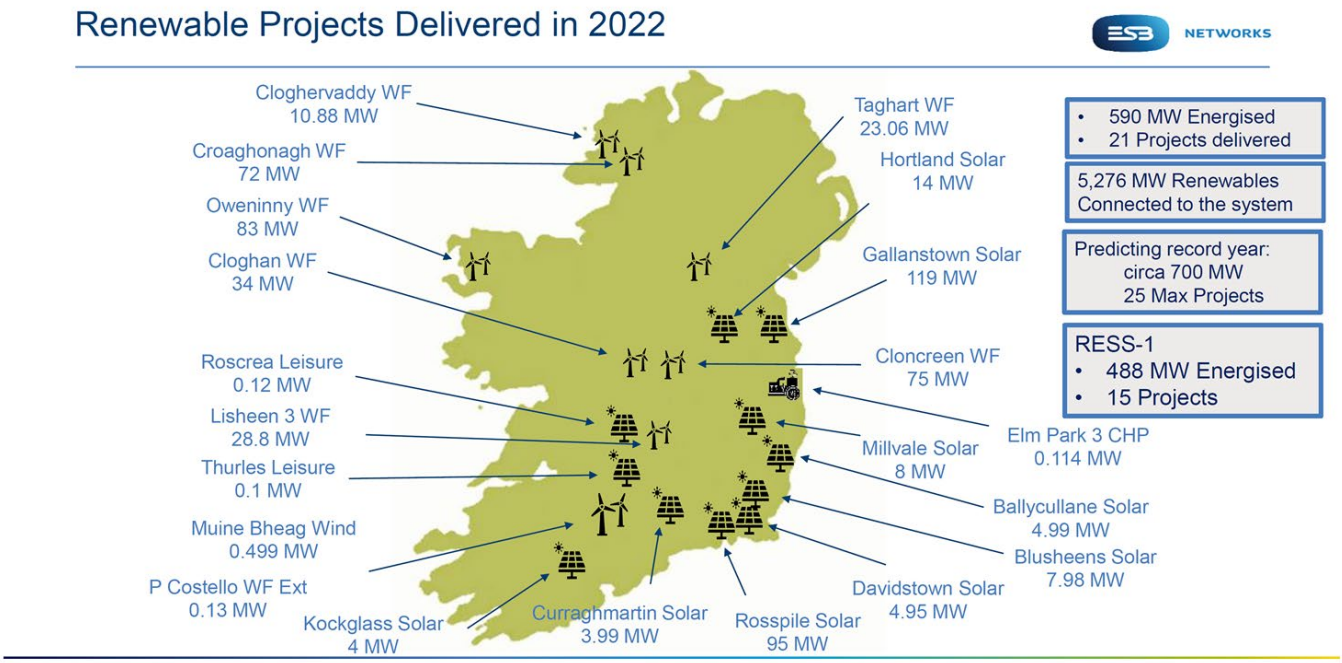

Figure 2-1: Renewable Projects Delivered in 2022. Source: ESB Networks

Planning Ref. 17601 BNRGN Millvale Limited - Millvale solar farm in County Wicklow is Irelands first grid-scale solar farm. This 8MW development became fully operational in 2022. This site comprises approximately 25 hectares with over 33,000 solar modules. This is enough to power around 3,600 homes every year and potentially avoid 4,800 tonnes in CO^2 emissions. In addition to Millvale five other large-scale solar farms have been constructed and energised across the Country.

Planning Ref. ABP 302475 Highfield Solar Limited- Rosspile solar farm in County Wexford is a c. 95MW ground mounted solar farm on a site of 153 hectares. The project consists of solar photovoltaic panels on ground mounted steel frames, an electrical control building, associated infrastructure, and site services. The Rosspile Solar Farm scheme also incorporates significant battery storage on site as part of its design.

Planning Ref. AA170600 JBM Solar Developments Limited – Gallanstown solar farm in County Meath is a c. 119MW ground mounted solar farm project. This solar farm consists of a 110kV substation and solar photovoltaic panels on ground mounted steel frames across four parcels of land.

Planning Ref. 19888 BNRG Neoen Holdings Limited - Hortland solar farm in County Kildare is a c. 14MW ground mounted solar farm on a site of 13.6 hectares, to project includes two electrical substation buildings, associated infrastructure, and site services.

Planning Ref. 2016/0009 Wexford Solar Limited - Blusheens solar farm in County Wexford is a c. 7.98MW ground mounted solar farm located on a site of 19 hectare. The project includes an onsite substation, associated infrastructure, and site services.

Separately sitting at a commercial level, self-generating solar projects associated with commercial uses are increasing throughout Ireland. These often take the form of Corporate Power Purchase Agreements (CPPA), MSD Ireland have completed a 7.3MW ground mounted solar farm at Ballydine, Co Tipperary (**Planning Ref 16600359 Elgin Energy Services Ltd)**. In addition, Eli Lily in Kinsale, Co. Cork have completed the installation of a 5.6MW commercial solar farm **(Planning Ref. 205304 Enerpower).** These commercial solar developments contribute to the reduction of Industries reliance on the national grid and have significantly reduced their carbon footprint.

Ireland has approximately 350MW of utility scale (Greater than 5 MW) solar constructed as of June 2023 as shown in Figure 2-2 below. In addition, there is approximately 22 MW of medium scale solar projects between 1-5 MW constructed. A number of these projects and the utility scale projects are shown on Figure 2-1 above.

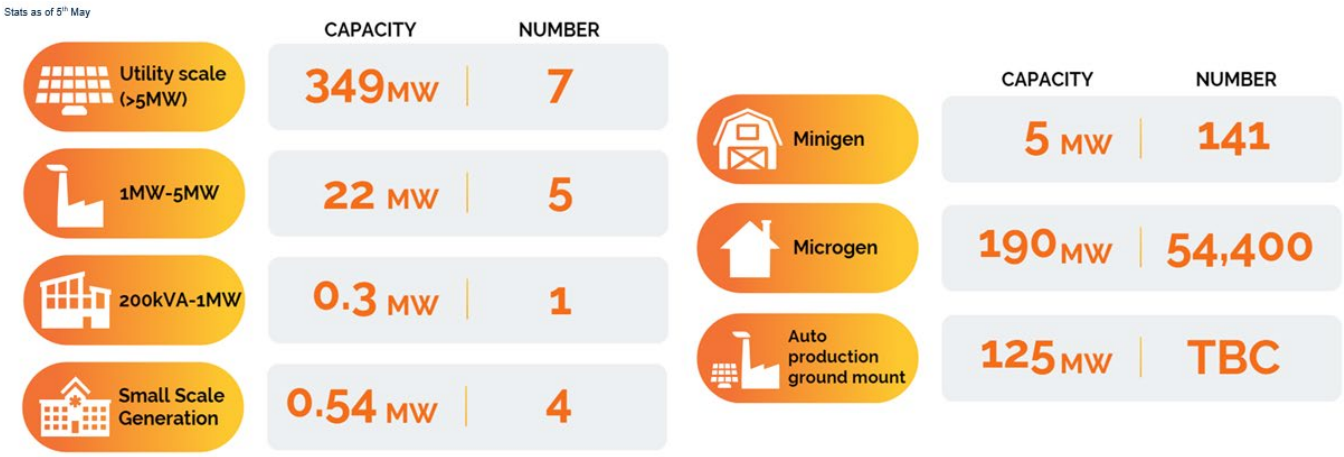

Figure 2-2: Scale of Solar Power Generation in Ireland: Source ISEA (June 2023)

2.1.4 Renewable Electricity Support Scheme (RESS)

The Renewable Electricity Support Scheme (RESS) supports renewable electricity projects in Ireland. With a primary focus on cost effectiveness, the RESS delivers a broader range of policy objectives, including:

- an Enabling Framework for Community Participation through the provision of pathways and supports for communities to participate in renewable energy projects;
- increasing technology diversity by broadening the renewable electricity technology mix;
- delivering an ambitious renewable electricity policy to 2030;
- increasing energy security, energy sustainability and ensuring the cost effectiveness of energy policy.

On 20 July 2020, Ireland received State Aid approval from the European Commission to operate a RESS until 2025. The European Commission concluded that the Irish RESS is in line with EU State aid rules, as it promotes the generation of electricity from renewable sources, in line with the European Green Deal, without unduly distorting competition.

There have been three RESS Auctions to date, RESS 1, RESS 2 and as of September 2023, RESS 3.

The successful projects in RESS 2 represent a potential increase of nearly 20% in Ireland's current renewable energy generation capacity. 1,534 MW of solar bids submitted were successful in the auction stages of RESS 2.

In April 2023 the Minister for the Environment, Climate and Communications announced details for RESS 3 which has received governmental approval. RESS 3 will follow a similar design to RESS 1 and RESS 2 to ensure high project delivery rates and competitive outcomes. Provisional results of RESS 3 were released in September 2023 with 20 no. solar developments delivering 497 MW in the auction stages of RESS 3. The final RESS 3 schemes are set to be finalised in October 2023.

The Community Benefit Fund (CBF) scheme established in RESS 1 has been maintained in RESS 3. The CBFs will generate a significant volume of capital for communities living close to renewable projects each year for the duration of the support scheme. These funds will support local community initiatives and the Sustainable Development Goals (SDGs).

RESS 1 and RESS 2 auctions included a separate community category to give a route to market for community-led generation projects. In 2020, RESS-1 saw seven community energy projects included in the awarding of supports to 82 electricity projects. At the time, the award was recognised as the first step towards incentivising community involvement in the energy transition.[6]

[6] Energy Ireland, 2021,' Community generation: Winning hearts and minds', (Accessed April 2023) https://www.energyireland.ie/community-generation-winning-hearts-and-minds/

The Community projects preference category was removed from RESS 3. Support for communities for the development of renewable projects will now transition to the non-competitive Small Scale Renewable Electricity Support Scheme (SRESS) which is scheduled to be launched in 2023. This scheme will align more closely to the capacity of the community energy sector, thus ensuring a more sustainable delivery of the renewable energy community target of 500MW by 2030.[7]

RESS 3 aims to support additional renewable energy generation as part of the Governments goal to reduce emissions by 51% and produce 80% of Irelands electricity from renewable energy sources by 2030. Key changes differing RESS 3 to the previous renditions are mentioned below:

- Changing the eligibility criteria to only allow projects in receipt of a letter of offer for a grid connection to take part in the auction. This will minimise the risks associated with projects speculatively bidding in the auction and the consequent significant risk to project delivery.
- Unrealised Available Energy Compensation (UAEC) an additional premium support to maximise energy generation.
- introduction of a limited form of indexation on the operation and maintenance element of projects
- Price cap on the highest permitted bid.
- Projects selected for the scheme must remain for a minimum of 12 months.
- Removal of Community Projects preference, it will be replaced by the Small Scale Renewable Electricity Support Scheme (SRESS)

2.2 Renewable Energy Policy Context

2.2.1 Global Context

The world's capacity to generate electricity from solar panels, wind turbines and other renewable technologies is on course to accelerate over the coming years.

Solar farms account for almost 60% of all renewable capacity additions worldwide, with almost 1,100 GW becoming operational over the forecast period 2021-2026. Solar capacity in these five years is expected to be almost double that of the previous five years[8].

Solar farm energy generation worldwide increased in 2020 to become the second-largest generation growth of all renewable technologies in 2020, slightly behind wind and ahead of hydropower. Looming policy deadlines in China, the United States and Vietnam spurred an unprecedented boom in PV capacity additions. Solar farms are becoming the lowest-cost option for electricity generation in most of the world, which is expected to propel investment in the coming years[9].

Policy support remains a principal driver of solar farm deployments in most of the world. Various types of policies are behind the capacity growth, of which include auctions, feed-in tariffs, net-metering and contracts for difference (CFD).

[7] Department of the Environment, Climate and Communications, (2023) Minister Ryan announces launch of third onshore Renewable Electricity Support Scheme (RESS 3), Press Release, (Accessed on 20/04/2023), gov.ie - Minister Ryan announces launch of third onshore Renewable Electricity Support Scheme (RESS 3) (www.gov.ie)

[8] IEA (2021), Solar PV, IEA, Paris. Accessed at: https://www.iea.org/reports/solar-pv

[9] Ibid.

Examples of global policies and incentivizing strategies include the following:

- China published its 14th Five-Year Plan in June 2022, including an ambitious target of 33% of electricity from renewables by 2025.
- In August 2022, the United States introduced the Inflation Reduction Act, a law significantly expanding support for renewable energy in the next 10 years through tax credits and other measures.
- In July 2021 the European Commission proposed to increase the bloc's renewable energy target for 2030 from 32% to 40%. The REPowerEU Plan further increased the proposed target to 45% in May 2022.
- During COP26, held in November 2021 in Glasgow, India announced new 2030 targets of 500 GW of total non-fossil capacity and 50% renewable electricity generation share, and net zero emissions by 2070.

2.2.2 European Policy

The European Union has committed to being a climate-neutral society by 2050 and is planning to increase its use of solar electricity. This will address its energy challenges, and assist in meeting climate ambitions, managing a large part of its electrification, decarbonizing the electricity grid, and becoming less reliant on others. As part of its "EU solar energy strategy,"[10] the region has announced a 750 Gigawatts, Direct Current (GWDC) target of installed solar-PV capacity by 2030—up from 224 GW of installed capacity in 2022. This represents a considerable step up in annual installations, going from some 26 GW in 2021 to around 70 GW a year in the second half of this decade. Germany alone aims to install 215 GW by 2030, adding 160 GW of new capacity on top of the current 58 GW, almost scaling the market by a factor of four.

This ambitious and proactive approach is led by the rising energy crisis relating to current affairs and climate change. The need for a more hospitable environment to renewable energy development is becoming increasingly necessary for all countries.

Climate Change is an accepted fact and is demonstrated by increasing temperature, changing weather patterns, glacial melting rates and rising sea levels. Monitoring has shown that the atmospheric concentration of greenhouse gases, including CO^2, is affecting the earth's climate due to an enhanced greenhouse effect. Scientists internationally believe that the balance of evidence suggests a discernible human influence on the global environment due to the build-up of CO^2 and other greenhouse gases in the atmosphere.

In response to international concerns, under the UN Framework Convention on Climate Change (UNFCCC), industrialised countries were to stabilise their greenhouse gas emissions at 1990 levels by 2000. The EU met this commitment. The Kyoto Protocol to the UNFCCC committed the 15 countries that were EU members at the time to reduce their collective emissions in the 2008-2012 period to 8% below 1990 levels.

COP26 also had an active stance on the ongoing need for more renewable energy developments as countries were asked to produce targets that align with net zero by 2050. Countries will need to accelerate the phase-out of coal, oil and gas, curtail deforestation and encourage investment in renewable energies to meet these targets.

