1. INTRODUCTION

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of Mid Clare Renewable Energy Windfarm Ltd., who intends to apply to Clare County Council for planning permission to construct a renewable energy development and all associated infrastructure in the townland of Cahermurphy and adjacent townlands, in Co. Clare.

This EIAR will accompany the planning application for the proposed development to be submitted to Clare County Council. The planning application will also be accompanied by a Natura Impact Statement ('NIS').

The proposed wind farm site is located approximately 5 kilometres to the north of Kilmihil and 25 kilometres southwest of Ennis, Co. Clare. It is proposed to access the site of the Proposed Development via an existing access track off the local road to the east of the site during the operational and construction phases. This entrance will be widened to facilitate the delivery of the construction materials and turbine components. The proposed wind farm site is further served by a number of internal existing forest roads.

It is proposed to connect the development to the national electricity network via a 38kV underground cable which will connect the proposed onsite substation to the existing Booltiagh substation, located approximately 7 kilometres to the southeast of the site. The substation and grid connection route are part of the proposd development and have been assessed as part of this EIAR.

Current land-use on the subject site comprises coniferous forestry, agriculture and turbary. Land-use in the wider landscape comprises a mix of agriculture, low density housing, wind farms and commercial forestry.

The proposed development is being brought forward in response to local, national, regional and European policy regarding Ireland's transition to a low carbon economy and associated climate change policy objectives. The site of the proposed development is located within an area designated in the Clare County Development Plan, 2017-2023 (as varied) as **'Strategic'** for wind energy development.

The townlands in which the proposed development is located are listed in Table 1-1.

Table 1-1 Townlands within which the Proposed Development is Located

Development Works	Townland
Wind turbines and access roads, Substation, Construction Compound, Borrow pits, Met mast, foresty felling and all associated site development works.	Cahermurphy, Knocknahila More South, Carrownagry South and Caheraghacullin.
Grid Connection Route	Cahermurphy, Drummin, Doolough, Carrownagry South, Glenmore and Booltiagh.

There are 56 occupied dwellings located within 1 kilometre of the turbine locations with 15 of those dwellings belonging to the landowners who form part of the proposed wind farm development. The closest occupied dwelling is located approximately 700 metres from the nearest proposed turbine location.

1.2 The Applicant and Project Background

The applicant for the proposed development is Mid Clare Renewable Energy Windfarm Ltd (MCRE). Coillte and MCRE are proposing to co-develop this project, also known as the Cahermurphy Two wind farm project.

Mid Clare Renewable Energy Windfarm Ltd (MCRE) is 100 percent Irish owned and is locally owned by Co. Clare based shareholders. The local ownership and local involvement is seen as an important feature in community acceptance of such renewable energy projects.

Coillte is a commercial semi-state company operating in forestry, land-based businesses, renewable energy and panel products. To date, Coillte has been the largest provider of high quality sites to the renewable energy sector and the Coillte estate has the potential to continue to make a significant contribution to achieving Ireland's 2030 target of sourcing 70% of its electricity consumption from renewable sources through wind energy generation, biomass production and the potential development of other renewable energy technologies.

Within Coillte, **Land Solutions** and **Renewable Energy** are active asset development and management businesses providing innovative commercial solutions to enable the attainment of key national policy objectives particularly those that are prescribed by the National Planning Framework (2018). The businesses span a wide range of industries including renewable energy, housing, healthcare, education, inward investment, infrastructure development, water, tourism and agriculture. Coillte has a longstanding heritage in the spheres of sustainability, recreation and community and a significant track-record in the renewable energy arena (specifically onshore wind through the development and construction of four wind farms totalling 230MW representing a total investment of over €400 million between 2010-2017).

In June 2019, Coillte established a new not-for-profit entity, **Coillte Nature**, which is dedicated to the restoration, regeneration and rehabilitation of nature across Ireland. Coillte Nature is seeking to deliver significant impact on the climate and biodiversity crises through innovative projects-of-scale across four strategic themes:

1. *Reforesting by planting new native woodland*
2. *Restoration of important biodiversity habitats*
3. *Regeneration of urban forests*
4. *Rehabilitation of critical ecosystem services*

Coillte is developing and will continue to develop renewable energy projects both on its own, in conjunction with codevelopment partners and with third party developers who require the lease or purchase of lands from Coillte in order to facilitate these developments, or an easement over the estate to develop their projects.

1.3 Brief Description of the Proposed Development

The proposed development will comprise the construction of up to 10 No. wind turbines and all associated works. The proposed turbines will have a maximum blade tip height of up to 170 metres. The full description of the proposed development, as per the public planning notices, is as follows:

i. *Construction of up to 10 No. wind turbines with a maximum overall blade tip height of up to 170 metres and associated hard stand areas;*
ii. *1 no. permanent Meteorological Mast with a maximum height of up to 100 metres;*
iii. *1no. 38kV permanent electrical substation which will be constructed at one of two possible locations on site: either Option A in Carrownagry South townland or Option B in Cahermurphy townland. The electrical substation will have 1 no. control building*

with welfare facilities, all associated electrical plant and equipment, security fencing, all associated underground cabling, waste water holding tank and all ancillary works;

iv. *All associated underground electrical and communications cabling connecting the turbines to the proposed on-site substation;*

v. *All works associated with the connection of the proposed wind farm to the national electricity grid via an underground cable to the existing Booltiagh 110kV substation;*

vi. *Upgrade of existing tracks, roads and provision of new site access roads and hardstand areas;*

vii. *Junction access road works;*

viii. *2 no. borrow pits;*

ix. *1 no. temporary construction compound;*

x. *Site Drainage;*

xi. *Forestry Felling to facilitate construction and operation of the proposed development; and*

xii. *All associated and ancillary site development works.*

This application is seeking a ten year planning permission and 30 year operational life from the date of commissioning of the entire wind farm.

Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the proposed development, will have an operational lifespan greater than the 30 year operational life that is being sought as part of this application.

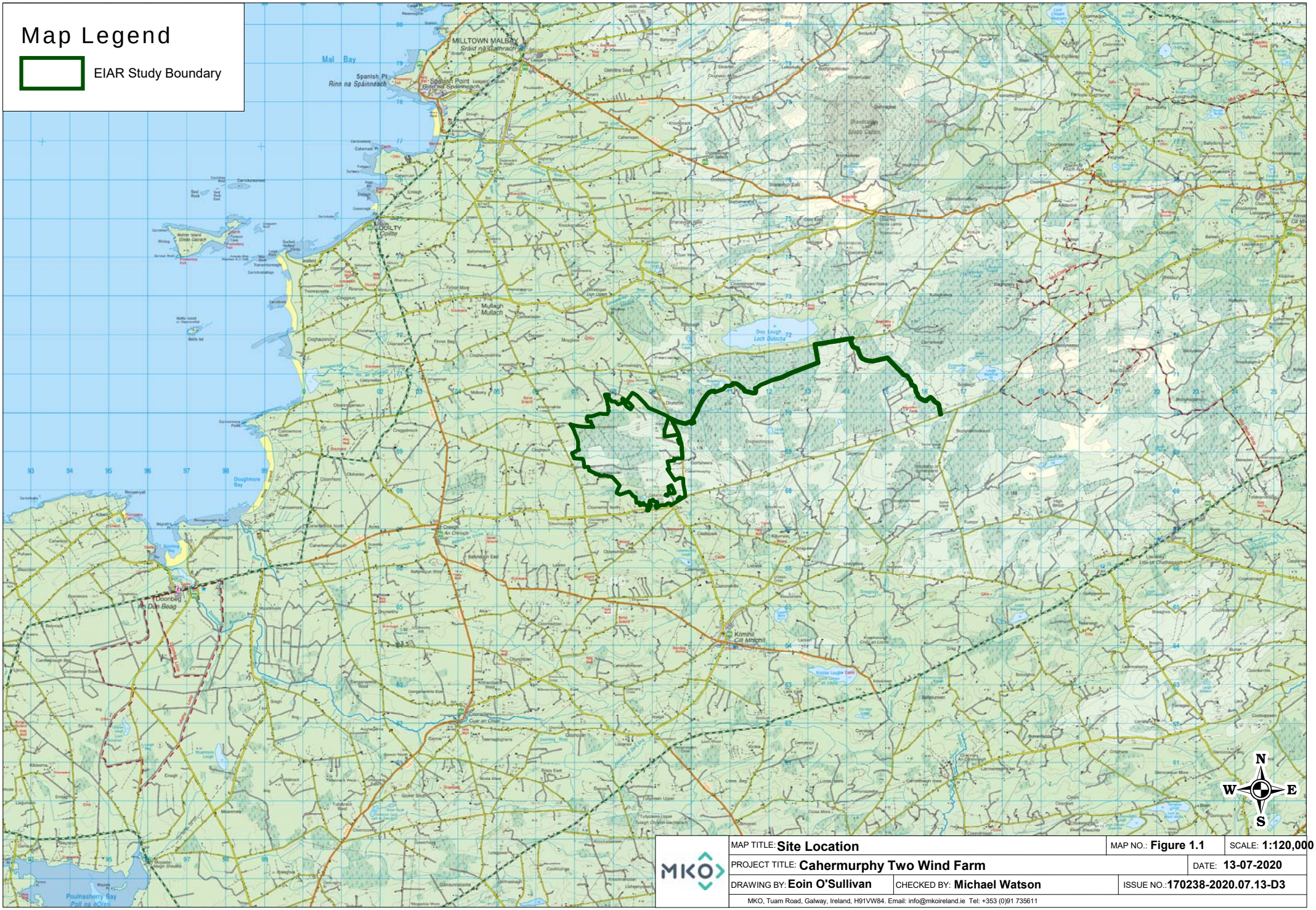
Modern wind turbine generators typically have an output of between 3.0 and 4.8MW. For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the proposed wind farm development will have an output of 4.8MW. Therefore, based on 10 no. wind turbines, the wind farm will have a total output of 48MW.

