

1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report ('EIA') has been prepared by McCarthy Keville O'Sullivan Ltd (MKO) on behalf of Bord na Móna Powergen Ltd. and ESB Wind Development Ltd. who intend to apply for planning permission to construct a large scale solar farm which will comprise mainly of a solar photovoltaic (PV) array, and associated infrastructure, a battery storage compound as well as a 110 kV (kilovolt) substation and associated works to connect to the national grid at Timahoe, Co. Kildare.

Due to the nature of the Proposed Project, which requires the provision of 110 kV infrastructure which will form part of the national electricity transmission network, two separate planning applications are required. One planning application will be submitted to An Bord Pleanála ('the Board') seeking permission for the 110 kV infrastructure and associated works in accordance with Section 182A of the Planning and Development Acts 2000 to 2018, as it is treated in planning terms as if it were strategic infrastructure, and the other planning application will be made to Kildare County Council under Section 34 of the same Act for the Solar Farm, battery storage compound and associated works. This approach has been confirmed following consultations with the Board under the provisions of section 182E of the Planning and Development Acts 2000 to 2018, and is not unknown to the Board.

1.1.1 References to Proposed Project

For the purposes of this EIA, where the 'Proposed Project' is referred to, this relates to the entirety of the project i.e. the Solar Farm which includes the solar array and all infrastructure supporting this, amenity proposals, replanting lands, peat repositories, battery storage facility; as well as the Substation and Grid Connection works, as delineated on Figure 1.1.

Where the 'Solar Farm' is referred to, this means the solar photovoltaic array, inverters, access roads and parking, battery storage, site compounds and security fencing, amenity trails and landscaping, peat and subsoil storage areas, site drainage and all associated works. The planning application for the Solar Farm is made to Kildare County Council.

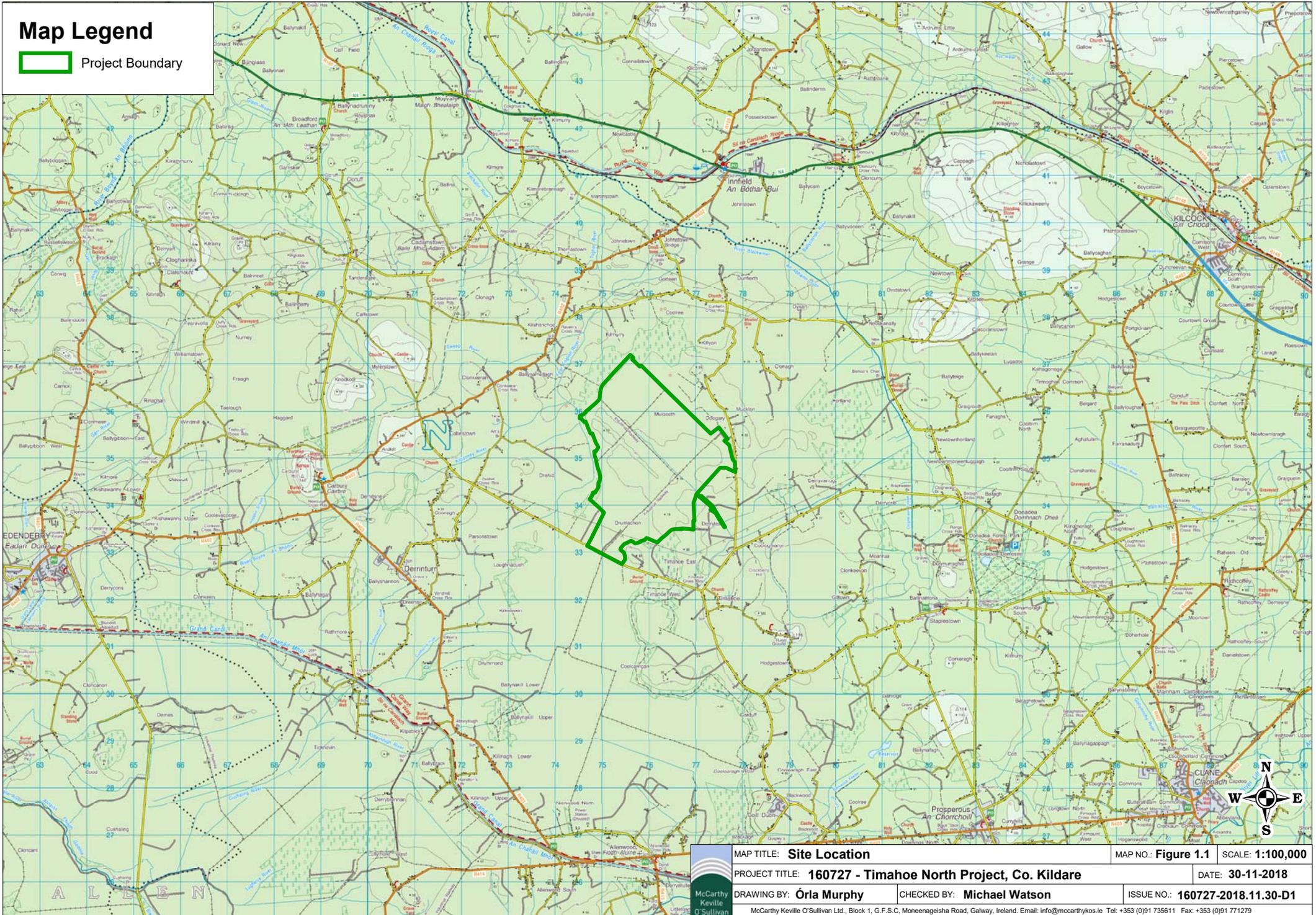
Where the 'Substation and Grid Connection' are referred to, this means the substation and the works required to connect to the national grid. The application for the Substation and Grid connection is made to the Board.

For clarity in this EIA, the Solar Farm will be assessed, the Substation and Grid Connection will be assessed and the entirety of the Proposed Project will be assessed cumulatively with each other and in combination with other plans and projects to aid the competent authorities in each carrying out EIA on the separate parts of the proposed development that come within their respective jurisdictions.

This EIA will accompany both planning applications required for the Proposed Project to be submitted to the An Bord Pleanála and Kildare County Council. The planning applications will also be accompanied by a Natura Impact Statement ('NIS'). Both the EIA and NIS contain the information necessary for both consenting authorities i.e. An Bord Pleanála and Kildare County Council to complete the Appropriate Assessment

Map Legend

 Project Boundary



	MAP TITLE: Site Location	MAP NO.: Figure 1.1	SCALE: 1:100,000
	PROJECT TITLE: 160727 - Timahoe North Project, Co. Kildare	DATE: 30-11-2018	
	DRAWING BY: Órla Murphy	CHECKED BY: Michael Watson	ISSUE NO.: 160727-2018.11.30-D1

and Environmental Impact Assessment as required for each of their jurisdictions, and taking into account the cumulative impacts of these entities of the Proposed Project.

1.1.2 Proposed Project Site Location

The Proposed Project is located in northwest Co. Kildare, approximately 6.5km (kilometres) north of the village of Allenwood, 6km east of Carbury and 3km south of Johnstownbridge. The townlands within which the Proposed Project will be located are listed on Table 1.1.

Table 1.1 Townlands containing proposed infrastructure.