[10] European Commission (2022), EU Solar Energy Strategy, Brussels. Accessed at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A221%3AFIN&qid=1653034500503

The EU 27's greenhouse gas emissions fell by 15% from 5,590 Mt in 1990 to 4,720 Mt in 2010. The EU also offered to increase its emissions reduction to 30% by 2020, so that other major emitting countries in the developed and developing worlds committed to do their fair share under a future global climate agreement. Finally, in December 2015 at the Paris climate conference (COP21) the first ever universal legally binding global climate change deal was agreed. It is now globally recognised that the window for action on climate change is rapidly closing and that renewable energy sources will have to grow from 30% of global electricity to 80% by 2050 if we are to limit global warming to below 2 degrees.

The European Commission's adoption of the 'Energy Roadmap 2050' looks beyond the 2020 targets and commits the EU to reducing greenhouse gas emissions to 80-95% below 1990 levels by 2050 effectively meaning that Europe's energy production will have to be almost carbon-free by 2050. The document examines several scenarios that could reduce emissions while ensuring member states retain their security of supply and competitiveness.

The 'high renewable energy sources decarbonisation scenario' would see renewable energy systems with a 75% share of final energy consumption by 2050 and 97% of electricity consumption, indicating that renewable energy will be central to European energy policy.

2.2.2.1 RePower EU Plan

The RePowerEU Plan[11] was published on 18th May 2022, the Plan sets out its response to the hardships and global energy market disruption caused by Russia's invasion of Ukraine and the need for the role of renewable energy to mitigate climate change. To address this issue, the REPowerEU Plan advocates the following key principles: energy savings, diversification of energy supplies and accelerated roll-out of renewable energy.

The EU Solar Energy Strategy will boost the roll-out of photovoltaic energy. As part of the REPowerEU plan, this strategy aims to bring online over 320 GW of solar photovoltaic newly installed by 2025, over twice today's level, and almost 600 GW by 2030. These frontloaded additional capacities displace the consumption of 9 billion cubic meters of natural gas annually by 2027. The strategy states the following:

- A European Solar Rooftops initiative: a gradual obligation to install solar rooftop panels in certain buildings, combined with renovations, while promoting self-consumption and energy communities;
- An EU Solar PV Industry Alliance for an innovative and resilient photovoltaic value chain in the EU;
- EU large-scale skills partnership: to ensure that the deployment of renewables happens smoothly and creates local jobs across the EU.

The RePowerEU Plan requires Member States to speed up the green transition and spur massive investment in renewable energy. Member States must enable industry and transport to substitute fossil fuels faster to reduce emissions and dependencies.

[11] European Commission (2022), REPowerEU Plan, Brussels. Accessed at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483

2.2.3 National Context

The Government's renewable energy strategy is set firmly in the Global and European context. All objectives accord with the EU's policy ambitions for renewable energy. These are grounded in the economic, environmental and supply security imperatives to decarbonise energy systems and diversify energy sources. In 2015, the President signed the Climate Action and Low Carbon Development Act into law. This was later amended in 2021 to scale up Ireland's level of climate ambition. It creates a national climate objective to have a climate neutral economy by 2050. It also created the framework for the Government to introduce legally binding five year carbon budgets, a long term climate action strategy, and gave Ireland's annual Climate Action Plan (The Government's national climate policy) a statutory basis. The Government of Ireland's national policy position states in 'The Climate Action Plan 2023'[12] (CAP23) that the Irish economy must become low-carbon and climate resilient but must also focus on pursuing competitiveness in the emerging global green economy. These objectives are not mutually exclusive, yet success depends on the right policy drivers and incentives to encourage renewable energy generation, green technologies, and innovative low carbon land use.

This Best Practice Guidance Report has been developed with consideration given to the following National Policies:

- Project Ireland 2040: National Planning Framework
- Project Ireland 2040: National Development Plan 2021-2030
- Climate Action Plan 2023
- National Biodiversity Action Plan 2017-2021 (or successor)

In addition to the above listed policies, this Best Practice Guidance Report has had regard to existing guidance on Appropriate Assessment and Environmental Impact Assessment. There are a number of existing national guidance documents related to both as listed below:

- Appropriate Assessment Screening for Development Management (Practice Note PN01) prepared by the Office of the Planning Regulator[13]
- Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities prepared by the Department of Environment, Heritage and Local Government[14]
- Environmental Impact Assessment Screening (Practice Note PN02) prepared by the Office of the Planning Regulator[15]

[12] Department of the Environment, Climate and Communications (2022), Climate Action Plan 2023, Dublin. Accessed at: https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/

[13] Office of the Planning Regulator (2021), Appropriate Assessment Screening for Development Management. Accessed at: https://www.opr.ie/wp-content/uploads/2021/03/9729-Office-of-the-Planning-Regulator-Appropriate-Assessment-Screening-booklet-15.pdf

[14] Department of Environment, Heritage and Local Government (2009) Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities. Accessed at: https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2009_AA_Guidance.pdf

[15] Office of the Planning Regulator (2021), Environmental Impact Assessment Screening. Accessed at: https://publications.opr.ie/view-file/66

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment prepared by the Department of Housing, Planning and Local Government[16]
- Guidelines on the information to be contained in Environmental Impact Assessment Reports prepared by the Environmental Protection Agency[17]

2.2.3.1 Project Ireland 2040: National Planning Framework

The National Planning Framework (NPF) outlines in Project Ireland 2040 that meeting the national commitments will require investment and ambitious and effective action across all sectors; because If Ireland is to make up for lost ground in relation to carbon reduction targets and move towards the objective of a low carbon and climate resilient Ireland by 2050, it is necessary to make choices about how we balance growth with more sustainable approaches to development and land use and to examine how planning policy can help shape national infrastructural decisions. as well as societal behavioural change. These aims are outlined in National Policy Objectives 53, 54 and 55. In March 2023, The Department of Housing, Local Government and Heritage established an expert group tasked with conducting a review of the NPF. This expert group published their first report on the NPF in August 2023[18]. The expert group made a number of recommendations in relation to the scope of the first revision of the NPF whereby Recommendation no. 4 sought that:

> *"The revision of the NPF should seek to name the principles for identifying priority locations for the deployment of infrastructure at a strategic scale across the country."*

It is expected that the Draft first revision of the NPF will be published for public consultation in Q4 of 2023 or Q1 of 2024 with the final first revision published in Q2 in 2024.

At a national level, the key driver on policy is the Climate Action Plan (CAP) which is described in more detail in section 2.2.5 below.

Ireland is one of the most ''energy import-dependent'' countries in the European Union. For the year 2018, Ireland's import dependency was 67% and the SEAI estimates that the cost of all energy imports to Ireland was approximately €5.0 billion[19]. The World Economic Forum report 'Fostering Effective Energy Transition 2022' ranks Ireland joint bottom in Europe for energy transition readiness. This low position highlights the need for such guidance and incentives for renewable energy developments nationwide.[20] The international fossil fuel market is growing increasingly volatile and affected by international politics. Any steps to reduce dependence on imported fossil fuels will add to financial autonomy and stability in Ireland.

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[16] Department of Housing, Planning and Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Accessed at: https://www.opr.ie/wp-content/uploads/2019/08/2018-Environmental-Impact-Assessment-1.pdf

[17] Environmental Protection Agency (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports. Accessed at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf

[18] Department of Housing, Local Government and Heritage (2023) Report of Expert Group for the First Revision of the National Planning Framework. Accessed at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/269769/2849f227-34e6-46da-82ff-6775c8fcb646.pdf#page=null

[19] SEAI (2019), Energy in Ireland: 2019 Report, Dublin. Accessed at: https://www.seai.ie/publications/Energy-in-Ireland-2019-.pdf

[20] World Economic Forum, (2022), Fostering Effective Energy Transition 2022 Edition, Accessed 03/04/2023 : chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www3.weforum.org/docs/WEF_Energy_Transition_Index_2022.pdf

Solar energy is a crucial part of the response towards meeting Ireland's EU targets and combating climate change.

In an AFRY report - 'The Speed of Light: The role of solar power in Ireland's energy transition' (Dec. 2022), the potential benefits of solar energy have been noted. The key messages of the analysis are as follows:

- Solar farms are rapidly becoming cost competitive, not only against other renewables but also against conventional forms of generation;
- The development of solar technology in Ireland will support economic activity and jobs;
- Solar farms build on Ireland's economic strengths;
- Solar farms can increase Ireland's energy security;
- Solar farm energy can empower Irish citizens and communities to take control of the production and composition of energy.

In the National context the Environmental Protection Agency (EPA) also highlights its concerns around climate change:

> *What is distinctive about the current period of global warming, compared to previous cycles of climate change, is the extent and rate of change, which exceeds natural variation. The impacts of climate change present very serious global risks and threaten the basic components of life, including health, access to water, food production and the use of land. As the earth gets warmer the damage from climate change will accelerate.*[21]

In its report on climate change the EPA also indicates that:

> *Whilst Ireland can be justifiably proud of our scientific and technological achievements, Ireland's greenhouse gas emissions per person are amongst the highest on the planet and the 2nd highest of the EU 27 countries. The reduction in greenhouse gas emissions in Ireland and other parts of the globe which is primarily due to the global financial crisis has shown that there is still a strong link between economic growth and emissions.*[22]

Should agricultural and transport emissions increase the EPA predicts significant challenges in Ireland achieving its 2030 targets under the 2030 obligations.

[21] EPA, 2023, 'What impact will climate change have on Ireland?', Environment & You, Accessed April 2023: https://www.epa.ie/environment-and-you/climate-change/what-impact-will-climate-change-have-for-ireland/#d.en.84746

[22] EPA, 2023, Greenhouse gas emissions and projections, Environment & You, Home> Our Services> Monitoring & Assessment> Climate Change> Greenhouse gas emissions (GHG), Accessed April 2023: https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/

2.2.3.2 Project Ireland 2040: National Development Plan 2021-2030

The National Development Plan 2021-2030 (NDP) published in October 2021, in tandem with the National Planning Framework (NPF), seeks to drive Ireland's long term economic, environmental, and social progress over the next decade, in accordance with the spatial planning context of the NPF. The NDP provides a platform from which investment can be provided and strategized regarding economic growth, development, and sustainability needs.

The NDP outlines the expected amount of investment that will unlock the economy's growth potential and enable sustainable employment, while also enabling the construction industry to plan and provide the necessary capacity and capabilities to deliver infrastructure projects.

The NDP recognises that:

> *"Action in the energy sector will be critical to the achievement of Ireland's climate targets and the transformation to a high-renewable, net-zero emissions future. This will require a fundamental shift in the means by which we supply, store and use energy. We need to plan our energy system as a whole to create greater links between different energy carriers; infrastructures; and consumption sectors. The long-term objective is to transition to a net-zero carbon, reliable, secure, flexible and resource-efficient energy service at the least possible cost for society by mid-century."*

Furthermore, the NDP anticipates that investment in renewable energy sources, amongst other things, will allow Ireland to decarbonise our energy generation:

> *"Investment in renewable energy sources, ongoing capacity renewal, and future technology affords Ireland the opportunity to comprehensively decarbonise our energy generation. By 2030, peat and coal will no longer have a role in electricity generation in Ireland. The use of peat will be progressively eliminated by 2030 by converting peat power plants to more sustainable low-carbon technologies."*

The NDP outlines the measures that will require coordinated investment to decarbonise energy generation and enhance energy efficiency as outlined below.

- *grid-scale renewable electricity generation and storage;*
- *an expanded and strengthened electricity transmission and distribution network;*
- *conventional electricity generation capacity to support the operation of the electricity system and provide security of supply for when variable generation (wind/solar) is not sufficient to meet demand;*
- *replenishing and electrifying our vehicle stock;*
- *retrofitting our homes to improve their energy efficiency and replace fossil-fuel heating systems;*
- *micro-generation to empower citizens to produce their own electricity.*

National Strategic Outcome 8, 'Transition to a Low-Carbon and Climate-Resilient Society' provides for a Regular Renewable Electricity Support Scheme (RESS). Auctions will deliver competitive levels of onshore wind and solar electricity generation. The Department of the Environment, Climate and Communications (DECC) recently announced a schedule of onshore and offshore Renewable Electricity Support Scheme (RESS) auctions out as far as 2025. These are intended to procure a total indicative volume of up to 49,000 GWh.

'Project Ireland 2040: National Development Plan 2021-2030' emphasises the importance of investment in renewable energy sources to increase the share of renewables in Ireland's energy mix for a transition to sustainable energy.

2.2.3.3 Climate Action Plan 2023

The Government published the CAP 2023 in December 2022, which has been most recently updated in January 2023. The CAP identifies how Ireland will achieve targets for 75% reduction in overall greenhouse gas emissions by 2030, and to reach a climate neutral economy no later than 2050. This includes for an increased reliance on renewable electricity to 80% by 2030 and a target of 9 GW from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy by 2030.

The 2019 and 2021 Climate Action Plans saw a significant step-up in the program of engagement with citizens and communities. Climate Action Plan 2023 (CAP 2023) identifies how Ireland will achieve its targets for carbon emissions throughout various sectors such as the energy system, building sector, transport system and food production with a number of actions. CAP 2023 outlines these six vital high impact sectors, one of which is "Powering Renewables" where it intends to have a 75% reduction in emissions by 2030. The driving force behind this aim is the intention to facilitate a large-scale deployment of renewables that will be critical to decarbonizing the power sector as well as enabling the electrification of other technologies. Other aims and targets which are outlined in this high impact sector are that of:

- *Accelerate the delivery of onshore wind, offshore wind, and solar.*
- *Dial up to 9 GW onshore wind, 8 GW solar, and at least* 5 *GW of offshore wind by 2030 (with 2 GW earmarked for green hydrogen production).*
- *Support at least 500 MW of local community-based renewable energy projects and increased levels of new micro-generation and small-scale generation.*
- *Phase out and end the use of coal and peat in electricity generation.*
- *New, dynamic Green Electricity Tariff will be developed by 2025 to incentivise people to use lower cost renewable electricity at times of high wind and solar generation.*

The CAP 2023 is integral to the National Development Plan 2021-2030. It shows how Ireland puts climate solutions at the very centre of our social and economic development. Emphasis is placed on the most critical measures within the CAP 2023, to increase the proportion of renewable electricity up to 80% , a target of 9 GW from onshore wind, 8 GW from solar, and 5 GW of offshore wind energy by 2030.

A new drive for solar energy with an ambitious target of up to 5 GW of solar by 2025 will impact land-use and allow farmers and communities to participate in the energy transition, through diversification of income to self-supply, and sell their power to the grid.