The layout of the proposed development has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the site. The roads layout for the proposed development maximises the use of the existing onsite access roads and tracks where possible, with approximately 6.6 kilometres of existing roadway/ tracks requiring upgrading and approximately 4.9 kilometres of new access road to be constructed.

The planning application for the proposed wind farm includes connection to the national electricity grid. The planning application includes 2 No. substations; however, only one substation will ultimately be constructed.

The proposed wind farm will connect to the national grid via one of the following methods:

- Option A: It is proposed to construct a 38 kV substation at the northern end of the site and to connect from here to the existing Booltiagh 110kV substation, located approximately 7 kilometres to the southeast of the site. Option A also includes for an alternative cable route running from the proposed onsite substation south to the access road and north along the local road to the east of the site. The alternative cable route option measures approximately 1.7 km in length. Connection via the Booltiagh route would comprise underground cabling, measuring approximately 12.1 km in total, located on existing forestry and agricultural land and within the public road corridor.
  Or
- Option B: It is proposed to construct a 38kvV substation at the south eastern end of the site and to connect from here to the existing Booltiagh 110kV substation, located approximately 7 kilometres to the southeast of the site. Connection via the Booltiagh route would comprise underground cabling, measuring approximately 12.1 km in total, located on existing forestry and agricultural land and within the public road corridor.



MKO	MAP TITLE: **Site Location**	MAP NO.: **Figure 1.1**	SCALE: **1:120,000**
	PROJECT TITLE: **Cahermurphy Two Wind Farm**		DATE: **13-07-2020**
	DRAWING BY: **Eoin O'Sullivan**	CHECKED BY: **Michael Watson**	ISSUE NO.: **170238-2020.07.13-D3**

MKO, Tuam Road, Galway, Ireland, H91VW84. Email: info@mkoireland.ie Tel: +353 (0)91 735611

Both Option A and Option B share the same grid connection route where the cable enters the forestry to the east of the wind farm site.

The substation options are required to provide flexibility to the electrical network provider when determining the most appropriate connection point for the export of the electricity to the national grid. The proposed on-site electrical substation will have 1 no. control buildings, associated electrical plant and equipment, and waste water holding tank.

Both substations options and the grid connection have been assessed as part of this EIAR.

As described above the majority of the proposed wind farm site is currently used for commercial forestry, a small proportion of which will be felled to accommodate the wind farm development. A total area of approximately 34.11 hectares of commercial forestry will require replanting elsewhere in the State and this forms part of the project for assessment. Details regarding the area to be felled are outlined in Chapter 4: Section 4.3.10 of this EIAR.

The Forest Service policy on the granting of felling licences requires replanting of forestry on a hectare-by-hectare basis. Four potential replanting areas have been identified for assessment purposes, with an availability of 36.72 hectares, located in Brackloon, Co. Roscommon, Cooraclare, Co. Clare, Pollnabrone, Co. Galway and Stranamart, Co. Cavan. These lands have been granted Forest Service Technical Approval[1] for afforestation, and this or similarly approved land will be used for replanting should the proposed development receive planning permission. Under the Forestry Regulations 2017, all applications for licences for afforestataion require the prior written approval (technical approval) of the Minister for Agriculture, Food and the Marine. Before the Minister can grant approval, he/she must first determine if the project is likely to have a a signifient environmental effect (for EIA purposes) and assess if the development, individually or in combination with other plans or projects is likely to have a significant effect on a European site (for Habitats purposes).

All elements of the overall project, including wind farm, grid connection, forestry felling, as well as the replanting have been assessed as part of this EIAR.

The proposed development and the replanting lands are described in detail in Chapter 4 of this EIAR.

1.3.1 References to the Proposed development Site

The EIAR site boundary of the proposed development encompasses an area of approximately 538 hectares, the majority of which comprises commercial forestry plantation. Where the 'site' is referred to in this EIAR, this means the primary study area for the EIAR. Generally, the study area extends beyond the planning application site boundary depending on the requirements of individual assessments. Where this occurs, the extent of the study area will be outlined in the relevant chapter, as required. The proposed permanent footprint of the proposed development measures approximately 14.5 hectares, which represents approximately 2.7% of the primary study area. The primary study area for the development, is delineated in green on Figure 1-1.

1.4 Legislative Context of Environmental Impact Assessment

The consolidated European Union Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, is currently transposed into Irish planning legislation by

[1] *All proposed forestry developments where the area involved is greater than 0.1 hectare must receive the prior written approval of the Forest Service. The application for approval is known as Pre-Planting Approval – Form 1.*

the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended). Directive 2011/92/EU was amended by Directive 2014/52/EU which has been transposed into Irish law with the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). The provisions of the new regulations have all come into operation as of 1st January 2019.

The European Union Directive 2011/92/EU, amended by EU Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), requires Member States to ensure that a competent authority carries out an assessment of the likely significant effects of certain types of project, as listed in the Directive, prior to development consent being given for the project.

The Environmental Impact Assessment (EIA) of the proposed development will be undertaken by Clare County Council as the competent authority.

This EIAR complies with the EIA Directive in terms of the structure and content of the information required.

Article 5 of the EIA Directive provides where an EIA is required, the developer shall prepare and submit an 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.*

MKO was appointed as environmental consultants on this wind farm project and were commissioned to prepare this EIAR in accordance with the requirements of the EIA Directive.

The relevant classes/scales of development that require Environmental Impact Assessment (EIA) are set out in Schedule 5 (Part 1 and Part 2) of the Planning and Development Regulations 2001, as amended. The relevant class of development in this case relates to "installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts", as per paragraph 3(i) of Part 2 of Schedule 5. The proposed development exceeds 5 turbines and 5 Megawatts in scale, and therefore is subject to EIA.

The EIAR provides information on the receiving environment and assesses the likely significant effects of the project 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 development.

All elements of the overall project, including grid connection, proposed tree felling and replanting have been assessed as part of this EIAR.

1.4.1 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 is intended to guide practitioners preparing an EIAR in line with the requirements set out in the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

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.

1.4.2 Wind Energy Development Guideline for Planning Authorities

The relevant considerations under the '*Wind Energy Development Guidelines for Planning Authorities*' (Department of the Environment, Heritage and Local Government (DOEHLG), 2006) have also been taken into account.

The '*Wind Energy Development Guidelines for Planning Authorities*' (DoEHLG, 2006) are currently the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments are outlined in the document '*Proposed Revisions to Wind Energy Development Guidelines 2006 – Targeted Review*' (December 2013), the '*Review of the Wind Energy Development Guidelines 2006 – Preferred Draft Approach'* (June 2017), and the Draft Revised Wind Energy Development Guidelines (December 2019). A consultation process in relation to the 2019 document concluded on the 19th of February 2020.

At time of writing, the Draft Guidelines have not yet been adopted, and the relevant guidelines remain those published in 2006. Notwithstanding this, however, due to the timelines associated with the planning process for renewable energy projects, it is possible that a version of the draft guidelines may be finalised during the consideration period for the current proposed development. Towards this end it is anticipated that Cahermurphy Two Wind Farm will be capable of adhering to the relevant noise and shadow flicker standards, and is in accordance with the set back requirements.

1.5 Need for the Proposed Development

1.5.1 Overview

Ireland faces significant challenges to its efforts to meet its 2020 targets, EU targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. It is clear that Ireland will not meet its 2020 target for renewable energy as well as the longer-term movement away from fossil fuels, with the SEAI reporting in May 2019 that 13 per cent of Ireland's energy will come from renewable sources by 2020, three per cent short of our European target of 16 per cent (SEAI, May 2019). Further detail can be found in Chapter 2 Section 2.2 of this EIAR.

In March 2019, the Government announced a renewable electricity target of 70% by 2030. The proposed development will be operational after 2020 and would therefore contribute to this target. More recently, the EPA reported that Ireland is set to fall far short of all of its carbon emissions reduction targets for both 2020 and 2030 despite climate action measures in the National Development Plan (EPA, June 2019). As such, the proposed Wind Farm is critical to helping Ireland address these challenges as well as addressing the country's over-dependence on imported fossil fuels.

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 Ireland's energy sources, with a view to achievement of national renewable energy targets and an avoidance of significant fines 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 2.2 in Chapter 2 of this EIAR on Background to the Proposed Development, presents a full description of the international and national renewable energy policy context for the project. Section 2.3 addresses climate change, including Ireland's current status with regard to meeting greenhouse gas emission reduction targets.

1.5.2 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 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 agreement, 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 such as wind 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 °C[2] and in accordance with the COP 21 agreement to limit global warming to well below 2°C above pre-industrial levels. Former Minister Kelly remarked in 2015 that "As a nation we must do everything in our power to curb our emissions".

In this regard, the Government enacted the Climate Action and Low Carbon Development Bill 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.

Most recently, the IPCC published an article on the 6th October 2018 titled 'Global Warming of 1.5°C', which notes the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of mitigation pathways, strengthening of the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. It provided detail on the impact of climate change if emissions are not reduced.

[2] IPCC Fifth Assessment Synthesis Report, Intergovernmental Panel on Climate Change AR5 Report

The Energy White Paper notes that "*The use of renewables in electricity generation in 2014 reduced CO_2 emissions by 2.6 Mt and avoided €255 million in fossil fuel imports*".

It is estimated that the proposed renewable energy development will have a potential output of approximately 48MW. On this basis, the proposed development will result in the net displacement of approximately 64,254 tonnes of carbon dioxide (CO_2) per annum, including accounting for back-up generation. The carbon offsets resulting from the proposed development are described in detail in Section 11.3.3 of Chapter 11 of this EIAR: Air and Climate.