Project Components	Townland
Solar Farm, Battery storage & Associated works	Drehid, Mulgeeth, Ballynamullagh, Mucklon, Kilmurry (Carbury By), Killyon and Timahoe East.
Substation & Grid Connection	Timahoe East

The Proposed Project is located on Timahoe North Bog which is currently a brownfield site (former commercial scale cutaway peatland) and forms part of the Bord na Móna Allen Bog Group. The Timahoe North Bog site measures approximately 807 hectares and was formerly used for the production of sod peat for power generation and domestic heating purposes. Timahoe North is not currently in commercial use and has been out of large-scale commercial production for over 20 years. A low level of 'turf on the spread' peat extraction activity is undertaken within the site and this will cease prior to construction, should the project be consented. This currently involves local turf contractors seasonally cutting turf sods by mechanical means and laying it across the bog to dry. Once dried, the sods are gathered by hand on site and either bagged or loaded loose onto trucks for removal offsite.

1.1.3 Legislative Context

On the 6th of June 2018, An Bord Pleanála decided that the proposed Substation and Grid Connection falls within the scope of Strategic Infrastructure Development (SID) under Section 182A(1) of the Planning and Development Acts 2000 to 2018.) The Board also stated that a planning application for the Solar Farm including the battery storage should be made to Kildare County Council.

The consolidated European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), was transposed into Irish planning legislation by the Planning and Development Acts 2000 to 2018 and the Planning and Development Regulations 2001 to 2018 (the 'Regulations'). The EIA Directive was amended by Directive 2014/52/EU which has been transposed into Irish law with the recent European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). Most of the provisions of the new regulations come into operation on the 1st of September 2018 with a number of other provisions coming into operation on the 1st of January 2019.

Accordingly, this EIAR complies with the EIA Directive as amended by Directive 2014/52/EU. Regard has been had to the existing provisions of the Planning and Development Acts 2000 to 2018 and the Planning and Development Regulations 2001 to 2018 insofar as they transpose the EIA Directive.

The Environmental Impact Assessment (EIA) of the Proposed Project will be undertaken both by An Bord Pleanála and Kildare County Council as the competent

authorities for each of the parts of the Proposed Project within their separate jurisdictions.

Article 5 of the EIA Directive as amended by Directive 2014/52/EU provides where an EIA is required, the developer shall prepare and submit an environmental impact assessment report (EIAR) previously referred to as an Environmental Impact Statement ('EIS'). The information to be provided by the developer shall include at least:

- (a) a description of the project comprising information on the site, design, size and other relevant features of the project;
- (b) a description of the likely significant effects of the project on the environment;
- (c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- (d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment;
- (e) a non-technical summary of the information referred to in points (a) to (d); and
- (f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

In addition, Schedule 6 to the Planning and Development Acts 2000 to 2018 (as amended) sets out the information to be contained in an EIAR, with which this EIAR complies.

MKO was appointed as environmental consultants on the Proposed Project and commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive as amended by Directive 2014/52/EU.

The relevant classes/scales of development that normally require Environmental Impact Assessment (EIA) are set out in Schedule 5 of the Planning and Development Regulations 2001 to 2018, as stated in Section 172 of the Planning and Development Acts 2000 to 2018. There is no class set out under Schedule 5 of the Regulations in relation to solar energy projects. Notwithstanding this, Class 1(d)(iii) of Part 2 of the Regulations refers to deforestation for the purpose of conversion to another type of land-use. The Proposed Project will require the felling of more than 10 hectares of woodland, which is the relevant EIA threshold area.

The Proposed Project will also encompass the construction of a private road exceeding 2,000 metres in length, which is the threshold length for EIA requirement, as stated in Class 10(dd) of the Regulations.

Therefore, under the provisions of Section 172 of the Planning and Development Acts 2000 to 2018 (as amended), it is considered that EIA is required for the Proposed Project.

The EIAR provides information on the current receiving environment and assesses the likely significant effects of the Proposed Project on it and proposes mitigation measures to avoid or reduce these effects. The function of the EIAR is to provide information to allow the competent authority to conduct the Environmental Impact Assessment (EIA) of the Proposed Project.

All elements of the Proposed Project, (including the Solar Farm, the Substation and Grid Connection, proposed tree felling and replanting, and site entrance works as well as decommissioning works) have been assessed as part of this EIAR.

1.1.4 EIAR Guidance

The Environmental Protection Agency (EPA) published its *'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, August 2017), which are intended to guide practitioners preparing an EIAR during the transition to the new Regulations transposing the revised EIA Directive.

In preparing this EIAR regard has also been taken of the provisions of the *'Guidelines for Planning Authorities and An Bord Pleanála on Carrying out Environmental Impact Assessment'*, published by the Department of Housing, Planning and Local Government (DHPLG) in August 2018 to the extent these guidelines are relevant having regard to the enactment of the revised EIA Directive.

The European Commission also published a number of guidance documents in December 2017 in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU as amended by 2014/52/EU) including 'Guidance on Screening', 'Guidance on Scoping' and 'Guidance on the preparation of the Environmental Impact Assessment Report'. MKO has prepared the EIAR with regard to these guidelines also.

1.2 The Applicant and Project Background

The Proposed Project is a joint venture project between Bord na Móna Powergen Ltd. and ESB Wind Development Ltd., the 'Applicant'. Bord na Mona Powergen Ltd. is a subsidiary of Bord na Móna plc. ESB Wind Development Ltd. is a subsidiary of ESB.

Bord na Móna plc is a publicly owned company, originally established in 1946 to develop and manage some of Ireland's extensive peat resources on an industrial scale, in accordance with government policy at the time. Bord na Móna's lands extend to approximately 80,000 hectares in total and are located mainly in the Irish midlands. Bord na Móna Powergen currently manages and operates a portfolio of thermal and renewable assets, namely Edenderry Power Plant a peat/biomass generating unit, Cushaling peaking plant, Bellacorick, Mountlucas and Bruckana wind farms, and the Drehid landfill gas facility.

In 2015, Bord na Móna published its *'Sustainability Statement 2030'*, which sets out the company's commitment to transition to peat-free electricity generation by 2030. Renewable energy generation, including solar power, biomass and wind power, is a key component of this transition. In October 2018, Bord na Móna announced its strategy to decarbonise, accelerating moves away from its traditional peat business into renewables, resource recovery and new sustainable businesses. Bord na Móna's target is for 75% of energy being generated by the company being renewable by 2020. Their aim to accelerate the development of renewable energy is a move to support national climate and energy policy targets.

ESB was established in 1927 as a statutory corporation in the Republic of Ireland. As a strong, diversified, vertically integrated utility, ESB operates right across the electricity market: from generation, through transmission and distribution to supply. In addition, ESB extracts further value at certain points along this chain: supplying gas, using their networks to carry fibre for telecommunications, developing electric vehicle public charging infrastructure and more.

ESB is a leading Irish utility, whom operates right across the electricity market: from generation, through transmission and distribution to supply. It has a regulated asset base of approximately €9 billion with 43% of electricity generation capacity in the all-island market and currently supplies electricity to approximately 1.4 million customers throughout the island of Ireland. ESB Group employs approximately 7,000 people.

ESB's mission is to bring sustainable and competitive energy solutions to all customers and its vision is to be Ireland's foremost energy company competing successfully in the all-island market.

