

Clare County Development Plan 2017–2023 Volume

Clare Renewable Energy Strategy 2017-2023



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Executive Summary

The Clare Renewable Energy Strategy 2017-2023 outlines the renewable energy resource that is deliverable in County Clare. Its vision, consistent with that of the Clare County Development Plan 2017-2023, is to position the County as the national leader in renewable energy generation, supporting energy efficiency and conservation, with an accessible modern telecommunications infrastructure, achieving balanced social and economic development and assisting Ireland's Green Energy target.

The table below sets out the renewable energy resource targets for County Clare by 2023. It indicates that a sustainable balance of renewable energy resources is planned, ensuring that there is no over reliance or over concentration on any single technology. Details of the technologies are contained in the chapters listed.

Table: Renewable Energy Resource Targetsfor County Clare for 2023

Chapter	Renewable Energy Resource Accessible - Planned	GWh/y	MW
Thermal			
6	Forest wood fuel & Wood Process by-product	128.3	29.3
6	Energy Crop (SRC-Miscanthus)	175.0	39.9
7	Geothermal	34.0	15.0
6,7	Micro-Thermal	175.7	92.8
Sub Tota	I	513.0	177.0
AD-CHP*	thermal		
12	AD - Grass Silage	20.1	2.5
12	AD - Animal wastes	15.8	2.0
12	Municipal Organic MSW	25.1	3.2
6	Micro CHP	2.0	0.5
6,13	Biomass CHP	460.0	58.3
Sub Tota	I	523.0	66.6
Electric			
9	Onshore wind	1,590.0	550.0
10	Offshore wind	27.3	10.0
11	Hydro	468.0	89.0
10	Wave	59.1	20.4
10	Tidal	66.1	20.0
5	Micro Gen - elec	7.2	2.1
5,6,13	CHP electric	261.5	29.2
Sub Tota	I	2,479.2	720.8
15	Transport	14.0	2.0
Overall 1	fotal Renewable Target	3,529.2	966.4

Note: Targets are not caps and are not intended to limit the potential for creation of renewable energy. Targets may be carried forward into subsequent renewable energy strategies if they have not been met within the life time of this strategy. It is not a requirement that targets for particular renewable energy technologies will be met by a single project. This Strategy outlines the potential for a range of renewable resources, including bioenergy and anaerobic digestion, micro renewables, geothermal, solar, hydro, energy storage, onshore and offshore wind, wave and tidal energy. It acknowledges the significant contribution they can make to County Clare being more energy secure, less reliant on traditional fossil fuels, enabling future energy export and meeting assigned targets.

The targets above do not include energy storage technologies in keeping with the methodology set out in the National Renewable Energy Action Plan.

The Clare Renewable Energy Strategy also recognises the importance of the excellent infrastructure in County Clare including road, electricity, gas and broadband network, airport, ports and the Shannon Estuary, both in supporting the development of renewables and enabling a competitive supply chain economy.

The targets above are supported by a suite of objectives which seek to give certainty to potential investors and developers of renewable energy in the County. Underlying the Renewable Energy Strategy is the need to increase energy efficiency and conservation and to promote the development of micro renewable technologies. An aim of the Renewable Energy Strategy is to raise awareness of micro technologies and their advantages, together with the benefits of being more energy efficient. This Strategy recognises the importance of not only generating and supplying energy in the County by renewable means, but balancing this with more energy efficient practices.

Some of the key objectives set out in this Strategy include the following:

 To maximise use in the County, of the available bioenergy resource to exceed national targets for renewable heat of 12% and 10% by 2020;

- To favourably consider the redevelopment of brown field sites in predominantly industrial / commercial areas for large solar PV projects subject to normal planning considerations such as impact on landscape, urban design, biodiversity, ecological impact, aviation, access to grid, security fencing, decommissioning issues and impact on residential amenity;
- To work in partnership with the marine renewable energy sector (wave, tidal and offshore), DECNR, EirGrid and other relevant stakeholders to deliver the key actions recommended by the Ocean Renewable Energy Development Plan (OREDP) and Grid 25, ensuring that electricity generated off the coast of County Clare can be exported to the demand market subject to the requirements of all environmental legislation;
- To facilitate the development of small scale hydro power developments at the locations identified in section 11.5 and at other locations on a case by case basis;
- To facilitate the development of Pumped Freshwater Hydroelectric Energy Storage in the indicative area identified on Map 14.1;
- To collaborate with EirGrid over the lifetime of the Strategy to ensure that County Clare has the grid infrastructure in place to maximise its potential for renewable energy generation to meet its own energy needs and to enable export to the demand market;
- To support and facilitate the emergence of a competitive supply chain economy that will sustain and assist in further developing a robust renewable energy sector in County Clare;
- To require all planning applications for new buildings to demonstrate how their designs have incorporated energy efficiency or passive measures, as a means of reducing future reliance on traditional fuel sources;
- To require all planning applications for new buildings in the residential, industrial, commercial and agricultural sectors throughout County Clare to identify how the energy needs of the proposed development can be addressed with indigenous renewable energy resources and technologies, as an important element in establishing a low carbon County and assisting in meeting committed county, regional and national renewable energy targets.

Chapter 1

Introduction and Vision



1.0 Introduction

As the world population increases, so too does the demand for energy. It is therefore of critical importance that future energy demands are facilitated through an efficient and secure energy supply. The renewable energy sector must be as efficient, cost effective and as reliable as traditional fossil fuel sources if it is to succeed as a viable alternative to fossil fuels.

Renewable energy is defined as energy developed from sources that are constantly replenished through cycles of nature and, unlike fossil fuels, are not finite. There are an abundance of renewable energy sources in Clare:

- Wind;
- Sun (solar energy);
- Moving water (hydropower, wave and tidal);
- Heat below the surface of the earth (geothermal energy);
- Biomass (wood, waste, energy crops).

Clare County Council wants to ensure that County Clare has the necessary land use and strategy framework in place to maximise its significant renewable energy resource, to provide a degree of certainty to future investors and local communities and to inform and guide the planning process for future renewable energy development. The delivery of this Strategy will be dependent on County Clare building on its existing high quality energy infrastructure. The vision of this Renewable Energy Strategy in line with one of the Clare County Development Plan's key goals is:

VISION

A County Clare that is the national leader in renewable energy generation which supports energy efficiency and conservation and which achieves balanced social and economic development throughout the County and assists in achieving Ireland's Green Energy target.

1.1 Strategic Aims of the Renewable Energy Strategy

The strategic aims of this Strategy are:

- To support the attainment of and to exceed in County Clare, where possible, the National targets and commitments to renewable energy;
- b To identify/highlight the opportunities for various renewable energy technologies and resources and identify broad areas suitable for their development in full compliance with the requirements of all environmental legislation including the requirements of the Strategic Environmental Assessment Directive, Habitats Directive and Water Framework Directive;
- C To provide an evidence-based strategy founded on understanding the local feasibility and potential for renewable and low carbon technology, predicated upon optimising the County's natural and socio economic, advantages and key assets, core skills, and nearby research institutes;
- d To maximise the opportunities for renewable energy development whilst safeguarding the environment and existing residential amenities;
- e To safeguard, where appropriate, areas with potential for renewable energy projects and to guide renewable energy development to preferred locations;
- f To set out policies and objectives for the main renewable sectors subject to Strategic Environmental Assessment (SEA) and Habitats Directive Assessment (HDA) requirements;
- **g** To provide guidance on energy efficiency and conservation;
- **h** To provide a clear development management framework.

1.2 Why a Renewable Energy Strategy?

As the technology for generating renewable energy continues to develop rapidly, so to does the need for clear planning policy and objectives that are sufficiently robust and flexible for planners to respond to continuing development challenges, to ensure appropriate and sustainable development and to give a greater level of certainty to investors / developers in renewable energy technology.

It is acknowledged that Clare has the natural resources needed to maximise energy generation by renewable means. Its geographical location on the Shannon Estuary and its Atlantic coastline, coupled with a strong wind resource, undulating topography and a significant grid network, present opportunities for both on-shore and off-shore wind, wave and tidal energy, and pumped freshwater hydro energy storage. County Clare is also ideally placed to maximise the potential of bio-energy - a strong woodland resource combined with significant heat demand centres at Ennis, Shannon and Kilrush, provide a viable opportunity for combined heat and power technology in particular.

This Renewable Energy Strategy provides the necessary framework to maximise the County's renewable energy potential and to assist it in becoming an energy secure, low carbon county, to meet renewable energy targets, with the potential to export excess energy. This Renewable Energy Strategy aims to ensure that County Clare is a exemplar in promoting and facilitating renewable energy generation.

1.2.1 Scope of the Strategy

This Renewable Energy Strategy sets out clear objectives and targets for the above technologies and provide a development management framework that enables County Clare to position itself as a front runner in facilitating appropriately located and sustainable renewable energy technology. The Strategy sets out the Council's objectives until 2023, a key date for Ireland to meet assigned national and European targets for renewable energy generation.

This Strategy provides a valuable tool for future investors by setting out clear Council policy in relation to renewable energy generation in County Clare – type, location, parameters, key planning issues etc. – and provides a comprehensive suite of data relating to the County's natural resources, including off-shore wind, geothermal, solar, tidal etc. The Strategy also informs and assists the development management process in the assessment of renewable energy proposals.

The Clare Wind Energy Strategy forms part of the Clare County Development Plan 2017-2023. Chapter 9 provides a summary of its key objectives, which are referenced for the purposes of completeness and are stated as fact in so far as they have already been adopted.

1.3 Context - Legislation and Policy

The context for the Renewable Energy Strategy is set in a hierarchy of International, European and National legislation and policy which has informed the preparation of this Strategy. The following list is not exhaustive, but the main legislation and publications informing this strategy are set out below. Additional legislative context is set out in the Appendix in relation to the individual technologies discussed in this Strategy.

1.3.1 International Context Kyoto Protocol

On a global scale there is rapid change in energy markets and energy supply which will present us with both opportunities and challenges. The driving force for this change derives from the requirement to reduce our dependence on fossil fuels and concurrently address climate change. Against this background the Kyoto Protocol was drawn up. The Kyoto Protocol 2012 is an international agreement which sets legally binding targets for industrialised countries to reduce green house gas emissions.

1.3.2 European Context

EU Directive 2009/28/EC - on the promotion of the use of energy from renewable sources

This Directive establishes that 20% of EU energy consumption will come from renewable sources by 2020. Under the terms of the Directive each member state is set a renewable energy target which will contribute to the achievement of this overall EU goal. Ireland must achieve 16% renewable energy penetration by 2020. It also requires each member state to adopt a National Renewable Energy Action Plan according to a standardised template. *EU Directive 2012/27/EU on energy efficiency* – amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.

The Energy Efficiency Directive includes indicative energy saving target for Member States, obligations on national public authorities as regards energy savings and energy efficient procurement and measures to promote energy efficiency and energy services.

EU Directive 2010/31/ EU- Energy Performance of Buildings

The building sector represents 40% of the EU's total energy consumption; therefore reducing energy consumption in this area has been highlighted as a priority. This Directive contributes to achieving this aim by proposing guiding principles for Member States regarding the energy performance of buildings. Member States are obliged to adopt a methodology for calculating the energy performance of buildings, to implement a system for energy performance certification and to set minimum requirements for energy performance of existing and new buildings. An objective has been set that all new buildings shall be nearly zero energy consumption buildings by December 2020. New buildings occupied and owned by public authorities shall comply by 2018.

EU 20-20-20 Agreement

The EU Climate and Energy Package is a set of legislation which aims to ensure the EU meets its ambitious climate and energy targets for 2020. The 20-20-20 targets are:

- 20% greenhouse gas reduction from 1990 levels;
- Raising share of EU energy consumption from renewables to 20%;
- A 20% increase in EU energy efficiency.

Strategic Environmental Assessment Directive (2001/42/EC)

While the development of renewable energy can have social and economic benefits, it must be developed in an environmentally sustainable way. A Strategic Environmental Assessment of the likely significant effects of implementing the Clare Renewable Energy Strategy has been undertaken as part of the preparation of this Strategy. This has established the potential future impact on various environmental parameters including inter alia: biodiversity, population and human health, soil, water, air factors, material assets, heritage, archaeology and landscape and has outlined mitigation measures to be integrated into the Strategy in relation to any potential impacts. The SEA process provides for the monitoring and implementation of the Strategy.

Habitats Directive (92/43/EEC)

In accordance with the requirements of the EU Habitats Directive an Appropriate Assessment Screening has been carried out to establish the likely impacts of the Strategy's implementation within or adjacent to specifically designated European sites of importance (Natura 2000 sites). The Strategic Environmental Assessment (SEA) and Apporpriate Assessment (AA) have provided a comprehensive assessment of all environmental considerations, which has informed the objectives set out within the Renewable Energy Strategy and the identification of strategic areas with potential to accommodate future renewable energy development.

Water Framework Directive (2000/60/EC)

This Directive aims to provide a new strengthened system for the protection and improvement of water resources and waterdependent ecosystems. The Directive requires Member States to identify river basins (or catchments) within its territory and to assign these to River Basin Districts which will serve as the 'administrative area' for coordinated water management.

River Basin Management Plans

The provisions of the Water Framework Directive (WFD) are implemented through River Basin Management Plans. On the basis of River Basin Districts, 95% of the County is located within the Shannon International River Basin (SIRB) (refer to Figure 8.1 of the Clare County Development Plan 2017-2023) with the remainder in the Western River Basin.

The principal objectives of these plans include:

- To prevent further deterioration in water quality;
- To protect/enhance all waters including surface, ground and coastal waters;
- To manage water bodies based on river basins or catchments.

The River Basin Management Plans propose a program of measures to achieve the objective of high or good water quality status.

The implications and requirements of the Water Framework Directive as regards protecting and enhancing water quality, particularly with regard to securing the objectives of the River Basin Management Plan, are incorporated into this Strategy.

EU Floods Directive (2007/60/EC)

The EU Floods Directive was transposed into Irish law through the European Communities (Assessment and Management of Flood Risks) Regulations 2010. The implementation of the requirements of the Directive is being carried out via the Catchment Flood Risk Assessment and Management programme (CFRAM). The OPW is the lead agency for flood risk management in Ireland and is the national competent authority for the EU Floods Directive. The CFRAM Programme comprises three phases:

- The Preliminary Flood Risk Assessment (PFRA): 2011;
- The CFRAM Studies and parallel activities: 2011-2015;
- Implementation and Review: 2016 onwards.