1.5.3 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 2015, the cost of all energy imports to Ireland was approximately €4.6 billion, with Ireland being one of the most energy import-dependent countries in the European Union, importing 88% of its fuel that year, up from 85% in 2014 This fell to €3.4 billion in 2016 (due mainly to reduced gas imports) but rose to approximately €4 billion in 2017 (the most recent period for which figures are available). Ireland's import dependency in 2017 was 66%, down 22% from 2015, however, Ireland is still one of the more import dependent countries in the EU, with the EU average being just over 50% ('*Energy in Ireland 2018*', Sustainable Energy Authority of Ireland, 2018).

Ireland continues to be hugely energy import-dependent leaving it exposed to large energy price fluctuations as a minimum and possibility of fuel shortages if a major energy crisis were to occur. The international fossil fuel market is growing increasingly expensive and is increasingly affected by international politics which can add to price fluctuations. This volatility will be increased as carbon prices increase in the future. This has implications for every Irish citizen.

The SEAI has stated that our heavy dependence on imported fossil fuels, "*is a lost opportunity in terms of keeping this money here in Ireland and further developing our abundant renewable resources*".

The cost of carbon credits is included in all electricity traded, and the price of electricity generated by coal is particularly vulnerable due to its high carbon emissions per unit of electricity generated. Coal still generates almost 25% of Ireland's electricity, but the Programme for Government[3] called for a review of options to replace it with low carbon alternatives within a decade. Any steps to reduce this dependence on imported fossil fuels will add to financial autonomy and stability in Ireland. The use of Ireland's indigenous energy resources, such as wind, will contribute to a reduction in energy imports.

The Energy White Paper 2015[4] notes *"There will be a substantial increase in the cost of carbon in the short and medium term, through the EU Emissions Trading Scheme".* Any steps to reduce dependence on imported fossil fuels will add to financial autonomy and stability in Ireland. As the White Paper notes:

> *"In the longer term, fossil fuels will be largely replaced by renewable sources".*

1.5.3.1.1 *Supports for Wind Energy*

While Ireland has a range of renewable resources, as the White Paper states "[Onshore Wind] is a proven technology and Ireland's abundant wind resource means that a wind generator in Ireland generates more electricity than similar installations in other countries. This results in a lower cost of support."

---

[3] *Department of Communications, Climate Action and Environment, National Climate Policy, available at:* https://www.dccae.gov.ie/en-ie/climate-action/topics/climate-action-at-a-national-level/Pages/default.aspx

[4] *Ireland's Transition to a Low Carbon Energy Future 2015-2030 (Department of Communications, Energy & Natural Resources, 2015)*

In fact, the cost of support is more than offset by the fact that adding large quantities of wind to the wholesale market drives down auction prices in any half hour trading period when the wind is blowing, i.e. for 80% of the hours of the year. Wind is capable of an average capacity factor of 31.7%[5], which is its average output throughout the year relative to its maximum output. However, wind is generating power at some level for 80% of the hours of the year. EirGrid's website has more detailed information. A Poyry study from 2015 showed that reaching our targets in 2020 would reduce wholesale prices by more than costs of new grid infrastructure, backup and the subsidies paid to wind, resulting in a net saving of €43m per year in 2020. The EU has noted that Ireland has one of the lowest costs of supporting renewables mainly because onshore wind is on a par with the cost of power from conventional generation when a full cost benefit analysis is undertaken.

1.5.4 EU 2020 Renewable Energy Targets

The burning of fossil fuels for energy creates greenhouse gases, which contribute significantly to climate change. These and other emissions also create 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, which includes a common EU framework for the promotion of energy from renewable sources.

The Directive sets a 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 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). The contribution of renewables to gross final consumption (GFC) was 11% in 2018, compared to the 2020 target of 16% ('Energy in Ireland – 2019 Report, SEAI, December 2019). Furthermore, the Department of Communications, Climate Action & Environment (DoCCAE) reported most recently in their 'Fourth Progress Report on the National Renewable Energy Action Plan' (December 2017) that Ireland will achieve 13% of its 16% RES target by 2020.

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, including wind energy, as a primary strategy in implementing national energy policy.

Noted above and further emphasised in the most recent SEAI report, 'Energy in Ireland – 2019 Report' (SEAI, December 2019); the share of renewable electricity (RES-E) was recorded at 33.2% in 2018, out of their 40% target; further reporting that Ireland is not on track to meet its 2020 renewable energy target.

In April 2020, the SEAI released an update to its 2019 'Renewable Energy in Ireland' report. The update report confirms that Ireland is not on track to meet any of its 2020 renewable energy targets and ranks second last of the 28 European countries (including the UK) in terms of progress towards 2020 targets. Renewable sources made up just 11% of Ireland's energy consumption in 2018, which is significantly short the 16% goal for 2020. The report notes that Ireland's dependence on fossil fuels for heating requirements (over 93%) was the primary cause for failing to achieve its overall renewable energy target.

[5] *Energy in Ireland 2019 Report (Table 17) (SEAI, December 2019). Report available at: https://www.seai.ie/publications/Energy-in-Ireland-2019-.pdf*

Furthermore, analysis from EirGrid, has shown that 32% of electricity demand in Ireland during 2018 was met by renewable sources[6]. This shows a positive increase in renewable energy in Ireland from that previously recorded in 2017, but still highlights a shortfall relative to the 2020 target and the significant progress required to meet our targets and beyond 2020.

1.5.5 EU 2030 Renewable Energy Targets

In March 2019, the Minister for Communications, Climate Action, and the Environment, Richard Bruton, announced a renewable electricity target of 70% by 2030 for Ireland. This is a rise from the previous target of 55%. This commitment will also from part of a new Climate Action Plan that is being overseen by the Government. The Joint Committee on Climate Change Action recommended in their recent report, '*Climate Change: A Cross- Party Consensus for Action'* (March 2019) , that new climate change legislation be enacted by the Oireachtas in 2019 to include:

- A target of net zero economy-wide GHG emissions by 2050;
- A provision for a 2030 target, consistent with the GHG emissions reduction pathway to 2050 to be set by 2020 by Statutory Instrument requiring the formal approval of both Houses of the Oireachtas following receipt of advice from the Climate Action Council;
- Provision for five-yearly carbon budgets, consistent with the emissions reduction pathway to 2030 and 2050 targets, to be set by Statutory Instrument requiring the formal approval of both Houses of the Oireachtas following receipt of advice from the Climate Action Council; and
- A target for the renewable share of electricity generation of 70% by 2030.

As noted previously, Ireland is not on track for meeting our 2020 renewable energy targets. It is now more critical than ever that we continue to progress renewable energy development in Ireland so as we are successful in meeting our 2030 target. Further detail on the EU 2030 targets in noted in Chapter 2 Section 2.2.

1.5.6 Increasing Energy Consumption

In their '*All Island Generation Capacity Statement 2018 - 2027'* (October 2018), EirGrid estimate that a band of between 3.9 and 4.4 GW of onshore wind energy capacity is required to meet Ireland's 2020 RES-E targets with 4.2 GW being the most likely figure and that this would imply an average build-out of about 300MW per year until the end of 2020. In April 2016[7] SEAI estimated the historic build rate for wind energy deployment as 180 MW per year since 2005. If this average build rate over the remaining period between 2018 and 2020 is assumed, then approximately 3.85 GW of wind would be built up to 2020, leaving an up to 550 MW shortfall on the current demand forecast.

It is noted that the key driver for electricity demand in Ireland for the next number of years is the connection of new large energy users, such as data centres. This statement notes that '*Large industrial connections normally do not dominate a country's energy demand forecast but this is the case for Ireland at the moment*'. EirGrid analysis shows that demand from data centres could account for 31% of all demand by 2027 in a median demand scenario (accounts for the connection of all 1400MVA of potential demand in the connection process). The median demand scenario is now higher than for last year's forecast for high demand, indicating the progression of many of the data centre projects.

It should be noted that each MW of additional data centre load will add at least 1 MW of wind to the 40% RES-E 2020 target[8]. Alternatively, 3 MW of wind could be required per MW of data centre if the

6 http://www.eirgridgroup.com/newsroom/renewables-demand-record/index.xml
7 https://www.seai.ie/Publications/Statistics_Publications/Energy_Modelling_Group_Publications/Ireland%E2%80%99s-Energy-Targets-Progress-Ambition-and-Impacts.pdf
8 Data centres have high load factors of around 80%. Each 1MW uses 24 x 365 x 80% = 7GWh. EU targets require that 40% or 3GWh of that should come from renewables. A 1MW wind turbine produces roughly 3GWh/yr.

data centre wants to commit to being powered 100% by renewable energy. Many of the data centres have made such a commitment and have well-publicised company policies to only use renewable electricity to power their data centres.

In 2015, IWEA commissioned a study '*Data Centre Implications for Energy Use in Ireland'* which concluded that an extra approx. 1 Gigawatt (GW) of electricity demand could materialise between 2015 and 2020 due to growth in data centres. Many of the proposed data centres have committed to using 100% renewable energy which will result in an increased demand for renewable electricity as detailed above.

In the context of increasing energy demand and prices, uncertainty in energy supply and the effects of climate change, our ability to harness renewable energy such as wind power plays a critical role in creating a sustainable future. The Department of Environment, Heritage and Local Government set a target for Ireland of 40% of total electricity consumption to come from renewable resources by 2020, within an overall renewable energy target of 16%. This target forms part of the Government's strategy to make the green economy a core component of its economic recovery plan for Ireland. It is envisaged that wind energy will provide the largest source of renewable energy in achieving this target.

The European Commission Report '*Report from the Commission to the European Parliament and the Council*' on the 2017 progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive, was published in November 2017. The report found that "*despite substantial reductions in the past that moved energy consumption closer to the 2020 targets, the increases in 2015 and possibly also in 2016 indicate that reaching the targets may require additional efforts*".