Bord na Móna and ESB have a long track record of developing energy projects together, dating back to the development of the first generation of peat-fired power stations. Renewable energy is a strategic growth area for both companies and is aligned with both corporate strategies, which include reducing carbon emissions.

The Proposed Project at Timahoe North will access part of Bord na Móna's land bank in a strategic location and brings together the expertise of two leading commercial semi-state companies in renewable energy with a proposed development of a solar farm that supports Ireland's energy transition.

1.3 Brief Description of the Proposed Project

The Proposed Project comprises a large scale solar PV farm with an export capacity of approximately 70 Megawatts (MW), as well as a battery storage facility with an estimated capacity of approximately 20MW.

It will consist of a solar photovoltaic array and associated infrastructure, inverters, a battery storage compound, access roads and parking, site compounds and security fencing, amenity trails and landscaping, peat and subsoil storage areas (repositories), site drainage and all associated works. The Proposed Project will also include the construction of a 110 kV substation within the site. It is then envisaged to connect from this substation to the Derryiron-Maynooth 110 kV overhead line that traverses the southern section of the Timahoe North site.

The layout of the Proposed Project has been constraints-led, thereby avoiding the more environmentally sensitive parts of the site. The roads layout for the Proposed Project makes use of the existing onsite access roads and tracks where possible, with approximately 12.05 kilometres of existing roadway/ tracks requiring upgrading.

The recreational amenity proposals will require the placement of approximately 5 km of a 2.5m wide gravel walking track predominantly along a former machine track and the construction access track will be re-purposed to form part of the amenity walkway, in addition to being used for maintenance access during operation. A dedicated gated entrance and car parking area will also be provided for recreational use during the operational stage.

The Kildare County Development Plan 2017-2023 (CDP) has a priority to support and capitalise on the employment and enterprise potential of the green economy. The plan also aims to support the development of a secure and affordable energy supply and renewable and efficient energy infrastructure to improve competitiveness, security and reduce costs.

The CDP lists the Council’s aims, objectives and policies surrounding Solar Energy for the lifetime of the plan. They note that *‘as solar energy technologies have become more effective, areas in northern Europe like Ireland have become viable for technologies including solar panels/tubes on roof spaces and the commercial development of solar farms together with storage facilities’*.

1.4 Need for the Proposed Project

1.4.1 Overview

Ireland faces significant challenges through efforts to meet its mandatory national renewable 2020 energy targets, its contribution to EU targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. It is now clear that Ireland is falling behind meeting its 2020 target for renewable energy as well as the longer-term movement away from fossil fuels. The Proposed Project is of significant importance to Ireland, by helping Ireland to address these challenges as well as addressing the country’s over-dependence on imported fossil fuels. As noted about in Section 1.2, Bord na Móna announced in October 2018 their strategy to decarbonise; moving away from their traditional peat business into renewables, resource recovery and new sustainable businesses. Their aim to accelerate the development of renewable energy is a move to support national climate and energy policy targets.

The need for the Proposed Project is driven by the following factors:

1. A legal commitment from Ireland to limit greenhouse gas emissions under the Kyoto protocol to reduce global warming;
2. A requirement to increase Ireland’s national energy security as set out in the Energy White Paper;
3. A requirement to diversify Irelands energy sources, with a view to achievement of national renewable energy targets and an avoidance of significant compliance costs from the EU (the EU Renewables Directive);
4. Provision of cost-effective power production for Ireland which would deliver local benefits; and
5. Increasing energy price stability in Ireland through reducing an over reliance on imported gas.

These factors are addressed in further detail below. Section 2.1 in Chapter 2 of this EIAR on Background to the Proposed Project, presents a full description of the international and national renewable energy policy context for the Proposed Project. Section 2.2 addresses climate change, including Ireland’s current status with regard to meeting greenhouse gas emission reduction targets.

1.4.2 International and Industry trends in Solar Energy

Compared to international markets in terms of installed solar PV capacity, the Irish market is in its infancy. There is no operational grid connected/ ground mounted solar PV generation in the Republic of Ireland at present however over the past decade there has been a remarkable growth in the global solar PV market and there is no technical reason why this technology should not be employed in Ireland.

In 2017, the worldwide installed capacity was estimated to be 402 Gigawatts (GW)¹. This amount is capable of producing a minimum of 348 terawatt hours (TWh) of electricity every year. In 2016, Irish electricity consumption was 26 TWh².

After hydro and wind power, solar PV is now the third most significant source of renewable energy in terms of installed global capacity. According to the Renewables 2018 Global Status Report (REN21, 2018), solar PV was the most installed renewable energy in 2017. Figure 1.2 below shows the key growth areas in 2017. As can be seen China is the largest single growth market.

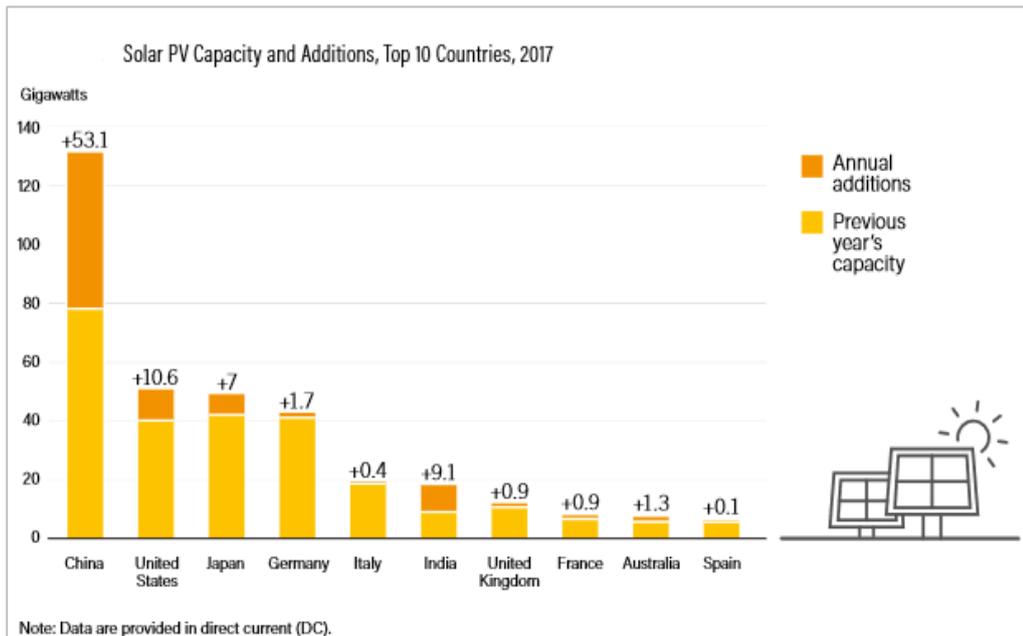


Figure 1.2: Solar PV and Additions, Top Countries, 2017
Source: REN 21, Renewable Energy Policy Network for the 21st Century, Global Status Report, 2018.

1.4.3 Battery Storage

In response to the binding National and European targets for renewable energy generation, EirGrid Group (Ireland’s transmission system operator) has initiated a multi-year programme to deliver, what is essentially a more robust electricity system known as DS3 i.e. “Delivering a Secure, Sustainable Electricity System”.