Work on CFRAM is not sufficiently progressed at this time to be taken in to consideration in the preparation of this Strategy. For the purpose of this Renewable Energy Strategy, flood risk has been assessed having regard to 'The Planning System and Flood Risk Management and Technical Appendices'-Guidelines for Planning Authorities' OPW/DoEHLG Nov 2009.

1.3.3 National Context National Spatial Strategy 2002-2020

The NSS is a strategic vision for the spatial development of Ireland designed to deliver more balanced social, economic and physical development between the regions. This document does not specifically highlight the role of renewable energy however the importance of the energy network, energy supply and infrastructure is addressed throughout. It is also highlighted that rural areas can make a significant contribution to the achievement of balanced regional development by utilising and developing resources including renewable energy resources.

Planning and Development (Strategic Infrastructure) Act 2006

The Strategic Infrastructure Act, 2006 was enacted to provide, in the interests of the common good, the ability to make planning applications directly to An Bord Pleanala in respect of certain proposed developments of strategic importance. The Act outlines the types of development which fall under its remit. Certain proposed renewable energy developments, by reason of their size and nature, must be determined by An Bord Pleanala.

Planning and Development (Amendment) Act 2010

The Planning and Development Act (as amended) in conjunction with the Planning and Development Regulations include planning exemptions for specified micro-renewable energy technologies for domestic, industrial, commercial and agriculture developments. These will be discussed in further detail in Chapter 5.

National Energy Efficiency Action Plan 2009-2020 DCENR 2009 and Ireland's Second National Energy Efficiency Action Plan to 2020, DCENR 2012.

The second National Energy Efficiency Action Plan builds on the foundations laid by the first plan in that it reaffirms the 20% energy saving target in 2020. From a renewable energy perspective, energy efficiency is the first issue to be addressed in maximising the impact of renewable energy, since a reduced total demand for energy will enable a larger percentage of the energy demand to be met by renewable energy.

National Renewable Energy Action Plan 2010-2020 DCENR 2010

The National Renewable Energy Action Plan (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's national target of 16% renewable energy under Directive 2009/28/EC. This action plan will be subject to several 'progress reports', the latest of which was submitted in 2012.

Strategy for Renewable Energy 2012-2020 (DCENR¹ May 2012)

This document sets out the key actions to be pursued at national level to ensure Ireland will deliver on its commitments to reduce greenhouse gases, increase renewable energy production and improve energy efficiency. Key actions are identified for each sector.

'National Climate Change Strategy 2007 -2012' (DoEHLG² 2007).

This strategy shows the measures by which Ireland will meet its 2008-2012 Kyoto Protocol commitments and how those measures will position the country post 2012. It also identifies the areas in which further measures are being developed to meet the 2020 commitments.

National Climate Change Adaptation Framework, DoECLG, Dec 2012

- The following national publications have also informed the preparation of this strategy:
- Energy (Biofuel Obligation and Miscellaneous Provisions) Act 2010;
- 'Delivering a Sustainable Energy Solution for Ireland. White Paper on Energy (DCENR 2007)';
- 'Grid 25. A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future' (Eirgrid 2008);
- A review of Irish Energy Policy. Research series no. 21 (ESRI³ April 2011);
- Draft Offshore Renewable Energy Development Plan (OREDP) version 1.3 Public Consultation Document' (DCENR November 2010);
- 'Maximising Ireland's Energy Efficiency The National Energy Efficiency Action Plan 2009-2020' Dept of Communication, Energy and Natural Resources;
- National Renewable Energy Action Plan Ireland (DCENR 2010) - sets out the Government's strategic approach and concrete measures to deliver on Ireland's target across the transport, heat and transport sectors;
- National Renewable Energy Action Plan IRELAND' First Progress report January 2012;
- SEAI publications.
- 1 Department of Communications, Energy and Natural Resources
- 2 Department of Environment, Heritage and Local Government
- 3 The Economic and Social Research Institute

1.3.4 Regional Context Mid-West Regional Planning Guidelines 2010-2022.

The Mid West Regional Planning Guidelines 2010-2020 (MWRPGs) state under section 4.1.8 that the region should develop appropriate strategies to become a leader in the provision of renewable energies.

It identifies the key assets in place in the region to exploit the opportunity presented by development of the renewable energy sector.

- The Mid-West has the highest potential generating capacity of renewable energy in the country. (Source: Grid 25: A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future, EirGrid 2008);
- Opportunity to further develop research and development activities in the region, e.g. at University of Limerick;
- EirGrid has planned key investment in the region's energy infrastructure, upgrading the transmission network in the region and urban centres of Ennis and Limerick and upgrading existing networks to facilitate higher capacity flows.

Section 6.6.1 'Renewable Energy' of the MWRPGs specifies that plans should identify the areas within which renewable energy proposals will be given favourable consideration.

Strategic Integrated Framework Plan for the Shannon Estuary (SIFP)

The aim of this plan is to identify the potential nature and location of future development, economic growth and employment that can be sustainably accommodated within the Shannon Estuary whilst protecting the environmental sensitivities of the area. The plan also identifies the potential of the estuary for renewable energy development. The preparation of this Renewable Energy Strategy has been informed by the SIFP.

1.3.5 County Context Clare County Development Plan 2017- 2023

The Clare County Development Plan 2017-2023 contains a number of objectives regarding renewable energy most of which are set out in Volume 1, including Chapter 10 Rural Development and Natural Resources, Chapter 11 Shannon Estuary, Chapter 12 Marine and Coastal Zone Management and Chapter 18 Climate Change, Flooding and Low Carbon Strategy.

Notably, the Plan recognises the importance of the development of renewable energy sources to deliver the goal of the National Climate Change Strategy, of achieving a low carbon economy and security of energy supply.

Clare County Development Plan 2017- 2023 - Volume 5 - Wind Energy Strategy.

The Wind Energy Strategy forms part of the Clare County Development Plan 2017-2023 (Volume 5). Refer to chapter 9 of this Strategy for more details.

'County Clare Integrated Strategy on Energy and Climate Change 2010- 2012'. (Clare County Development Board Oct 2010).

This document sets out a profile of County Clare regarding energy and climate change. It sets out an action plan based on the following 5 themes:

- Energy security, conservation and efficiency;
- Renewable and indigenous energy;
- Low carbon economy reducing CO₂ emissions;
- Research and development capacity for alternative energy;
- Transport energy efficiency, conservations and renewable energy.

The action plan identifies the action required, the lead party and partners responsible for implementation, other supporters, a start time and end time and desired outcome. The following documents at County level have also informed the preparation of this strategy:

- Limerick and Clare Energy & Emissions Balance Executive Summary 2006;
- The Limerick Clare Climate Change Strategy Executive Summary 2006;
- The Limerick Clare Energy Emissions Balance 2010 (March 2012);
- Limerick Clare Climate Change Strategy 2010 (Oct 2012);
- Micro Hydro Electricity Potential in County Clare, 2010;
- Potential for Freshwater Pumped Hydroelectric Energy Storage in County Clare, 2010.

1.4 Flood Risk Assessment

Clare County Council has sought to proactively manage flood risk in the County. In preparing the Renewable Energy Strategy, the Planning Authority has had regard to 'The Planning System and Flood Risk Management and Technical Appendices' - Guidelines for Planning Authorities' (OPW/DoEHLG Nov 2009). Clare County Council has mapped the location of flood risk in the county based on fluvial (river) flood mapping and tidal (coastal) flood mapping processes and by defining flood hazard in the County by zonal classification. A flooding map survey has been carried out by the Council based on technical information, existing available historical data including maps, photos, archives, verbal descriptions and newspaper extracts. The data was collated and allowed the County to be mapped in terms of recent and past flooding events. Volume 2, Map 11 – 112 of the Clare County Development Plan 2017-2023 sets out flood risk maps for the County.

Objective CDP 18.6 of the Clare County Development Plan 2017-2023 sets out to ensure that proposals for development in areas where there is a risk of flooding, (based on the flood risk maps contained in Volume 2 of the Clare County Development Plan 2017-2023, or any updated version) shall have regard to the OPW / DoEHLG planning guidelines The Planning System and Flood Risk Management (and technical appendices) – Guidelines for Planning Authorities Nov 2009 and any future OPW flood assessment information, and such proposals must also demonstrate that appropriate mitigation measures can be put in place. At a strategic level, Volume 10C of the Clare County Development Plan 2017-2023 contains the strategic flood risk assessment of the County. In the case of renewable energy development that may have an impact on flood risk a stage 3 site specific flood risk assessment shall be carried out at project level.

1.5 Relationship to Other Plans

1.5.1 Relationship to the Shannon Estuary Integrated Framework Plan

The Strategic Integrated Framework Plan for the Shannon Estuary is an inter–jurisdictional strategy. The strategy includes provision for potential for the renewable energy development in the Shannon Estuary and is discussed in more detail in Chapter 9 in the context of marine renewable energy.

1.5.2 Relationship to the Clare County Development Plan 2017 - 2023

This strategy forms part of the Clare County Development Plan 2017-2023. This Strategy should be read in conjunction with Volume 1 (Written Statement), Volume 2 (Maps) and Volume 5 (Wind Energy Strategy).

1.6 SEA and SEA Alternatives

The SEA process seeks to document the preparation and adoption of the Renewable Energy Strategy process where key decisions are reached, and consider the environmental impact on the policy path chosen.

Key considerations by Clare County Council in the development of each alternative strategy were identified and incorporated in the description of each alternative. The key considerations include:

- Community acceptance of energy infrastructure;
- Economic impact and job creation;
- Energy security and climate change;
- Energy infrastructure capacity/ development;
- Land use change;
- Ecological and environmental impact;
- Landscape characteristics.

The objective of this Strategy is to meet all of County Clare's energy needs from 100 % renewable resources. In preparing a renewable energy strategy one must decide on the renewable energy resource to be harnessed and the scale or proposed outcome of the successful delivery of such a strategy. The alternatives are:

- Alternative 1 Do nothing;
- Alternative 2 Focus on energy efficiency and conservation;
- Alternative 3 Mixed technologies;
- Alternative 4 Single technology;
- Alternative 5 Combined technologies and efficiency in demand.

1.6.1 Overview of Alternatives

Full details of the over view of alternatives is set out under section 8.4.1. of SEA Environmental Report. The following is a short summary of that overview.

Alternative 1 Do nothing

This alternative would mean that this strategy is not prepared and thus not incorporated into the CDP by way of a proposed variation. This alternative relies solely on the unfettered activity of the market responding to the forces of supply and demand for green energy. This approach relies on external agencies and developers to drive the agenda for sustainable low carbon energy resources, and removes most of the local control in decision making. This alternative would place County Clare at a distinct disadvantage to other counties that are taking a proactive approach to low carbon communities and commerce. Such approach would lack the benefit of proper planning. It was considered this alternative may have moderate community acceptance, moderate impact on energy infrastructure and land use change and could perform poorly in terms of job creation, energy security and climate change.

Alternative 2 Focus on energy efficiency and conservation

This alternative focuses on the demand side of the equation i.e. How energy use is managed? It relies on improving the energy efficiency of building stock through uptake of incentives and national campaigns for energy efficiency. However this approach alone will not meet Clare's share of national targets for energy consumption and green house gas emissions. This alternative may have little or no consequences for landscape character and land use change. However it could be beneficial for job creation and economic activity, energy security and climate change.

Alternative 3 Mixed Technologies

The aim of this Strategy is to support a mix of suitable renewable technologies which include bio-energy, shallow geothermal, solar, off shore wind, wave, tidal, and micro hydro power. This alternative is considered to be highly favourable in terms of community acceptance, economic impact, job creation, energy security and climate change. It is considered that such a mix of technologies gives more flexibility and adaptability for an urban or rural setting.

Alternative 4 Single Technology

This alternative identifies a single technology to support the renewable energy needs for County Clare. Such a strategy would have the advantage of seeking to establish a specialisation in the chosen area. The disadvantage of this approach is that it may over look the potential for economic development and carbon reduction by other means. Such alternative may lack broad community support, and may have a negative impact on landscape, land use change and environment.

Alternative 5 Combined Technologies and Efficiency in Demand

This alternative proposes the accessible resources option based on a mixture of renewable energy technologies that have been outlined in alternative no.3 and supported by rigorous demand side management in the form of energy efficiency and conservation as identified in Alternative no.2. Alternative no.5 would reduce the risk associated with relying on one technology, which may be vulnerable to commercial failure, or not supported through national policy, grants or REFIT. This alternative recognises that some technologies are currently in use and other such as offshore energy are being tested and will not be available commercially for some time to come. It is therefore not proposed to phase the use of any one technology. It is considered that imposing a phased approach may impede the bringing forward of certain projects which are otherwise 'good to go'. The mixed technology approach allows for solutions to be tailored to both rural and urban settings.

1.7 General Environmental Objectives

RES 1.1

General Environmental Objectives

It is an objective of Clare County Council:

- A Any renewable energy development shall protect habitats which by virtue of their linear and continuous structure (e.g. rivers and their banks) are essential for the migration, dispersal and genetic exchange of wild species;
- **B** All renewable energy developments within County Clare shall comply with the requirements of the Habitats Directive, Marine Strategy and Water Framework Directives and all other relevant EC Directives;
- C To consult with National Parks and Wildlife Services (NPWS) when undertaking or determining application for development which are likely to affect plant, animal or bird species protected by law. In the event of a proposed renewable energy development impacting on a site known or likely to be a breeding or resting site of species listed in Habitat Regulations a derogation licence, issued by the Dept. of Arts, Heritage and the Gaeltacht may be required in advance of a permission;
- D To ensure that all renewable energy developments control and manage alien/ invasive species;
- E To assess all planning applications for renewable energy developments to ensure they have no adverse impact on existing groundwater protection schemes, groundwater source protection zones, and all drinking water extraction points and supplies;
- F To ensure the monitoring and control of EIA threshold development within the County, through the document Environmental Impact Assessment (EIA) Guidance for Consent Authorities regarding sub-threshold development (DEHLG 2003,) or any updated document with specific reference to the requirement of Appropriate Assessment (AA) screening;
- **G** To safeguard the conservation value of NHA's, statutory nature reserves and refuges for Fauna and Annex 1 habitats in accordance with the provision of national legislation.