Recent communications from SEAI[9] have noted with concern that '*Significant progress has been made, but to realise Ireland's 2020 targets and reap the associated economic benefits requires an acceleration of effort'*.

Failure to meet Ireland's 2020 targets for renewable energy will result in substantial EU sanctions. SEAI in their report '*National Energy Projections to 2030'* (November 2018) anticipated that Ireland will fall short of its overall renewable energy target, predicting an estimated achievement of between 12.7% and 13.9% of the 16% target by 2020. More recently, Minister Bruton announced in May 2019 that fines of up to €150 million would be imposed for failure to reach the 2020 target. The Department of Public Expenditure and Reform (DPER) in their report 'Future Expenditure Risks associated with Climate Change/Climate Finance'[10] concluded that *'potential costs of purchasing non-ETS GHG compliance for the Irish Exchequer for the 2020 to 2030 period could have a cumulative total in the billions in the absence of any further policy changes'*. If Ireland decided to backfill shortfalls in the RES-H target with additional renewable electricity this could significantly reduce these costs.

The Department of Communications, Energy & Natural Resources (DCENR) noted in their Draft Bioenergy Plan 2014, that achieving the anticipated renewable energy usage in the three energy sectors will be challenging, with the 12% for renewable heat being particularly so. SEAI estimate that the shortfall could be in the region of 2% to 4% of the 12% RES-H target. Given that individual member state 2030 targets are expected to be set at a more challenging level than 2020, fines could persist for an extended number of years, and so the total cost to Ireland could run to billions. For comparison, the entire wholesale electricity market has an annual value of around €3bn.

Recognising the scale of this risk, the Department of Finance noted in its April 2016 'Stability Programme Update'

[9] https://www.seai.ie/resources/publications/Ireland___s-Energy-Targets-Progress-Ambition-and-Impacts.pdf
[10] https://igees.gov.ie/wp-content/uploads/2013/10/Future-Expenditure-Risks-associated-with-Climate-Change-Climate-Finance1.pdf

> *"There are fiscal risks associated with a legally binding EU Effort Sharing Decision on climate change covering the 2013-2020 period. Ireland is obliged to achieve a 20 per cent Greenhouse Gas emissions reduction (compared to 2005 levels) in certain sectors. Current EPA projections estimate that Ireland will not achieve this reduction and failure to comply may incur costs of hundreds of millions through the purchase of carbon credits until such time as the target is complied with. Similarly, further new costs may arise in the context of a new EU climate and energy framework for the period 2020-2030, which will set new emissions reduction targets."*

In the medium-term, with the introduction of electric vehicles and uptake of smart demand such as storage heating and heat pumps, emissions in the heat and transport sector will be substantially reduced. A high renewables electricity system is the foundation of such a transformation.

The Energy White Paper published by DCENR in December 2015 expanded on the vision set out above. It outlines a radical transition to a low carbon future which 'will involve [inter alia] generating our electricity from renewable sources of which we have a plentiful indigenous supply..[and].. Increasing our use of electricity and biogas to heat our homes and fuel our transport'.

The DCENR confirmed in the publication of the White Paper 'Ireland's Transition to a Low Carbon Future' 2015 – 2030, that wind is the cheapest form of renewable energy:

> *"(Onshore wind) is a proven technology and Ireland's abundant wind resource means that a wind generator in Ireland generates more electricity than similar installations in other countries. This results in a lower cost of support."*

The 2020 40% electricity from renewable sources target has provided a particular focus for Irish Government policy and the renewables industry in recent years. However, 40% should only be considered as an interim target rather than an end in itself. Looking beyond 2020, EU countries have agreed on a new 2030 Framework for climate and energy, including EU-wide targets and policy objectives for the period between 2020 and 2030. These targets aim to help the EU achieve a more competitive, secure and sustainable energy system and to meet its long-term 2050 greenhouse gas reductions target. It is noted that a binding EU target of 32% for renewable energy by 2030 has been set by the EU 2030 Framework for Climate and Energy, with Ireland confirming its own targets for 2030 as detailed below.

Ireland will therefore have to meet even more demanding climate change and renewable energy supply obligations in order to play its part in achieving the European climate and energy ambitions. As announced in March 2019, the Irish Government have pledged to generate 70% of the country's electricity supply from renewable sources by 2030. This figure is up from the current target for that period of 55% and will form a commitment in the recent climate action plan[11] which was published in August 2019 and is being overseen by the Minister for Communications, Climate Action and the Environment. The development of additional indigenous wind energy generating capacity, such as that proposed at Cahermurphy, will not only help to reduce carbon emissions but will also improve Ireland's security of energy supply. Such penetration levels of wind are technically and economically feasible once paired with other energy system changes such as increasing electric vehicle penetration and electrification of heat. Further information on the 2030 commitments for Ireland are noted in Chapter 2, Section 2.2.

These sources of 'flexible demand' allow the system to match intermittent renewable energy resources with minimal extra cost. Additional interconnection is also planned with the UK and France, further assisting in the integration of wind (and in the future solar) on the power system.

A number of alternative energy types have been examined when considering how best to meet this renewable energy target.

[11] *Climate Action Plan 2019 – To Tacke Climate Breakdown (DCCAE 2019)*

In 2014, a report prepared by UK consultant BW Energy for the Rethink Pylons campaign group has suggested that converting Moneypoint generation station (which runs solely on coal) from coal to biomass would enable Ireland to meet 2020 renewable energy targets. Dr Brian Motherway, Chief Executive SEAI[12] refutes this claim. While Dr Motherway agrees that biomass offers benefits and is helping Ireland to move away from fossil fuels he states that "*the conversion of Moneypoint to biomass has been considered a number of times over the years, including actual trials of small amounts of biomass in the station. However, the technical and economic challenges have proven far greater than some would have us believe*".

The reason being that the move of Moneypoint from coal to biomass would not entail a clean swap. In fact, '*to allow for combustion of biomass, a full redesign and rebuild of much of the station would be required*'. In the UK where this has been done, energy generation stations have required significant financial support to make the process viable and with each unit of energy in the UK being worth approx. 13 cents, almost double that of Ireland which is approx. 7 cents, wind energy works out cheaper in Ireland. Also, the amount of biomass required to feed Moneypoint would require 300,000ha of land; an equivalent area of Counties Wexford and Carlow being planted with willow which is far more than Ireland currently produces which means we would need to import.

Importation raises the question; would this be cost effective? As prices are volatile and availability of biomass is difficult to predict Ireland would become dependent on the uncertainty of imported biomass. It is also noted that there will be emissions from transport and distribution. The further the biomass is transported, the greater the greenhouse gas emissions[13]. So, while biomass is currently contributing to a move to renewable energy production, on its own it is not the sole answer to meeting Ireland's 2020 renewable energy targets. Ireland has a legal obligation to diversify its energy sources by 2020 requiring the development of renewable energy to avoid substantial fines.

More recently, and with the 2030 targets being released; the Joint Committee on Climate Action has published its cross-party report entitled, '*Climate Change: A Cross- Party Consensus for Action'* (March 2019). This report highlights the requirements for alternate energy production. More specifically, the report notes that it is currently planned to stop burning coal at Moneypoint by 2025 as well as peat at Bord na Mona and ESB stations by 2030. In August 2019, the Department of Communications, Climate Action and Environment published its Climate Action Plan (CAP), which notes the need for renewable alternatives to coal and peat. Further information on the CAP can be seen in Chapter 2, Section 2.2.4.

Against this backdrop, the importance of wind energy as the main component of Ireland's renewable energy development is acknowledged, and wind energy is accepted as the main contributor to meeting the Country's national climate change and energy supply obligations. Notwithstanding this, it must also be acknowledged that not every part of Ireland is well endowed with wind resources and therefore, not all counties will be able to deliver wind-based renewable energy. Furthermore, whilst it is accepted that there are other renewable energy technologies in operation, for the foreseeable future many areas will be unable to deliver significant renewable energy output. This primarily applies to the more populous areas.

National and international renewable energy and climate change targets must be achieved and it is crucial that these are appropriately translated and implemented at regional and local levels. Wind farm development and design involves balancing the sometimes-conflicting interests of constraints (e.g. natural and built heritage, human beings, ecological, ground conditions, hydrological, etc.) with visual amenity and the technological/economic requirements/realities of the specific project and turbines.

[12] http://www.seai.ie/News_Events/Press_Releases/2014/Biomass-is-a-big-part-of-the-solution-but-not-the-whole-solution.html
[13] *Sustainability Criteria Options and Impacts for Irish Bioenergy Resources (SEAI 2019)*

1.5.7 Programme for Government – 'Our Shared Future' – 2020

In Jun 2020, a draft programme for government was agreed by the leaders of Fine Gael, Fianna Fail and the Green Party. The draft programme contains commitments under a number of policy headings which inlcude:

- A better quality of life for all;
- Reigniting and renewing the economy;
- A green new deal;
- Universal healthcare;
- Housing for all;
- Balanced regional development;
- A new social contract;
- Building stronger and safer communities;
- Better opportunities through education and research;
- A shared island;
- At the heart of Europe and global citizensip; and
- Reforming and reimagining our public life.

Under the 'Green New Deal', The government is committed to an averarage 7 per cent per annum reduction in overall greenhouse gas emissions from 2021 to 2030, which is a 51 per cent reduction over the decade, with the aim of achieving net zero emissions by 2050. The 2050 target will be set in law by the Climate Action Bill.

The proposed development is likely to be operational before 2030 and would therefore will contribute to this 2030 target.