CAP 2023 has outlined measures it intends to impose to meet the new ambitious targets. Such measures relate to the acceleration of renewable energy. Such measures are as follows:

- *Accelerate the delivery of onshore wind, offshore wind, and solar through a competitive framework to reach 80% of electricity demand from renewable energy by 2030;*
- *Target 6 GW of onshore wind and up to 5GW of solar by 2025;*
- *Target 9 GW onshore wind,* 8 GW solar, *and at least 5 GW of offshore wind by 2030 (and an additional 2 GW offshore wind for green hydrogen production);*

- *Complete a revised version of Shaping our Electricity Future to define the required new construction and reinforcement of the electricity transmission and distribution system across the country required to achieve sectoral ceilings and carbon budgets;*
- *Having regard to the interaction between the planning and grid consenting systems and the overall timeframes for permitting, deliver a streamlined electricity generation grid connection policy and process and remove barriers for installation of renewables and flexible technologies without the need to build new grid, including hybrid (wind/solar/storage) connections and private wires;*
- *Align the relevant constituent elements of the planning and permitting system to support accelerated renewable energy development, supported by national policy and associated methodologies to inform regional and local planning policies, noting that Development Plans are obliged to set out objectives to facilitate energy infrastructure;*
- *In line with the emerging EU frameworks, ensure that renewable energy generation projects, and associated infrastructure, will be considered to be in the overriding public interest;*
- *All relevant public bodies to carry out their functions to support the achievement of the 80% renewable electricity target;*
- *Support at least 500 MW of local community-based renewable energy projects and increased levels of new micro-generation and small-scale generation.*

2.2.4 Regional Planning Policy

There are a total of three Regional Spatial and Economic Strategies (RSES) which form the regional planning policy within Ireland.

- The Southern Regional Assembly published its RSES in January 2020. This document now supersedes the previous Mid-West Regional Planning Guidelines, the South-East Regional Planning Guidelines and the South-West Reginal Planning Guidelines.
- The Eastern and Midland regional Assembly published its RSES in June 2019. This document now supersedes the previous regional Planning Guidelines for the Border region.
- The Northern and Western regional Assembly published its RSES in January 2020. The RSES replaces the former regional Planning Guidelines for the Border region.

Chapter 5 'Environment' of the Southern Regional Assembly RSES report, outlines the need for Climate Action and a transition to a low carbon economy. Within the Southern Regional Assembly RSES report, Regional Policy Objective 94 (RPO 94) addresses the need for decarbonisation in the agricultural sector stating that it is an objective to support initiatives that advance an approach to achieve carbon neutrality for agricultural land.

The Eastern Midland RSES stresses that the Region will need to shift from relying on fossil fuels and natural gas as its main energy source to a more diverse range of low and zero-carbon sources, including renewable energy and secondary heat sources. Decentralised energy will be critical to the Region's energy supply and will ensure that the Region can become more self-sufficient in relation to its energy needs. The Eastern Midland RSES supports an increase in the number of renewable energy sources within the Region and includes solar photovoltaics and solar thermal energy on solar farms as an appropriate use of renewable energy that is in following with National and Regional policies.

The Northern and Western Regional Assembly RSES outlines solar energy developments as a potential use for bogland in section 5.8 of the RSES. The Northern and Western RSES also outlines the pivotal role the Region has with regard to alternative forms of electricity and the capacity for further expansion amongst the electric grid system.

The principal statutory purpose of each RSES as outlined in the strategy is to support the implementation of the National Planning Framework – Ireland 2040, and the economic policies and objectives of the Government by providing a long-term strategic planning and economic framework for the development of each specific region.

Each RSES supports sustainable renewable energy generation and the implementation of the National Renewable Energy Action Plan. Each strategy supports the sustainable development, maintenance and upgrade of electricity network grid infrastructure to integrate renewable energy sources and ensure that the national and regional energy system remains safe, secure and ready to meet increased demand as the regional economy grows. As well as providing policy support for renewable energy, each RSES supports resource efficiency while maintaining sustainability and minimising environmental impacts.

3. SOLAR FARM CONSIDERATIONS

3.1 Introduction/Background

The location of solar farms will ultimately be determined by the solar resource available, access to the grid, and suitable site selection criteria. This section of the Guidelines outlines key considerations in site selection and design considerations which influence the layout of solar farms.

3.2 Site Selection

Prior to the progression of a formal planning application, there are many factors that need to be considered in determining whether a solar farm installation will be feasible at a given location. It is considered best practice for the Developer to conduct a detailed site feasibility or assessment before the planning stage with any site. These assessments should include the evaluation of the subject lands and broader area as well as any relevant local policies. The feasibility study should consider the following criteria.

3.2.1 Grid Connection

The method by which a proposed solar farm is connected to the national grid to export electricity from the site, is crucial.

Solar farm sites need to be either within immediate proximity to an existing overhead power line with capacity or nearby an existing substation connected to the national grid with capacity. The sole purpose of a solar farm is to generate electricity, therefore the ability to utilise such energy is a fundamental necessity for such sites.

A solar energy project must be commercially viable, to ensure it will attract the necessary project finance required to progress to construction. The distance of any potential solar project to a grid connection point, the extent and cost of required grid upgrades to facilitate the connection, the delay in having those reinforcement works undertaken and also the process of securing a grid connection offer, are all critical factors rendering a project commercially viable or unviable. With a potential grid connection available, other site selection considerations can be considered further.

3.2.2 Land Orientation and Siting

Solar farms typically require flat land unimpeded by aspects that may cause excessive shadowing so to maximise solar radiation collection. The overall size of the solar farms which have sought planning permission across Ireland range from approximately 5-200 hectares. This site size has various factors that must be considered at the feasibility stage. Orientation of solar farm sites is typically done so to ensure solar irradiance. In general, land should be oriented in a southerly direction and free from excessive shadowing so to maximise solar radiation collection. However, the tilt and angle of solar panels can be adjusted to the position of the sun to maximise solar radiation to site specific characteristics.

Having a southern facing field or land is not a limiting factor due to the advancements of PV technologies, in particular solar tracker technology can be used to ensure that the panels remain perpendicular to the Sun's rays which allows for more scope in selecting sites that do not have a southern orientation. PV arrays are tilted at an angle that ensures maximum sunlight; this is typically at 15 degrees but can range from 10-25 degrees. Furthermore, by combining East-facing and West-facing in one system, you can get a high power output from early morning right through to late evening.

3.2.3 Planning Policy

It is paramount that all prospective applicants and stakeholders check and review the Policies and Objectives of City and County Development Plans at the feasibility stage.

City and County Development Plans and Local Area Plans (LAPs) are the principle planning strategy documents for development within a Planning Authority jurisdiction. The Development Plan gives spatial expression to the physical, economic, social and environmental needs of the community, in order to support and regulate new development, enhance valued assets and amenities and protect the environment.[23]

Development Plans and LAPs facilitate the orderly development of lands, and in some instances designate specific areas for development through the designation of land for appropriate uses. Most Development Plans include for a Renewable Energy Strategy which sets out the Councils strategy in promoting renewable development in the area. These documents set out key considerations in the location of renewable energy projects in a specific county. Specific policies with a spatial dimension or restrictions associated with an area may significantly impact the design stage of a solar farm.

It is noted that some Development Plans may not have detailed and robust renewable energy strategies or detailed guidance on solar energy developments. In this instance, it is considered best practice for any applicant to review and have regard to other relevant policies contained within statutory land use plans including those related to the protection of biodiversity, waterbodies, built heritage and landscape. In addition to Development Plans, policies in County Climate Action Plans, Biodiversity Action Plans, Heritage Plans, Local Area Plans (LAP) and Local Economic and Community Plans should also be consulted prior to the design stage of any large scale solar energy development.

For example, City and County Development Plans can designate or zone specific lands as protected or sensitive areas for development. Typically this will be seen with areas designated as high or sensitive landscape value/character. Such designations could impact the siting or viability of solar energy developments within a specific area as the use of solar may not be deemed appropriate.

There are fundamental elements of a solar farm that should be taken into consideration by Local Authorities when updating and writing future policies and objectives. There are often a number of development management principles which can often apply to solar farm developments. These include the following:

- Design Details.
- Ground Works.
- Co-Location with other renewable energy developments/land uses.
- Site Locations and Impacts on Agriculture.
- Landscape and Visual Impacts.
- Biodiversity/Ecology.
- Archaeology & Built Heritage.
- Drainage and Flood Risk.
- Glint and Glare.
- Airport Safety.

[23] Department of Housing, Local Government and Heritage (June 2022), Development Plan Guidelines for Planning Authorities. Accessed at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/228826/6e26204a-ffd0-42a4-b868-097d647e537f.pdf#page=null

- Noise.
- Duration and Decommissioning.

These elements must also be appropriately considered at the design and feasibility stages of a prospective solar farm development. The inclusion and requirement for various assessments and reports to accompany a planning application helps ensure that any solar farm development successfully assimilates into the wider area and does not negatively impede upon the surrounding environment.

3.2.4 Adjacent Road Network & Site Access

Consideration should be given to site access and potential haul routes in the area of any potential development. During the operational stage of any solar farm, traffic generation is minimal with the greatest impact generated during the construction stage.

A suitably designed site entrance with adequate sight lines that comply with TII standards and or the local County Development Plan standards should be sought. It is recommended that habitat is considered in site access design. Habitat features (hedge and treeline) should be protected, and existing accesses utilized where possible. However, where a site access is limited with regard to sightlines, mitigation measures can be incorporated into the design and construction of the project. Mitigation measures can include: the incorporation of signage on public roads and the use of banks men to ensure that the proposed construction traffic will not create a potential traffic hazard on the existing road network.

In addition to the site access, the ease of haulage of construction materials to the site should be considered at an early stage.

3.2.5 Landscape/ Visual impact

Normally Planning Authorities include a Landscape Character Assessment (LCA) as part of a Development Plan. This LCA may identify areas where solar is or is not appropriate. In considering whether a project is likely to be compatible in a general landscape setting an applicant needs to consider whether the landscape has the capacity to accommodate or absorb any solar farm development. It is best practice in considering the potential landscape impacts on any landscape that the following criteria are considered:

- Landscape character, value, importance, and sensitivity;
- Magnitude of likely impacts; and
- Significance of landscape effects

It is recommended that a site visit is carried out to determine the landscape suitability for solar farm developments. However, given the relatively low profile of solar panels and its flexibility, normally landscape impacts can be mitigated by avoiding certain parts of the land or through the incorporation of mitigation measures such as enhancement of hedgerow enhancement, additional screening planted or incorporation of setbacks from panels.

3.2.6 Conservation designations

At an early stage it should be established whether any proposed site is designated as a Special Area of Conservation (SAC), Special Protection Area (SPA), Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA). This is discussed in more detail in 'Biodiversity Recommendations for Solar Development' in Section 3.4.11. Solar development in general should be located outside any areas which are designated as an SPA, SAC, NHA or pNHAs so as not to impact upon the qualifying interests of the SPA, SAC, NHA or pNHA. This should be a key consideration in the site selection process at an early stage.

In addition, to designated sites listed above. A high level review should be undertaken of any habitats located on any potential site with particular consideration of habitats listed on Annex I of the Habitat Directive 92/43/EEC. It is recommended that appropriate ecological advice is available, early in the process, to identify important ecological features. As protected species may be present on non-designated sites which may require additional surveying where relevant.

It is recommended that the avoidance of areas of ecological sensitivity outside designated sites where solar development would/could result in impacts to habitats of ecological value and/or to protected species (e.g., wetland habitats). To ensure that this is achieved, it is recommended that the input of an ecologist is required at the earliest stages of the process when sites are being identified and layouts designed.

3.2.7 Flood risk

An assessment of the potential for and scale of flood risk at any site is often conducted using historical and predictive information. Typically this assessment will identify any sources of potential flood risk a potential site and reviews historic flood information. The Office of Public Works (OPW) have a website[24] which can be used to review any recorded flood history and determine if a site has the potential to flood in a flood event.

Flooding is not seen as a hard constraint as solar farm can be built in areas of flood risk. Mitigation measures can be introduced such as raising the solar panel arrays to be constructed above predicted flood levels within a site and the supporting structures do not impede the conveyance of floodwaters or result in the displacement of floodwaters. Raising solar panel arrays above predicted flood levels could result in undesirable consequences on landscape character. This needs to be considered if panels are to be raised.

Many areas of flood risk are along riverbanks or in scenic areas or areas with specific wetland biodiversity. Caution needs to be practiced when proposing solar energy development in areas of flood risk. It is important to apply the precautionary principal and ensure developments on flood zones do not impede the sites ability to provide an essential ecosystem service or impact/disturb wetland habitats or protected wildlife species. It is imperative that sites, following development, do not subsequently require drainage to address flooding issues.

The only equipment related to solar farms that is sensitive to flood risk are the inverters, transformers, substation & electrical buildings and grid connection units which would need to be located outside the flood zone. This equipment is deemed critical electrical infrastructure with regards to flood risk. If a site is in an area of flood risk, mitigation measures should be agreed in advance with the Planning Authority at a pre-application consultation stage.

[24] https://www.floodinfo.ie/map/floodmaps/

3.2.8 Cultural Heritage and Archaeology

A high level review should be undertaken of all known archaeological, architectural and other cultural heritage sites which may be located within or affected by a proposed development. This can typically be undertaken by a suitably qualified archaeologist either as a desktop study or site based constraints study. Potential vulnerable receptors that should be identified include:

- UNESCO World Heritage Properties and sites included on the World Heritage Tentative List
- National Monuments, Recorded Monuments and other known archaeological sites included within the Sites and Monuments Record (SMR) maintained by the National Monuments Service;
- Wrecks and /or other underwater cultural heritage that may be affected by the development (e.g. impact on watercourses);
- Structures and Gardens listed in the National Inventory of Architectural Heritage (NIAH)
- Record of Protected Structures (RPS) designated by each Local Authority in the relevant County Development Plan.

A key tool for the identification of SMR and NIAH Structures is the Historic Environment Viewer[25]. In addition, the lists of National Monuments (https://www.archaeology.ie/nationalmonuments/search-by-county) and Preservation Order sites (https://www.archaeology.ie/sites/default/files/media/publications/po19v1-all-counties.pdf) should also be consulted to identify sites subject to protection under Section 14 of the National Monuments Act (1930–2014), as well as the RPS maintained by the relevant Local Authority.

3.2.9 Residential Dwelling Proximity

Due to the relatively low profile of Solar arrays, they are considered broadly compatible in residential areas subject to appropriate separation distances and buffers. There are no recommended separation distances between solar farm development and residential units, however it is recommended that a minimum separation distance of 22 meters should be considered a starting point. Addition separation distances may be warranted depending on the orientation, typography and nature of the receiving environment and residential receptor.

Appropriate screening can be utilised to minimise potential impacts on residential units, this could be the use of established hedgerows to obstruct views of the proposed solar arrays which mitigates potential visual impact or glint & glare impact or through the planting of new hedgerows or enhancements to existing hedgerows.

3.2.10 Potential yield for project and exclusions

With the above information available through undertaking a desktop feasibility. A potential yield analysis could be carried out to determine the viability of a site based on the opportunities and constraints identified at feasibility stage. This analysis would adequately inform any applicant of a sites potential and constraints. While desktop feasibility studies can give a broad overview of potential constraints within a given area, Significant environmental and landscapes changes can occur over short periods of time resulting in desktop studies being limited by the most recently available data (Change in policy).