The DS3 Programme is designed to ensure that EirGrid can securely operate the power system with increasing amounts of variable renewable generation (predominantly wind and solar generation) over the coming years. As part of this programme, battery storage is one of the tools that EirGrid will use to securely operate the national power system into the future. According to EirGrid, *the DS3 programme is critical to meeting the renewable electricity targets by 2020*.

The battery storage element of the Proposed Project is intended to be used to provide cost effective services to EirGrid, such as adding electricity to, or removing electricity from the system, when this is useful to the operation of the system. EirGrid procures such services from grid connected energy systems and the flexibility they provide is critical to achieving national decarbonisation targets and a stable supply of electricity at least cost to consumers.

¹ <http://www.ren21.net/status-of-renewables/global-status-report/>

² <https://www.seai.ie/resources/publications/Energy-in-Ireland-1990-2016-Full-report.pdf>

1.4.4 Climate Change and Greenhouse Gas Emissions

At the Paris climate conference (COP21) in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal the Paris Agreement. The Paris Agreement sets out a global action plan to avoid dangerous climate change by limiting global warming to well below 2°C above pre-industrial levels. Under the Paris Agreement, the EU and Governments also agreed on the need for global emissions to peak as soon as possible, recognising that this will take longer for developing countries and to undertake rapid reductions thereafter in accordance with the best available science.

The International Panel on Climate Change (IPCC) has put forward its clear assessment 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 at present to 80% by 2050 if we are to limit global warming to below 2 degrees³ and in accordance with the COP 21 agreement to limit global warming to well below 2°C above pre-industrial levels.

In this regard, the Government enacted the Climate Action and Low Carbon Development Act, 2015 which provides for the approval of plans by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy.

The Energy White Paper notes that *“The use of renewables in electricity generation in 2014 reduced CO₂ emissions by 2.6 Mt and avoided €255 million in fossil fuel imports”*. It is estimated that the Proposed Project with a potential export of approximately 70 MW will result in the net displacement of approximately 43,729 tonnes of Carbon Dioxide (CO₂) per annum, including accounting for back-up generation. The carbon offsets resulting from the Proposed Project are described in detail in Section 9.2.3 of Chapter 9 of this EIAR: Air and Climate.

1.4.5 Energy Security

At a national level, Ireland currently has one of the highest external dependencies on imported sources of energy, such as coal, oil and natural gas. In 2016 (the most recent period for which figures are available), the cost of all energy imports to Ireland was approximately €3.4 billion, with Ireland reducing its energy import dependency from 88% in 2015 to 69% in 2016 (*Energy in Ireland 1990 - 2016*, Sustainable Energy Authority of Ireland, 2017).

1.4.6 EU 2020 Renewable Energy Targets

The burning of fossil fuels for energy creates greenhouse gases, that contribute significantly to climate change. These greenhouse gases and other emissions contribute to acid rain and air pollution. Sources of renewable energy that are utilised locally with minimal impact on the environment are necessary to meet the challenges of the future. The EU adopted Directive (2009/28/EC) on the Promotion of the Use of Energy from Renewable Sources in April 2009 includes a common EU framework for the promotion of energy from renewable sources.

The Directive sets a legally binding mandatory national target for the overall share of energy from renewable sources for each Member State. This package is designed to achieve the EU’s overall 20:20:20 environmental target, which consists of a 20% reduction in greenhouse gases, a 20% share of renewable energy in the EU’s total

³ IPCC Fifth Assessment Synthesis Report, Intergovernmental Panel on Climate Change AR5 Report

energy consumption and a 20% increase in energy efficiency by 2020. To ensure that the mandatory national targets are achieved, Member States must follow an indicative trajectory towards the achievement of their target as outlined in Ireland's National Renewable Energy Action Plan (NREAP).

Ireland's mandatory national target is to supply 16% of its overall energy needs from renewable sources by 2020. This target covers energy in the form of electricity (RES-E), heat (RES-H) and transport fuels (RES-T). For RES-E alone, Ireland has set a national target of 40% by 2020 as outlined in NREAP. Government policies identify the development of renewable energy, as a primary strategy in implementing national energy policy.

1.4.7 Reduction of Carbon Emissions and Other Greenhouse Gases

This production of renewable energy will assist in achieving the Government's and EU's stated goals of ensuring safe and secure energy supplies, promoting an energy future that is sustainable and competitively priced to consumers whilst combating energy price volatility and the effects of climate change. The Energy White Paper in 2015 outlines an ambitious Greenhouse gas reduction target of between 80% to 95% compared to 1990 levels out to 2050. Furthermore, if national carbon emissions targets are divided out amongst each county, each Local Authority may be responsible for meeting its own targets.

In addition to a reduced dependence on oil and other imported fuels, and as noted above in Section 1.4.4, the Proposed Project will displace approximately 43,729 tonnes of Carbon Dioxide (CO₂) per annum from the largely carbon-based traditional energy mix, the detail of which is presented in Section 9.2.3 of this EIAR.

Recent EU and World Health Organisation reports estimate that poor air quality accounted for premature deaths of almost 600,000 people in Europe in 2012⁴. In Ireland, the premature deaths attributable to air pollution are estimated at 1,200 people (*Ireland's Environment – An Assessment*, Environmental Protection Agency, 2016.) The EPA 2016 report *Ireland's Environment – An Assessment* states that the pollutants of most concern are NO_x, (the collective term for the gases nitric oxide and nitrogen dioxide), PM (particulate matter) and O₃ (ozone). The EPA report goes on to state that:

"Ireland has considerable renewable energy resources, only a fraction of which are utilised to address our energy requirements.

*Wind, ocean, solar, hydro and geothermal energy do not produce GHG (greenhouse gas) emissions or emissions of air pollutants such as particulates, sulphur dioxide and nitrogen dioxide. Use of these renewable resources can have **considerable co-benefits for human health and ecosystems**. Meeting energy requirements from renewable resources can provide significant economic and employment benefits at local to national scales."*

The Proposed Project therefore represents an opportunity to further harness Ireland's significant renewable energy resources, with valuable benefits to air quality and in turn to human health. The consumption of fossil fuels for energy results in the release of particulates, sulphur dioxide and nitrogen dioxide to our air. The use of solar energy,

⁴www.euro.who.int/en/health-topics/environment-and-health/air-quality/news/news/2014/03/almost-600-000-deaths-due-to-air-pollution-in-europe-new-who-global-report

by providing an alternative to electricity derived from coal, oil or gas-fired power stations, results in emission savings of carbon dioxide (CO₂), oxides of nitrogen (NO_x), and sulphur dioxide SO₂, thereby resulting in cleaner air and associated positive health effects. Bord na Móna have recently announced their plans to cease using peat for energy over the coming years. Peat has been historically used in peat fired stations and burnt for energy.

1.4.8 Economic Benefits

In addition to helping Ireland avoid significant fines and reducing environmentally damaging emissions, the Proposed Project will have significant economic benefits. At a national level, Ireland currently has one of the highest external dependencies on imported sources of energy, such as coal, oil and natural gas. As detailed above, in 2016 the cost of all energy imports to Ireland was approximately €3.4 million with imported fossil fuels accounting for 69% of all energy consumed (‘*Energy in Ireland 1990 - 2016*’, Sustainable Energy Authority of Ireland, 2017).