1.5.8 Reduction of Carbon Emissions and Other Greenhouse Gases

The production of renewable energy from the proposed development 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, the generation of electricity from wind power by the proposed development will displace approximately 64,254 tonnes of carbon emissions per annum from the largely carbon-based traditional energy mix, the detail of which is presented in Section 11.3.3 in Chapter 11 of this EIAR.

Under WHO and EU estimates, more than 400,000 premature deaths are attributable to poor air quality in Europe annually ('*Ireland's Environment: An Assessment*', Environmental Protection Agency, 2016). In Ireland, the premature deaths attributable to air pollution are estimated at 1,200 people per year. The EPA 2016 report '*Ireland's Environment – An Assessment*' states that the pollutants of most concern are NOx, (the collective term for the gases nitric oxide and nitrogen dioxide, PM (particulate matter) and O_3 (ozone). The EPA 2016 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 development 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 wind energy, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, results in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide SO_2, thereby resulting in cleaner air and associated positive health effects.

1.5.9 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 2018 the cost of all energy imports to Ireland was approximately €5 billion with imported fossil fuels accounting for 67% of all energy consumed ('Energy in Ireland 2019', SEAI, 2019).

The SEAI report 'Energy in Ireland 2019' indicated that renewable electricity (mostly wind energy) during 2018 and compared to 2016:

- Displaced €430 million in fossil fuel imports;
- Reduced CO_2 emissions by 4 million tonnes; and
- Did not add to consumer bills.

The 2014 report 'The Value of Wind Energy to Ireland', published by Pőyry, stated that growth of the wind sector in Ireland could support 23,850 jobs (construction and operational phases) by 2030. If Ireland instead chooses to not develop any more wind, then by 2030 the country will be reliant on natural gas for most of our electricity generation, at a cost of €671 million per annum in fuel import costs.

The proposed development will be capable of providing power to over 35,040 households every year, as presented in the calculations in Section 4.3.1.6 of this EIAR.

At a Regional Level, the proposed development will help to supply the rising demand for electricity, resulting from renewed economic growth. The EirGrid report '*All-island Generation Capacity Statement 2018 – 2027*' (October 2018) notes that the demand forecast in Ireland is heavily influenced by the expected growth of large energy users, primarily data centres and that *'due to this growth, the electricity demand in Ireland could grow by up to 57% in the next 10 years'*.

The proposed development will have both long-term and short-term benefits for the local economy including income to local landowners, job creation, work opportunities for local businesses and service providers, local authority commercial rate payments and a Community Benefit Scheme.

Commercial rate payments from the proposed project will be provided to Clare County Council each year, which will be redirected to the provision of public services within Co. Clare. These services include provisions such as road upkeep, fire services, environmental protection, street lighting, footpath maintenance etc. along with other community and cultural support initiatives.

It is estimated that the proposed project has the potential to create up to 72 jobs during the construction, operational and maintenance phases of the proposed wind farm. During construction, additional employment will be created in the region through the supply of services and materials to the

wind farm. There will also be income generated by local employment from the purchase of local services i.e. travel, goods and lodgings. Further details on employment associated with the proposed wind farm are presented in Section 5.8 of this EIAR.

There are substantial opportunities available for areas where wind farms and other types of renewable energy developments are located, in the form of Community Gain Funds. Based on the current proposal, a Community Gain Fund in the region of up to €5.6 million will be made available over the lifetime of the project. Further details on the proposed Community Gain proposals are presented in Section 4.5 of this EIAR.

The value of this fund will be directly proportional to the level of installed MWs at the site and will support and facilitate projects and initiatives including youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, and environmental projects.

1.6 Purpose and Scope of the EIAR

The purpose of this EIAR is to document the current state of the environment on and in the vicinity of the proposed site and to quantify the likely significant effects of the proposed development on the environment. 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 development.

It is important to distinguish the Environmental Impact Assessment (EIA) to be carried out by Clare County Council, from the EIAR accompanying the 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 significant effects of the 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 Article 5 of the revised EIA Directive described in Section 1.4 above.

1.7 Structure and Content of the EIAR

1.7.1 General Structure

This EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the proposed wind farm development thereon and the proposed mitigation measures. Background information relating to the proposed development, scoping and consultation undertaken and a description of the proposed development are presented in separate sections. The grouped format sections describe the impacts of the proposed development in terms of human beings, biodiversity, soils and geology, water, air and climate, noise and vibration, landscape and visual, cultural heritage and material assets such as traffic and transportation, together with the interaction of the foregoing.

The chapters of this EIAR are as follows:

- Introduction
- Background to the Proposed Development
- Consideration of Reasonable Alternatives
- Description of the proposed Development
- Population and Human Health
- Biodiversity (excluding Birds)
- Birds
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Air and Climate
- Noise and Vibration
- Landscape and Visual
- Cultural Heritage
- Material Assets (including Traffic and Transport, Telecommunications and Aviation)
- Interactions of the Foregoing
- Schedule of Mitigation Measures

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

1.7.2 Description of Likely Significant Effects and Impacts

As stated in the *'Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2002), an assessment of the likely impacts of a 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 EIAR 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).
- *'Revised Guidelines on the Information to be contained in Environmental Impact Statements – Draft September 2015'* (EPA, 2015)
- *'Advice Notes for Preparing Environmental Impact Statements – Draft September 2015'* (EPA, 2015).
- *'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements'* (EPA, 2003)
- *'Guidelines on the Information to be contained in Environmental Impact Statements'* (EPA, 2002)

The European Commission 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', which have also been referred to.

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 development 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

Impact Characteristic	Term	Description
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,

Impact Characteristic	Term	Description
		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, duration and type, where possible. A 'Do-Nothing' impact is also predicted in respect of each environmental theme in the EIAR. 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 EIAR.

1.8 Project Team

1.8.1 Project Team Responsibilities

The companies and staff listed in Table 1-3 were responsible for completion of the EIAR of the proposed development. Further details regarding project team members are provided below.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of wind 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 EIAR are summarised in Section 0 below. Each chapter of this EIAR has been prepared by a competent expert in the subject matter.

Table 1-3 Companies and Staff Responsible for EIAR Completion

Consultants	Principal Staff Involved in Project	EIAR Input*
MKO Tuam Road, Galway, H91 VW84	Gus McCarthy Brian Keville Michael Watson Eoin O'Sullivan Jimmy Green Meabhann Crowe Paul Sweeney Pat Roberts John Hynes Dr. Úna Nealon Aoife Joyce Sarah Mullen Dervla O'Dowd Padraig Cregg Ciaran McKenna David Naughton Owen Cahill Dr. John Staunton Stephen Corrigan Patrick Hehir Joanna Mole James Newell Joseph O'Brien	Project Managers, Scoping and Consultation, Preparation of Natura Impact Statement, EIAR Report Sections: 1. Introduction 2. Background to the Proposed Development 3. Site Selection & Alternatives 4. Description of the Proposed Development 5. Population & Human Health 6. Shadow Flicker 7. Biodiversity 8. Birds 11. Air & Climate 13. Landscape & Visual 15. Material Assets (non-Traffic) 16. Interaction of the Foregoing
Hydro Environmental Services 22 Lower Main Street Dungarvan Co. Waterford	Michael Gill David Broderick	Flood Risk Assessment, Drainage Design, Preparation of EIAR Sections: 9. Land, Soils & Geology 10. Hydrology & Hydrogeology
Fehily Timoney & Company The Grainstore Singletons Lane Bagnelstown Co. Carlow	Gerry Kane Ian Higgins	Preparation of Peat Stability Assessment & Peat Management Plan

Consultants	Principal Staff Involved in Project	EIAR Input*
AWN Consulting The Tecpro Building Clonshaugh Business & Technology Park Dublin 17	Damian Kelly Dermot Blunnie Mike Simms	Baseline Noise Survey, Preparation of EIAR Section 12. Noise and Vibration
Dominic Delaney & Associates Unit 3 Howley Court Main Street Oranmore Co. Galway	Dominic Delaney	Preparation of EIAR Section 14. Cultural Heritage
Alan Lipscombe Traffic and Transport Consultants Claran, Headford, Co. Galway	Alan Lipscombe	Swept Path Analysis, Preparation of EIAR Section 15. Material Assets - Traffic and Transport

* (A Statement of Authority is included in each chapter of this EIAR detailing the the experts who contributed to the preparation of the report, identifying for each such expert the part or parts of the report which he or she is responsible for or to which he or she contributed, his or her competence and experience, including relevant qualifications in relation to such parts, and such additional information in relation to his or her expertise that demonstrates the expert's competence in the preparation of the report and ensures its completeness and quality.

1.8.2 Project Team Members

1.8.2.1 MKO

Gus McCarthy BA, MRUP, MIPI

Augustine (Gus) McCarthy is a Company Director with McCarthy Keville O'Sullivan Ltd. and is a professional planner with over 35 years of experience in both private practice and local authorities combined. Prior to establishing AP McCarthy Planning Consultants in 2000, Gus worked as a Senior Planner for both Galway County Council and Galway City Council. Gus has significant experience in a wide range of projects and extensive experience in both terrestrial and coastal/marine based developments. He is retained as planning advisor for development programmes of large organisations and has been the lead planning consultant on a wide range of infrastructure, energy, commercial and other projects throughout the Country.

Brian Keville B.Sc. (Env.)

Brian Keville has over 18 years' professional experience as an environmental consultant having graduated from the National University of Ireland, Galway with a first class honours degree in Environmental Science. Brian was one of the founding directors of environmental consultancy, Keville & O'Sullivan Associates Ltd., prior to the company merging in 2008 to form McCarthy Keville O'Sullivan Ltd. Brian's professional experience has focused on project and environmental management, and environmental impact assessments. Brian has acted as project manager and lead-consultant on numerous environmental impact assessments, across various Irish counties and planning authority areas. These projects have included large infrastructural projects such as roads, ports and municipal services projects, through to commercial, mixed-use, industrial and renewable energy projects. The majority of

this work has required liaison and co-ordination with government agencies and bodies, technical project teams, sub-consultants and clients.