Chapter 2

Energy Profile of County Clare



2.0 Introduction

This section presents data and outlines key trends in the energy profile of County Clare, in terms of both energy consumption and CO₂ emissions. It investigates whether County Clare has the resources and potential to meet its energy needs from 100% renewable sources. It stresses the importance of energy efficiency as the first pillar in the move to a low carbon society. The evidence based data presented in this chapter has been used to inform the targets for the sectors based on either meeting the demand for energy in County Clare or exceeding demand, through the provision of renewable energy.

2.1 Evolution of County Clare's Current Energy Consumption

County Clare has a proud heritage of harnessing natural resources through strategic energy infrastructure. In 1929, County Clare harnessed the hydro electric power of the river Shannon at Ardnacrusha and was supplying over 80% of the Country's electricity needs from renewable resources.

County Clare, by reason of its abundant natural resources and significant existing infrastructure available, remains in an ideal position to continue the development of renewable energy resources (electrical and thermal) and to deliver them to the national and international markets.

2.2 County Clare's Energy Needs

The Limerick Clare Energy Agency published in March 2012 the "Clare Energy & Emissions Balance" for 2010. This report identifies the amount of energy consumed in County Clare, excluding the large energy consumers.⁴

The following table sets out the County's energy needs in 2010 and predicts ahead to 2020 based on two scenario's – a no change / business as usual (BAU) approach to energy use, versus a 'with measures' (WM) approach which assumes compliance with national programmes on energy efficiency and renewable energy targets. Thermal energy, in simple terms, is the energy generated through the heating of matter. Electric energy is the presence and flow of an electric charge, i.e. electricity. Transport energy refers to the energy consumed by the transportation sector (HGV's, cars, rail, etc.)

Table 2.1 indicates that energy needs in County Clare are expected to rise by 2020; however in fully implementing energy efficiency actions in line with national programmes⁵ County Clare can contain its energy needs to less than the 2010 levels of 3,669 GWh. Table 4.2, in Chapter 4 outlines the National Energy Efficiency Action Plan targets by sector.

⁴ Those consumers authorised to hold Kyoto units in an account on Ireland's National Emission Trading Registry.

⁵ National Energy Efficiency Action Plan, 2009 and 2012 set out Ireland's national targets on energy efficiency in compliance with EU Directives.

Table 2.1 County Clare Energy Consumption by Use⁶

County Clare Total Final Energy Demand	2010 GWh/y ⁹	2020- BAU ⁷ GWh/y	2020- WM ⁸ GWh/y
Thermal Energy	1,693	1,772	1,484
Electric Energy	682	776	750
Transport	1,294	1,448	1,404
Total Final Energy Use	3,669	3,996	3,638

Table 2.2 shows the existing and predicted future evolution of energy consumption in County Clare from 2000 to 2020 by energy sector. Note that Table 2.2 does not include large energy users in County Clare that are in the Emissions Trading Scheme administered by the Environmental Protection Agency (EPA). This data is illustrated in figure 2.1 below. The width of the bands reflects the level of energy use for that sector. As can be seen, the grey (transport) and brown (residential) bands are the widest, clearly showing that the majority of energy use is consumed by these sectors.

Table 2.2

County Clare Evolution of Energy Consumption 2000 to 2020¹⁰

Year	Agriculture	Commercial	Industry	Residential	Transport	Total
2000	175	374	902	768	984	3,203
2005	186	473	949	898	1,344	3,850
2008	166	517	879	970	1,527	4,059
2010	153	500	725	997	1,294	3,669
2020 Baseline	213	569	799	968	1,448	3,996
2020 (as per NEEAP / NREAP4	213	461	787	774	1,404	3,638

(All figures in GWh/y)

- 6 Limerick Clare Energy and Emissions Balance 2010, LCEA, 2012
- 7 Business as Usual
- 8 With Measures, i.e. in full compliance with national programmes on meeting energy efficiency and renewable energy targets
- 9 Gigawatt hours per year. A gigawatt hour is a measurement of energy quantity. One gigawatt hour is equal to one million kilowatt hours. It provides an amount of energy which could power approximately 200 homes for a period of one year.
- 10 Limerick Clare Energy and Emissions Balance 2010, LCEA, 2012

Figure 2.1 Evolution of Energy Consumption in County Clare by Sector¹¹

(All figures in GWh/y)



Figure 2.2 outlines in pie-chart form, the energy sector use for the year 2010. The transport and residential sectors constituted 62% of total energy consumption in County Clare during that year.

Figure 2.2 County Clare Total Energy Consumption by Sector - 2010¹²



11 National Renewable Energy Action Plan - Ireland has set out its targets for renewable energy in the NREAP). In response to Article 4 of directive 2009/28/EC, the NREAP sets out national targets for 2020 in respect of the share of energy from renewable sources, consumed in transport, electricity and heating and cooling.

¹² Limerick Clare Energy and Emissions Balance 2010, LCEA, 2012

Table 2.3

County Clare - Evolution of Energy Use by Fuel Source¹²

Year	Oil	Electricity	Natural Gas	Coal	Peat	Renewables	Grand Total
2000	1,998	563	382	127	92	41	3,203
2005	2,413	665	465	157	83	67	3,850
2008	2,510	723	523	134	85	84	4,059
2010	2,185	682	505	111	77	108	3,669
2020 Baseline	2,399	776	613	55	42	110	3,996
2020 NEEAP/ NREAP	2,035	750	468	52	39	294	3,638

(All figures in GWh/y)

Having considered previous trends and future energy needs of the County, it is also necessary to assess the types of fuel that are used to meet the needs of the County and to analyse future needs. In this regard Table 2.3 shows that oil represented the largest quantity of energy by fuel in 2010, at 1,998 GWh/y or 59% of County Clare's energy demand. This is illustrated in Figure 2.3 below. County Clare does not have any oil reserves therefore the County is entirely dependent upon imported fuel for heat and transport. The energy needs of the County (excluding large energy users) equates to equivalent 6,400 barrels of oil per day.

Figure 2.3



For County Clare, it is of critical importance that energy efficiency is improved in the use of electricity, heat and transport and that imported energy sources are displaced by renewable energy as far as possible. If energy efficiency is not addressed, a sudden oil shortage, or indeed any imported fossil fuel, would severely impact the County, both economically and socially. This Strategy seeks to guide and facilitate appropriate and sustainable renewable energy development in County Clare to assist in reversing this trend of high fossil fuel dependence and reliance on imports to meet energy needs.

2.3 Meeting the County's Energy Needs from 100% Renewable Sources

Table 2.3 County Clare- Evolution of Energy use by Fuel Source shows for 2010 a figure of 3,669 GWh/y and a figure of 3,996 GW/Y for 2020 baseline. This Chapter has outlined County Clare's history of energy production and consumption. However the County has considerable capacity to produce energy from renewable and indigenous resources. The next chapter will address the potential for County Clare to meet all of its energy needs from indigenous renewable energy.

RES 2.1

Meeting the County's energy needs from 100% renewables

It is an objective of Clare County Council:

To meet the County's energy needs from 100 % indigenous renewable energy sources.

¹² Limerick Clare Energy and Emissions Balance 2010, LCEA, 2012

Chapter 3

Summary of Renewable Potential, Resource and Targets

3.0 Strategic Aims

- To summarise the gross renewable energy potential of County Clare.
- To provide a plan-led and environmentally sustainable approach to renewable energy development, outlining deliverable renewable energy potential within County Clare.

3.1 Introduction

Clare County Council has identified its strategic aims for renewable energy in the Clare County Development Plan 2017 – 2023 and the County Clare Integrated Strategy on Energy & Climate Change 2010 - 2012. The stated aim in these documents is for County Clare to become a 'Low Carbon' County. A low carbon county is one where greenhouse gas emissions are minimised as a result of increased energy use from renewable means and improved energy efficiency. A low carbon county is the precursor to the more advanced zero-carbon situation, whereby carbon emissions are eliminated completely – this necessitates the disuse of all fossil fuels.

A significant element of achieving a low carbon economy and society is to further progress the ability to meet ones energy needs from low carbon indigenous resources. County Clare is working towards meeting the national target of 40% energy used generated from renewable sources by 2020. This Renewable Energy Strategy aims to assist in the transition to meeting this target and to eventually meeting all of the County's energy needs from renewable resources. Such a position would greatly enhance the local economy through job creation and a greater proportion of wealth created being retained locally. County Clare has substantial renewable energy resources and this Strategy will seek to maximise this potential. The capacity to harness those resources and generate energy will need to be balanced with other considerations, including:

• Community acceptance of energy infrastructure

Key issues include community consultation at an early stage, raising awareness of renewable energy and linking to health, well being and social and economic development;

- Ecological and environmental impact Impacts on designated sites, flora, fauna, air, water, soil, peat etc. Requirements of Strategic Environmental Assessment, Appropriate Assessment, Water Framework Directive;
- Energy infrastructure capacity / development

Capacity of the grid to accept the levels of electricity capable of being generated by renewable means; requirement for close liaison with EirGrid in regard to Grid 25 Strategy, project proximity to grid connection;

- Landscape characteristics Issues surrounding established landscape character and potential impacts thereon, landscape impact, visual impact, mitigation, cumulative issues, e.g. with wind farms;
- Land use change
 Linked to landscape also, a growing demand for fuel to serve the renewable energy industry (e.g. woodland and energy crops as biomass) may change agricultural practices and create new demands on rural areas;
- Economic Impact and Job creation Increased up take of new renewable energy technologies can support job creation and further economic activity.

3.2 **Renewable Energy Resource Analysis**

In determining the renewable energy potential for County Clare, this Strategy will identify and quantify the renewable energy resource that is available in the County. The analysis of the resource is based on a "sieve analysis", which starts with the maximum resource possible and concluded with the presently accessible / competitive resource. A graphic analysis of this method is shown below.



Source: Methodology for Local Authority Renewable Energy Strategies, SEAI, 2013

The sieve analysis employed in this strategy is:-

- Unconstrained Renewable Energy Potential based on indigenous resources;
- Technically Practical Renewable Energy Targets, based on a balanced approach resources versus other considerations as identified above, e.g. requirements of SEA / AA, community impact etc;
- Accessible & Planned Strategic • development. This identifies the potential of that resource which is technically possible and balances it with the competing interests of other industries and the statutory consideration for ecological, environmental and heritage.



3.3 Renewable Energy Resource – Unconstrained

The first analysis of the renewable energy resources in the County is "unconstrained" analysis. The term "unconstrained" does not mean un-planned, but rather it is a technical term to describe the gross renewable energy potential that exists, irrespective of our ability to harness, convert, store or deliver the energy created. However it is a useful starting point for our analysis of renewable energy resources as it highlights the exceptional geographical and geological value of being located on the west coast of Europe.

Renewable energy development of this scale would be entirely based on capturing the existing resources and would not be representative of the various competing interests of social, community, heritage, ecological or environmental consideration. Renewable energy development on this theoretical and unconstrained scale is not proposed in this Strategy, as it may have negative impact on the landscape, environmental, ecological, heritage and community aspects of the County.

Table 3.1 below shows that Clare has renewable energy resources capable of meeting its energy needs many times over. Details of the technologies are contained in the chapters listed.

Table 3.1 County Clare Gross Renewable Energy Resource – Unconstrained¹³

	Renewable	Commenter Class		
	Energy Resource:-	County Clare		
Chapter	Unconstrained	GWh/y	MW	
Thermal				
6	Forest wood fuel & wood Process by-product	256.5	48.8	
6	Energy Crop (SRC-Miscanthus)	700.0	159.8	
7	Geothermal	306.5	140.0	
6,7	Micro Thermal	962.8	549.1	
Sub Tota	I	2,225.8	897.7	
AD-CHP*1	thermal			
12	AD - Grass Silage	181.0	23.0	
12	AD - Animal wastes	32.0	4.1	
12	Municipal Organic MSW	226.0	28.7	
6	Micro CHP	74.7	10.7	
6,13	Biomass CHP	460.5	58.4	
Sub Tota	I	974.2	124.8	
Electric				
9	Onshore wind	13,766.0	4,761.6	
10	Offshore wind	819.0	311.6	
11	Hydro	467.8	89.0	
10	Wave	19,700.0	7,496.2	
10	Tidal	367.0	127.0	
5	Micro Gen elec	48.6	14.9	
5,6,13	CHP electric	584.5	35.0	
Sub Tota	1	35,752.9	12,835.4	
15	Transport	1,404.0	200.3	
		40,356.9	14,058.2	

Table 3.1 above presented the gross theoretical renewable energy potential of County Clare (unconstrained). It shows that County Clare has the potential to provide many times its actual energy needs from renewable resources. However, this level of renewable energy development would be unlikely to be achieved on adoption of a balanced, sustainable plan-led approach.

¹³ Renewable Energy Resource Assessment of Clare and Limerick, 2010, LCEA

3.4 Renewable Energy Resource – Technical & Practical

It will not be possible to harness the unconstrained potential of renewable energy for a number of important reasons:-

- The present economic activity from land resources;
- The present economic activity from sea / marine resources;
- Technological readiness for some resources (such as marine energy) is well advanced but commercial machines are not yet being deployed;
- Infrastructure to facilitate the transmission, distribution and storage of energy will be required for the optimal development of some electric and thermal systems (e.g. Combined Heat and Power – CHP).

Therefore the unconstrained quantity of renewable energy identified in Table 3.1 has been moderated to reflect the issues raised above. Details of the technologies are contained in the chapters listed.