The SEAI report ‘*Renewable Energy in Ireland 2013*’ (SEAI, February 2015) indicated that renewable electricity (mostly wind energy):

- Displaced €300 million in fossil fuel imports;
- Increased in the period 1990 to 2013, from 5.3% to 20.9%;
- Avoided CO₂ emissions by 2.9 million tonnes; and
- Did not add to consumer bills.

The Proposed Project will be capable of providing power to approximately 22,012 Irish households every year, as presented in the calculations in Section 4.3.1 of this EIA.

At a Regional Level, the Proposed Project will help to supply the rising demand for electricity, resulting from renewed economic growth. The EirGrid report ‘*All-island Generation Capacity Statement 2018 - 2027*’ (SONI & EirGrid, October 2018) notes that electricity demand on the island of Ireland could grow by 57% over the next ten years. Much of this growth is expected to come from new data centres in Ireland.

The Proposed Project will have several significant long-term and short-term benefits for the local economy including job creation, local authority commercial rate payments and community amenity facilities.

The commercial rate payments from the Proposed Project will provide a significant contribution to the Local Authority per annum, which will be directed to the provision of public services within Co. Kildare. For example, these services could include provisions such as road upkeep, street lighting, footpath maintenance etc.

It is estimated that the Proposed Project will create in excess of 150 jobs during the construction phase with a low number of operational and maintenance staff during those phases of the Proposed Project. During construction, additional employment will be created in the region through the supply of services and materials to the project. In addition to this, there will also be income generated by local employment from the purchase of local services i.e. travel and lodgings. Further details on employment associated with the Proposed Project are presented in Section 5.7.2.2 of this EIA.

1.4.9 Social and Recreational Benefits

In addition to the economic and environmental benefits of the Proposed Project, there will be potential social and recreational benefits associated with the proposed Recreational Amenity walkway.

The Proposed Project and all its associated infrastructure creates a unique opportunity to develop an amenity area for use by members of the local and wider community alike. The peatland habitat at Timahoe North Bog is attractive to both locals and visitors to the area because of its history and variety of vegetation. Parts of the site of the Proposed Project will be developed and promoted for walking activities. This proposal is based on the current use of the area as an informal walking route; where the proposed amenity facilities will allow for an upgrade of the current track and allow the site to be more openly available to walkers, trail runners and other recreational users, as outlined below.

This will provide a long-term benefit to both the local community and visitors to the area.

1.5 Purpose and Scope of the EIAR

The purpose of this EIAR is to document the current state of the environment in the vicinity of the Proposed Project site and to quantify the likely significant effects of the Proposed Project on the environment in accordance with the requirements of the EIA Directive, as amended. The compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from the possibility of any negative impacts arising from the Proposed Project.

It is important to distinguish the Environmental Impact Assessment (EIA) to be carried out by An Bord Pleanála and Kildare County Council, from the accompanying planning application. The EIA is the assessment carried out by the competent authority, which includes an examination that identifies, describes and assesses in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 11 of the Environmental Impact Assessment Directive, the direct and indirect effects of the Proposed Project on the following:

- a) population and human health
- b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC
- c) land, soil, water, air and climate
- d) material assets, cultural heritage and the landscape
- e) the interaction between the factors referred to in points (a) to (d)

The EIAR submitted by the applicant provides the relevant environmental information to enable the EIA to be carried out by the competent authority. The information to be contained in the EIAR is prescribed in Article 5 of the revised EIA Directives described in Section 1.1.3 above.

1.6 Structure and Content of the EIAR

1.6.1 General Structure

This EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the Proposed Project during the construction, operation and decommissioning phases and the proposed mitigation measures. Background information relating to the Proposed Project, scoping and consultation undertaken and a description of the Proposed Project are presented in separate sections. The grouped format sections describe the impacts of the Proposed Project in terms of population and human health, biodiversity, land, soils and geology, water, air and climate, noise

and vibration, landscape and visual, cultural heritage and material assets such as roads, traffic and transportation, together with the interaction of the foregoing and a schedule of mitigation.

The chapters of this EIA are as follows:

- Introduction
- Background to the Proposed Project
- Site Selection & Alternatives
- Description of the Proposed Project
- Population & Human Health (including Glint and Glare)
- Biodiversity
- Land, Soils and Geology
- Water
- Air and Climate
- Noise and Vibration
- Landscape and Visual
- Cultural Heritage
- Material Assets (including Roads, Traffic and Transport, Electricity, Waste and Other Services and Aviation)
- Interactions of the Foregoing
- Schedule of Mitigation Measures

Each Chapter assesses the Solar Farm, the Substation and Grid Connection and the entirety of the Proposed Project separately and then cumulatively, with each other and then together in combination with other plans and projects in the vicinity.

The EIA also includes a Non-Technical Summary, which is a condensed and easily comprehensible version of the EIA document. The non-technical summary is laid out in a similar format to the main EIA document and comprises a description of the Proposed Project followed by the existing environment, impacts and mitigation measures presented in the grouped format.

1.6.2 Description of Likely Significant Effects and Impacts

As stated in the *'Draft Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2017), an assessment of the likely impacts of a proposed development is a statutory requirement of the EIA process. The statutory criteria for the presentation of the characteristics of potential impacts requires that potential significant impacts are described with reference to the extent, magnitude, complexity, probability, duration, frequency, reversibility and trans-frontier nature (if applicable) of the impact.

The classification of impacts in this EIA follows the definitions provided in the Glossary of Impacts contained in the following guidance documents produced by the Environmental Protection Agency (EPA):

- *'Guidelines on the Information to be contained in Environmental Impact Assessment Reports – Draft August 2017'* (EPA 2017);
- *'Advice Notes for Preparing Environmental Impact Statements, Draft September 2015'* (EPA 2015);
- *'Revised Guidelines on the Information to be contained in Environmental Impact Statements, Draft September 2015'* (EPA 2015);
- *'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements'* (EPA, 2003) and;

- *‘Guidelines on the Information to be contained in Environmental Impact Statements’* (EPA, 2002)

Table 1.2 presents the glossary of impacts as published in the EPA guidance documents. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, duration and type of impacts associated with a proposed development on the receiving environment. The use of pre-existing standardised terms for the classification of impacts ensures that the EIA employs a systematic approach, which can be replicated across all disciplines covered in the EIAR. The consistent application of terminology throughout the EIAR facilitates the assessment of the Proposed Project on the receiving environment.

Table 1.2 Impact Classification Terminology (EPA, 2017)

Impact Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends
	Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
	Profound	An effect which obliterates sensitive characteristics
Extent & Context	Extent	Describe the size of the area, number of sites and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions

Probability	Likely	Effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented
	Unlikely	Effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Duration and Frequency	Momentary	Effects lasting from seconds to minutes
	Brief	Effects lasting less than a day
	Temporary	Effects lasting less than a year
	Short-term	Effects lasting one to seven years
	Medium-term	Effects lasting seven to fifteen years
	Long-term	Effects lasting fifteen to sixty years
	Permanent	Effect lasting over sixty years
	Reversible	Effects that can be undone, for example through remediation or restoration
	Frequency	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)
Type	Indirect	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	‘Do Nothing’	The environment as it would be in the future should the subject project not be carried out
	‘Worst Case’	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents

Each impact is described in terms of its quality, significance, extent, duration & frequency and type, where possible. A ‘Do-Nothing’ impact is also predicted in respect of each environmental theme in the EIA. Residual impacts are also presented

following any impact for which mitigation measures are prescribed. The remaining impact types are presented as required or applicable throughout the EIA.