[25] https://maps.archaeology.ie/HistoricEnvironment/index.html

3.2.11 Conclusion for Site Selection

It is recommended following the completion of a high level feasibility for a prospective solar site that a pre-planning meeting should be carried out with the relevant Planning Authority to present the proposed development and seek feedback on the site identified.

3.3 Community Engagement

Providing the public with a good flow of information about a proposed solar farm in their locality prior to a formal planning application can avoid conflict within the planning process. It is therefore recommended that the applicant undertake community engagement before submitting a planning application. The advice below is intended to assist with the identification of the appropriate geographical area and relevant stakeholders who should be invited to engage with the pre-application discussions. This guidance provides suggestions about the methods of communication which might be used. Any community engagement undertaken should be detailed and submitted to the Planning Authority alongside the planning application.

A fair and transparent process should be employed to identify the appropriate groups to consult. It should be outlined that this is not a prescriptive checklist to be applied for every solar farm but rather good practice. The relevant Planning Authority may also be able to assist with identifying the likely geographical area and stakeholders to be considered. This can be discussed at the pre application stage with the appropriate Planning Authority.

Applicants should circulate information to properties within approximately 500m of the proposed solar farm. This 500m proximity to the site (Perimeter/boundary) may depend on the project's scale. A larger radius may need to be used for larger scale solar farms and will need to factor in the geography and topography of a proposed site and the characteristics of the development.

Applicants are encouraged to be aware of other nearby renewable energy developments and to work together where possible. Working collaboratively is likely to optimise opportunity and impact for the community and achieve higher credibility for developers, while reducing the burden on community volunteers. Applicants should also recognise that some groups may require support to fully contribute to discussions while some well-resourced communities may have established networks which can be utilised. There may be existing action plans or similar which can be supported, and community issues might have already been identified through other means such as those identified through consultation with the Planning Authority and community members.

3.3.1 Identifying stakeholders

Once the applicant has considered an appropriate geographical boundary for consultation, links should be explored and where possible developed with individuals and groups as listed below:

- Local residents.
- Local landowners.
- Local businesses and business groups such as Chambers of Commerce.
- Land managers.
- Community associations such as community or town councils.
- Local politicians.
- Social groups, for example sports groups or organisations representing the retired or elderly.

- Local environmental bodies.
- Tourists visiting the area, tourist development agencies and providers.
- Other key service providers, e.g. schools, colleges, healthcare facilities, residential facilities, care providers, community transport services, credit unions etc.

3.3.2 Methods of consultation

All consultation should be conducted in an open and transparent manner. Encouraging and facilitating ongoing dialogue should be the focus of the process, alongside ongoing provision of information about different aspects of community benefit. At the outset, applicants and stakeholders need to be clear about what elements of the community benefit package can be shaped by the consultation and what cannot. Applicants are expected to draw on a range of engagement methods and tailor to specific developments and communities. The following non exhaustive lists suggest some starting points for designing the consultation process:

- Letter notification;
- House visits;
- Press releases and community newsletters;
- Public meetings/community drop-in session or workshop;
- Creation of a dedicated project website with key information on progress and links to planning documentation;
- Via existing community stakeholders such as community council representatives or other locally elected representatives;
- Use of social media; and
- Online meetings

Ongoing consultation with the community during the development's construction, operational and decommissioning phases is also advised. Any planned disruption or traffic restrictions in the local area associated with phases of the construction or decommissioning of the project should be highlighted to the local community in advance.

3.4 Layout and Design Considerations.

3.4.1 Introduction

There are a number of factors that can influence the design and layout of a solar farm on a site that has been considered appropriate for development. Below the key components of a solar farm are set out and key planning and environmental issues that should be taken into consideration.

3.4.2 High Level Layout Considerations

When selecting land for solar farm, designers should aim to assimilate the development within the existing landscape. This can be done by using and enhancing existing hedges/tree lines where possible. Additional screening can also be incorporated where deemed necessary. Existing field boundaries should be maintained and enhanced where practicable in solar farm developments. Removal of mature hedge and treeline features should be clearly rationalised and minimised. Areas for enhancement, retention and proposed removal should be clearly shown on all project/application drawings.

The breaking up of solar array clusters can potentially have a positive influence as it can represent a smaller intervention on the landscape and a sense of encroachment would not transpire as the project would read as multiple smaller projects rather than one expansive single form project. The typical fragmented nature of lands designated for solar development is commonly utilised to populate unfavourable lands for other uses such as agriculture. This practice is already common and shouldn't require a restrictive local objective which could hinder the future development of solar farms. It is also noted that solar farm developments should not be limited in size but only restrained by the availability of suitable lands and surrounding constraints. The size and capacity of any large scale solar farm is determined to cater for grid capacity within the wider area and should be facilitated for and not restricted. Nonetheless, the potential associated benefits of breaking up the development into smaller segments which link together includes that the visual and landscape impact would be dispersed over a broader area.

3.4.3 Grid Connection and Overhead Lines

Grid connection and grid capacity considerations will be explored and determined by the developer and the grid provider. The physical connection points, proposed infrastructure and associated works for any given project should be considered as part of any project. In Ireland grid connection are made typically to either 38kV or 110kV connections and should be design in accordance with specific standards issues by ESB Networks and EirGrid.

Where overhead lines traverse a potential solar site, the overhead lines should either be re-routed or appropriate set backs from same should be incorporated into the design of the solar farm. Current standard with regard to set backs from overhead lines are set out in the following documents:

- From ESB Networks: 'Interim Standard Guideline Clearances for Solar Farm to DSO Overhead Network' [26]
- From EirGrid 'Transmission Line and Solar Farm Guideline Clearances' [27]

[26] ESB Networks (2021), Interim Standard Guideline Clearances for Solar Farm to DSO Overhead Network, Dublin. Accessed at: Guideline Clearances for Solar Farm to DSO Overhead Network (esbnetworks.ie)

[27] Eirgrid (2018), Transmission Line and Solar Farm Guideline Clearances, Dublin. Accessed at: 8-Transmission-Line-and-Solar-Farm-Guideline-Clearances.pdf (eirgridgroup.com)

3.4.4 Substations

Typically a solar farm which seeks to connect directly to the national grid will require an on-site substation. The size and configuration of the substation will depend on the overall scale of the proposed development and the method of connection. A 110kV connection will require a 110kV substation and a 38kV connection will require a 38kV substation.

The siting of a substation should be considered at an early stage of the project design. Where it is proposed to connect directly to an overhead transmission line, usually at 110kV, the substation should be located proximate to the overhead line so to minimise extensive cabling and located in an area that is suitably set back from any sensitive receptors. From a visual amenity perspective, the substation should be located close to existing hedgerows where possible, which can act as natural screening. The ground levels should be relatively flat so to minimise the extent of cut and fill that may be required.

Different planning considerations must be taken into account, dependant on the type of substation necessary for the development. Generally, a 38kV substation will be included as a component of an overall solar farm. These developments are submitted to the relevant Planning Authority by way of a Section 34 planning application. The provision of a 110kV substation or greater is typically regarded as SID and will require its own planning consent procedure to An Bord Pleanála under a SID Application in accordance with Section 182A of the Planning and Development Act 2000 (as amended)

The provision of an onsite substation will also require other electrical infrastructure such as cabling, control building, and associated inverters and transformers. The location of transformers and inverters is largely determined by the electrical design configuration proposed for the solar farm; however it is recommended that consideration is given to potential noise impact of transformers and inverters on sensitive receptors when determining the location of such equipment.

3.4.5 Orientation and Panel Details

Typically, solar panels will be orientated in a south facing aspect and typically tilted between 10 and 25 degrees. Within this range, the most likely angle of solar panels will be at 15 degrees. In general, land should be oriented in a southerly direction and free from excessive shadowing so to maximise solar radiation collection. However, having a southern facing field or land is not a limiting factor due to the advancements of PV technologies. Tracker technology can be introduced to ensure that solar panels remain perpendicular to the Sun's rays and achieve the most power output at specific times during the day. Details of this are explained in section 3.2.2 of this Guidance report. Any tilt angle proposed must be assessed within the Glint and Glare assessment which accompanies all solar farm applications.

3.4.6 Ground Supports and Suitable Ground Conditions

Solar farms proposed for agricultural land should be ‘reversible’ in so far as possible. Best practice is for a solar farm to be quickly restored to the previous agricultural use. Trenching and foundations, should therefore be minimised. Solar arrays can be installed using ‘pile’ driven or screw foundations, or pre-moulded concrete blocks/ballasts (shoes), and capable of easy removal. The use of concrete shoes may be required as a mitigation measure for archaeological sensitive areas or as an engineering solution to unsuitable ground conditions.

Where 'pile' driven foundations are proposed, developers should consider impacts during the construction phase the piling will have on nearby noise sensitive properties. This can be demonstrated within the planning application as part of the overall noise assessment for any development. It is noteworthy that vibration from and materials used during piling may have other environmental and ecological impacts (e.g. to sensitive ecological receptors such as water courses, Otter holts, Badger setts etc.) and therefore impacts would need to be considered and may need to be mitigated for. Some forms of piling may be unsuitable in some ecologically sensitive areas.

3.4.7 Security Fencing/ Lighting

For security and insurance reasons, it is a requirement that solar farms are appropriately fenced with CCTV cameras installed. In some instances, the use of flood or security lighting may be required for solar farm developments. The impacts of security features on biodiversity and residential amenity can be minimised through the following measures:

- Utilise existing features, such as hedges or landscaping, to screen security fencing;
- Use natural elements, such as vegetation planting, to assist in site security;
- Minimise the use of flood/security lighting. Any lighting should utilize a passive infra-red (PIR) technology and should be designed and installed in a manner which minimizes glare, light pollution and impacts on biodiversity, in particular bats (see ecology section);
- Ensure that appropriate measures are in place to facilitate continued access through lands by larger mammals, such as badgers and foxes.

3.4.8 Access Tracks

Access tracks to the electrical infrastructure such as the inverters/transformers may be necessary to enable maintenance and replacement. Agricultural vehicles, including tractors, quad bikes and 4WD vehicles, should be capable of safely servicing the equipment daily.

During construction, temporary access tracks will typically be required to install the solar panels and all other associated development works. These temporary tracks will ensure minimal ground disturbance on the existing agricultural land.

Where access tracks need to be provided, permeable tracks should be used, and localised Sustainable Urban Drainage Systems (SUDS), such as swales and infiltration trenches, should be used to control any run-off where recommended. It is recommended that Nature-Based SUDS are utilised to ensure biodiversity gain.

Given the temporary nature of solar farms, sites should be configured or selected to avoid impacting on existing drainage systems and watercourses. Culverting existing watercourses/ drainage ditches should be avoided where possible. If a watercourse crossing is required, the details of the crossing should be adequately detailed and considered in the planning application.

Turning points or 'hammerhead turns' are also a common design feature which can minimise the extent of onsite access tracks. During the design stage of a solar farm, auto-track should be undertaken on the internal access tracks to ensure the layout provided can accommodate the required turning radius needed for vehicles accessing the solar farm.

3.4.9 Construction Compound

The construction stage of a solar farm will require the delivery of solar arrays. Temporary storage will be required for the storage of solar panels, construction materials and plant. A temporary compound including office and welfare facilities for contractors is often developed for this purpose. It is, therefore, likely that a temporary construction compound will be required for most developments. Such compounds should be carefully located within the development lands to minimise the environmental impact such as proximity to existing dwellings, visual impact and proximity to watercourses, archaeological sites and monuments or environmentally sensitive areas.

Planning applications should contain details of the size and location of the proposed construction compound.

3.4.10 Ground Works

3.4.10.1 Site Levelling

Consideration should be given to the existing site contours. If any site levelling works are proposed to facilitate the development of a solar panel array the extent and impact of these levelling works should be detailed within any planning application.

3.4.10.2 Ground Maintenance

Vegetation will grow under the solar panels, and this will require management, particularly to avoid the site becoming overgrown with noxious weeds and assist with the eventual restoration of the site, normally to agriculture. There are various techniques for managing the vegetation, these include mowing, grazing, strimming, spraying, or mulching.

Spraying should be avoided wherever possible and mulching large areas is likely to present technical challenges. Use of pesticide / herbicide should be minimised and discouraged in solar farms in line with the EU Biodiversity Strategy goals.

During times of the year when growth requires managing, grazing is encouraged wherever practicable. Animals such as sheep, chickens and geese are seen across most solar developments across the United Kingdom and Europe. Where grazing is to be facilitated it is advised that solar panels are positioned at least 700mm above ground level and all cabling is suitably protected from animal disturbance.

3.4.10.3 Soil Stripping and Replacement

The development of a solar farm is likely to require the excavation of soils associated with construction compounds, access roads, cable trenching, substation construction etc. Where such soil stripping occurs, topsoil and subsoil should be stripped, stored and replaced separately to minimise soil damage and to provide optimal conditions for site restoration. Any planning application should contain a methodology for soil stripping, storage and replacement, which should subsequently be adhered to during site development.

It is important that soil is not excavated within buffers built into the design of a solar farm such as buffer zones around archaeological sites (Both full exclusion buffer zones and no-dig buffer zones), Riparian buffers from mapped watercourses and hedgerow maintenance buffers to allow the protection of these features.

With regard to soil storage, care needs to be taken to minimise soil compaction and dust. Soil stockpiles should be positioned to ensure that run off will be intercepted and adequately contained so that all sediment is settled prior to entering any watercourses.

3.4.11 Ecology/Biodiversity

Applicants and Stakeholders are advised to engage early with Planning Authorities to scope out ecological and broader environmental issues. This early intervention supports the design stages of any development as design should be informed and influenced by ecological assessments. Ecology considerations needing particular assessment include ground nesting birds, wintering birds, bats, reptiles and badgers. The use of an advising ecologist throughout the design process can ensure that appropriate ecological impacts are avoided. Where adverse impacts are identified, they are appropriately mitigated, and biodiversity enhancements are maximised.

Some species need particular assessment and consideration include protected flora and fauna including ground nesting birds, wintering birds, bats, other protected mammals (Including otter and badger), amphibians and reptiles, as well as some butterfly species. Other protected animal and plant species listed as requiring protection under the Wildlife Act and the Habitats Directive may also require particular assessments.

Depending on the specific ecological features, licences issued by State Bodies may be required to facilitate specific works and may be subject to specific requirements including timing of works (e.g. derogation licences for works with potential to affect bats, badger, otter). Clearance of vegetation should be done at the most appropriate times (Being cognisant of ecological constraints including bird nesting season (1st of March to 31st August) and be considerate of nesting birds in grassland, scrub, woody and built areas.

The avoidance of areas of ecological sensitivity is recommended when identifying sites, designing layouts and developing grid connections. Flight patterns of relevant bird species may need to be considered when identifying routes for overhead lines. In addition to this, the avoidance of ecologically sensitive areas outside of sites designated for nature conservation should be considered throughout the design stages of large scale solar energy developments.