Table 3.2 Renewable Energy Resource Targets (Technical & Practical)

	Renewable Resource	County Clare		
Chapter	Technical & Practical	GWh/y	MW	
Thermal				
6	Forest wood fuel & Wood Process by-product	128.3	29.3	
6	Energy Crop (SRC-Miscanthus)	175.0	39.9	
7	Geothermal	134.9	61.6	
6,7	Micro Thermal	529.5	302.0	
Sub Total		967.6	432.8	
AD-CHP*	thermal			
12	AD - Grass Silage	60.3	7.6	
12	AD - Animal wastes	16.0	2.0	
12	Municipal Organic MSW	75.3	9.5	
6	Micro CHP	3.7	0.5	
6,13	Biomass CHP	460.0	58.3	
Sub Total		615.3	78.1	
Electric				
9	Onshore wind	2,753.2	952.4	
10	Offshore wind	272.7	103.8	
11	Hydro	468.0	89.0	
10	Wave	197.0	75.0	
10	Tidal	110.1	41.9	
5	Micro Gen elec	16.1	4.8	
5,6,13	CHP electric	307.6	29.2	
Sub Total		4,124.8	1,296.0	
15	Transport	140.4	20.0	
Overall 1	Overall Total Renewable Target 5,848.1 1,826.9			

3.5 Renewable Energy Resource – Accessible & Planned

The Technical / Practical Renewable Energy Resource identified in Table 3.2 may be delivered. However there are a number of issues that would limit the full delivery of those resources that are technically and practically possible. The issues to be addressed would include:-

- Proximity to or within a designated area such as NHA, SPA, SAC;
- Proximity to suitable energy infrastructure or consumer(s);
- Proximity to suitable transport infrastructure;
- Economic harvesting & life cycle of bio-energy resources;
- Competing economic / social interests
- National / Regional and Local Planning Policy on energy.

A more balanced approach would be to examine the targeted renewable energy potential based on available resources, taken together with all other considerations, including environmental requirements, availability of grid connections, impact on community etc. This is presented in Table 3.2 below.

Table 3.4 shows that County Clare has the capacity to meet almost 100% of its energy needs from renewable energy resources in the County by 2020. However this target can only be met if:

- Biomass energy crops are planted in significant area throughout County Clare;
- Waste streams, especially organic waste, are utilised for energy generation;
- The County Clare Wind Energy Strategy Target of 550MW by 2017 is realised;
- Marine energy development is progressed and supported in the period up to 2020.

This renewable energy strategy will be in place until 2023, allowing for a significant period in which to facilitate and support renewable energy projects and acknowledging the long lead in time for many schemes (testing / planning / construction / commissioning etc.). The targets set out go beyond 2020 – a key date for Ireland to meet assigned national and European targets for renewable energy generation. The targets presented in this strategy should not be interpreted as a ceiling. In the event that significant progress is being made towards the overall goal of a low carbon economy through renewable energy generation, any further projects should not be delayed or influenced by the fact they may result in any of the above figures being exceeded.

The following table reflects the issues identified above and moderates the technical & practical renewable energy resource to determine the Accessible Renewable Energy Resource

Table 3.4 Renewable Energy Resource Targets (Accessible - Planned)

	Renewable Energy Resource	County Clare	
Chapter	Accessible - Planned	GWh/y	MW
Thermal			
6	Forest wood fuel & Wood Process by-product	128.3	29.3
6	Energy Crop (SRC-Miscanthus)	175.0	39.9
7	Geothermal	34.0	15.0
6,7	Micro-Thermal	175.7	92.8
Sub Tota	I	513.0	177.0
AD-CHP*t	hermal		
12	AD - Grass Silage	20.1	2.5
12	AD - Animal wastes	15.8	2.0
12	Municipal Organic MSW	25.1	3.2
6	Micro CHP	2.0	0.5
6,13	Biomas CHP	460.0	58.3
Sub Tota	l	523.0	66.6
Electric			
9	Onshore wind	1,590.0	550.0
10	Offshore wind	27.3	10.0
11	Hydro	468.0	89.0
10	Wave	59.1	20.4
10	Tidal	66.1	20.0
5	Micro Gen - elec	7.2	2.1
5,6,13	CHP electric	261.5	29.2
Sub Total		2,479.2	720.8
15	Transport	14.0	2.0
Overall Total Renewable Target		3,529.2	966.4

3.6 Identification of existing RE projects -Installed Capacity

Map 3.1 shows the location and installed capacity (Mw/h) of renewable energy projects in Clare which include energy from wind, hydro, and biomass. It does not show projects which were refused permission or projects which are deemed to be exempted development having regard to the Planning and Development Regulations 2007- 2008.

3.7 Identification of potential RE projects – Permitted Capacity

Map 3.2 shows the location and capacity (Mw/h) of renewable energy projects permitted but not constructed/not operational in Clare which include energy from wind, hydro, and biomass. This map also shows permissions pending. It does not show the spatial distribution of projects which were refused permission.

3.8 Key success and failure factors of RE projects

The merits of having a plan led strategy to guide the location and provision of renewable energy projects is evident when the key success and failure factors are examined. A plan led strategy provides greater certainty and clarity to developers and the public. It affords opportunities for public consultation, which engenders a greater sense of ownership of the final adopted strategy. An assessment of the reason for success or failure of renewable energy projects was carried out and reveals the following: Successful renewable energy projects are generally characterised by:

- Compliance with Development Plan policy and strategies;
- Compliance with regional and national guidelines;
- Engagement in pre planning;
- Early consultation with prescribed bodies;
- Continuous and meaningful community consultation;
- No adverse environmental, traffic, or visual impact;
- Implementation of proposed mitigation measures;
- Broad community support;
- Ease of access to grid;
- Geographical proximity to suppliers/ or end users;
- Protection of residential amenity.

Unsuccessful renewable energy projects may be characterised by:

- Non compliance with Development Plan policy and strategies;
- Non compliance with regional and national guidelines;
- Inadequate or no engagement in pre planning;
- Inadequate or no consultation with prescribed bodies;
- Lack of community consultation;
- Adverse environmental, traffic, or visual impact;
- Non compliance with Habitats Directive;
- Non Implementation of proposed mitigation measures;
- Delay or lack of access to grid;
- Renewable resource remote from potential customers or suppliers;
- Excessive transport costs;
- Inadequate feed in tariffs- economically non viable;
- Adverse impact on residential amenity.



3.9 Objectives

RES 3.1

Renewable Energy Targets

It is an objective of Clare County Council:

To facilitate the achievement of (or to exceed where possible) the renewable energy targets set out in Table 3.2 by 2020, ensuring that County Clare is the national leader in sustainable renewable energy generation, supporting energy efficiency, security and conservation, achieving balanced social, environmental and economic development throughout the County and assisting in the achievement of Ireland's Green Energy target.



Map 3.1: Renewable Energy—Installed Capacity



Map 3.2: Renewable Energy—Permitted Capacity



2023 Volume 6 Clare Renewable Energy Strategy 2017-2023

Development Plan 2017

County

Chapter 4

Energy Conservation and Efficiency

kWh Type ALF FM 2S 2-200A 240V TA 50A 60 Hz Kh 7.2 1 PH 3W AE-1356	

		-
		1

NAMES OF TAXABLE PARTY.

4.0 Strategic Aims

The strategic aims of this chapter are to:

- Define what is meant by energy conservation and energy efficiency;
- Set out legislative and policy context for energy efficiency and conservation;
- Set out policy in support energy efficiency and conservation;
- Set out objectives for energy efficiency and conservation.

4.1 Introduction

Clare County Council has a significant role to play in promoting and facilitating a pattern of development which helps to reduce County Clare's carbon footprint facilitating mitigation and adaptation measures for climate change.

A key role of the Council is to support the move towards new lower carbon development through the use of energy efficiency, micro generation and decentralised (produced on site or locally) renewable energy systems so that carbon reductions are considered and secured at the design stage of projects. The Council will ensure that energy efficiency and micro generation make an increased contribution to sustainable development, climate change and overall energy objectives. Rigorous demand side management of our energy consumption is required if there is to be a dramatic increase in energy efficiency and conservation.

Energy efficiency and energy conservation are both energy reduction techniques. Energy efficiency refers to the efforts to reduce the amount of energy required to provide products and services, e.g. to power an industrial plant, to heat a home, to transport goods etc. Energy conservation refers to reducing energy through using less of an energy source. Energy conservation and energy efficiency in particular are critical concepts in the further development of Clare as a low carbon county. The generation of energy by renewable means must be aligned to an increased awareness of the need to conserve energy where possible and to be more efficient with the energy that is used. There is little benefit in generating energy by renewable means if it is only to be wasted at point of use. The transition to the status of a low carbon county will be best served by a twin approach – renewable energy generation and increased energy efficiency and conservation practices.

Ireland has agreed to internationally binding targets to reduce energy consumption and CO_2 emissions by 20% by 2020. The public sector, including Clare County Council, is obliged to reduce energy and CO_2 emissions by 33% by 2020.

4.2 Context

4.2.1 National

The Sustainable Energy Association of Ireland (SEAI) estimates that in the order of 40% of current national energy demand is used by buildings and it is this area that has been identified as having the greatest potential for energy saving. In County Clare, the residential sector ranks second to transport in terms of energy consumption and emissions. This sector accounted for 23% of total final consumption in County Clare in 2005 and 26% of energy emissions, which is in keeping with national trends. In response to the European Directives outlined above, Ireland has the following national policy and legislation:

- 'National Energy Efficiency Action Plan for Ireland 2009 – 2020' (NEEAP) Maximising Irelands Energy Efficiency. This document sets out Ireland's intention to reduce its energy consumption by 20% by 2020;
- 'Conservation of Fuel and Energy- Dwellings. Building Regulations 2011 Part L Technical Guidance Document'. Dept. of Environment, Community and Local Government;
- 'Energy Efficiency in Ireland' SEAI 2009;
- 'Quality Housing for Sustainable Communities Best practice guidelines for delivering homes and sustaining communities'. Dept of Environment Heritage and Local Government 2007;
- Better Energy Homes and Greener Homes scheme, Home insulation initiatives SEAI. (ongoing);
- National Energy Efficiency Retrofit programme (announced in Budget 2010).

4.2.2 County Clare

The County Clare Energy and Emissions Balance (2010) has estimated the County's own energy needs and the associated CO_2 emissions. This report shows that 64% of all energy is consumed in the residential (24%) and transport (40%) sectors. The report also shows that the County is over 95% dependant on imported energy. Indigenous/renewable energy accounts for just 3% of the County's present energy needs.

The economic and social sustainability of the County is highly dependent upon external forces governing the supply and cost of our energy needs. In order to provide future generations with a secure, clean, energy resource, it is essential that we:-

- i increase our energy efficiency;
- use indigenous, low carbon energy resources to meet the reduced quantity required.

Table 4.1 below shows the energy savings targets for Ireland from 2010 to 2020. It shows that the greatest energy savings required are in the business, residential and transport sectors.

Table 4.1

Ireland's Energy Reductions – NEEAP

National Energy Efficiency Action Plan	Savings toward targets			
2009 - 2020		GWh - PEE		
Sector	2010	2016	2020	Target
Business	1,650	3,235	8,200	34.5%
Public	140	140	140	0.6%
Residential	2,605	7,640	10,365	43.7%
Transport	775	3,105	4,670	19.7%
Energy Supply	275	300	365	1.5%
Total of Measures	5,445	14,420	23,740	100%
Energy Savings Directive Target	6,500	13,117	31,925	
Additional Measures	1,055	-	8,185	

Table 4.2 summarises the energy savings required in County Clare as part of the county's burden sharing of the national targets under the NEEAP.

Table 4.2County Clare energy reductions in relationto the NEEAP

NEEAP		County Clare - GWh		
	2010	2016	2020	
Public Sector	15.8	50.4	84.7	
Business	70.9	121.0	164.0	
Buildings	66.6	249.8	400.9	
Mobility-Transport	16.9	90.0	145.9	
Sub Total Energy Consumers	170.2	511.2	795.5	
Energy Supply	50.6	52.0	114.8	
Grand Totals	220.8	563.2	910.2	

The table illustrates the importance of energy savings in buildings and particularly in the residential sector.
National standards for energy efficiency and conservation set out in Building Regulations are improving continuously, and moving from a system based largely on discretionary measures and best practice to one based on mandatory obligation. The approach is double edged under the 'asset model', a building energy rating (BER) measures the energy efficiency of the fabric of a domestic or commercial building under the DEAP¹⁴ method of calculation. The 'operational model' applies to public buildings and focuses on measuring the running costs of a building. Under this scheme, public buildings must have a Display Energy Certificate. Given that the energy running costs of a public building may change over time, these Display Energy Certificates are updated annually.

It is Clare County Council policy to support the implementation of all national energy efficiency standards and to support and facilitate energy conservation and efficiency, including through:

 improved building design – the Clare County Development Plan 2017 - 2023 includes objectives specifically on design and built environment (Chapter 17 refers); the Council has also hosted Design and Conservation Awards to encourage and promote higher standards of design;



- promoting the use of micro renewable technologies;
- promoting smarter travel;
- incorporate walking and cycling strategies into future local area plans as per the Shannon Town and Environs Local Area Plan 2012- 2018;
- facilitating EV ownership by providing associated infrastructure across the County

 EV charging stations are located in Ennis and Kilrush, with plans for additional facilities throughout the County;
- raising awareness / benefits of energy conservation;
- ensuring proper planning and sustainable development, whereby services are provided close to residential developments, e.g. schools, shops, workplaces etc. thus reducing the need to travel and in particular to travel by car.

Rigorous management of our energy consumption in our homes is required if there is to be a dramatic increase in energy efficiency and conservation. While building regulations will address energy efficiency in new buildings, a renewed effort to improve energy efficiency, particularly in the existing residential stock, is required. The Council encourages the uptake of incentives, schemes, grants and other available funding available to improve energy efficiency.

4.3.1 Sustainable Energy Communities and Commerce

Sustainable energy communities are those which employ an integrated, collaborative effort, with everyone working together to develop a sustainable energy system. This concept is also being promoted and supported through Sustainable Energy Authority Ireland's Programme's. This system will ensure a balance of demand and supply and provide the community with greater energy autonomy. The process involves the establishment of a Sustainable Energy Zone within which an integrated approach to sustainable energy practices will be undertaken.

¹⁴ Dwelling Energy Assessment Procedure - the official Irish procedure for calculating and assessing the energy performance of dwellings.