Michael Watson, MA; MIEMA, CEng, PGeo

Michael Watson has over 19 years' experience in the environmental sector. Following the completion of his Master's Degree in Environmental Resource Management, Geog from National University of Ireland, Maynooth he worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy. Michael's professional experience includes managing Environmental Impact Assessments on behalf of clients in the renewable energy, waste management, commercial and industrial sectors nationally. These projects have required liaising with the relevant local authorities, Environmental Protection Agency (EPA) and statutory consultees as well as coordinating the project teams and sub-contractors. Michael has significant experience in the EPA Industrial Emissions, IPPC and Waste licensing regimes managing licence applications and subsequent regulatory compliance on behalf of clients in the waste and industrial sectors. Michael also has a Bachelor of Arts Degree in Geography and Economics from NUI Maynooth, is a Member of IEMA, a Chartered Environmentalist and Professional Geologist.

Jimmy Green BA, MRUP; MIPI

Jimmy Green is a Senior Planner with McCarthy O'Sullivan Ltd. with over 18 years of experience in both private practice and local authorities. Jimmy holds a Bachelor of Arts Degree (BA) in both Human and Physical Geography from the National University of Ireland, Galway as well as a Masters in Regional and Urban Planning (MRUP) from University College Dublin. Prior to taking up his position with McCarthy Keville O'Sullivan in 2004, Jimmy worked as an Assistant Planner, Executive Planner and Senior Executive Planner in Galway County Council and as an Assistant Planner in Donegal County Council. Jimmy is primarily involved in co-ordinating and preparing Environmental Impact Assessment Reports, leading significant and complex development proposals through the planning process (from feasibility, through application, appeals and judicial processes) and has a strong ability to work with many other disciplines and individuals, as well as with Council officials, elected members and members of the public. Jimmy also manages a planning team within MKO in order to ensure timely delivery of project outputs. Jimmy has significant experience in dealing with Strategic Infrastructure Development proposals, Environmental Impact Assessment Reports, Environmental Impact Assessment, Renewable Energy, Electrical Infrastructure proposals, as well as the full range of Commercial, Retail, Residential and Industrial developments. Jimmy is a corporate member of the Irish Planning Institute.

Eoin O'Sullivan M.Sc., B.Sc., CWEM; CEnv

Eoin O'Sullivan is a Senior Environmental Consultant with McCarthy Keville O'Sullivan Ltd. with over 10 years of experience in the assessment of a wide range of energy and infrastructure related projects and working in the fields of environmental and human health risk assessment, waste management, waste policy and permitting. Eoin holds a BSc (Hons) in Environmental Science & Technology and a MSc in Environmental Engineering. Prior to taking up his position with McCarthy Keville O'Sullivan in July 2017, Eoin worked as a Chartered Senior Engineer with CGL in Surrey, UK. Prior to this Eoin worked as a Project Engineer with RPS Consulting Engineers in Belfast. Eoin has wide experience in the project management of large scale infrastructural projects and brownfield developments and has routinely undertaken detailed quantitative risk assessment for the protection of controlled waters and ground gas risk assessments. Eoin has also experience in completing PPC Permit Applications and in the preparation of Environmental Impact Statements/Environmental Impact Assessment Reports for renewable energy projects, quarries and a number of non-hazardous landfill sites and anaerobic digesters for both public and private clients. Other key strengths and areas of expertise include remediation options appraisals, remediation method assessments and waste management planning. Eoin is a Chartered Member of the Chartered Institute of Water and Environmental Management and Chartered Environmentalist with the Society of Environment.

Meabhann Crowe BA (Hons), M.Sc.

Meabhann Crowe is a Project Planner with McCarthy O'Sullivan Ltd with over 10 years private sector experience. She is a fully chartered member of the Royal Town Planning Institute (MRTPI). Meabhann holds a BA (Hons) in Geography, Sociological and Political Science and a Masters in Urban and Regional Planning. Prior to taking up her position with McCarthy Keville O'Sullivan in October 2018, Meabhann was employed as an Associate Director with Colliers International in their Edinburgh office, prior to which she was employed for several years with Halliday Fraser Munro. In her time in the industry Meabhann has been active on a number of instructions across a broad spectrum of mixed-use, residential, commercial, renewable energy and retail projects.

Meabhann brings particular expertise in initial development feasibility appraisals and development strategies. Her experience in managing large multi-disciplinary teams in the preparation of local and major planning applications across residential and mixed-use and retail developments means she has a wealth of knowledge to draw on in the early stages of development. She has particular experience in preparing and managing site strategies which include both responding to emerging planning policy whilst also preparing and progressing planning applications and appeals.

Paul Sweeney BA. M.Sc.

Paul Sweeney is a Graduate Planner with MKO 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 MKO, 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.

Pat Roberts B.Sc. (Env.)

Pat Roberts is a Senior Ecologist and director of the Ecology team with McCarthy Keville O'Sullivan Ltd. with over 12 years post graduate experience of providing ecological services in relation to a wide range of developments at the planning, construction and monitoring stages. Pat holds B.Sc.(Hons) in Environmental Science. Pat has extensive experience of providing ecological consultancy on large scale industrial and civil engineering projects. He is highly experienced in the completion of ecological baseline surveys and impact assessment at the planning stage. He has worked closely with construction personnel at the set-up stage of numerous construction sites to implement and monitor any prescribed best practice measures. He has designed numerous Environmental Operating Plans and prepared many environmental method statements in close conjunction with project teams and contractors. He has worked extensively on the identification, control and management of invasive species on numerous construction sites. Prior to taking up his position with MKO in June 2005, Pat worked in Ireland, USA and UK as a Tree Surgeon and as a nature conservation warden with the National Trust (UK) and the US National Park Service. Pats key strengths include his depth of knowledge and experience of a wide range of ecological and biodiversity topics and also in his ability to understand the requirements of the client in a wide range of situations. He currently manages the ecological team within MKO and and ensures that the outputs from that team are of a very high standard and meet the requirements of the clients and relevant legislation and guidelines. He is a full member of the Chartered Institute of Ecologists and Environmental Managers (CIEEM),

John Hynes M.Sc. (Ecology), B.Sc.

John Hynes is a Senior Ecologist with McCarthy Keville O'Sullivan Ltd. with over 5 years of experience in both private practice and local authorities. John holds a B.SC in Environmental Science and a M.Sc. in Applied Ecology. Prior to taking up his position with MKO in March 2014, John worked as an Ecologist with Ryan Hanley Consulting Ltd. and Galway County Council. John has specialist knowledge in Flora and Fauna field surveys. Geographic Information Systems, data analysis, Appropriate Assessment, Ecological Impact Assessment and Environmental Impact Assessment. John's key strengths and areas of expertise are in project management. GIS and impact assessment. Since joining MKO John has been involved as a Senior Ecologist on a significant range of energy infrastructure, commercial, national roads and private/public development projects. Within MKO John plays a large role in the management and confidence building of junior members of staff and works as

part of a large multi-disciplinary team to produce EIAR Reports. John has project managed a range of strategy and development projects across Ireland and holds CIEEM membership.

Una Nealon PhD, B.Sc.

Úna Nealon is a Project Ecologist with McCarthy Keville O'Sullivan Ltd. with over 8 years of experience in consultancy, research and conservation management. After gaining a first class honours degree in Environmental Science at NUIG, Úna worked as an Environmental Consultant for OES Consulting where she gained experience in multidisciplinary ecological surveys and impact assessment. In addition, she has held research roles in Tanzania and Madagascar, studying local flora and fauna, and developing conservation management plans. Before joining MKO in June 2016, she completed her PhD with the Centre for Irish Bat Research, examining the impacts of wind farms on Irish bat species. Úna's primary expertise lies in bat ecology, particularly in relation to wind farm EIA. Beyond this, she is a skilled general ecologist, with experience in flora identification, habitat classification, GIS mapping, mammal surveys, Ecological Impact Assessment and Appropriate Assessment. Since joining MKO, Úna has been responsible for managing bat survey requirements for a variety of wind and solar energy planning applications, as well as other commercial, residential and infrastructure projects. This includes scope development, roost assessments, acoustic surveying, sonogram analyses, impact assessment and report writing. Within MKO, she works as part of a multi-disciplinary team to quickly identify potential ecological constraints and to produce EIA Reports, Appropriate Assessment Screening Reports and Natura Impact Statements. Úna is a member of the Irish Ecological Association, Bat Conservation Ireland and is Secretary of Galway Bat Group.

Aoife Joyce M.Sc. (Agribioscience), B.Sc

Aoife Joyce is a Graduate Ecologist with MKO Planning and Environmental Consultants with experience in research, consultancy and drilling contractors. Aoife is a graduate of Environmental Science (Hons.) at NUIGalway, complemented by a first class honours MSc in Agribioscience. Prior to taking up her position with MKO in May, 2019, Aoife worked as an Environmental Scientist with Irish Drilling Ltd. and held previous posts with Inland Fisheries Ireland and Treemetrics Ltd. She has a wide range of experience from bat roost identification, acoustic sampling, sound analysis, soil and water sampling, Waste Acceptability Criteria testing, electrofishing, mammal and habitat surveying to GIS, Environmental Impact Assessments (EIAs) and mapping techniques. Since joining MKO, Aoife has been involved in managing bat survey requirements for a variety of wind farm planning applications, as well as commercial, residential and infrastructure projects. This includes scope, roost assessments, deploying static bat detectors and weather stations nationwide, dawn and dusk bat detection surveys, acoustic analysis, mapping, impact assessment and report writing. Within MKO, she works as part of a multidisciplinary team to help in the production of ecological reports and assessments. Aoife is a member of Bat Conservation Ireland and CIEEM and holds a current Bat Roost Disturbance licence.