Root protection should be considered in applications where applicable. Existing field boundaries and woodland and tree assets may have significant rooting systems which can be adversely impacted through compaction, excavation, transport, construction and soil removal activities.

The location and design of solar farms should be informed and influenced by ecological assessments to avoid any impacts to SAC and SPA and NHA sites designated under the Habitats Directive and Birds Directive (European Sites). To avoid an adverse outcome to these designated sites, suitable buffers will be applied to avoid any interaction or any potential impact to designated sites. This includes suitable buffers from watercourses and the avoidance of sensitive habitats on sites. Ideally proposed solar farms should be sited outside of European Sites.

3.4.12 Archaeology/Cultural heritage

Any applicant or developer should consider a suitably qualified archaeologist as part of their design team where appropriate to provide on-going advice as well as consulting with the relevant Local Authority and the NMS and Architectural and Built Heritage Unit (ABHU) of the Department (DAU) where required in areas of archaeological potential.

The location and design of solar farms should be informed and influenced by archaeological assessments and constraint studies to avoid impacts to known archaeological resources and features. Ideally proposed solar farms should be sited so as to avoid impacts to known archaeological sites (which could include visual impact) and take into account likely impacts on potential archaeological sites within the footprint of a solar farm development site.

Potential solar farm sites should also have regard to tourism and heritage assets, often in relation to visual impact and proximity to such sites. It is recommended that any developer/applicant review any designated or protected sites within a Local Authority Development Plan or National Designation or Policy.

4. PLANNING APPLICATION DOCUMENTS

4.1 Introduction

This section outlines the key studies and assessments which should support a planning application. Having robust and detailed assessments can assist stakeholders in considering the appropriateness of the site for solar farm development. The studies and assessments should clearly set out any potential impacts that the solar farm could have on the receiving environmental followed by any proposed mitigation measures that may be required during the construction stage and operation stage of the Solar Farm.

4.2 Pre-application Consultation

Once a site has been selected and progressed through a feasibility assessment the developer should engage with the relevant Planning Authority to discuss the project through a pre-planning meeting prior to lodging the planning application. Also, where applicable, consult with the DAU (As outlined in section 3.3.2) in relation to key issues such as archaeology, biodiversity, heritage.

Pre-planning meetings are a valuable resource available to prospective applicants to engage with the Planning Authority. It is advised that all prospective applicants should seek to avail of this facility provided by Planning Authorities at the earliest opportunity. Pre-planning engagement allows the prospective application to present the site and rational for development. The Planning Authority through its experience in dealing with renewable energy projects can advise the prospective applicant of their key consideration in determining planning applications for renewable energy projects. It is advised that, as part of this process, developers or applicants take the opportunity to engage with and be advised by the relevant specialist (Conservation/heritage/archaeology) professionals employed by the relevant Planning Authority where deemed appropriate in relation to key site specific environmental considerations.

4.3 Planning Application Material

The Planning Authority should confirm the level of information necessary to accompany and support any planning application. It is recommended that a report detailing a site's planning and environmental assessment is prepared and submitted alongside any solar farm planning applications. Such a report can set out the key characteristics of the proposed solar farm while describing the potential impact of the development and mitigation measures where necessary.

Supporting documents often contained in a solar farm planning application include the following:

- Planning and Environmental Report (PER) or detailed Planning Report/Assessment;
- Construction and Environmental Management Plan (CEMP);
- Environmental Statement or Assessment;
- Appropriate Assessment (AA) Screening or Natura Impact Statement (NIS);
- An ecological assessment where applicable;
- Archaeological Impact Assessment where applicable;
- Glint and Glare Assessment where applicable;
- A Landscape and Visual Impact Assessment where applicable;
- Site Specific Flood Risk Assessment (if required);
- Traffic Impact Assessment (if required)

The requirements for accompanying reports and assessments will likely be agreed upon at a pre-planning stage between the applicant and the relevant Planning Authority. The above list is not final and other additional reports and/or assessments may be required for an application and are dependent on the site specific details of any given location.

4.4 Planning Drawings

Articles 17 & 18 of the Planning and Development Regulations 2001 (as amended) sets out the requirements for a valid planning application to be made.

The prescriptive scales can be agreed with the relevant Planning Authority before to submission. Given the large size of many solar farms, alternative scales on drawings such as the Site Location and Layout drawings may be agreed upon by the applicant with the Planning Authority in accordance with Article 23 (1) (a) & (b) of the Planning and Development Regulations 2001 (as amended). Article 23 (1) (a) & (b) states that site plans, layout plans, elevations and sections can be in a scale which is agreed upon with the Planning Authority before the submission of the application in any particular case.

4.5 Environmental Impact Assessment (EIA)

4.5.1 Overview

The European Union Directive 2014/52/EU (the EIA Directive) on the assessment of the effects of specific public and private projects on the environment, requires member states to ensure that a competent authority carries out an assessment of the environmental impacts of certain types of projects, as listed in the Directive, before development consent is given for the project.

The EIA Directive requires that:

> *"in order to ensure a high level of protection of the environment and human health, screening procedures and EIA assessments should take account of the impact of the whole project in question, including where relevant, its subsurface and underground, during the construction, operational and, where relevant demolition phases".*

The requirement for the Environmental Impact Assessment of various types of development are transposed into Irish legislation under the Planning and Development Act, 2000 (as amended), and the Planning and Development Regulations, 2001 (as amended).

Schedule 5, Part 1 of the Planning Regulations 2001 (as amended) includes a list of projects which are subject to EIA based on their type. Part 2 of the same schedule includes a list of projects which by reason of scale also fall into the EIA category for example, waste handling facilities that handle in excess of 25,000 tonne of waste per annum all fall into Part 2. Schedule 5 also includes a section on extensions or changes to developments for example, any change or extension to existing projects which would result in the development being of a class listed in Schedule 5 or result in an increase in size greater than 25% or 50% of the appropriate thresholds would fall into Schedule 5 and thus require an EIA.

A recent circular was published by the DoHLGH on 27th July 2023, informing of the new regulation entitled 'Planning and Development (Amendment) (No.2) Regulations 2023' (S.I. 383 of 2023). These Regulations amend Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended), which incorporates a new category of development that should be subject to Environmental Impact Assessment (EIA) by the insertion of 'Projects for the restructuring of rural land holdings'. The new category of development 'Restructuring of rural land holdings" the threshold is set out as follows.

> *"(a) Projects for the restructuring of rural land holdings, undertaken as part of a wider proposed development, and not as an agricultural activity that must comply with the European Communities (Environmental Impact Assessment)(Agriculture) Regulations 2011, where the length of field boundary to be removed is above 4 kilometres, or where re-contouring is above 5 hectares, or where the area of lands to be restructured by removal of field boundaries is above 50 hectares."*

The above referenced amendment also provides that, where a Planning Authority or ABP is assessing an application for development consent for a project that involves the restructuring or rural landholdings, they have the jurisdiction to carry out EIA Screening or EIA as appropriate.

The EIA criteria are quite clear and prescriptive, however in addition to the above, 'sub threshold' (discretionary) EIA may arise in the event that a development of a type set out in Schedule 5, Part 2, which does not equal or exceed the quantity, area or limit specified, is determined to warrant environmental impact assessment. This is where any project listed in Schedule 5 Part 2 which does not exceed its specified limits in respect of the relevant class of development (e.g., waste facility handling 20,000 tonnes per year) should be subject to EIA where the project would be likely to have significant effects on the environment, having regard to the criteria set out in Schedule 7 of the Regulations.

While solar farms do not fall within a prescribed class of projects requiring mandatory EIA as outlined in either Part 1 of Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended). Habitats important for ecological features and wildlife should be avoided as per the EUIPR 01/2023 Planning and Development (Amendment) (No. 2) Regulations 2023 (S.I. 383 of 2023). Solar farms may still fall within another mandatory EIA category due to their sometimes unique and complex nature. For example, if as part of a solar farm it was proposed to fell 15 hectares of broadleaf or natural woodlands to accommodate the development, this would trigger the need for mandatory EIA as the development would exceed the 10 hectare threshold for deforestation under Part 2 (1)(d) of Schedule 5 of the Planning and Development Regulations 2001 (as amended).

4.6 Appropriate Assessments

With the introduction of the Birds Directive in 1979 and the Habitats Directive in 1992 came the obligation to establish the Natura 2000 network of sites of highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SACs, including candidate SACs), and Special Protection Areas (SPAs, including proposed SPAs)

It is a requirement to consider the possible nature conservation implications of any plan or project on the Natura 2000 site network before any decision is made to allow a plan or project to proceed. Ecological Impact Assessments should be considered on a case-by-case basis for non-designated sites that may be locally important, which would support planning authorities in their assessment and decision making.

The Competent Authority must take into consideration the possible effects a project or plan may have in combination with other plans and projects on the Natura 2000 network by going through the process known as Appropriate Assessment (AA).

The obligation to undertake appropriate assessment derives from Article 6(3) and 6(4) of the Habitats Directive, and both involve a number of steps and tests that need to be applied in sequential order. Article 6(3) is concerned with the strict protection of sites, while Article 6(4) is the procedure for allowing derogation from this strict protection in certain restricted circumstances.

National guidance for Planning Authorities on Appropriate Assessment of plans and projects in Ireland[30] was published by the Department of Environment, Heritage and Local Government (DEHLG) in 2009 and updated in 2010. In addition, the Office of the Planning Regulator (OPR) has published a practice note on 'Appropriate Assessment Screening for Development Management'[31]. The practice note provides useful information on screening for appropriate assessment during the planning application process.

Whilst the role in carrying out an Appropriate Assessment sits with the Competent Authority; the prospective applicant can help facilitate this process by either submitting an Appropriate Assessment Screening statement or a Natural Impact Statement. It is recommended that potential impacts on Natura 2000 sites are considered at an early stage of the design process and the necessary supporting documentation is submitted with the planning application so to facilitate the Competent Authorities assessment.

4.7 Planning Application Fee

There is no national guidance on solar farms regarding a planning application fee category. However, typically the planning application fee will relate to the size of the overall development and the number of, and size of structures proposed within the development. Prospective applicants or developers should consult with the relevant Planning Authority regarding planning application fees.

[30] Department of the Environment, Heritage and Local Government (2009), Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Dublin. Accessed at: Appropriate Assessment of Plans and Projects in Ireland (npws.ie)

[31] Office of the Planning Regulator (2021), Appropriate Assessment Screening for Development Management. Dublin. Accessed at: https://www.opr.ie/wp-content/uploads/2021/03/9729-Office-of-the-Planning-Regulator-Appropriate-Assessment-Screening-booklet-15.pdf

The planning applications for typical solar farms, have fallen under a certain Class of Development for fee calculation. Section 2 of Schedule 9 of the Planning and Development Regulations 2001 (as amended) outlines the classes of development and the corresponding fee required. Typically solar farm developments fall under Class 4, Class 8 and Class 13 Development, details of each of these Classes is outlined in the table below:

Table 4-1: Extract of the relevent sections from the Planning and Development Regulations (2001) as amended

Column 1 Class of Development	Column 2 Amount of Fee	Column 3 Amount of Fee for Retention Permission
4. The provision of buildings other than buildings coming within class 1, 2 or 3.	*€80 for each building, or €3.60 for each square meter of gross floor space to be provided, whichever is the greater.*	*€240 for each building, or €10.80 for each square meter of gross floor space to be provided, whichever is the greater.*
8. .The provision on in over the land or under land of plant or machinery, or of tanks or other structures (other than buildings) for storage purposes.	*€200 or €50 for each 0.1 hectare of site area, whichever is the greater.*	*€600 or €150 for each 0.1 hectare of site area, whichever is the greater.*
13. Development not coming within any of the foregoing classes.	€80, or €10 for each 0.1 hectare of site area, whichever is the greater.	€240, or €30 for each 0.1 hectare of site area, whichever is the greater.

As noted above, Class 4 allows for the provision of buildings other than buildings coming within class 1, 2 or 3 and has a corresponding fee for permission at €80 for each building, or €3.60 for each square metre of gross floor space to be provided, whichever is the greater. Typically, Class 4 will apply to any substation, electrical infrastructure building or other associated building provided as part of any proposed development.

Class 8 allows for development comprising of plant and machinery. This would apply to some electrical equipment which would not constitute a building/structure that would fall under Class 8 has a corresponding fee for permission at €200, or €50 for each 0.1 hectare of site area, whichever is the greater.

Class 13 allows for development not coming within any of the foregoing classes and has a corresponding fee for permission at €80, or €10 for each 0.1 hectare of site area, whichever is the greater. Typically, the Class 13 fee for any proposed development will apply to the site area.

It should also be noted that Applications for Strategic Infrastructure Development under Section 182A of the Planning and Development Act 2000 (as amended) carry a fee of €100,000.

Furthermore, a number of planning applications often have a condition attached to the grant of planning requiring the applicant to confirm the MW prior to commencement. This results in Development Contributions calculations that are paid out on a per MW basis and the total number of MW correlating to the total accurate development contributions paid out.

As there is no direct Class of planning application fee for solar farms. The above listed classes form the guideline basis for planning fee calculations for solar farms. In any instance it is recommended that any applicant or developer engage with the relevant Planning Authorities Planning Department in relation to any queries regarding the correct planning application fee calculation as fees for solar development can vary from Planning Authority to Planning Authority.

4.7.1 Electricity Generating Capacity

Planning applications for solar farms typically do not indicate the proposed facility's installed capacity (MW). It has been widely accepted and understood that the quality and performance of the solar panels may fluctuate significantly during the permission period and degrade over time. As a result, a definitive installed capacity cannot be accurately provided.

The MW is not provided as it is difficult to be precise on the Megawatt (MW) output of solar farms at the planning application stage as there are a number of factors which will govern the final energy output of the facility, this includes:

- The Commission for Regulation of Utilities has determined that to apply for connection to the national grid under the Enduring Connection Process (ECP), a prospective applicant must first have been granted planning permission.
- When a grid connection application is accepted, EIRGRID or ESBN, who assess the application, consult the applicant to determine the quantum of energy to be permitted based on available infrastructure and grid capacity requirements. For a project that is applying for planning permission, this process has yet to be undertaken, and the permissible MW output will thus be finalised after a connection agreement under ECP has been completed.
- Solar panels generate energy as direct current (DC) which is inverted to Alternating Current (AC), and voltages are stepped up in accordance with requirements and efficient management of the system prior to final output to the national grid. These processes can result in losses of energy. Technology associated with electrical infrastructure and management is developing rapidly with ongoing efficiencies in loss management being achieved. Prior to installation the electrical design will determine the most cost-efficient energy management system for the solar farm, and thus determine what will be the MW output from the facility.
- Solar panel technology is also developing rapidly with more efficient conversion of sunlight to electrical energy. Prior to construction and in tandem with the electrical design, final decisions on the choice of panel will be made to ensure the permitted solar panel area, as indicated in the development description, will be efficiently utilised. This in turn will also affect the final MW output.