4.4 Waste Heat Recovery

County Clare has a number of public and private organisations that have high thermal energy loads. The nature of the operations at some of these locations necessitates the release of heat as a "waste" stream. Waste heat is a valuable energy resource that should be identified and wherever possible utilised. The efficient utilisation of waste heat requires a cooperative agreement between the generator of the heat and a local consumer. The form of waste heat may need specialised equipment to capture or transfer the heat to a reusable form.



4.5 Objectives

RES 4.1

Energy Efficiency and Conservation

It is an objective of Clare County Council:

- A To require all planning applications for new buildings to demonstrate how they have incorporated measures for sustainable energy efficiency, in respect of siting, design, building fabric and services , (i.e. heating and ventilation), as a means of reducing future reliance on traditional fuel sources;
- B To encourage a high standard of sustainable energy efficiency and conservation in the existing building stock by encouraging developers, owners, and occupiers to improve the environmental performance of buildings and to promote the uptake in incentives, schemes, grants or other available funding to improve energy efficiency, in accordance with the requirements of the Habitats Directive;
- C To reduce the County's dependence on imported fossil fuels and to develop a low carbon economy by:
 - Promoting innovative new building design which demonstrate a high level of energy conservation, energy efficiency and use of renewable energy sources;
 - Promoting retrofitting of existing buildings to achieve a high level of energy conservation, energy efficiency and use of renewable energy sources, in accordance with the requirements of the Habitats Directive;
 - Promoting the development and use of alternative energy vehicles in line with the concept of smarter travel and encourage and facilitate the development of ancillary infrastructure.

- D To increase awareness of the environmental, financial, social and practical benefits of being energy efficient;
- **E** To support and facilitate the development of sustainable energy communities and commerce;
- F To promote the further development of sustainable energy practices in industry and commerce, including the use of clean technologies;
- **G** To promote and facilitate research and development in energy efficiency and conservation best practice;
- H To identify significant 'waste' energy sources in County Clare and to promote and facilitate the capture and conversion of such energy to a usable resource for local consumption;
- To promote the use of efficient energy storage systems and infrastructure that supports energy efficiency and renewable energy system optimisation, in accordance with proper planning and sustainable development.



Chapter 5

Micro Generation



5.0 Strategic aims

- To define micro generation and the term micro-renewables;
- To briefly outline domestic, commercial and agricultural micro generation technologies that are exempt from the requirement to procure planning permission having regard to the Planning Acts and Regulations;
- To promote the use of micro generation technology in County Clare.

5.1 Introduction

There are numerous definitions of micro generation. For the purpose of this Strategy and in keeping with the ESB classification, micro generation is classified as grid connected electricity generation up to a maximum of 11kW when connected to three phase portion of a distribution grid (400 v). The vast majority of domestic and agricultural customers are connected to the single phase portion of the distribution grid (230v) and for these customers to be classified as micro-generators the maximum technical rating permitted is 5.75kW. (http://www.seai.ie/Renewales/Microgeneration)

The concept of micro generation can also apply to where energy is created and consumed on site, and is not exported to the grid. In this context it is understood as zero or low carbon heat and power generated by individuals, small businesses and communities to meet their individual energy needs.

(www.iwes.com/index.cfm/page/microgeneration)

It is acknowledged that on-site / decentralised heat and electrical micro generation can have a significant impact on reducing carbon emissions from dwellings and businesses. Micro renewable technologies include:

- Solar photovoltaic panels (PV);
- Small free standing wind turbines;
- Micro scale CHP plants;
- Hydro electric schemes;
- Solar hot water panels;
- Micro scale biomass heating and wood burning stoves;
- Ground source heat pumps;
- Air source heat pumps.

5.2 Micro generation – the benefits

Micro generation is particularly suitable for domestic and commercial purposes. The Council encourages small businesses to harness opportunities presented by the use of micro renewables, reducing energy costs down and increasing competitiveness. There are many benefits of micro-generation which are listed below:

Environmental

- Reduction in CO₂ by utilising renewable energy sources (as opposed to fossil fuels);
- Energy generation efficiency is improved as more than 90% of the fuel is converted to energy (a greater proportion of energy is lost as waste with conventional fossil fuel sources);
- The use of renewable energy sources does not deplete the Earth's resources.

Social

- Energy diversity through micro generation, in a competitive market, will ensure affordable energy is available for all;
- Micro generation will inform and educate users on these systems and encourage them to spread word of the benefits;
- Fostering a sense of pride, i.e. playing a small part in the fight against climate change;
- Employment opportunities.

Financial

- Micro generation uses freely available resources (wind/sun etc.), reducing energy bills;
- Security against energy price fluctuations;
- Many micro generation technologies qualify for government grants, e.g. REFIT (fixed payments for energy generated and for any surplus energy exported back to the grid).



Practical

- Heat and electricity can be generated together in the same process at point of use;
- Some systems can have year round benefits (lower bills, reduced CO₂ emissions);
- Some micro-generation technologies do not require planning permission.

Examples of micro-generation technology in County Clare include the woodchip boiler at Clare County Council main offices at New Road, Ennis and solar panels used in the Molex premises Shannon. Also, many individual homes in the County have erected solar panels on their roofs or installed single wind turbines on their property.

5.3 Micro generation – exemption from planning

Micro generation of heat and electricity is exempt from the requirement for planning permission under certain conditions.

- Domestic Renewable Energy Installations

 SI 83 2007, Planning and Development Regulations 2007;
- Commercial SI 235 2008, Planning and Development Regulations 2008.

Details of the types of exempted development can be found on the Department of Housing, Planning, Community and Local Government website: www.housing.gov.ie.

Those wishing to determine whether or not a specific proposal is exempted development or not can apply for a Declaration on Development and Exempted Development, under Section 5 of the Planning and Development Act 2000 (as amended). This process can also ensure that the development does not conflict with qualifying conditions such as environmental, habitats and heritage etc.

It should be noted that under Article 9 'Restrictions on Exemptions' of the Planning and Development Regulations 2001 (as amended) certain developments shall not be exempted development for the purpose of Planning Acts if the carrying out of such a development is likely to have significant effects on nature conservation sites.

5.4 Objectives

RES 5.1

Requirement for new build to harness micro-renewable technology

It is an objective of Clare County Council:

- A To require all planning applications for new buildings in the residential, industrial, commercial and agricultural sectors throughout County Clare to demonstrate how the energy needs of the proposed development can be provided for with indigenous renewable energy resources, harnessed by incorporating micro renewable technologies, as an important element in establishing a low carbon County and assisting in meeting assigned renewable energy targets. All planning applications must be accompanied by an environmental appraisal outlining the potential impacts and required mitigation measures to reduce impacts on the natural environment and any potential impacts on architecture;
- **B** To encourage the retro fit of domestic and commercial buildings with micro generation technologies, to improve the environmental performance of buildings and to promote the uptake of incentives, schemes, grants and other available funding to improve energy efficiency. All retrofits must be screened for Appropriate Assessment in accordance with Article 6(3) and 6(4) of the Habitat Directive and where judged necessary a Natura Impact Statement shall be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential negative impact on Qualifying Interest Features and their associated Conservation Objectives. Where works are being undertaken outside of a European site an ecological impact assessment, informed through consultation with the local authority, should be submitted.

RES 5.2

Promotion of micro renewables

It is an objective of Clare County Council:

To actively promote the use of micro-renewable technologies throughout the County for all redevelopment / extension / expansion projects. All such proposals must be screened for Appropriate Assessment in accordance with Article 6(3) and 6(4) of the Habitats Directive and where judged necessary an Natura Impact Statement must be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential negative impacts on Qualifying Interest Features and their associated Conservation Objectives.

Chapter 6

Bio-energy - Biomass



6.0 Strategic aims

The strategic aims of this chapter are:

- To assess the potential for the wood energy and energy crops in Clare and identify part of the County broadly suitable for a) development of supply/demand clusters for woody biomass and b) the production of energy crops;
- To set out Clare County Council's policy in support of the industry;
- To set out Clare County Council's objectives for the development of the industry.

6.1 Introduction

Bio-energy may be defined as the energy derived from biomass. The bio-energy sector will play a key role in delivery of renewable heat and renewable transport targets for the County. The RE Directive categorises bio-energy into three sub groups, biomass, bio-liquids, and biofuels. The term biomass encompasses a variety of fuels and technologies used to produce renewable energy. Biomass refers to land and water based vegetation , organic waste, and photosynthetic organisms. These are non fossil, renewable carbon sources from which energy can be produced and used as fossil fuel substitutes. (http://www.seai.ie/Archive1/ files_Misc/ REOIBiomassfactsheet.pdf)

Biomass is formed by the biodegradable fraction of products, wastes and residues from agriculture, forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste. It is often referred to as a carbon neutral fuel as the amount of CO₂ released during combustion is offset by the levels absorbed during growth.

Biomass fuels can be categorised as either dry or wet. The energy conversion of dry biomass generally involves heat, whereas the conversion of wet biomass generally involves fermentation or digestion. This chapter shall focus primarily on dry biomass fuels. Examples of biomass include; Short rotation coppice, straw, municipal waste combustion, landfill gas, sewage sludge waste, agricultural waste, wood industrial residue, and forest residues.

The main types of dry biomass resources include:

- Forestry
 - > Private Sector Roundwood;
 - > Public Sector Roundwood;
 - Sawmill Residues / by-product from wood processing – bark woodchip and sawdust
 Post harvest residues.
- > Post narvest residue
- Energy Crops Short rotation coppice willow, miscanthus and other energy grasses such as reed canary grass.

The Council acknowledges that there are many opportunities for bio-energy particularly when sourced from the processing of waste. However the focus of this chapter is on woody biomass having regard to the abundance of the resource in the County and surrounding region.

6.1.1 Bioenergy

Bioenergy is energy derived from biomass – it is the utilisation of solar energy that has been bound up in biomass during the process of photosynthesis. Energy from biomass is a renewable, indigenous source of fuel that can be used in all the main energy markets of transport (e.g. bio-fuel), heating (e.g. district heating network) and power generation (e.g. CHP plant). This chapter focuses on biomass from wood and on the growth of energy crops.

At a national level, the Delivering a *Sustainable Energy Future for Ireland 2007-2020: Government White Paper* aims to achieve 800MW from Combined Heat and Power with a particular emphasis on biomass fuelled CHP by 2020. The *Bio-energy Action Plan for Ireland (2007)* includes the target of 12% renewable share in the heating sector and 10% biofuel by 2020. This chapter outlines that Clare is well placed to make a significant contribution in meeting these national targets.

6.2 The Technology

Bioenergy technologies have the potential to contribute towards renewable energy targets for heat, electricity and transport in the domestic, commercial and industrial sectors.

Examples of biomass technologies include:

- Wood log stoves and boilers;
- Wood log gasification boilers;
- Woodchip/ pellet boilers;
- Combined heat and Power (CHP) plants.

6.3 Biomass potential in County Clare

6.3.1 Wood Energy

An assessment of potential for the wood energy industry in County Clare indicates a number of issues in relation to the **supply** of wood product.

In 2011, Clare was the third most afforested County in Ireland¹⁵ with 16.34% land area covered by woodland. Public sector forestry supplies (Coillte) are forecast to remain at existing levels or to decline slightly in the medium term. 45% of the existing forestry cover in County Clare (23,360 hectares) is in public ownership¹⁶. Private forestry (55%) will continue to be an important source of expansion in the wood fuel supply. Figure 6.1 shows hectares of forestry cover in County Clare relative to nearby counties, Limerick, Tipperary, Kerry and Galway. The majority of the resource in Clare is located in the East and West of the County, centred around Scarriff and Connolly respectively.

County Clare is ideally placed with a substantial biomass resource to serve identified areas of heat demand. With transport costs being a critical viability factor in the industry, this creates an opportunity in County Clare to develop sustainable supply / demand clusters for wood biomass and energy crops¹⁷, as shown on maps 6.1 and 6.2, thereby minimizing transport distances.

The age profile of forestry is a key factor in determining its sustainability for production and supply. The 11-15 years and 16-20 years are the plantations approaching first thinning. Planting activity in County Clare peaked in the mid 1990's with the result that many plantations may have passed the age for first thinning thus lessening the opportunity for the harvesting of pulp wood to supply the renewable heat industry. This is an important factor to note in terms of supply within the County and may necessitate further new planting in the County, together with the importing of product from the wider region. Fortunately, County Clare has the benefit of an excellent road network between its neighbouring counties of Limerick and Galway (refer to section 6.4.3 below) and also has the benefit of existing port facilities at Moneypoint and Shannon Airport.

Factors which will influence the decision to carry out thinning of woodland include the provision of site access from public roads and access to the plantation i.e. forest road. In County Clare, this will require a more targeted approach to identify the number and locations of new properly constructed entrances, or improvements to existing access routes, in consultation with the relevant forestry bodies, to ensure that forestry plantations are accessible.





¹⁵ The Forest Service

¹⁶ The Forestry Service, 2010

¹⁷ Forestry coverage mapping obtained from The Forestry Service

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In relation to the **demand** for wood product in County Clare, between 2006 and 2011, 310 biomass boilers and stoves were installed with grant aid from the Greener Homes Schemes. In 2011, the Western Development Commission conducted a survey of wood energy installations in Clare (systems with a boiler size range of 60kW to 1MW); seven installations in the commercial and industrial heat market segment were identified with a total installed capacity of 2.2 MW¹⁹. The majority of these are woodchip fuelled boilers supplied by locally based woodchip suppliers.

In building on this existing demand, this Strategy recognises the potential for the abundant biomass resource in the County to serve the existing areas of high heat demand. The target for renewable energy from biomass outlined in this chapter will be dependent on a number of factors, including whether fuel is burnt in facilities that only generate electricity, or those which produce combined heat and power, or is burned in a boiler that produces heat only. The amount of fuel required in each case will depend on the efficiency of the combustion process as well as the number of hours in a year a facility is operational.

6.3.2 Energy Crops

The opportunity for the development of energy crops arises out of a documented forecast of shortfall in woody biomass / forestry derived sources. Energy crops can play a complementary role to woody biomass. The current growth of energy crops in County Clare is limited, with no willow grown and only 11.3 ha of miscanthus in total.