1.7 Project Team

1.7.1 Project Team Responsibilities

The companies and staff listed in Table 1.3 were responsible for completion of the EIA of the Proposed Project. Further details regarding project team members are provided below and CVs are provided in Appendix 1-1.

The EIA project team comprises a multidisciplinary team of experts with extensive experience in the assessment of renewable energy developments and in their relevant area of expertise. The qualifications and experience of the principal staff from each company involved in the preparation of this EIA are summarised in Section 1.7.2 below. Each chapter of this EIA has been prepared by a competent expert in the subject matter. Further details on project team expertise are provided in the Statement of Authority at the beginning of each impact assessment chapter.

Table 1.3 Project Team

Consultants	Principal Staff Involved in Project	EIA Input
<p>McCarthy Keville O’ Sullivan Ltd.</p> <p>Block 1 GFSC Moneenageisha Road Galway</p>	<p>Michael Watson Jimmy Green Órla Murphy Lorraine Meehan Pat Roberts Dervla O’ Dowd Paul Sweeney David McNicholas Dr. Úna Nealon Joanna Mole Kathryn Blade Owen Cahill Eoin Gilson James Newell</p>	<p>Project Managers, Scoping and Consultation, Preparation of Natura Impact Statement, Report Sections:</p> <ul style="list-style-type: none"> ▪ 1. Introduction ▪ 2. Background to the Proposed Project ▪ 3. Site Selection & Alternatives ▪ 4. Description of the Proposed Project ▪ 5. Population & Human Health ▪ 6. Biodiversity ▪ 9. Air & Climate ▪ 11. Landscape & Visual ▪ 13. Material Assets (non-Traffic) ▪ 14. Interaction of the Foregoing ▪ 15. Schedule of Mitigation Measures
<p>Hydro Environmental Services</p> <p>22 Lower Main Street Dungarvan Co. Waterford</p>	<p>Michael Gill David Broderick</p>	<p>Preparation of Report Sections:</p> <ul style="list-style-type: none"> ▪ 7. Land, Soils & Geology ▪ 8. Water

Consultants	Principal Staff Involved in Project	EIAR Input
ESB International One Dublin Airport Central, Dublin Airport, Cloghran, Co. Dublin, K67 XF72, Ireland	Annmarie Downey Donnacha Cody Kevin McCloy Susan Stack Ronan Canavan Rory McGowan Nikolas Konstantopoulos Bernard Leonard	Project Design Engineers Preparation of Peat Stability Risk Assessment Procurement & Management of Site Investigation PSDP
Hydro Environmental Ltd No 4 Caiseal Riada, Clarinbridge, Galway, Ireland.	Tony Cawley	Preparation of Flood Risk Assessment
AWN Consulting The Tecpro Building Clonshaugh Business & Technology Park Dublin 17	Leo Williams Jennifer Harmon	Baseline Noise Survey, Preparation of Report Section 10: Noise and Vibration
Tobar Archaeological Services Saleen Midleton Co. Cork	Annette Quinn Miriam Carroll	Preparation of Report Section 12: Cultural Heritage
Alan Lipscombe Traffic and Transport Consultants Claran, Headford, Co. Galway	Alan Lipscombe	Preparation of Report Section13: Material Assets - Traffic and Transport

1.7.2 Project Team Members

1.7.2.1 McCarthy Keville O’Sullivan Ltd.

Michael Watson, MA; CEnv PGeo

Michael Watson is head of the Environment Team in MKO. Michael has a Bachelor of Arts Degree in Geography and Economics and a Masters’ Degree in Environmental Resource Management, Geography, from National University of Ireland, Maynooth. Michael is a Member of IEMA and is a Chartered Environmentalist (CEnv) and Professional Geologist (PGeo).

Following the completion of his Masters’ Degree Michael worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological

consultancy prior to joining MKO in 2014. Michael's professional experience includes managing Contaminated Land Assessments, Environmental Impact Assessments, EPA Licence application's, hydrogeological assessments, environmental due diligence and general environmental assessment on behalf of clients in the wind farm, waste management, public sector, commercial and industrial sectors nationally. Michael's key strengths include project strategy advice for a wide range and scale of projects, project management and liaising with the relevant local authorities, Environmental Protection Agency (EPA) and statutory consultees as well as coordinating the project teams and sub-contractors. Michael is a key member of the MKO senior management team and as head of the Environment Team has responsibilities to mentor various grades of team members and promote continuous professional development for employees. Michael has over 17 years' experience in the environmental sector.

Jimmy Green BA, MRUP; MIPI

Jimmy Green holds the position of Senior Planner in McCarthy Keville O'Sullivan and has a wide range of experience in project management and coordination, planning research, analysis, and retail planning. Jimmy has extensive planning experience in both the public and private sectors having worked as an Assistant Planner in Donegal County Council and subsequently as both an Executive and Senior Executive Planner in Galway County Council prior to joining private practice in October 2004. Since moving into the private sector he has provided consulting services to a wide range of private and public sector clients, and his experience includes planning application project management, environmental impact assessment preparation, retail impact assessment, development potential reporting, preparation of linguistic impact statements and submissions to Development Plans/Local Area Plans. Jimmy has a Bachelor of Arts Degree in Human and Physical Geography from National University Ireland Galway and a Masters in Regional and Urban Planning from University College Dublin. Jimmy is also a corporate member of the Irish Planning Institute.

Lorraine Meehan B.Sc. (Env.)

Lorraine Meehan graduated from NUI Galway in May 2006 with a first class honours degree in Environmental Science. Lorraine has gained extensive experience with McCarthy Keville O'Sullivan since joining the company shortly after graduating, working primarily on Environmental Impact Assessments and Strategic Environmental Assessments. Lorraine has acted as Project Manager on numerous Environmental Impact Statements, Constraints & Feasibility Reports and Site Selection Reports for a wide range of projects, including renewable energy projects, roads, power lines and municipal services projects, and large-scale commercial, mixed-use and residential developments. Lorraine has also completed the Introduction, Background to the Proposed Development, Description of the Proposed Development, Human Beings, Air and Climate, Landscape, and Telecommunications sections of these EISs, in addition to numerous site constraints and layout maps, and has coordinated the scoping and consultation exercises with the relevant statutory and non-statutory bodies.

Órla Murphy M.Sc., B.Sc.

Órla Murphy is an Environmental Scientist with McCarthy Keville O'Sullivan Ltd. with over 2 years of experience in private consultancy. Órla holds BSc (Hons) in Geography from Queens University Belfast & a MSc in Environmental Protection and Management from the University of Edinburgh. Prior to taking up her position with McCarthy Keville O'Sullivan in January 2018, Órla worked as an Environmental Project Assistant with ITP Energised. Órla's key strengths and areas of expertise are in Environmental Protection and Management, EIA, Project Management, Renewable Energy and Peatland Management, where she has carried out research projects and site work relating to restoration and management of peatland sites in both Scotland and

Northern Ireland. On joining MKO Órla has been involved on a range of renewable energy infrastructure projects, working as part of a large multi-disciplinary team to produce EIA Reports. Órla holds a graduate membership with the Institute of Environmental Management and Assessment.