As the MW figure for solar farms typically cannot be accurately determined and included in the planning application, the total square meters of the panels or total number of panels can be included to provide a detailed and accurate refence for the scale of such works proposed. This detail provides a quantitative figure by which the planning permission cannot exceed to allow a degree of certainty in the assessment of the impacts of the planning application.

Recently, planning applications have had a condition attached to the grant of planning requiring the applicant to confirm the MW prior to commencement. This condition can ensure the development contributions can be paid and applied accurately to any permitted development. Numerous Planning Authorities took this approach, and it is considered a sensible and thorough approach.

Meath County Council in response to scoping conducted as part of this Guidance Report accepted:

> *"that the quantum of energy output on a solar farm cannot be accurately provided at the planning application phase of a solar PV project and that the permissible MW output is only finalised after a connection agreement has been completed under the Enduring Connection Process. It is therefore accepted that a condition requiring the applicant to confirm the MW prior to commencement will serve as an appropriate record to measure the county's renewable energy output."*

5. KEY CONSENTING CONSIDERATIONS

5.1 Introduction

The following section outlines the key planning and environmental considerations that each solar farm planning application in Ireland will need to have regard to. The section gives an overview of the different consenting process for solar farm development and associated grid connections. In addition, it outlines the key environmental assessments and methodologies that all solar farm planning applications should adhere to.

5.2 Consenting Process

Solar farm components can currently be consented under three consenting processes.

1. A conventional planning application to the relevant Planning Authority under Section 34 of the Planning and Development Act 2000 (as amended);
2. A Strategic Infrastructure Development (SID) application to An Bord Pleanála for consent under 182 of the Planning and Development Act 2000 (as amended);
3. The use of a Section 5 (Exempted Development) Declaration to the relevant Planning Authority under Section 5 of the Planning and Development Act 2000 (as amended)

The grid connection method for the solar farm will dictate which of the above consenting process should be undertaken. The grid connection options are outlined in the table 5-1 below:

Table 5-1: Options for Grid Connections for Solar Farms

Grid Connection Options	Details
1) On site substation/electrical infrastructure and connection to existing substation on current electricity network	The solar farm connects to an existing 110kV substation within proximity of the site through a number of options. This requires provision of an on-site substation or electrical infrastructure which will then connect to the existing nearby 110kV substation.
a) Included as development as part of the solar farm application	The grid connection route is included within the red line boundary and development description of the solar farm and forms part of the planning application to the Planning Authority.
b) A separate exempted development application (Class 26)	The grid connection route meets the requirements of exempted development per the Planning and Development Regulations 2001 (as amended).
c) A separate planning application if the grid connection triggers one of the criteria that are required for exempted development.	The grid connection route is included in a separate planning application, submitted to the relevant Planning Authority.
2) Provision of 110kV substation (or greater) and cable route	If the Competent Authority in this instance considers that the 110kV connection meets the definition of transmission or distribution the grid connection and its associated substation must be considered under the SID process. Whilst the Solar Farm array must be considered under Section 34 process.

5.2.1 Assessment of the Impact upon Agricultural Land & Site Selection

Solar farms are deemed compatible with agricultural land. When development is proposed on agricultural land the applicant should propose a project end date to demonstrate the temporary nature of the solar farm. Agricultural land use can still be maintained while the solar farm is at the operational stage. In 2014 BRE prepared a guidance report for 'Agricultural Good Practice for Solar Farms'.[32] This report describes experience and principles of good practice to date for managing small livestock within solar farms on agricultural land, derelict/marginal land and previously developed land.

The introduction of solar development into agricultural settings is considered a suitable technology for diversifying the rural economy. The temporary nature of solar farms also allows for the continued use of farming after the solar farm has been decommissioned. Solar farms are a non-invasive land use which respects and retains the quality and character the lands used. This is demonstrated by the capability of solar farms to support a dual land use, for instance for energy production, while also allowing for the continuation of agricultural uses in and around the solar arrays.

In particular, some solar sites may be suitable for grazing sheep and this has proven to be a successful dual use of the land for agriculture. For example, at Millvale Solar Farm in Co. Wicklow, sheep graze around the panels, this demonstrates that there is potential to integrate farming activities with solar developments in Ireland. Other successful dual land use options include agrivoltaics and horticulture. International research and case studies identified that a large number of crops, vegetables, livestock, fish and shrimp can grow under solar PVs, although larger-scale demonstrations need to be carried out.[33]

Figure 5-1: Sheep grazing on solar farms (Dual use).Source: ISEA

5.2.2 Landscape / Visual Impact

Landscape considerations must be embedded in the decision-making process, as a potential significant environmental effect of a solar farm may be the impact on landscape character and visual amenity.

The question to be addressed is whether the solar farm is likely to give rise to significant environmental effects on the landscape, and thereby whether the Environmental Impact Assessment Regulations apply to the application.

[32] BRE (2014) Agricultural Good Practice Guidance for Solar Farms. Ed J Scurlock
[33] IRENA (2021), Bracing for Climate Impact: Renewables as a Climate Change Adaptation Strategy, Abu Dhabi: International Renewable Energy Agency.

There are many elements associated with solar farms which have the potential to influence the significance of the impacts on landscape character and visual amenity. These include:

- Gradient of the site and the surrounding landform,
- Extent of the application site,
- Height and layout of the panels,
- Colour of the panel's surrounding frames,
- Treatment of the ground below and between the panels, for example to grow crops, graze small livestock,
- Perimeter fencing.

As part of any proposed development, it is not advised to remove existing vegetated field boundaries such as, hedges as this will irrevocably alter the landscape character of the site. However, it should be noted that if the vegetated field boundaries are in a poor condition, then it may be necessary to do so as they may prove to be an obstruction or safety concern at this section, and it may be necessary to replace with field boundaries as described in section 3.2.7.

In 2000, the Department of the Environment and Local Government (DoEHLG) published 'Landscape and Landscape Assessment: Consultation Draft of Guidelines for Planning Authorities', which recommended that all Planning Authorities adopt a standardised approach to landscape assessment for incorporation into Development Plans and consideration as part of the planning process. Although the DoEHLG 2000 guidelines remains in draft form, they (as well as a range of other guidelines) help inform and shape the layout and design of various solar farms across the country. Such other guidelines include:

- Guidelines for Landscape and Visual Impact Assessment (The Landscape Institute/Institute of Environmental Management and Assessment, UK, 2013).
- Photography and Photomontage in Landscape and Visual Assessment; Landscape Institute Advice Note 01/2011 (2011).

Planning applications for solar farms are typically accompanied by a detailed Landscape and Visual Impact Assessment (LVIA). LVIA's methodologies typically follow a rational sequence of steps to identify the impact on the surrounding landscape receptors that might be affected by solar developments and recommend appropriate mitigation measures. These are then further filtered to yield those receptors to those likely to experience such effects. These steps are as follows.

1. Identify study area and desktop analysis
2. Identify receptors.
3. Preliminary Landscape and Visual Impact analysis.
4. Site visit.
5. Preparation of photomontages.
6. Mitigation through design by either recommending additional or enhanced screening or the omittance of panels.
7. Completion of comprehensive assessment.

One of the first stages of carrying out a typical LVIA is establishing the baseline landscape and visual conditions. In order to carry out this assessment, initial desktop studies are often undertaken which identify relevant policies and guidelines as well as existing features location within or adjacent to the subject lands. An initial assessment of a site and its surrounding landscape and receptors is often undertaken during a site feasibility assessment progression to a planning application.

As outlined above, a step-by-step process is typically followed in the preparation of an LVIA. This process also applies in selecting appropriate photomontage viewpoint (VP) locations. These VP locations are typically based on the following criteria:

- Potential visibility of the development site;
- Critical landscape designations e.g. scenic routes, areas classed as sensitive or vulnerable;
- If site located in an area of archaeological importance, potential visual impacts on such area;
- Proximity to settlements or groups of residential dwellings;
- Within public areas or on public roads, particularly more trafficked routes;
- Visual impact of cumulative developments within the wider landscape;
- Views that cover a wide area in terms of geographical location, elevation and varying distance from site.

The proposed photomontage VP locations are often presented to the Planning Authority during a pre-planning meeting. The applicant should seek advice from the Planning Authority if they want any specific VPs addressed.

Mitigation and restoration measures to protect landscape and visual impact that may be appropriate for solar farm sites could include the following measures:

- Retention and bolstering of existing hedgerow boundaries within and around the site also aid visual screening and maintains the existing field pattern.
- Provision of additional hedgerows around the site where there is little to no obstructions.
- Provision of tree line covers thicket/woodland for screening. Typically utilising a mix of mature and immature native species.
- On-site access tracks should try follow existing farm tracks and follow existing topography in order to minimise ground disturbance, alteration of physical landscape character and visual intrusion.

Any buildings required to house electrical equipment etc should be designed and constructed to minimise their landscape and visual impact. Construction materials should be selected to reflect the local landscape context. If compound buildings are used, consideration should be given to the need to screen the building with vegetation or using landscape appropriate paints.

Good collaboration between the consultants preparing the LVIA and Archaeological Impact Assessment (AIA) should exist at all stages of the design and application process.

5.2.3 Ecology and Biodiversity

The nature of impacts on ecology will depend on the ecological characteristics and features of the site and sensitivity to proposed changes. Solar arrays could have implications for habitat loss, fragmentation, and modification and for displacement of species. However, solar arrays can also deliver environmental gains through biodiversity enhancement and the rewilding of previously intensively farmed agriculture lands. The absence of certain farming activities can allow the surrounding biodiversity to flourish and enhance which can help create a habitat for pollen and nectar feeding insects though the emergence of wildflowers. The possible creation of flower rich areas can contribute towards the objectives of the All-Ireland Pollinator Plan 2021-2025.

Given the flexible characteristics of solar farms, mitigation measure and enhancement measures can be engrained into the design of a solar farm so to minimise impact and maximise biodiversity gain. For example, buffer zones can be applied to sensitive habitats such as watercourses. The retention and enhancement of existing hedgerows and tree lines within a site is a key feature in the design process of solar farms and where hedgerows need to be removed, they should be replaced elsewhere on the site so that there is no net loss of hedgerows. The incorporation of additional biodiversity enhancement areas or introduce new hedgerows and treelines within the development is a simple feature that can be incorporated into the design.

Ecological and Aquatic (where necessary) Impact Assessments (EcIA) are typically prepared for most solar farm planning applications. It is recommended that any EcIA have regard to best practice in relation to survey, site evaluation, impact assessment, mitigation measures and enhancements. Typical biodiversity enhancement measures can include:

- Identifies existing biodiversity features and how these will be protected during development.
- Inclusion of cultivated strips/plots for rare arable plants;
- Manage existing areas of grassland;
- Planting of rough grassland margins;
- Inclusion of bumble bee and wild bird plant mixes;
- Inclusion of bird and bat boxes;
- Inclusion of Biodiversity ponds;
- Creation of wildflower meadows;
- Reseeding wildflower seeds;
- Retention of suitable habitats for roosting bats and nesting birds;
- Mammal gaps placed in security fences.

Mitigation measures that may be appropriate for some solar farm sites. It is known that mitigation by avoidance of impacts is always the recommended first option when designing any form of development, however, the development of solar farm sites could also include the following measures.

- **Lighting** – Security lighting may affect bats. It is advised that lighting is not used unless absolutely necessary. If lighting is necessary, it must be minimised and directed away from hedges / woodland / scrub. An example would be the use of motion sensor lighting which will activate by movement within a specific range of the sensor security light. A bat survey may be required for some to inform any other mitigation required and indeed whether lighting would be allowable on site.

- **Cables** – Overhead and underground cables have the potential to impact upon biodiversity adversely linked to the excavation activities associated with the foundations of site tracks and underground cabling linked to the substation especially during the construction phase. Cable routes must be carefully designed in consultation with the ecologist.
- **Construction** – It is advised that existing hedges and established vegetation, including mature trees, should be retained wherever possible, and the minimum possible number of new hedge breaks are created. If any hedges/scrub are to be removed, further surveys may be necessary. Trees and hedges should be protected during construction. The impact of the proposed development on established trees and hedges should be informed by a tree survey and / or a hedge assessment as appropriate. Pile driving may affect any badgers nearby; this will need to be informed by surveys and field studies.
- **Fencing** - It is advised that gaps are left between perimeter fencing and hedges to allow maintenance of the hedgerows. A gap to allow small mammals and reptiles access should be left around the entire base of the fence, with larger gaps or gates for badgers at suitable intervals.
- **Enhancement, Management and Monitoring** – Solar farms can potentially increase a sites biodiversity value if the land was previously intensively managed. Sheep grazing or an autumn cut with removal of grass cuttings could increase the botanical diversity of the site. The ecologist engaged on the project for the planning application should specify a suitable management regime for each case, bearing in mind shading by the solar panels.

Wildflower meadows can be considered and, where possible, management should strive to support plant species and flowers from the existing soil seed base through appropriate management. Depending on the ecological value of the site, the introduction of wildflower plant species of local provenance may be considered to support ecological enhancement of the area. Ecological benefits would be greatest when seed of local and native provenance are used. In this regard, guidance documents from the National Biodiversity Data Centre are available and could be noted and considered. Some of these are listed below:

- All-Ireland Pollinator Plan 2021-2025. National Biodiversity Data Centre Series No. 25, Waterford. March 2021.
- Creating and restoring meadows in local communities and gardens. All-Ireland Pollinator Plan, How-to Guide 11. National Biodiversity Data Centre Series No.30. November 2022.
- Farmland: actions to help pollinators. All-Ireland Pollinator Plan, Guidelines 5. National Biodiversity Data Centre Series No.14, Waterford. September 2017. Updated October 2022.

In order to address a number of potential impacts from a solar farm, it has been recommended by various Planning Authorities that a Biodiversity Management Plan accompanies applications. The requirement for a Biodiversity Management Plan may be agreed upon at a pre-planning consultation stage with the relevant Planning Authority. This Management Plan may not be deemed necessary for all solar farms and should be considered on a case by case basis. The inclusion of Biodiversity Management Plan is intended to address any and all ecological and biodiversity issues which any given solar farm may have and ensure that the development will not impede upon the existing character of the surrounding areas. Such plan will ensure the ecological baseline assessment is carried out which would assist with the identification of suitable site locations and inform site design and layout.

5.2.4 Historic Environment and Archaeology

A review of industry standards and consented developments require that a site-specific Archaeological Impact Assessment (AIA) should be carried out for any solar farms proposed. This AIA should address all direct and indirect impacts that may occur to any archaeological resource or feature and shall define appropriate mitigation measures as well as other features associated with the construction and decommissioning of the solar farm.

A properly prepared AIA will address comprehensively the known or potential archaeological impacts of the development and propose mitigation measures to ameliorate such impacts. Therefore, all construction methodologies that will be employed must be clearly understood by the archaeologist preparing the AIA and fully articulated and explained within it. All installations and components should be sensitively located and planned for having regard to the findings of the AIA. Any opportunities to introduce better management of affected assets, or to improve the settings of designated sites, should be identified.