Sarah Mullen PhD, M.Sc, B.Sc

Sarah Mullen is an Ecologist with McCarthy Keville O'Sullivan Ltd. with 3 years of experience in consultancy. Sarah holds a B.Sc. (Hons) in Botany, an M.Sc. in Biodiversity and Conservation and a Ph.D. in Botany, in which she investigated the role of biodiversity in the functioning of plant-pollinator interactions in semi-natural grassland habitats. Prior to taking up her position with McCarthy Keville O'Sullivan in September 2018, Sarah worked as an Ecologist with Ryan Hanley Ltd. where she gained experience in multidisciplinary ecological surveys, ecological impact assessment and appropriate assessment. Sarah also has experience working with Indigo Development and Change, a conservation focused NGO in South Africa and with the German branch of the Global Biodiversity Information Facility (GBIF) in the Museum für Naturkunde in Berlin. Sarah's key strengths and areas of expertise are in terrestrial flora and fauna ecology, including vegetation surveys, habitat mapping, invasive species surveys, mammal surveys, Appropriate Assessment and Ecological Impact Assessment. Since joining MKO Sarah has been involved as an ecologist on various energy infrastructure, commercial and water services projects. Within MKO Sarah plays a large role in preparing Ecological Impact Assessment reports and Stage 1 and Stage 2 Appropriate Assessment reports. Sarah holds membership with the Chartered Institute of Ecology and Environmental Management.

Dervla O'Dowd B.Sc. (Env.)

Dervla O'Dowd is a Senior Ecologist and Project Manager with McCarthy Keville O'Sullivan Ltd. with twelve years of experience in environmental consultancy. Dervla graduated with a first class honours B.Sc. in Environmental Science from NUI, Galway in 2005 and joined Keville O'Sullivan Associates in the same year. Dervla has gained extensive experience in the project management and ecological assessment of the impacts of various infrastructural projects including wind energy projects, water supply schemes, road schemes and housing developments nationwide and has also been involved in the compilation of Environmental Impact Statements, with emphasis on sections such as Flora & Fauna, and acted as EIS co-ordinator on many of these projects. Dervla has also provided site supervision for infrastructural works within designated conservations areas, in particular within aquatic habitats, and has also been involved in the development of environmental/ecological educational resource materials and major ecological surveys of inland waterways. Currently, Dervla is responsible for coordinating ecological work, in particular ornithological surveys required on major infrastructural projects, with emphasis on wind energy projects. Dervla's key strengths and areas of expertise are in project management, project strategy, business development and survey co-ordination to ensure the efficient operation of the Ornithology team's field survey schedule. Dervla holds full membership of the Chartered Institute of Ecology and Environmental Management and current Safe Pass card.

Padraig Cregg M.Sc., B.Sc.

Padraig Cregg is a Senior Ornithologist with McCarthy Keville O'Sullivan Ltd. with over 7 years of experience in both private practice and NGOs. Padraig holds a BSc (Hons) in Zoology and Masters in Evolutionary and Behavioural Ecology. Prior to taking up his position with McCarthy Keville O'Sullivan in December 2018, Padraig worked as a Senior Ornithologist and held previous posts with TOBIN Consulting Engineers, Energised Environments Ltd in Scotland, WSP Environment and Energy Ltd in Scotland and BirdWatch Ireland. Padraig has specialist knowledge in designing, executing and project managing ornithological assessments, primarily in the renewable industry. Padraig's key strengths and areas of expertise are in ornithology and ecology surveying and in writing Natura Impact Statements (NIS) and the Biodiversity chapter of Environmental Impact Assessment Reports (EIAR) to accompany planning applications. Since joining MKO Padraig has been involved in designing, executing and project managing the ornithological assessment on over 20 proposed wind farm developments. He has played a key role in project managing these planning applications through the statutory planning system, with more projects in the pipeline. Within MKO Padraig plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIAR and NIS Reports.

Ciaran McKenna BA (Hons)

Ciarán is a Field Ornithologist with McCarthy O'Sullivan Ltd. with over 3 years of experience in ecology consultancy. Ciarán holds BA (Hons) in Wildlife Biology. Prior to taking up his position with McCarthy Keville O'Sullivan in March 2018, Ciarán worked as a graduate ecologist with Malachy Walsh and Partners, and was a freelance ecology consultant. Ciarán has knowledge of an array of ecological survey techniques including; mammal, bat, bird, and habitat. Ciarán's key strengths are in the area of ornithological surveys and he has training and experience for rough upland terrain.

David Naughton B.Sc. (Env.)

David Naughton is an Ecologist with two years of professional experience, working within the Ornithology Department for MKO. David graduated with an honours B.Sc. degree in Environmental Science from NUIG in 2016. David has a wide range of ecological experience including bird surveys, vegetation surveys, terrestrial invertebrate surveys, freshwater invertebrate surveys, river surveys for salmonids and other fish species, small mammal surveys and habitat identification. David is also very accomplished in GIS software systems for use in interpreting ecological data. David has experience in report writing and has been involved the production of several EIS/EIARs for various windfarm projects as well as numerous interim bird survey reports issued to clients on an ongoing basis. David has also been responsible for the production of collision risk modelling for bird activities at several windfarm sites over the past year, many of which have been peer reviewed by experts in CRM and were found to be appropriate. David's key strengths and areas of expertise are applications of GIS

systems, including viewshed analysis and collision risk modelling, project management, survey planning and analysing & interpreting large scale datasets. Since joining MKO David has been involved in a wide range of various projects, acting as project manager for many bird survey projects while providing a pivotal contact link between clients and field surveyors.

Owen Cahill B.Sc., M.Sc.

Owen is an Environmental Engineer with McCarthy Keville O'Sullivan Ltd. with over 10 years of experience in the environmental management and construction industries. Owen holds BSc. (Hons) and MSc. in Construction Management and a Masters in Environmental Engineering. Prior to taking up his position with MKO in October 2013, Owen worked as an Environmental Officer with Kepak and prior to which he held a post with Pentland Macdonald Contaminated Land & Water Specialist in Northern Ireland. Prior to working in planning and environmental consultancy, Owen was employed within the construction industry where he gained significant experience on a variety of civil, residential and commercial projects. Owen's wide ranging multi sector experience has provided him with specialist knowledge and understanding of the challenges in the planning and delivery of developments with the minimum environmental impact and with practicality and constructability in mind. Owen's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy & solar energy construction & environmental management planning and waste permit management. Since joining MKO Owen has been involved as a Project Manager on a range of energy infrastructure, commercial, residential, waste facility and quarry projects as well as managing the licensing requirements of a number of EPA licensed facilities. Within MKO Owen plays a large role in the management and confidence building of junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports. Owen has project managed the Environmental Impact Assessment of a range of development projects across the Ireland and holds Affiliate Membership with the Institute of Environmental Management & Assessment and is currently awaiting interview and assessment to become a Full Member and Chartered Environmentalist.

John Staunton PhD, B.Sc.

John Staunton is a Project Environmental Scientist with McCarthy Keville O'Sullivan Ltd. with over 10 years of postgraduate experience in both research and private consultancy. John holds both a BSc (1st class Hons) and a PhD in Environmental Science. Prior to taking up his position with McCarthy Keville O'Sullivan in October 2014, John worked as a research assistant for several soil and hydrogeological contamination research projects being undertaken by the Earth and Ocean Sciences department in NUI Galway. John also carried out research as part of a PhD, is lead author on four international peer-reviewed scientific papers, and presented at numerous national and international conferences. John's key strengths and areas of expertise are in project management, report writing, map making, communication and impact assessments. Since joining MKO, John has been involved as a Project Environmental Scientist on a significant range of energy infrastructure projects, hydrological and ecological monitoring, report writing of Environmental Reports (ER), Environmental Impact Statements/Environmental Impact Assessment Reports (EIS/EIAR) & Strategic Environmental Assessments (SEA) and carrying out research/literature reviews. This is in addition to project managing multiple jobs ranging from small projects to multi-million euro energy developments. Within MKO John works as part of a large multi-disciplinary team to produce EIS/EIAR, ER and SEA documents.

Stephen Corrigan B.Sc.

Stephen Corrigan is an Environmental Scientist with McCarthy Keville O'Sullivan Ltd. with over 2 years of experience in private and public sector positions. Stephen holds a B.SC in Environmental Science. Stephen has specialist knowledge in environmental field surveys, database management, geographic information systems and data analysis. Stephen's key strengths and areas of expertise are in data management and GIS. Since joining MKO Stephen has been involved as an Assistant Environmental scientist on a significant range of energy infrastructure and private/public development projects, hydrological and ecological monitoring projects. Within MKO Stephen has a role in site construction monitoring, report writing and database management. Stephen works as part of a large multi-disciplinary team to produce EIA Reports, operational compliance reports and monitoring reports for MKO.

Patrick Hehir B.Sc. (Hons), M.Sc.

Patrick Hehir is an Environmental Scientist with McCarthy Keville O'Sullivan Ltd. with over 10 years of experience in private practice. Patrick holds BSc (Hons) in Construction Management and Masters in Environmental Science. Prior to taking up his position with McCarthy Keville O'Sullivan in January 2016, Patrick worked as a Quality Manager and Environmental Coordinator with BAM Ireland Ltd. and held previous posts with Allnorth Consultants in Canada, the M3 Motorway JV, Stanger Testing Ireland, the M4 Motorway JV and Coffey Construction Ltd. Patrick has specialist knowledge in day-to-day monitoring, oversight, auditing and reporting of the implementation of all planning and environmental requirements for on-site wind farm developments. Patrick's key strengths and areas of expertise are in project management, hydrology, waste management, environmental auditing, site and construction supervision, water quality monitoring and renewable energies. Since joining MKO Patrick has been involved as a Site Environmental Officer (SEO)/Planning Compliance Officer (PCO) on a large energy infrastructure project with a projected output of circa 85MW of wind energy, pre-planning compliance of new wind energy infrastructure projects and project management of industrial EPA compliance projects. Within MKO Patrick plays a large role in the management and confidence building of junior members of staff through his experience gained on large infrastructural projects both in Ireland and internationally.