Pat Roberts B.Sc. (Env.)

Pat Roberts joined MKO (then Keville & O’Sullivan Associates) in 2005 following completion of a B.Sc. in Environmental Science. Prior to joining the company, Pat worked extensively in Ireland, the USA and UK as a tree surveyor, having previously worked with The National Trust in Cornwall for three years. He also has over five years’ practical conservation experience working both as a volunteer and employee in National Parks in Texas, Utah and at Exmoor National Park in the UK. Patrick has worked as project manager and ecologist on over 150 ecological assessments completed by the company to date, including a wide range of work within sensitive ecological areas. He has extensive experience of on-site supervision of construction and civil engineering works and has worked closely with construction personnel at the set-up stage of construction sites in the design systems to prevent environmental damage.

David McNicholas B.Sc. (Env.), M.Sc. (Env.)

David McNicholas is a Senior Ecologist at McCarthy Keville O’Sullivan, Planning & Environmental Consultants. David holds a BSc (First Class Hons) Environmental Science and an MSc (Hons) Environmental, Health and Safety Management. David specialises in the preparation of EIAs, ECIAs and NISs including ecological surveys and monitoring. David has worked on all phases of wind farm and solar farm development from feasibility/ scoping, ecological surveys, preparation of full EIS chapters, construction phase environmental monitoring and post-construction ecological monitoring. David has worked as an Ecological Clerk of Works (ECoW) during the construction phase of ten large scale wind farms in Ireland and Northern Ireland, gained significant experience on the implementation of the environmental and ecological measures. David is a full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).

Dr Úna Nealon PhD, B.Sc.

Úna Nealon is an Assistant Ecologist at McCarthy Keville O’Sullivan. Úna’s primary expertise lies in bat ecology, particularly in relation to wind farms, having obtained her PhD in *‘Systems to predict and assess bat presence at wind turbines in Ireland’* from UCD in 2016. Úna’s research experience is strengthened by her previous consultancy experience, leaving her ideally suited to undertake scope development for bat surveys, including the practical application of bat survey guidelines at Irish wind energy sites. She is also well practiced in bat survey methods at potential development sites using multiple techniques. Furthermore, she is skilled in bat impact assessment and the design of mitigation measures where she applies scientific and technical knowledge to produce practical solutions.

Kathryn Blade B.Sc.

Kathryn Blade is a Landscape Architect with McCarthy Keville O’Sullivan and holds a BSc (Hons) in Landscape Architecture from University College Dublin. Kathryn has worked primarily in private practice and has experience in the areas of public realm design, commercial, leisure and residential development in Ireland, the UK and the Middle East. Kathryn has experience in design and delivery from concept stage through to construction in the UK and overseas projects. Prior to taking up her position with McCarthy Keville O’Sullivan in June 2018, Kathryn worked as a Landscape Architect in Belfast and was part of a core team developing both landscape and public realm

schemes for the Belfast City Council Framework. Kathryn was also part of the core design team appointed to deliver the significant Dubai Expo 2020, working alongside industry leaders in design and sustainability. Amongst her skills she has a breadth of strong computer-based expertise, drawing, design and graphics ability. Kathryn is a Licentiate Member of the Landscape Institute in the U.K. and is working towards her professional chartership. Since joining MKO Kathryn has been involved in projects such as energy infrastructure, extraction industry and residential projects.

Joanna Mole

Joanna Mole is a Chartered Landscape Architect with over 20 years of experience in both private practice and local authorities. Joanna graduated from Sheffield University with a degree in BSc (Hons) in Landscape Design & Plant Science (2006) and also holds a Postgraduate Diploma in Landscape Architecture from Leeds Beckett University and a MSc in Renewable Energy Systems Technology from Loughborough University. She has worked as a Landscape Architect on a range of projects including commercial, residential, renewable energy and recreational projects. Since joining MKO Joanna has been involved in projects such as energy infrastructure, extraction industry and residential projects. Within MKO Joanna works as part of a large multi-disciplinary team to produce EIA Reports and landscape plans. Joanna holds chartered membership of the British Landscape Institute since 1998 and has been an examiner for British Landscape Institute professional practice exam.

Paul Sweeney BA. MSc.

Paul Sweeney is a Graduate Planner with McCarthy Keville O'Sullivan having joined the team in April 2018. Paul holds a BA (Hons) in Geography and English and a Masters in Planning and Sustainable Development from University College Cork where he graduated in 2017. Since joining McCarthy Keville O Sullivan Paul has started to develop experience in a range of sectors through various projects and planning issues with a current focus within the Environmental and Energy sector.

Owen Cahill B.Sc., M.Sc.

Owen Cahill joined MKO as an Environmental Engineer in October 2013. Owen completed a Master's Degree in Environmental Engineering at Queens University Belfast, following his primary degree in Construction Management. Owen brings considerable experience to his role having previously worked for a Belfast-based environmental consultancy and large-scale building and civil engineering contractors in the West of Ireland. Owen has gained considerable experience in Hydrogeology, Renewable Technologies, Water & Wastewater Engineering, Contaminated Land, Waste Management & Engineering Hydrology. Owen's work with MKO includes oversight of the MKO Environmental Clerk of Works projects including the development of Construction & Environmental Management Plans and their implementation including delivery of 'tool Box Talks' and implementation of monitoring programmes.

Eoin Gilson B.Sc., M.Sc.

Eoin is a Graduate Environmental Scientist with McCarthy O'Sullivan Ltd. who took up his position in October 2018. Eoin holds a BSc (Hons) in Microbiology and a MSc (Hons) in Applied Environmental Science. Eoin has specialist knowledge in environmental field surveys, data analysis and renewable energy systems. Eoin's key strengths and areas of expertise are in data management, report writing and environmental monitoring and management. On joining MKO Eoin has been involved on a range of renewable energy infrastructure projects, working as part of a large multi-disciplinary team to produce EIA Reports.

James Newell

James holds the position of CAD and Information Technology Technician with MKO since joining the Company in May 2006. Prior to joining MKO, he worked as a graphic designer and illustrator for over eight years. In recent years James' role has extended to include all solar farm visual modelling completed by the company. He is proficient in the use of MapInfo GIS software in addition to AutoCAD and other design and graphics packages.

1.7.2.2 ESB International

Anmarie Downey B.A., B.A.I, M.Sc., Higher Diploma Project Management, CEng

Anmarie has over 12 years specialist experience in Civil and Environmental Engineering. Joined ESB in 2009 and currently managing the development of renewables projects – ground mounted Solar, offshore wind and ocean energy. Expertise in project consenting and permitting, project management, commercial management, contractor procurement, hydro station water management, flood assessment, hydraulic river modelling, thermal plume studies and hydrology.

Team leader of a team of specialists in the areas of renewables, emerging technologies, hydrology and flood assessment.

Rory McGowan BEng (Hons), MSc

Rory has 6 years specialist experience in drainage design and flood risk assessment. Has experience of a range of modelling and design techniques including simple one-dimensional steady state, two-dimensional dynamic models and dimensionless models. Prior to specialising in water engineering Rory worked as a site engineer for 3 years.