Site specific AIA's should propose appropriate mitigation measures which ensure the solar farm will not negatively impact surrounding sites. Common types of mitigation measures employed can include:

- Preservation in situ
  - Avoidance of recorded and newly identified Archaeological Sites, through the establishment of buffer zones.

    In some instances, the use of pre-cast concrete anchors (concrete shoes) instead of piles or screws which may allow for the preservation in-situ of sub-surface or potential archaeological remains.[34]
- Preservation by record
  - Full archaeological excavation of sites or portions of sites in advance of construction, where deemed appropriate.
- Management of residual risk
  - Archaeological monitoring of construction stage groundworks.

Applications should take account of the results of such AIA in their design. A suitably qualified archaeologist should be appointed as part of the design team for the project to provide on-going advice during the design stage and to prepare the AIA. The AIA should include detailed documentary (Desktop) research and fieldwork. It is important to note that the AIA process covers the entire planning process from the information submitted with the planning application, the Planning Authorities decision, Planning Conditions and Compliance with planning conditions therefore the appropriateness and timing of surveys (Geophysical) and excavation (Test Trenching) associated with the AIA process will depend on the site characteristics and the level of archaeological features present. The Planning Authority and National Monument Services should be consulted prior to the lodgement of a planning application. Regard should be had to the National Monument Services 'Explanatory Note & Glossary of Terms to Accompany Sample Archaeology Conditions.[35]

[34] The use of concrete shoes as an archaeological mitigation measure has been accepted as an option in some permitted solar developments. Their use has been permitted in Tead More, Midleton, Co. Cork (Cork County Council Planning *Reg. Ref. 16/6302*) and Kilcurly, Dundalk, Co. Louth (Louth County Council *Reg. Ref. 20187*).

[35] National Monuments Services (2022) Explanatory Note & Glossary of Terms to Accompany Sample Archaeology Conditions. Accessed at: https://publications.opr.ie/planning-practice-download/53

In addition to the above prepared by the National Monuments Service. The Office of the Planning Regulator (OPR) has published a 'Practice Note (PN03) on Planning Conditions in October 2022'.[36] The OPR advises that:

> *"The developer shall engage a suitably qualified archaeologist (licensed under the National Monuments Acts) to carry out pre-development archaeological testing in areas of proposed ground disturbance and to submit an archaeological impact assessment report for the written agreement of the planning authority, following consultation with the National Monuments Service, in advance of any site preparation works or groundworks, including site investigation works/topsoil stripping/ site clearance/dredging/underwater works and/or construction works. The report shall include an archaeological impact statement and mitigation strategy. Where archaeological material is shown to be present, avoidance, preservation in-situ, preservation by record [archaeological excavation] and/or monitoring may be required. Any further archaeological mitigation requirements specified by the planning authority, following consultation with the National Monuments Service, shall be complied with by the developer. No site preparation and/or construction works shall be carried out on site until the archaeologist's report has been submitted to and approval to proceed is agreed in writing with the planning authority. The planning authority and the National Monuments Service shall be furnished with a final archaeological report describing the results of any subsequent archaeological investigative works and/or monitoring following the completion of all archaeological work on site and the completion of any necessary post-excavation work. All resulting and associated archaeological costs shall be borne by the developer."*

It is advised that further detailed archaeological testing (Geophysical surveys or test trenching as appropriate) can be required as a condition of planning. The requirement of geophysical surveys and test trenching can be dependent on the existing constraints and surrounding sites. In areas of high existing archaeological potential, such surveys and testing may be required. However, in areas of low existing potential, such surveys and testing could be reserved to a post planning stage, prior to the commencement of any construction works on the site. The classification of an area's archaeological potential should be determined by the qualified archaeologist within the AIA.

- Exclusion buffer zones — where no development works of any kind are permitted;
- No-dig buffer zones — where no groundworks are permitted, but where solar farm infrastructure may still be placed using above-ground supports only.

The determination of the appropriate size and extent of any buffer zone must be made based on the specific circumstances of the individual development proposal and the character of the archaeological resource that is to be protected. Access to and the individual amenity characteristics of sites will need to be established and maintained. It is advised that consultation with NMS is carried out prior to finalising any proposals for buffer zones to obtain appropriate site and project specific guidance. This consultation should be undertaken by a suitably qualified archaeologist or appropriate qualified individual within an applicant's design team. Proposals for buffer zones of any type must be informed by the AIA.

The following is offered by way of general best practice regarding the design and implementation of buffer zones:

[36] OPR, Practice Note PN03, (2022), Planning Conditions, Accessed: https://publications.opr.ie/view-file/113

- The extent of a buffer zone of either type (Whether an exclusion buffer zone or no-dig buffer zone) must be measured from the outermost extent of the archaeological monument or feature to be protected. Any or a combination of the following may be necessary in order to adequately determine this: review of aerial photography, historical mapping and/or Light Detection and Ranging (LIDAR) data;
- No construction groundworks of any kind (including geotechnical investigations) can be carried out within either type of buffer zone;
- Exclusion buffer zones must be fenced off for the duration of construction and decommissioning works. No machinery, storage of materials or any other activity related to construction or decommissioning can be permitted within exclusion buffer zones;
- Only non-invasive above-ground solar panel supports can be used within no-dig buffer zones and all cable connections or other necessary service conduits must be placed in above-ground housings;
- Pre-cast concrete anchors (concrete shoes) can be used, in certain instances, within no-dig buffer zones, to protect any possible subsurface archaeological structures or features. Such anchors place the weight of the panel arrays directly to the soil surface and do not disturb soils or sub-soils. (Ordinarily solar panels are mounted on frame foundations which are typically secured on either steel pile construction or earth screw mounts.)
- Careful consideration must be made for how infrastructure will be put in place within no-dig buffer zones and removed during decommissioning before determining if it is a viable mitigation measure. Protective matting may be needed during installation or decommissioning to prevent machine rutting. Machine access and transits must be limited to essential works only;
- Visual impact assessment should be considered when putting forward no-dig buffer zones as an option (see Landscape and Visual Impact Section 4.7.4);
- Establishment of exclusion and no-dig buffer zones must be carried out under archaeological supervision and the locations of these zones must be highlighted to all construction personnel (through inclusion in a CEMP or similar).

All of the above recommended mitigation measures are in line with the NMS guidance outlined above in relation to archaeology and solar farms.

Concrete shoes are a potential archaeological mitigation measure in certain instances. Ordinarily solar panels are mounted on frame foundations which are typically secured on either steel pile construction or earth screw mounts. The use of concrete shoe can be used to protect any possible subsurface structures or features. These shoes place the weight of the panel arrays directly to the soil surface and do not disturb soils or sub-soils. An example of concrete shoes is shown in Figure 5-2 below. The shoes should be used if required under guidance from the on-site archaeological investigations and surveys recommended to be completed post planning and before construction.

Figure 5-2: Typical Concrete Shoe Support

5.2.5 Site Access

With regard to access points and site entrances it is recommended that applicants for large scale solar energy developments submit the following information with any planning application, It should be noted that some of these documents are best provided at a post planning stage prior to the commencement of construction works:

- Specific Details – Operational and construction stage.
- Haul Route
- Access junction assessment including visibility splay.

5.2.5.1 Specific details

It is recommended that any developer or applicant should submit details related to both the construction and operational phase of development. These typically consist of the following details:

- Traffic management and road safety procedures and measures for the duration of construction works.
- Sightline details for the entrance to be used during the construction phase.
- Identification of hedging required to be removed to achieve the necessary sightlines in accordance with TII/DMURS.
- Set back entrance gates for entrance.
- Truck Wheel Wash detail
- Drainage details at entrance (Where applicable) and any other drainage flow direction away from the road.
- Car parking for construction workers.
- HGV activity on site per day over the construction period. Activity on normal operation should also be made clear.

5.2.5.2 Haul Route

In most sites, detail on a Haul Route should be submitted in the planning application. Details of the haul route shall meet the requirement of the relevant Planning Authority.

5.2.5.3 Site Access Details

The most important points that need to be assessed within details or drawings in relation to site access include:

- Required sightlines details for the site entrance .
- Identification of hedging required to be removed to achieve the necessary sightlines in accordance with TII/DMURS.
- Changes to existing entrances vs proposed entrances (If applicable).
- Set back entrance gates for entrance.
- Drainage details at the entrance and any other drainage flow direction away from the road.
- HGV swept path analysis for the entrance.
- Further information/details on access or other necessary detail.

5.2.6 Drainage, Surface Water Run-off, and Flooding

Guidelines on flood risk assessment for Planning Authorities are contained in the 2009 document The Planning System and Flood Risk Management (and Technical Appendices) – Guidelines for Planning Authorities (DEHLG & OPW, 2009). The Guidelines state that Planning Authorities are required to introduce flood risk assessment as an integral element of development plans. Development plans and local area plans must establish the flood risk assessment requirements for their functional area. The guidelines provide a methodology for management of flood risks. Strategic Flood Risk and Catchment Flood Risk Assessment Management Plans have been developed for each county and catchment area. These plans and maps should be studied and assessed when preparing feasibility and pre-application reports. Excessive drainage associated with solar farm creation can lead to reduced drought resilience of areas, reduced habitat value and result in the loss of wetlands, ponds and ponding areas.

Where flood risk may be an issue for any proposed solar farm, a more detailed site-specific flood risk assessment should be carried out appropriate to the scale and nature of the development and the risks arising. Solar panels by virtue of their flexibility can be considered appropriate in flood zones as the panel arrays can be raised up above the potential flood heights and the light support frame structures do not restrict flows under the panels therefore solar arrays can be developed within flood zones without impacting the flood capacity of the site. It is important however that vulnerable infrastructure such as substations and inverters/transformers are located outside of such zones.

Where access tracks need to be provided within a site, permeable tracks should be used, and localised SUDS, such as swales and infiltration trenches, should be used to control any run-off where recommended.

Solar farm sites should, where possible, be configured or selected to avoid impacting existing drainage systems and watercourses. Culverting existing watercourses/drainage ditches should be avoided where possible. Where culverting for access is unavoidable, it should be demonstrated that no reasonable alternatives exist and where necessary only temporarily for the construction period.

The following should be considered when developing solar farms proximate to watercourses.

- Buffer zones should be a minimum of 10m either side of a mapped (EPA mapped) watercourse and may extended past 10m either side in more sensitive sites. The extension for more sensitive sites will need to be assessed on a site-specific basis and incorporate an appropriate buffer zone.
- All watercourse crossings and their associated methodologies should be included in any planning application with a preference for clear-span structures rather than culvers.
- All works should be carried out as per the Inland Fisheries Ireland (IFI) Guidance documents on protection of fisheries during construction work in and adjacent to waters as well as the Urban Watercourse Riparian Zone Guidance document[39].

5.2.7 Water Services

Prior to the commencement of construction works on any large-scale solar energy development it is advised that the developer consult with Uisce Éireann (UÉ) in advance of any physical works on the ground. If UÉ are not consulted with, it is important that any applicant or developer has consideration for UÉ assets. Details, where known, can be obtained by emailing datarequests@water.ie, however, exact locations will still need to be verified on site by the developer/applicant.

Consultation and consideration for water services is of particular importance for development of grid connection works as these are often undertaken within a public roadway where existing UÉ services are located.

Consultation and consideration for UÉ infrastructure and services ensures that the details and methodologies of the proposed construction program align with the policies and best practices of construction regarding impacts to water services infrastructure. The following should be considered in advance of any planning application

- Where the development proposal has the potential to impact an UÉ water sources, the applicant shall provide details of measures to be taken to ensure that there will be no negative impact to UÉ water sources during the construction and operational phases of the development.
- Any physical impact on UE assets – reservoir, drinking water source, treatment works, pipes, pumping stations, discharges outfalls etc. including any relocation of assets.
- Any and all potential impacts on nearby reservoirs as public water supply water sources are to be thoroughly assessed, including any impact on hydrogeology and any groundwater/ surface water interactions.
- If required, the applicant shall identify any upgrading of water services infrastructure that would be required to accommodate the proposed development.
- Where road closures are necessary, emergency repairs of watermains or the clearing of sewer blockages may still be required, and the developer of any development is required to enable the relevant authorities to carry out such work in a timely manner and in order to minimise disruption to the public.
- Where connection(s) to the public network is required as part of the development proposal, applicants are advised to complete the Pre-Connection Enquiry process and have received a Confirmation of Feasibility letter from UÉ ahead of any planning application.

[39] Inland Fisheries Ireland (2020), Planning for Watercourses in the Urban Environment, Dublin. Accessed at: IFIUrbanWatercoursesPlanningGuide (fisheriesireland.ie)

For all projects and developments, the process for interactions with the existing UÉ assets is outlined on the UÉ website (https://www.water.ie/connections/developer-services/diversion-and-build-over/).

5.2.8 Glint and Glare

Glint and glare are defined as:

> *"Glint" gives out or reflects small flashes of light.*
>
> *"Glare" shine with a strong or dazzling light.*

Glint and glare are essentially the reflection of sunlight from reflective surfaces. Glint may be produced as a direct reflection of the sun on the surface of the solar panels. It may be the source of the visual issues regarding viewer distraction. Glare is a continuous source of brightness, relative to diffused lighting. This is not a direct reflection of the sun, but rather a reflection of the bright sky around the sun. Glare is significantly less intense than glint. In the case of solar farms, glint and glare are minimal. PV modules reflect a similar amount of sunlight as water bodies, less than other materials that make up the built environment, namely, aluminium (and other metals), concrete and even vegetation.

The potential for solar farm panels, frames and supports to have a combined reflective quality should be assessed as part of a glint and glare assessment. This assessment needs to consider the likely reflective capacity of all of the materials used in constructing the solar farm.

In terms of reflectance, photovoltaic solar panels are not considered to be a highly reflective surface. They are designed to absorb sunlight and not to reflect it. Nonetheless, photovoltaic panels have a flat, polished surface, which emits 'specular' reflectance rather than a 'diffuse' reflectance, which would occur from a rough surface.

'Glint and glare' is not a new feature in the Irish landscape as buildings, cars and other reflective surfaces have produced this phenomenon for some time. The assessment and quantification of the glint and glare implications of a solar farm is a relatively new consideration. A review of consented planning applications suggests that stakeholders are most concerned with potential impacts on the following receptors:

- Residential dwellings;
- Historical monuments/heritage landscapes;
- Road networks; and
- Aviation infrastructure.

The preparation and submission of a Glint and Glare Assessment with a planning application for solar farms is often required by many Planning Authorities and stipulated in policies and objectives in Local Authority Development Plans.

Glint and Glare assessment methodologies typically follow a rational sequence of steps to identify receptors that might potentially be affected by glint and glare. These are then further filtered to yield those receptors to those likely to actually experience such effects.