Although the growth of fuel crops is an activity that is outside the remit of planning, this Strategy has considered it as part of the SEA process and takes a proactive approach in identifying areas of the County that may be suitable for growing short rotation coppice willow and miscanthus, subject to all other considerations. The areas identified as suitable for the planting of energy crops on maps 6.1 and 6.2 are indicative and do not equate to a definitive zoning for such use. These indicative areas of broad suitability will be tempered by the fact that the percentage change over to energy crops may be small, given existing agricultural practices and well established patterns of land use.

The SEAI has established a comprehensive Bioenergy GIS system that considers the suitability of land for growing energy crops based on a weighted assessment of the suitability of soil type, rainfall, slope, aspect and height. This is a useful tool for identifying theoretical potential; however it is important to note that the system does not take account of environmental restrictions. This GIS system was used to inform this Strategy and to identify areas with potential for new energy crop plantation (refer to table 6.1). Table 6.1 indicates that County Clare has the potential to supply a very substantial solid biomass demand from within the County. Note that the figures shown are not additive, i.e. land highly suitable for short rotation coppice willow may also be counted as highly suitable for miscanthus.

Table 6.1

Energy Crop Opportunities in County Clare20Available Area (Hectares)231,932SRWC Highly Suitable105,827Miscanthus99,310Reed Canary Grass132,155

18 Based on 2009 figures

20 Adapted from RASLRES Energy Crop Opportunities for the Western Region, pg 13

¹⁹ RASLRES 2011

Map 6.1 shows grades of suitability for SRC Willow across Clare. Two main areas emerge.

- Area 1: Map 6.1 indicates that the Limerick/ Shannon/Ennis corridor is suitable to develop a supply / demand cluster for src willow bio-energy crop. Similarly to woody biomass, the economic viability and environmental sustainability of energy crops for fuel is greatly influenced by the distance between supply centre and demand centres. The shorter the distance to the end user, the more viable the resource becomes;
- Area 2: The opportunities to exploit pockets of suitability along the west coast will depend on the ability of large heat demand users along the west coast switching to biomass boilers. Such potential users may include hotels and spas, guest houses, hostels and visitor centres.

Map 6.2 shows Miscanthus suitability across Clare. This map indicates three areas of high miscanthus suitability:

- Area 1: North Clare;
- Area 2: Loop Head peninsula;
- Area 3: Throughout East and South Clare.

6.4 Policy

Having regard to the key facts and trends emerging from the assessment of potential for the woody biomass industry, it is the Council's policy to support and encourage the development of bio-energy opportunities, facilities and associated enterprises in Clare. As regards biomass potential, the focus of this Strategy is on the identified heat centres and areas where there is potential to plant energy crops in conjunction with the harvesting of existing forest plantations. Clare County Council recognises that the development of this industry will play a significant role in meeting renewable heat targets and in attracting economic investment and job creation to the County.

6.4.1 Combined Heat and Power (CHP) and District Heating (DH)

A combined heat and power plant (CHP) is one designed to generate heat and electricity together in a single, highly efficient process. In conventional electricity generation, much of the input energy is lost to the atmosphere as waste heat. In Ireland 55% of the input energy is lost with the remaining 45% being transformed into electricity²¹. Combined Heat and Power (CHP) systems channel the waste heat to useful purposes, such as a district heating (DH) network, which connects the power plant to heat customers (e.g. industry, residential etc.). A 25% energy saving can be achieved using CHP compared to the separate production of heat and electricity.

Based on evidence of heat demand and energy use, environmental considerations and proper planning and sustainable development, indicative locations for potential CHP facilities in County Clare are identified on map 6.2

6.4.2 CHP potential in County Clare

CHP facilities have the potential to produce in a highly efficient process, green electricity and thermal heat and cooling, which can be distributed around a settlement through a district heating and cooling network. Such a facility can attract a dynamic mix of other related uses, including green energy development, industry / green energy generation, R and D, and bio-refining etc. to a low carbon zone. Having regard to the 'supply/demand' spatial pattern emerging from examination of woody biomass and energy crops, the Council considers that there is the opportunity to develop a number of CHP plants and associated district heating in the County. Map 6.1 shows 5 zones of high heat demand in County Clare which may have potential to accommodate CHP facilities. In the Shannon zone, Shannon town has been the subject of a detailed energy needs study and energy modelling²² which has identified an existing energy use breakdown of 57% thermal and 43% electric (industrial, commercial and residential sectors) which is a good match for combined heat and power. Moreover, the Shannon Town and Environs Local Area Plan 2012-2018, in sections 3.5.6 and 8.3.2, identifies a site in Shannon which may be suitable for a green energy development, potentially a CHP facility.

Opportunities may also present in the Shannon estuary area, in particular the Kilrush / Moneypoint area, where co-firing of biomass at the existing power station may be possible. In addition, having the existing port resource here would enable the importation of additional biomass fuel. The Strategic Integrated Framework Plan for the Shannon Estuary (SIFP), to which regard has been had in the preparation of this Strategy, recognises the role that Moneypoint can play as part of a strategic energy hub, facilitating the growth of other synergistic industries such as renewable energy and combined heat and power.

The Council also encourages the use of onsite CHP associated with industrial plants, manufacturing or processing, or any activity where heat and electricity are a significant cost base in the operation of the facility. Planning applications for CHP and AD facilities will be required to be accompanied by traffic impact assessment and road safety audits.

6.4.3 Transport

County Clare is well served with motorway and national road links, port infrastructure and railway network. As well as the significant woodland resource within Clare, together with identified opportunities to plant energy crops, the quality of the transportation network is such that biomass product to serve any future CHP facility, for example in Ennis or Shannon, could easily be transported quickly and efficiently, where traffic considerations are acceptable and the road network has adequate carrying capacity to cater for the additional traffic that will be generated by the proposed development.

The potential of the Shannon Estuary is also of critical importance, and provides a number of port facilities, including Moneypoint, which have the potential to provide additional stocks of biomass fuel to serve future CHP / bio-energy facilities in County Clare. The SIFP recognises this potential and the Renewable Energy Strategy, in outlining clear objectives and identifying indicative sites, establishes the planning framework to enable the optimum use of existing and future infrastructural resources.

²² Limerick Clare Energy Agency, 2012

6.5 Objectives and Targets

RES 6.1

Bio-energy targets

It is an objective of Clare County Council:

- A To maximise bio-energy use in the County in order to make a proportional contribution to meeting, or exceeding, national targets for renewable heat and transport of 12% and 10% respectively by 2020;
- B By 2020, to supply in a sustainable manner 80,000 tonnes of sustainable biomass to serve the biomass installations, thus contributing to County Clare's share of regional targets for renewable heating²³. (representing an approximate 30 % share of the regional biomass targets). The planting of biomass product such as willow and miscanthus must be subject to appropriate environmental considerations.





23 This represents an approximate 30% share of the regional biomass targets.

RES 6.2

Combined heat and power

It is an objective of Clare County Council:

To facilitate the development of CHP plants / green energy industry at the zones identified on maps 6.1 and 6.2:

- A Where practical, proximate to the national or regional road network and where traffic considerations are acceptable and the road network having adequate carrying capacity;
- **B** In a central location within the supply catchment area in order to minimise road hauls;
- **C** Located close to the point of demand to facilitate sustainable district heating networks;
- Proximate to grid or gas network or large heat demand end users;
- E In line with national policy and proper planning and sustainable development;
- F All such proposal must be screened for Appropriate Assessment in accordance with Article 6(3) and 6(4) of the Habitats Directive and where judged necessary, an Natura Impact Statement shall be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential negative impacts on Qualifying Interest Features and their associated Conservation Objectives.

RES 6.3

Brownfield and industrial bioenergy development

It is an objective of Clare County Council:

To generally permit proposals for commercial bio-energy plants on brownfield sites adjacent to industrial / enterprise areas or on lands which are in industrial / enterprise use or zoned for such purposes, subject to all environmental considerations. All such proposal must be screened for Appropriate Assessment in accordance with Article 6(3) and 6(4) of the Habitats Directive and where judged necessary, an Natura Impact Statement shall be submitted and Appropriate Assessment must be conducted. The AA shall include assessment for potential negative impacts on Qualifying Interest Features and their associated Conservation Objectives.

RES 6.4

Bio-energy promotion

It is an objective of Clare County Council:

- A To showcase the wood biomass boiler at Council headquarters for demonstration purposes and to promote the use of biomass heating for all public buildings within the lifetime of this strategy;
- **B** To implement best practice in 'Green' public procurement;
- C To facilitate an increase in the percentage of sustainable energy crops grown throughout County Clare, to prepare a suite of measures that will assist in developing the market for biomass energy crops and facilitate such alternative farm enterprise;
- D To promote the installation of district heating schemes powered by renewable fuel sources, in accordance with the requirements of the Habitats Directive.

RES 6.5

Transportation and Access

It is an objective of Clare County Council:

- A To facilitate the development of new or upgrading of existing entrances and off road turning and loading areas to forest plantations, in association with Coillte, The Forest Services, Teagasc and the Clare Wood Energy Project and relevant land owners subject to all environmental considerations;
- **B** To identify the preferred main haulage routes for biomass in the County in cooperation with the biomass sector.

RES 6.6

District Heating

It is an objective of Clare County Council:

To require planning applications for multi unit housing developments and large commercial and industrial developments to be accompanied by a feasibility study setting out the potential for incorporating district heating infrastructure into the proposed development. In addition to a feasibility study, an environmental appraisal of all potential impacts will be required to ensure compliance with the proper planning and sustainable development.

Map 6.1: Zones of High Heat Demand and Biomass Resource



Map 6.2: Zones of High Heat Demand and Biomass Resource



ss Resource	
	Date: January 2017

Chapter 7

Ground Source Heat Pumps



7.0 Strategic aims

The strategic aims of this chapter are:

- To focus on the application of shallow ground source heat collection technology and its potential contribution to meeting National thermal energy targets;
- To assess potential for shallow geothermal in Clare;
- To identify the key planning issues;
- To set out objectives for the development of shallow geothermal;
- To set out policy and objectives for the uptake of ground source heat pumps.

7.1 Introduction

Geothermal energy can be defined as energy stored in the form of heat beneath the surface of the earth²⁴. 80% of this energy beneath the ground originates from the radioactive decay of minerals, with the remaining 20% arising from the initial formation of the planet. Geothermal energy can be classified as either deep or shallow, depending on the depth involved. The focus of this chapter is on shallow geothermal.

7.1.1 The Technology

Geothermal energy is harnessed using refrigeration technology. The equipment is called a heat pump. The heat pump operates in a similar manner to a refrigerator, however the purpose of the heat pump is to harness large quantities of low grade thermal energy (in water, air or soil) and compress the energy to deliver a smaller quantity of higher temperature to a building heating system.



For shallow ground sources the heat pump works by transferring the heat stored in the earth into the building and release it at a higher temperature to enable re-use. The ground collector system can have vertical or horizontal layout. One unit of electricity used by the pump creates 3 to 4 units of heat²⁵.

Ground source heat resources can be exploited for space heating and cooling, as well as water heating. They can be utilised by a number of different technologies, ranging from those suitable for individual buildings based on low temperature resources to large scale developments utilising high temperature resources.

There are 3 no. main methods of exploiting ground source heat energy –

- Horizontal shallow ground loop utilising heat in the ground up to 2m below the surface;
- 2 Vertical borehole utilising subterranean aquifers up to 200m below the surface;
- 3 Shallow bodies of water such as lakes / rivers.

²⁴ Directive 2009/28/EC.

²⁵ A unit of heat is the amount required to increase the temperature of one pound of water by one degree, at sea level.

currently preparing a national shallow geothermal energy resource map which, when available, will enable informed decision making and preliminary site suitability assessments. This will assist in identifying spatially parts of County Clare that are suitable for vertical or horizontal ground collection. It will inform optimum site selection, facilitating future planning decisions, ensuring appropriate installation in different areas and reducing the number of installations in unsuitable conditions. The shallow geothermal energy resource map will map suitability for open loop collector and closed loop collector systems. Data sets that will inform suitability for closed loop collector systems (horizontal) include mean soil temperature, depth to bedrock, soil and sub soil type and the thermal conductivity values of such soil types. Data sets that will inform suitability for open loop collector systems include geological unit

The Geological Society of Ireland (GSI) are

depths involved, the lack of a refit tariff, and aquifer classification, vulnerability data, and lack of identified substantial heat demand that open loop collector flow rates. could make a project commercially viable. The NREAP does not envisage electricity from deep geothermal sources contributing to the national

7.2 **Assessment of Potential** for Shallow Geothermal

Methods 1 and 2 above may be exempt from

certain conditions. The reader is directed to

Community and Local Government website

www.housing.gov.ie for more details. Those wishing to determine whether or not a specific

the requirement for planning permission under

examine the Department of Housing, Planning,

proposal is exempted development or not can

apply for a Declaration on Development and

Exempted Development, under section 5 of

the Planning and Development Act 2000 (as amended). This process can also ensure that the

development does not conflict with qualifying

conditions such as environmental, habitats and

Methods 3 is not exempt from the requirement

for planning permission under any conditions.

Note: This chapter does not assess potential for

deep geothermal having regard to the excessive

heritage etc.

2020 targets.

Currently there is limited national, geological information relating to geothermal energy. At the time of adopting this strategy there is no national legislation for the installation of shallow geothermal. At the time of adopting this strategy, Geological Survey of Ireland (GSI) is addressing these short comings through the preparation of guidelines for best practice to inform installers and customers.

The following factors are considered to influence the potential for horizontal systems (shallow):

- Adequate depths of suitable type of subsoil (0.6–1m depth required to bury horizontal array of pipe network);
- Generally moist soil that will conduct heat;
- Subsoil permeability generally soils with low permeability hold moisture and therefore are better suited than quick draining sandy soils;
- Ground water vulnerability Shallow soils with rock outcrop will not be appropriate for horizontal systems;
- Space required to install the system rural versus urban context.

Whilst the GSI national shallow geothermal energy resource map is not yet available, much of the data above, necessary to assess potential, is already available including soil depths, soil data maps, groundwater vulnerability etc. This strategy will have regard to GSI mapping data when published.

The Cliffs of Moher Visitor Centre in County Clare is served by a 120kW horizontal ground source heat pump installation.