Joanna Mole BSc PGDipLA MSc CMLI

Joanna Mole is a Landscape and Visual Impact Assessment Specialist and Chartered Landscape Architect with McCarthy O'Sullivan Ltd. with over 15 years of experience in both private practice and local authorities. Joanna holds a BSc (Hons) in Landscape Design & Plant Science from Sheffield University, a Postgraduate Diploma in Landscape Architecture from Leeds Beckett University, and a MSc in Renewable Energy Systems Technology from Loughborough University. Prior to taking up her position with MKO in October 2017, Joanna worked as a Landscape Architect with Kav-Banof in Israel and held previous posts with CSR in Cork, LMK in Limerick, Geo Architects in Israel and Groundwork Bridgend in South Wales. Joanna is a Chartered Landscape Architect with specialist knowledge in Landscape and Visual Impact assessments for projects ranging from individual houses to large windfarms, cycle route design and landscape contract management. Since joining MKO Joanna has been involved in projects such as energy infrastructure, extraction industry and residential projects. Joanna holds chartered membership of the British Landscape Institute since 1998 and has been an examiner for British Landscape Institute professional practice exam.

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 wind 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.

Joseph O'Brien

Joseph O'Brien holds the position of CAD Technician. Joseph holds a BA Honours Level 8 Modelmaking, Design and Digital Effect, Institute of Art Design and Technology (IADT), Dun Laoghaire & City & Guilds Level 3 2D &3D AutoCAD certificates. Joseph's role entails various wind and solar farm projects which require various skills such as mapping, aerial registration and detailed design drawings for projects. Prior to joining us, Joseph worked as a free-lance Modelmaker and CAD Technician. His previous experience included designing various models and props through CAD and then making them for various conventions such as Dublin Comic Con and Arcade Con.

1.8.2.2 Hydro Environmental Services Ltd

Michael Gill

Michael Gill is an Environmental Engineer with over ten years' environmental consultancy experience in Ireland. Michael holds an honours degree in Civil and Environmental Engineering from Trinity College Dublin (TCD), as well as a research M.Sc. in Wetland Hydrology also from TCD. Michael also

holds a diploma in Geology from University College Cork and a second M.Sc. in Applied Hydrogeology, from Newcastle University. Michael is a member of International Association of Hydrogeologists (IAH) and was a member of the conference sub-committee from 2003 until 2009. He is also a Member of Engineers Ireland (MIEI), a Member of the Chartered Institute of Water and Environmental Management (CIWEM) and a professional member of the Institute of Geologists (IGI). Michael has completed numerous hydrological and hydrogeological impact assessments of wind 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. David holds a B.Sc. in Environmental Science, University of Wales, Aberystwyth (2001), as well as a H. Dip. Environmental Engineering, Trinity College Dublin (2004). David also completed a M.Sc. in Hydrogeology at University of Leeds (2006). David is a member of International Association of Hydrogeologists (IAH). 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 and wind farms. David has completed numerous geology and water sections for input into EIARs for a range of commercial developments.

1.8.2.3 Fehily Timoney

The geotechnical aspects of the report, which are incorporated into the Geology & Soils and Water sections of the EIAR, have been completed by Fehily Timoney. Fehily Timoney has extensive experience in the production of Peat Stability Assessments for wind energy developments. Fehily Timoney provides specialist geotechnical engineering and engineering geology advice to local authorities, contractors and consultants, particularly for infrastructure projects forming part of the National Development Plan and also for private commercial and residential developments as they move on to sites with more complex ground conditions.

Gerry Kane

Gerry Kane joined Fehily Timoney (formerly AGEC) as a Geotechnical Engineer in 2008. Gerry graduated from IT Carlow in 2008 with a BEng (Hons) degree in Civil Engineering. Gerry is a Geotechnical Engineer with over seven years' experience in geotechnical design and analysis, supervision and interpretation of ground investigations, foundation & earthwork design, supervision of construction of bulk earthworks and structure foundations, slope stability analysis, desk studies and walkover surveys. Previous and current experience in the wind energy field has included work for wind farm developments in Ireland, Northern Ireland, Scotland, Wales and England. This work has covered Peat Stability Assessment Reports, Soils and Geology Chapters of EIAR's, site assessments for wind farm developments and the investigation of peat failures at wind farm sites.

Ian Higgins

Ian holds a BSc in Engineering Geology from the University of Sunderland and an MSc in Geotechnical Engineering from Heriot-Watt University in Edinburgh. Ian is a Member of the Institute of Engineers of Ireland and a Fellow of the Geological Society of London. Ian is a geotechnical engineer with over 18 years' experience in the design and supervision of construction of bulk earthworks, geotechnical foundation design, geotechnical monitoring and reviewing, reinforced earth design and 3rd party checking of piling and ground improvement designs. Ian's experience also includes the design, supervision and interpretation of ground investigations, including desk studies, walkover surveys, hazard mapping of rock excavations and slopes.

Ian has experience in many areas of civil engineering including highways, railways, energy projects and commercial developments. Ian's responsibilities include managing junior engineers, reviewing work

carried out for ground investigation, reporting and design. Ian has also experience in using a number of geotechnical software packages including slope stability, finite element, pile design and retaining wall design.

1.8.2.4 AWN Consulting Ltd

Damian Kelly – Director (Acoustics)

Damian Kelly (Director (Acoustics)) holds a BSc from DCU and an MSc from QUB. He has extensive experience as an acoustic consultant working in the field since 1997 and is a member of the Institute of Acoustics. He is currently a sitting member of the Irish committee of this organisation. He has extensive knowledge in the field of noise modelling and prediction having developed many of the largest and most complex examples of proprietary noise models prepared in Ireland to date. Damian has prepared an extensive number of wind farm noise impact assessments throughout the country.

Dermot Blunnie - Senior Acoustic Consultant

Dermot Blunnie (Senior Acoustic Consultant) holds a BEng in Sound Engineering, MSc in Applied Acoustics and has completed the Institute of Acoustics (IOA) Diploma in Acoustics and Noise Control. He has been working in the field of acoustics since 2008 and is a member of the Institute of Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA). He has extensive knowledge of all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, energy, industrial, commercial and residential. Dermot specialises in wind farm noise modelling, compliance and complaint investigations.

Mike Simms - Senior Acoustic Consultant

Mike Simms (Senior Acoustic Consultant) holds a Bachelor of Mechanical Engineering and Master of Engineering Science from University College Dublin he also holds a Diploma in Acoustics and Noise Control from the University of Ulster at Jordanstown. He has 16 years' experience in the field of environmental acoustics, in particular using computer-based noise modelling for environmental noise assessments.

1.8.2.5 Dominic Delaney & Associates

Dominic Delaney BA, MIAI

Dominic Delany graduated from University College Galway in 1986 with a BA (honours) degree in archaeology and history. He is licensed by the state to carry out archaeological excavations in Ireland since 1989 and has over 25 years of experience in the provision of archaeology and cultural heritage services to public and private sector clients. Dominic Delany & Associates was established in 2002 and the company has demonstrated its ability to provide archaeological mitigation to developments through management and co-ordination of projects from pre-planning assessment stage to archaeological resolution of sites. Dominic has accumulated a wealth of experience on all aspects of Irish archaeology. He has vast experience in archaeological excavation and has directed some of the most important excavations in Galway City such as the Red Earl's Hall, a 13th century Anglo-Norman building in the city centre and Bollingbrook Fort, a Cromwellian siege fort on the eastern approach to the city. He has project managed numerous large scale archaeological projects most notably the Broadband Projects or Metropolitan Area Networks (MAN's) for over 30 towns in Ireland, the towns and villages sewerage schemes for counties Leitrim and Wexford, and the gas feeder and distribution networks for a number of towns in the West of Ireland. Dominic has over 15 years of experience in the compilation of archaeology and cultural heritage chapters for Environmental Impact Assessment Reports with projects ranging from residential, commercial and industrial developments to strategic infrastructure projects such as pipelines and wind farms.

1.8.2.6 Alan Lipscombe Traffic and Transport Consultants

Alan Lipscombe

Alan holds a BEng (Hons) in Transportation Engineering from Napier University and is a Member of the Chartered Institute of Highways and Transportation and a member of the Institute of Engineers, Ireland. 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, including for numerous wind farm developments, and is an accomplished analyst who has experience of a wide variety of modelling packages and methods.

1.9 Difficulties Encountered

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

1.10 Viewing and Purchasing of the EIAR

Copies of this EIAR will be available online, including the Non-Technical Summary (NTS), on the Planning Section of the Clare County Council website, https://www.clarecoco.ie/services/planning/planning-applications/, under the relevant Planning Reference Number (to be assigned on lodgement of the application).

This EIAR and all associated documentation will also be available for viewing at the offices of Clare County Council. The EIAR may be inspected free of charge or purchased by any member of the public during normal office hours at the following address:

Clare County Council
Áras Contae an Chláir
New Road
Ennis
Co. Clare
V95 DXP2

The EIAR will also be available to view online via the Department of Planning, Housing and Local Government's EIA Portal, which will provide a link to the planning authority's website on which the application details are contained. This EIA Portal was recently set up by the Department as an electronic notification to the public of requests for development consent which are accompanied by an EIAR.

(https://www.housing.gov.ie/planning/environmental-assessment/environmental-impact-assessment-eia/eia-portal).