These steps are as follows:

1. Identify and analyse study area;
2. Identify relevant receptors;

3. Undertake the glint and glare assessment;
4. Where instances of glint and glare remain, determine whether they are likely to cause a hazard / nuisance;
5. If hazard / substantial nuisance is likely to occur, recommend appropriate mitigation measures;
6. If necessary, re-run the glint and glare calculations with mitigation in place.

The table below presents an example of the magnitude for Glint and Glare on surrounding receptors and the typical requirement for mitigation under each:

Table 5-2: Magnitude of Glint and Glare and relevant mitigation

Magnitude of Change	Description	Mitigation Requirement
No Impact	A solar reflection is not geometrically possible or will not be visible from the assessed receptor.	No mitigation required.
Low	A solar reflection is geometrically possible however, any impact is considered to be small such that mitigation is not required e.g., Intervening screening will limit the view of the reflecting solar panels or small periods of reflection	No mitigation required.
Moderate/Medium	A solar reflection is geometrically possible and visible however it occurs under conditions that do not represent a worst-case.	Impact may be acceptable. Further analysis should be undertaken to determine the requirement for mitigation.
Major/High	A solar reflection is geometrically possible and visible under conditions that will produce a significant impact. Mitigation and consultation is recommended.	Mitigation will be required if the proposed development is to proceed.

Typical mitigation measures include additional planting to screen potential Glint and Glare effects or in some instance the removal of panels where mitigation is not considered appropriate.

The sensitivities associated with glint and glare as regards landscape, visual impact and the potential impact on aircraft safety, should be a key consideration in a glint and glare assessment. The inclusion of a glint and glare assessment in any planning application for solar farms is recommended as best practice.

The Federal Aviation Authority (FAA) have produced guidelines addressing the safety concerns of solar farms in the proximity of airports. Additionally, the FFA approved Solar Glare Hazard Analysis Tool (SGHAT) is commonly associated together to be regarded at the accepted industry standard by aviation authorities internationally when considering the glint and glare effects upon aviation-related receptors. These two documents are referred to by both the Irish Aviation Authority (IAA) and 'daa' for proposed solar farms in Ireland.

The IAA requires the referral to it of all solar PV development submissions within 10km of an approved airport or aerodrome. As of August 2017, 'daa' has specifically expanded this extent for both Dublin Airport and Cork Airport to a radius of 15km.

5.2.9 Noise

There is no statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a solar farm. In the absence of specific noise limits, appropriate emission criteria relating to permissible construction noise levels for developing this scale may be found in the British Standard 'BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise'.

The ABC Method from 'BS 5228-1:2009+A1:2014' is used to derive appropriate noise limits for solar farms. The threshold limits as defined in Table 3.4 below is based on existing ambient levels, which if exceeded, signify a potentially significant effect. For the appropriate period (e.g. daytime), the ambient noise level is determined and rounded to the nearest 5 decibel's (dB).

A construction noise threshold limit of 65dB at the closest receptor during weekdays should be applied in any instance. The applicable BS 5228 limits for construction noise during all periods are described in Table 5-3 below.

Table 5-3: Applicable Construction Noise Limits

Threshold value period (L_{Aeq})	Threshold Value, in decibels (dB)
	Category A
Night-time (23:00 to 07:00 hrs)	45
Evenings and weekends [D)]	55
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65
[D)] 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays.	

Construction noise is to be assessed by comparing predicted construction activities against best practice construction noise criteria at the nearest noise sensitive locations to the construction activities. If the expected construction noise level meets the relevant BS 5228 noise limits at the nearest locations, compliance at all other more distant residential locations can be assumed.

During the operational period, it is noted that solar farms do not produce any discernible noise.

During the operational phase, the static nature of solar photovoltaic arrays means there will be no mechanical movement of the solar array. As such, there is no noise emission from solar panels. The potential noise sources on solar farm sites are from inverters connected to the PV panels and a transformer located within a potential onsite substation compound. It is recommended that all solar farm planning applications address potential noise impacts, modelling the impact of such noise sources against noise sensitive receivers.

The definition of a noise sensitive receiver in the Environmental Protection Agency's 2016 NG4 noise guidance note is 'any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels'. Noise sensitive receivers are deemed to be locations where the inhabitants can be disturbed by noise or changes in noise levels due to the construction or operation of development.

Screening and modelling on these receptors are necessary to ensure the appropriate placement of electrical infrastructure and to ensure that the solar farm does not negatively impact the surrounding residential amenity with regard to noise. In doing so, this will negate the emission of discernible noise within the operational phase of a solar farm.

5.2.10 Co-Location of other Renewable Energy Development

Where there are plans to develop a co-located renewable infrastructure, careful assessment of potential impacts must be assessed with regard to each form of development. Appropriate policy guidance must be adhered to for any development as Wind Energy Guidelines and similarly best practice methods should be followed regarding the solar energy components.

The key assessment for multiple renewable energy features within one development would be the cumulative impact of the development. The cumulative impact would need to have careful consideration of the following impacts:

- Landscape and Visual Impact Assessment;
- Noise;
- Traffic;
- Biodiversity;
- Impact on European Sites and other Designations.

The cumulative impact would need to be demonstrated within the planning. It should be outlined that different renewable energy developments require different specialised assessments to be undertaken. For example, the assessment of Glint and Glare for a proposed development is a key feature for solar farms. Similarly for wind energy developments, the impact and assessment of shadow flicker is a key feature of the assessment.

5.2.11 Duration of Planning Permission and Operational Period

5.2.11.1 Duration of Planning Permission

Typically planning permission is granted for five years. While some solar farms may seek this standard duration, typically the period in which solar farms will require to be completed is for ten years from the date of grant of planning permission. This is according to Section 41 of the 'Planning and Development Act 2000' (as amended) which states that the consenting authority may:

> *"having regard to the nature and extent of the relevant development and any other material considerations, specify the period, being a period of more than 5 years, during which the permission is to have effect".*

Solar farms depend on achieving suitable connection to the electricity grid network under the control of EirGrid or ESB Networks. The timeframe for receiving an offer is unknown, therefore applicants typically request that the Planning Authority consider the issue as a material consideration given the nature of the proposed development.

While there is no official Planning Guidelines for solar farms, the Department of the Environment, Heritage and Local Government's 'Planning Guidelines on Wind Farm Developments' states the following:

> *"Planning Authorities may grant permission for a duration longer than 5 years if it is considered appropriate, for example, to ensure that the permission does not expire before a grid connection is granted. It is, however, the responsibility of the applicants in the first instance to request such longer durations in appropriate circumstances".*

In addition, the Department of the Environment, Heritage and Local Government's 'Development Management Guidelines for Planning Authorities' further notes that:

> *"Planning Authorities may grant permission for a duration longer than 5 years if they see fit, but it is the responsibility of applicants in the first instance to request such longer durations in appropriate circumstances".*

In addition to ten year durations in accordance with Section 41 of the 'Planning and Development Act 2000 (as amended). There is also the remit to extend the duration of any five year permission under Section 42 of the Planning and Development Act 2000 (as amended), in certain circumstances. For example, the extension cannot exceed 5 years, also the granting of such extension is subject to the Planning Authority being satisfied that the development has been commenced, substantial works have been carried out, the development will be completed in a reasonable time and that EIA and AA are not required for the proposed extension.

The timing of the construction and installation works for solar farms is predicated on a number of factors, not least of which is the surety of achieving planning permission for the development. Once planning permission has been granted, this provides the context to pursue financial support mechanisms and facilitate fulfilment of grid connection offers. This is why a ten-year permission, or an extension of duration is often required for solar farm. It is also noted that any applicant should outline any SID components of adjoining the large scale solar energy development to support a longer duration of permission.

5.2.11.2 Operational Period Duration

The technology associated with solar photovoltaic cells and solar farms have made rapid advances in recent years and has resulted in the expected physical lifetime of modern solar photovoltaic equipment to be at least 40 years. In addition, the manufacture warranty for solar photovoltaic equipment is typically that of 40 years or greater.

Financing associated with solar energy, and indeed most significant infrastructure development, is based around its operational life and thus landholding agreements, maintenance contracts and other associated operational agreements will be based around a minimum 35 year timeframe, typically 40 year timeframe. Therefore, it is reasonable that to maximise environmental and sustainable energy benefits of such solar farms, a minimum 35 year operational lifetime is deemed appropriate to such developments. The minimum of a 35 year duration has been deemed acceptable by Planning Authorities This is typically secured by way of a planning condition. As of 2023, many Planning Authorities have deemed that a 40-year operation period is now an acceptable duration the operational life for solar developments [40] [41]

Solar farms are normally regarded as a temporary use of land except for some permanent electrical infrastructure such as 110kV substations, made under a separate application as per section 182A of the Planning and Development Act 2000.

[40] Kerry County Council Planning Reg. Ref. 23284, Offaly County Council Planning Reg. Refs. 21123, 218, 2374 and Tipperary County Council Planning Reg. Ref. 19601323

[41] Meath County Council Scoping Response Dated 24/08/2023 to Draft Best Practice Planning Guidelines for Large Scale Ground-Mounted Solar Energy Development.

5.2.12 Decommissioning

Typically, solar farms will at the end of their operational period, either need to seek a new planning permission for continuation of use or to be decommissioned. This decommissioning would be undertaken as per the requirements within the planning conditions attached to the initial grant of permission. Depending on the method of connection to the national grid, the substation may stay in place permanently and continue to support other projects. During decommissioning the majority of infrastructure will likely be removed from site, however it may be more appropriate to cover over some foundations associated with substations and inverters.

Given that a solar farm can operate successfully for 40 years, it is common that the full details of the decommissioning plan is not agreed with the Planning Authority until closer to the decommissioning date as the receiving environment, technology and decommissioning process may evolve over time as it is more appropriate to apply the best techniques rather than committing and agreeing to a decommissioning plan years in advance and before the construction of the project. This is a common approach generally accepted by Planning Authorities for all renewable energy projects which has a specific operation life. For example, some planning permissions often include conditions requiring the submission of the decommissioning plan within 5 years of the end of the operational life of the consented solar development.

It is recommended that the AIA for any project should also address the decommissioning phase of works in carrying out the impact assessment for any proposal as well as the construction and operation phases. This will assist in highlighting any site-specific issues that must be considered at the decommissioning plan stage.

Solar farms commonly incorporate the preservation in situ of vulnerable archaeological and cultural heritage sites. These sites may be preserved within exclusion zones or no-dig zones within the permitted solar farm. Therefore, any decommissioning plan must incorporate measures for the protection of archaeological and cultural heritage. Any decommissioning plan must include the location of any archaeological or cultural heritage constraints. This decommissioning plan should describe all direct and indirect impacts and all mitigation measures to be employed. This is in order to protect the archaeological or cultural heritage environment during decommissioning works. Specifically, this would include the engagement of suitably qualified archaeological personnel to advise on and supervise all decommissioning works at or near a known monument.

6. CONCLUSION

This Best Practice Guidance document aims to devise evidence based and consultation tested considerations which may inform the development and guidance for solar farms through the planning system in Ireland. As this research progressed, it became evident that the existing planning system is returning positive decisions for solar farms in line with the concept of proper planning and the principles of sustainable development. Notwithstanding the above, there is evidence to suggest that specific guidance is required in a number of areas in order to bring certainty and consistency to the planning process.

The need for solar farms across Ireland is growing, and a progressive and transparent planning process is fundamental in ensuring that ambitious national energy targets pertaining to renewable energies are met. The development of coherent national, regional and local policies around solar farms is a key prerequisite for growth within the renewable energy sector in Ireland. The absence of such direct policies is a concern and will further induce miscommunication and stunt the progression of such applications within the planning system.

These considerations clearly outline the realities of solar farm design stages and aim to assist applicants and Planning Authorities in making comprehensive and knowledgeable decisions surrounding solar farms at all stages. The co-operation and transparency between these bodies is fundamental in ensuring the renewable energy targets set for 2030 are met.

This Guidance document outlines and addresses the relationship between pre-planning and planning application considerations. The need for a uniform approach to solar farms is needed as this form of development does not have specific guidance.

Pre-application consultation is a fundamental part in identifying potential issues and concerns that the Planning Authority may have regarding any aspect of a proposed solar farm. This consultation process also allows for the Planning Authority to express the need for the inclusion of certain assessments in e submission stage of the application as well as give the applicant a chance to outline the reasoning for the omittance of certain documents and assessments.

This Guidance report outlines the necessary considerations the applicant and Planning Authority should have with regards to the various topics such as landscape, ecology, archaeology, glint and glare and noise. These considerations included the consideration of the feedback received form the list of bodies outlined, which were consulted with during the preparation and drafting of this report.

In identifying and assessing these considerations, all parties must recognise the reasoning for the inclusion of these considerations. In doing so, it will create a degree of comfort for the communities involved and a comfort for applicants of such developments as they will be aware of how such developments fit within the policy framework of the subject area. In addition, a robust and coherent approach to the policies and assessments of solar farm applications will provide applicants with a better understanding of what a Planning Authority requires for such applications.

Through the formulation of clear and uniform considerations for best practice regarding solar farm applications, applicants, and Planning Authorities can be better informed of the constraints and elements associated with solar farms in Ireland. These guidelines aim to ensure that the design and planning stages of such developments adhere to the principles of proper planning and sustainable development with the concerns, aims and requirements of all parties considered.

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APPENDIX 1

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APPENDIX 2

List of Bodies Consulted

Organisation	Response	Organisation	Response
An Bord Pleanála		Kildare County Council	
An Taisce		Kilkenny County Council	Yes
Arts Council		Laois County Council	
Biodiversity Ireland		Leitrim County Council	
Bord Gais Energy		Limerick City and County Council	
Bord Iascaigh Mhara		Longford County Council	Yes
Carlow County Council		Louth County Council	
Cavan County Council		Mayo County Council	
Clare County Council		Meath County Council	Yes
Commission for Communications Regulation		Minister for Agriculture, Food and the Marine	Yes
Cork City Council	Yes	Minister for Communications, Climate Action and Environment	
Cork County Council	Yes	Minister for Housing, Planning and Local Government	Yes
Donegal County Council		Minister for Transport, Tourism and Sport	Yes
Dublin City Council		Monaghan County Council	Yes
Dún Laoghaire–Rathdown County Council		National Monuments Service	Yes
Eastern & Midland Regional Assembly		National Transport Authority	
EirGrid		North Western Regional Assembly	
Environmental Protection Agency		Offaly County Council	Yes
ESB Networks		Roscommon County Council	Yes
Fáilte Ireland	Yes	Sligo County Council	
Fingal County Council		South Dublin County Council	
Galway City Council		Southern Regional Assembly	
Galway County Council		Sustainable Energy Authority of Ireland	
Gas Networks Ireland	Yes	The Heritage Council	
Health and Safety Authority		Tipperary County Council	Yes
Inland Fisheries Ireland	Yes	Transport Infrastructure Ireland	Yes
Irish Aviation Authority		Waterford City and County Council	
Irish Rail		Westmeath County Council	
Irish Water	Yes	Wexford County Council	
Kerry County Council		Wicklow County Council	

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