7.3 Planning Issues for Shallow Geothermal

Provided there is sufficient soil depth and type and adequate space on site, there are generally few planning issues and constraints associated with shallow ground heat collectors (vertical or horizontal closed loop systems). The following issues may arise in certain circumstances:

- Horizontal collectors the land used for the collector area generally should remain under the control of the building owner and the area required should be sterilised from inappropriate future development;
- Vertical borehole collectors it must be ensured that they do not pose any threat to the subterranean aquifers and water bodies;
- Shallow horizontal and borehole collectors regard must be had for the cumulative effect of collectors in urban / sub-urban areas.

It is considered that ground source energy has the potential to make a significant contribution to meeting thermal energy targets, particularly in the residential and commercial sectors. Ground source heat collectors can be installed in both urban and rural settings. The objectives below will assist in the delivery of the national and county targets for renewable heat.

7.4 Objectives

RES 7.1

Development and dissemination of geothermal potential

It is an objective of Clare County Council:

- A To utilise the GSI's shallow geothermal energy resource map and other available data sources, including environmental information, when available to identify the areas most suitable for shallow geothermal installations and to enable better informed decision making and preliminary site suitability assessments;
- **B** To inform all applicants for one-off houses, at pre-planning stage, of the GSI's best practice guidance for the installation of geothermal systems, when they become available.

RES 7.2

Facilitation of ground collection and heat pump energy installations

It is an objective of Clare County Council:

- A To protect wells, aquifers and other water courses in the development of shallow geothermal resources in accordance with the Programme of Measures in the Shannon River Basin Management Plan and Western River Basin Management Plan and otherwise in accordance with the requirements of the Water Framework Directive and the Habitats Directive;
- B (i) Following publication of GSI shallow geothermal resource mapping, to require all applications for planning permission to evaluate the potential for the installation of ground collectors and heat pumps (or other suitable micro renewable technology), where suitable geological and environmental conditions exist and where there is sufficient space on site;

(ii) Following publication of GSI shallow geothermal resource mapping, to require all applications for planning permission located in areas of identified high shallow geothermal potential to incorporate proposals for heat pump energy installations, or, in the absence of same, to demonstrate clearly why such installation is not viable;

- C To promote the use of ground collection heat pump energy technology across County Clare, including schools and other public buildings;
- D All proposals for ground source collection and heat pump energy installations must be screened for Appropriate Assessment in accordance with Articles 6(3) and 6(4) of the Habitats Directive, and where judged necessary an Appropriate Assessment must be conducted. The AA shall include assessment for potential impacts on Qualifying Interest Features and their associated Conservation Objectives.

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Chapter 8



8.0 Strategic aims

The strategic aims of this chapter are:

- To describe the resource;
- To assess its potential and identify factors influencing the preferred locations for its application;
- To set out policy and objectives to ensure solar power, in particular thermal solar energy contributes to the attainment of renewable energy targets.

8.1 Introduction

For the purpose of this strategy, there are two types of solar energy extraction – thermal solar energy and photovoltaic.

- Thermal solar energy– The heat from the sun is a source of energy which can be used in buildings for heating / hot water. For demands such as hot water, which does not vary much seasonally, thermal solar can make a significant contribution to the reduction of water heating energy use in a building. Energy and cost savings deriving from thermal solar can be significant. Grant schemes run by SEAI for the heating sector have to date supported thermal solar energy. Market trends suggest we may see increased solar energy installations in the period to 2020. Much of this will arise from use of solar panels in the domestic and commercial sectors;
- Photovoltaic energy The light from the sun is also a source of energy that can produce electricity. The most common technology for solar electricity production is solar photovoltaic (PV). Solar PV panels convert sunlight into electric current that can be used in a variety of ways.

8.1.1 The Technology

The solar energy is harnessed using the solar thermal or photovoltaic panels. The efficiency of the panels may vary considerably based on the materials used and the use of vacuum tubes. However regardless of the technology efficiency it is essential that solar collectors are located in a southern orientation (SE-S-SW) and angled at 15-55 degrees. Some photovoltaic panel arrays employ solar tracking technology to maintain optimum alignment of the panels to the sun as the sun tracks the sky.

Map 8.1 shows Ireland's average annual solar radiation in kWh/m.sq./day²⁶. It shows that the southern half of the country, including County Clare has higher annual solar radiation.

It is difficult to quantify the current use of solar thermal systems in Clare. However, statistics derived from the national Greener Homes Scheme show that 1,086 solar systems were installed in County Clare between March 2006 and May 2011. Three quarters of these systems were solar flat plates.

26 SEAI - Best Practice Guide - Photovoltaic (PV).

8.2 Assessment of Potential

The first part of this section identifies factors influencing the preferred locations for micro installation of PV and solar thermal. The second part of this section looks at potential for large scale photovoltaic installations and the factors influencing preferred location for same.

8.2.1 Factors influencing preferred location for micro installations – PV and thermal

- Installations should be generally south facing, with an angle of 15-55 degrees. Some installations may have tracking technology with sensors and motors to track the motion of the sun and maximise electricity production;
- It is well suited to urban environments where other micro renewable may not be as easy to install. It is clean and silent to operate;
- Residential property is more challenging because times of required demand are intermittent and highly dependent on the way in which occupants use the house. Grid connected systems work best with dwellings as the grid acts as a storage device. Feed in tariffs were introduced in 2009 for this purpose. On site storage using battery is also a possibility but incurs increased capital costs;
- Requirement to be located on south facing roofs or facades, or integrated into the building fabric or design;
- Systems should be located in areas that are not shaded at all times of the day.

8.2.2 Factors influencing preferred location for large scale photovoltaic installations (exceeding 50 square metres)

- For the purposes of this strategy the term 'large scale' shall be taken to mean an area that is greater than the area that is exempt under S.I. 235 – 2008;
- Installations should be generally south facing, with an angle of 15-55 degrees. Some installations may have tracking technology with sensors and motors to track the motion of the sun and maximise electricity production;
- Vacant brown field sites in predominantly industrial areas which have not been developed to date with access to grid, vehicular access and with associated transformers and power cables. Such sites may occur in the Shannon Free Zone and other industrial areas in the County;
- Land diversification, where solar farms can be developed on agricultural land, where proposals include the continued agricultural use of the site or incorporate biodiversity measures within the project;
- Industrial / commercial sites with large available roof space. Such sites may occur in the Shannon Free zone which would complement green zone policy as per the Shannon Local Area Plan 2012-2018;
- Office developments have good PV potential because their electricity demand is significant year round (including summer) and because demand is highest between 9am and 5pm. Thus the match between demand and supply is good;
- Sufficient hours of day light (as per SEAI irradiation map of Europe);
- Secure un-shaded site (shadow from buildings, trees and other structures can significantly reduce the performance of PV's).





8.3 Planning Issues and Policy

There are few planning issues and constraints associated with micro renewables such as thermal solar energy and solar PV having regard to Exempted Development Planning and Development Regulations 2007 and 2008. Potential constraints to the development of large PV systems may include:

- Normal planning considerations including impact on landscape, urban design, biodiversity, ecological impact, on-site water management, access to grid, security fencing, decommissioning issues and residential amenity including potential glint and glare;
- Buildings located within designated Architectural Conservation Areas or those listed in the Record of Protected Structures;
- Requirement for an exclusion zone / restrictions around Shannon Airport, due to potential conflict between aircraft radar systems and large PV tracker technology; also potential reflection / glare issues;
- The need to have sufficient areas of solar modules to produce the required energy output from the system;
- Functional effectiveness of the solar units in Ireland's climate;
- Shadow from buildings, trees and other structures can significantly reduce performance of PV's.

It is the policy of the Council to encourage the use of solar energy for generating the electricity/heating needs of buildings and infrastructure such as street lighting and road signage, in accordance with the principles of proper planning and sustainable development. The Council will generally support proposals for appropriately designed thermal solar and PV systems other than in circumstances where visual impact is critically damaging to a Recorded Monument, Protected Structure or an Architectural Conservation Area, has the potential to impact negatively on the amenity (including residential) of the area or adversely affect a protected species and/or its habitat.

8.4 Passive Design

An increasing number of buildings are utilising 'passive solar' technology and design that is capable of meeting most, if not all of the building's thermal energy needs from the sun (i.e. without the use of fuel or heating systems). The Council encourages the use of passive design for new build structures.

8.5 Objectives

RES 8.1

Promotion of thermal solar energy and photovoltaic energy

It is an objective of Clare County Council:

- A To encourage, as part of the design and planning process, an evaluation of the potential to incorporate thermal solar or solar PV (or other suitable micro renewable technology) into the design of all new developments, or extensions to existing development, or change of use proposals, and to submit this evaluation with any planning application;
- B To facilitate the development of thermal solar and PV in suitable locations, subject to proper planning and sustainable development.
 Potential impact on architectural conservation areas, and protected structures will be considered in all applications;
- C To promote and facilitate the use of solar technology across County Clare including schools, public offices and for infrastructure, e.g. traffic lights, street lights, road information signage etc.;
- D All proposals in relation to solar, electric and thermal technology must be screened for Appropriate Assessment in accordance with Articles 6(3) and 6(4) of the Habitats Directive, and where judged necessary a Natura Impact Statement shall be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential impacts on Qualifying Interest Features and their associated Conservation Objectives.

RES 8.2

Large scale/Utility scale Solar – Photovoltaic Panels

It is an objective of Clare County Council:

- A To favourably consider the redevelopment of brown field sites in predominantly industrial / commercial areas for large solar PV projects subject to normal planning considerations and appropriate environmental considerations;
- **B** To favourably consider the development of solar farms on agricultural lands which allow for farm diversification and multipurpose land use, subject to normal planning considerations. All such applications should be accompanied by an environmental report addressing issues such as ecological impacts, impacts on the amenity of adjoining properties, glint/glare, landscape impact assessment, cable trenching, sustainable drainage systems for the management of surface water disposal on site, decommissioning and site restoration;
- C To require the preparation and assessment of all planning applications relating to solar energy in the plan area to have regard to the information, data and requirements of the Natura Impact Report, SEA Environmental Report and Strategic Flood Risk Assessment Report contained in Volume 10 of the Clare County Development Plan 2017-2023;
- D To require projects to be fully informed by ecological and environmental constraints at the earliest stage of project planning and any necessary assessment to be undertaken, including assessments of disturbance to species, where required;
- E To require compliance with the objectives and requirements of the Habitats Directive, the Bird Directive, Water Framework Directive, all other relevant EU Directives and all relevant transposing legislation.

Map 8.1: National Irradiation and Solar Electricity Potential

National irradiation and solar electricity potential Horizontally mounted photovoltaic modules

Ireland



Helen Quinn

Reserved.

Council

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Padraig McManus

Scale:

Not to Scale

Chapter 9

Onshore Wind



9.0 Introduction

This chapter deals with onshore wind and provides a summary of the key objectives of the Clare County Wind Energy Strategy (WES), in the interests of completeness. The WES forms Volume 5 of the Clare County Development Plan 2017-2023. Chapter 10 of this Strategy deals with offshore wind.

As the WES has been adopted, any changes to it are outside the scope of this Strategy, however the SEA and AA processes that have informed the preparation of the Renewable Energy Strategy have taken account of the adopted WES and potential cumulative effects.

9.1 The Strategy

The WES facilitates the development of onshore wind farms by maximising the wind resources of the County having regard to technological advances in turbine design, information on wind speeds, proximity and availability to grid connection and to changing energy and grid connection regulations while minimising any environmental and visual impacts.

The WES identifies sites of strategic regional and national importance that have the potential to accommodate wind energy development. It designates areas as being either a) strategic, b) acceptable in principle, c) open for consideration or d) not normally permissible, for wind energy development, as shown on map 9.1.



Whitegate Mountshannon Lough Derg Bridgetown O'Briensbridge Killaloe Scarriff Cloonlara Ardnacrusha Parteen Athlunkard Slieve Aughty roadford (Ballycannon North) LIMERICK CITY Feakle Sixmilebridge Kilkishen Bunratty Cratloe Kilmurry N20 Tulla N21 N18 Newmarket on Fergus Quin Crusheen SHANNON INTERNATIONAL Barefield 69N M18 ENNIS Shannon Estuary Burren **šallyvaughan** Corrofin • • Kilmaley Killadysert • Kilfenora eve Callan Lissycasey Labasheeda Inagh. Lisdoonvarna Ennistymon/ Lahinch Slieve Elva N67 Kilmihil Miltown Mal<mark>bay</mark> Uoolin Mullagh • Cooraclare Quilty Kilrush Cliffs of Moher Spanish Pt. Doonbeg Aran Islands 12 Atlantic Ocean N67 Kilkee Carrigaholt Not Normally Permissable Acceptable in Principle **Open to Consideration** Strategic Areas Loop Head

Map 9.1: Wind Energy Designations

9.2 Objectives and Targets

The WES has an overall stated target of:

550MW electricity to be generated from wind energy by 2017

The key objectives of the WES focus on the four classifications identified on the wind energy designations map and are complimented by additional objectives relating to:

- Facilitating renewable energy and developing a low carbon economy in response to national policy;
- Adopting a partnership approach and promoting community involvement;
- Supporting infrastructural development;
- Protecting the environment;
- Supporting auto-producers.

The objective for the **Strategic Areas** (WES8) states that these areas are eminently suitable for wind farm development and notes their good/excellent wind resource, access to grid, distance from properties and location outside designated sites. A target of **400MW** from these areas is identified. WES8 outlines key issues as being compliance with the D. o E. Wind Energy Guidelines, comprehensive development of the strategic areas, environmental protection and avoidance of visual clutter.

The objective for the **Acceptable in Principle** areas (WES9) states that these areas are considered suitable for wind farm development and notes their sufficient wind speeds, access to grid and established patterns of inquiries. A target of **150MW** from these areas is identified. WES9 outlines key issues as being compliance with the D. o E. Wind Energy Guidelines, environmental protection and avoidance of visual clutter.

The **Areas Open to Consideration** will be assessed on a case by case basis, subject to viable wind speeds, environmental resources and constraints and cumulative impacts.

The **Not Normally Permissible** areas are not considered suitable for wind farm development as a result of their overall sensitivity arising from landscape, ecological, recreational and/ or cultural and built heritage resources. The SEA and AA processes assisted in the identification of these areas.