Nikolas Konstantopoulos Dipl. Ing., Electrical & Computer Engineering

Nikolas is a specialist Solar PV Engineer with 8.5 years' experience in the design of Solar PV (roof top and ground mounted solar systems).

Bernard Leonard Certificate in Health and Safety at Work, Diploma in Project Management, HV Switchgear Substation Earthing, High Voltage Engineering

Over 33 years' experience, Bernard is currently the team leader for the High Voltage Projects External EBOP team. The EBOP team has responsibility for managing the Electrical Balance of Plant (EBOP) contract during the development, construction and energisation of ESB Asset Development's renewable energy portfolio.

Kevin McCloy B.Sc. (Hons), BTEC National Diploma in Construction.

Kevin is contracts Manager and engineer with a strong technical background and over 15 years' experience in the Civils and Construction Industry. Highly motivated with an in-depth knowledge and experience of construction methods, project planning, commercial procedures, cost forecasting and contract administration. Joined ESB in 2016 and over that time has managed the civil works on 2 wind farm projects, civil lead for the solar JV project, due diligence and feasibility work on solar projects.

Susan Stack BE (Hons)

Susan has 8 years of specialist geotechnical experience with ESB International since joining in 2010. Significant on-site experience in Ireland and UK, gained on a variety of renewables, substation, overhead lines, hydroelectric, and gas fired power station projects. Work includes the specification, supervision and review of site investigations, geotechnical desk studies, geotechnical risk management, slope stability analysis, foundation design, supervision of construction works on site, project management, and health and safety management.

Ronan Canavan B.A., B.A.I. Civil Engineering, MSc in Structural Engineering

Ronan assisted Susan Stack and completed the geology and ground conditions report. Ronan joined ESB International after graduating in 2004 and has 14 years specialist experience in geotechnical engineering. He is an innovative geotechnical engineer, with broad expertise delivering an extensive and diverse portfolio of power generation (thermal and renewable), transmission and distribution projects. He has significant experience in the specification and supervision of site investigations, evaluation of soil design parameters, shallow and deep foundation design, slope stability analysis. Expert in geotechnical and civil due diligence for the assessment of potential thermal power plant sites. Ronan developed a simplified geotechnical risk register template to improve ESB's geotechnical risk management capability.

Michael Brides B.A., B.A.I. Civil Engineering, M.Sc. Structural Engineering

Michael has in excess of 15 years of experience as a chartered civil engineering manager and project manager with a track record of successfully managing multi-disciplinary technical design teams and projects of significant scale. He currently holds the role of Geotechnical Risk Manager for ESB International. He has performed various lead civil engineering/geotechnical roles on major infrastructure projects most recently Oweninny Wind Farm, Grousemount Wind Farm and Tilbury Green Power Biomass Plant. Michael has in depth knowledge and expertise in the design of foundation solutions, in particular deep foundation solutions (e.g. CFA piling, bored piling, driven piling) and deep retention solutions (e.g. secant pile walls, contiguous pile walls, sheet pile walls). Furthermore, Michael has been lead foundation designer for ESB's wind turbine foundations. Michael has significant expertise in the area of peat stability assessment and mitigation and has been responsible for peat stability assessment and design of mitigation for a number of projects including Oweninny Wind Farm, Co. Mayo.

1.7.2.3 Hydro Environmental Ltd

Tony Cawley

Tony Cawley is Senior Hydrologist & Managing Director of Hydro Environmental Ltd, a Galway based Hydrological consultancy firm providing specialist services in the area of hydrology, hydrogeology, hydraulics and coastal engineering. It holds a unique position as a consultancy company dedicated to water-related hydrological and environmental engineering studies. The company provides expertise and a comprehensive range of services for clients in Ireland and the UK.

1.7.2.4 Hydro Environmental Services Ltd.

Michael Gill

Michael Gill is an Environmental Engineer with over ten years' environmental consultancy experience in Ireland. Michael has completed numerous hydrological and hydrogeological impact assessments of wind and solar farms in Ireland. He has also managed EIA/EIS assessments for infrastructure projects and private residential and commercial developments. In addition, he has substantial experience in wastewater engineering and site suitability assessments, contaminated land investigation and assessment, wetland hydrology/hydrogeology, water resource assessments, surface water drainage design and SUDs design, and surface water/groundwater interactions.

David Broderick

David Broderick is a hydrogeologist with over seven years' experience in both the public and private sectors. Having spent two years working in the Geological Survey of Ireland working mainly on groundwater and source protection studies David moved into the private sector. David has a strong background in groundwater resource assessment

and hydrogeological/hydrological investigations in relation to developments such as quarries, solar farms and wind farms. David has completed numerous geology and water sections for input into EIAs for a range of commercial developments.

1.7.2.5 AWN Consulting Ltd.

Leo Williams

Leo Williams (Acoustic Consultant) holds an MA in Mechanical Engineering and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. He is also an Associate Member of the IOA. He has extensive knowledge in aspects of environmental surveying, modelling and impact assessment.

Jennifer Harmon

Jennifer Harmon (Senior Acoustic Consultant) holds a BSc in Environmental Science and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. She is also a Member of the IOA. She has 16 years' experience in the fields of environmental noise and vibration consultancy and has carried out monitoring, prediction and assessment of noise impact from various road, rail, industrial and commercial projects nationwide.

1.7.2.6 Tobar Archaeological Services

Tobar Archaeological Services is a Cork-based company entering its ninth year in business. They offer professional nationwide services ranging from pre-planning assessments to archaeological excavation, and cater for clients in state agencies, private and public sectors.

Tobar's Directors, Annette Quinn and Miriam Carroll, are licensed by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs to carry out excavations in Ireland and have carried out work directly for the National Monuments Services of the Department of the Environment, Heritage and Local Government. Tobar Archaeological Services has a proven track record and extensive experience in industry from EIS stage through to construction stage when archaeological monitoring is frequently required.

1.7.2.7 Alan Lipscombe Traffic and Transport Consultants

Alan Lipscombe (B.Eng. Hons.) MIHT

In January 2007 Alan Lipscombe set up an independent traffic and transportation consultancy providing advice for a range of clients in the private and public sectors. Prior to this Alan was a founding member of Colin Buchanan's Galway office having moved there as the senior transportation engineer for the Galway Land Use and Transportation Study. Since the completion of that study in 1999, Alan has worked throughout the West of Ireland on a range of projects including: major development schemes, the Galway City Outer Bypass, Limerick Planning Land-Use and Transportation Study, Limerick Southern Ring Road Phase II, cost benefit analyses (COBA) and various studies for the NUI Galway. Before moving to Galway in 1997, Alan was involved in a wide variety of traffic and transport studies for CBP throughout the UK, Malta and Indonesia. He has particular expertise in the assessment of development related traffic and transport modelling and is an accomplished analyst who has experience of a wide variety of modelling packages and methods.

1.8 Difficulties Encountered

There were no technical difficulties encountered during the preparation of this EIAR.

1.9 Viewing and Purchasing the EIAR

Copies of this EIAR will be available online, including the Non-Technical Summary (NTS), on the following website address: www.timahoenorthgrid.ie

This EIAR and all associated documentation will also be available for viewing at the offices of An Bord Pleanála and Kildare County Council.