Any planning applications for wind energy development within the County shall ensure that development proposals in the vicinity of or potentially affecting in any way an NHA or pNHA provide sufficient information showing how it potentially would impact on the designated site (through an assessment of effects on their Features of Interest) and how any such potential impact will be appropriately mitigated. Any planning applications for wind energy development within the County shall ensure that all NHA's and pNHA's are afforded the appropriate level of protection by only permitting development demonstrated not to have a significant adverse effect on the conservation value of such areas. Any proposed wind energy development that could have significant effects on an NHA is likely to require an EIA and the preparation of an EIS.

The planning authority is committed to reviewing the WES Vol. 5 on foot of any future revisions to the national Wind Energy Guidelines.

It should be noted that nature designations including SAC's, SPA's, NHA's and pNHA's undergo constant change, both with regard to geographic extent and legal status due to appeal procedures and ongoing processes of designation. Changes to the designations may occur over the life time of the CCRES, which may not be reflected on the maps. Applicants/ land owners are advised to consult with the NPWS to obtain the most up to date information. In the assessment of any planning application for wind energy or other renewable energy development Clare County Council will have regard to the most up to date nature designation boundaries and the consequent requirements and obligations under the Habitat Directive and associated Regulations.

Chapter 10

Marine Renewables



10.0 Strategic Aims

The strategic aims of this chapter are:

- To briefly profile offshore wind, wave and tidal energy;
- To clarify Clare County Council's role in relation to the industry;
- To set out policy, objective and targets to assist the development of the marine renewable sector.

10.1 Introduction and background

Given that this is a relatively new industry, the associated nomenclature is emerging and may change over the life of this strategy. The term 'ocean energy' usually refers to wave and tidal. The term 'marine renewables' or 'marine energy' normally refers to wave, tidal and offshore wind.

The offshore wind, wave and tidal resource off the coast of Clare has the potential to offer a significant source of renewable energy, along with associated spin off supporting industry such as construction, distribution and information communications technology (ICT). This abundant resource is evidenced in the designation of the Clare coastline as part of Area 5 (West coast) in the DCENR Ocean Renewable Energy Development Plan (OREDP). Area 5 is stated as having the potential to accommodate a total of 18,500 – 19,500 MW of energy from offshore wind and wave energy. This Strategy seeks to ensure that the County delivers the maximum possible share of this potential. The OREDP also identifies the Shannon Estuary as a potential location for tidal energy. Map 10.1²⁷ below indicates area 5 (west coast), of which the Clare coastline is part.

Wave and tidal technology is currently focused on research, testing and pilot deployment. This Strategy seeks to ensure that the coast off County Clare is a flagship project location for pre-commercial stage testing, experimental deployment and demonstration purposes in the medium term (2017-2020) and will play a significant role in exporting power in the longer term (2030-2050).

The Foreshore (Amendment) Bill 2011 provides significant opportunity to local authorities for increased engagement in the consent process for marine energy development. County Clare is ideally placed in this regard –This Strategy provides the plan led policy framework that will enable the Council to manage development of the marine sector when the Bill is enacted during the lifetime of the Strategy.

27 Ocean Renewable Energy Development Plan, DCENR, 2010



Chapter 10 Marine Renewables

>=7m/s Wind Speed & Water Depth 60m to 200m

10.2 **The Technology**

10.2.1 The Wave Resource

The kinetic energy and power contained in waves can be harnessed and converted into electricity. The average wave height off the coast of Ireland is 2.5 to 3m and the power generated is a function of the wave height, speed and water density. Many different prototype devices for the capture of wave energy have been developed by several different companies²⁸.

County Clare is ideally placed for the delivery of pre-commercial wave energy projects, with a number already active off the Clare coast. The County has several advantages for wave energy including an excellent wave resource, strong grid connection and proximity to existing maritime infrastructure located on the Shannon Estuary. This Strategy seeks to ensure that the advantages County Clare has with excellent infrastructure such as ports and electricity grid together with the Shannon Estuary are maximised.

The Strategic Integrated Framework Plan for the Shannon Estuary (SIFP), in section 4.6.4.4, outlines that:

'The Shannon Estuary occupies a strategic location in respect of wave energy resource on the west coast and currently can provide sheltered facilities with good water depth and port services'.

The wave resource off the coast of Clare is identified on Maps 10.2 and 10.3²⁹.

10.2.2 **The Tidal Resource**

Tidal energy can provide reliable and predictable energy resources due to the predictability of tidal streams. The two main types of tidal extraction are tidal barrage systems and tidal stream flow turbines. Barrages are usually located across a tidal inlet and capture the energy of the tidal movement by creating a barrier and channelling it through the turbines. Tidal stream flow turbines are located beneath the water surface and can be submerged so they are not seen or heard. Similar to wave devices, there are currently a broad and diverse range of technologies under development for harnessing tidal energy.

The SIFP states that the Shannon Estuary is macro-tidal having the largest tidal range on the Irish coast (5.44m at Limerick Docks) and considerable potential as a tidal energy resource. It identifies 4 potential sites in the Shannon Estuary which could harness this tidal energy - Kilconly Point, Carraig Island, Tarbert Bay and adjacent to Moneypoint. These sites have potential to be developed, realising further economic development and job creation potential, in addition to existing strategic shipping, navigation and commercial fishing industries.

10.2.3 The Offshore Wind Resource

Offshore wind sites require grid connection under the current Gate 3 process. Offshore wind projects require development consent under the foreshore leasing and planning processes. Local Authorities will primarily be concerned with the onshore elements of offshore wind farms such as cable landfall and onshore grid connection infrastructure which would facilitate this type of project but will also have an important role during the consent process for offshore wind farms³⁰.

The offshore wind resource off the coast of Clare is identified on maps 10.4 and 10.5³¹.

- 30 SEAI Draft Methodology for Local Authority Renewable Energy Strategies Dec 2011, section 2.2.1 p7.
- 31 SEAI Mapping

²⁸ SEAI Draft Methodology for Local Authority Renewable Energy Strategies Dec 2011 section 2.2.5 p10 29 Maps from Marine Institute website – note that Pelamis

10.3 Planning Issues and Policy

The key planning issues and main challenges relating to marine renewables can be identified under the headings of policy/legislative, environmental, uses and infrastructure.

Policy/legislative

- No National Marine Spatial Plan in place to date;
- Marine atlas not completed to date;
- Tasks under Marine Strategy Framework Directive will not be completed until 2016.
 Full impact on the marine renewable industry is currently unknown;
- Forthcoming new Foreshore Bill is not enacted yet which will introduce significant new regulatory functions for Local Authorities.

Environmental

- Archaeology;
- Ecology/designated sites;
- Biodiversity;
- Heritage.

Balancing with other marine uses

- Aquaculture;
- Fishing sites;
- Tourism and leisure;
- Navigation lanes.

Infrastructure

- Availability of infrastructure proximity to grid and capacity of grid;
- Distance to port facilities supply chain infrastructure;
- Physical engineering challenges;
- Commercial viability;
- High capital investment.

10.3.1 Supporting Infrastructure Figure 10.1 (not to scale)



County Clare is ideally placed to serve the marine renewable industry by virtue of the existing infrastructural resource in the County. The Shannon Estuary, its' deep water and existing port facilities can assist the industry in terms of shipments, storage, and maintenance activities. The road network in the County is also of a high standard and includes motorway links. An excellent electricity network is available in Clare having line capacity from 10kv to 400kv. Broadband in Clare has resulted in a high quality ICT network and the County also benefits from an International Airport. This infrastructural resource is evidenced by the OREDP's stated potential for the west coast zone and the identification, by the Marine Renewable Industry Association, of an Initial Development Zone off the Clare coast, (see figure 10.1, left).

This Strategy provides the baseline necessary for County Clare to maximise its marine renewable development potential and aims to ensure that the opportunities in marine / ocean energy relating to enterprise, economic development, energy security and potential future electricity export are fully exploited.

The Council acknowledges that certain support infrastructure may have location specific requirements along the coastline. A building or enclosure may be required to house switch gear and other safety equipment serving the marine renewable industry. In identifying preferred locations where cabling etc. can come onshore and where support infrastructure serving the marine renewable industry can be located, the Council will have regard to the objectives set out in the Clare County Development Plan 2017-2023, with a focus on those set out in chapters 8, 11, 12, 13, 14 and 15, together with the SIFP for the Shannon Estuary.
10.4 Objectives and Targets

RES 10.1

Marine Renewable Energy Targets

It is an objective of Clare County Council:

- A To facilitate the attainment of 20MW from wave energy by 2020 in line with national policy, proper planning and sustainable development;
- **B** To facilitate the attainment of 20MW from tidal energy by 2020 in line with national policy, proper planning and sustainable development;
- C To facilitate the attainment of 10MW from offshore wind energy by 2020 in line with national policy, proper planning and sustainable development;
- Proposals for the construction of facilities, to achieve the above targets, shall be screened for Appropriate Assessment in accordance with Articles 6(3) and 6(4) of the Habitats Directive, and where judged necessary a Natura Impact Statement shall be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential impacts on Qualifying Interest Features and their associated Conservation Objectives.

RES 10.2

Strategic Marine Energy Infrastructural Development

It is an objective of Clare County Council:

To work in partnership with the marine renewable energy sector (wave, tidal and offshore), DECNR, EirGrid and other relevant stakeholders to deliver the key actions recommended by the Ocean Renewable Energy Development Plan (OREDP) and Grid 25, ensuring that electricity generated off the coast of County Clare can be exported to the demand market subject to the requirements of all environmental legislation.

RES 10.3

Marine Energy Service and Port Infrastructure

It is an objective of Clare County Council:

- A To actively explore and pursue opportunities to service the marine renewable energy sector at existing ports, to facilitate the growth of new ports, supporting infrastructure and associated development, in compliance with the Strategic Integrated Framework Plan for the Shannon Estuary and any future coastal zone management plans;
- B To facilitate the expansion of ports and provision of additional quayside harbour working areas and /or additional quay length to further enhance their attractiveness to marine renewable industry developers;
- C All proposals must be screened for Appropriate Assessment in accordance with Articles 6(3) and 6(4) of the Habitats Directive, and where judged necessary a Natura Impact Statement shall be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential impacts on Qualifying Interest Features and their associated Conservation Objectives.

RES 10.4

Marine Energy Research and Development

It is an objective of Clare County Council:

- A To promote and to facilitate, as far as possible, all proposed testing and research sites / required installations for future potential marine renewable energy off the coastline of County Clare;
- **B** To maximise the opportunities provided by the Shannon Estuary's strategic location and its' deep water for marine renewable energy development;
- C All proposals relating to marine renewable energy must be screened for Appropriate Assessment in accordance with Articles 6(3) and 6(4) of the Habitats Directive, and where judged necessary an Appropriate Assessment must be conducted. The AA shall include assessment for potential impacts on Qualifying Interest Features and their associated Conservation Objectives.

Map 10.2: Average Annual Wave Height (meters)



Map 10.3: Annual Average Pelamis Power Practicable (megawatts)



Clare County Council: Clare Renewable Strategy 2017–2023	Map: 10.3	Annual Average Pelamis Power Practicabl		
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Licence Number: 2015/18/CCMA/Clare County Council	Padraig McManus	Helen Quinn	Not to Scale	

2023 Volume 6 Clare Renewable Energy Strategy 2017-2023

Clare County Development Plan 2017

Map 10.4: Offshore Wind Speed at 75m



Mean Wind Speed (m/s)
15 +
14.75 - 15
14.5 - 14.75
14.25 - 14.5
14 - 14.25
13.75 - 14
13.5 - 13.75
13.25 - 13.5
13 - 13.25
12.75 - 13
12.5 - 12.75
12.25 - 12.5
12 - 12.25
11.75 - 12
11.5 - 11.75
11.25 - 11.5
11 - 11.25
10.75 - 11
10.5 - 10.75
10.25 - 10.5
10 - 10.25
9.75 - 10
9.5 - 9.75
9.25 - 9.5
9 - 9.25
8.75 - 9
8.5 - 8.75
8.25 - 8.5
8 - 8.25
7.75 - 8
7.5 - 7.75
< 7.5

Chapter 10 Marine Renewables

Date: January 2017

Map 10.5: Offshore Wind Speed at 100m



Clare County Council: Clare Renewable Strategy 2017–2023	Map: 10.5	Offshore Wind Speed at 100m	
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Licence Number: 2015/18/CCMA/Clare County Council	Padraig McManus	Helen Quinn	Not to Scale



Date: January 2017

Chapter 11

Micro Hydroelectric Power



11.0 Strategic Aims

The strategic aims of this chapter are:

- To describe the resource, how it works and identify the theoretical potential;
- To identify planning issues and constraints to the development of micro hydro power;
- To set out policy and broad criteria of planning considerations to be applied in assessing hydro schemes applications having regard to relevant environmental legislation;
- To set out objectives;
- To support micro hydropower developments which can make a contribution to our renewable energy targets while minimising any adverse impact on the environment.

11.1 Introduction

Clare has a proud tradition of hydro schemes. In 1929, the Ardnacrusha hydro electric power station was the biggest of its kind in the world and produced 90% of Ireland's energy needs.

The County also has significant potential to accommodate smaller scale hydro power development. Due to the undulating nature of the County and the presence of numerous water bodies, the opportunity exists to provide appropriately scaled hydro electric power stations. Where a suitable resource exists, with access to the grid and / or a corresponding local electricity demand, a micro hydro-power site can provide a strong financial return, as well as contributing to a reduction in carbon use as a renewable energy source.

There are approximately 100 potential micro hydro sites in Clare with domestic potential and 15 with commercial potential³². Although it is beyond the scope of this Strategy to assess flow and head data for each location (together with other site suitability considerations), this chapter identifies 4 no. commercial sites with potential to harness micro-hydroelectric power in County Clare.

11.2 The Resource 11.2.1 Hydro power electricity

Hydro power is derived from the energy from falling water. Water flowing from a higher to a lower level is used to drive a turbine which produces mechanical energy. This mechanical energy is usually turned into electrical energy by a generator. Schemes can be classified as low head schemes or high head schemes based on the geographic characteristics of the site. Plants operating with a head of over 150m are referred to as high head, those in the 20m-150m range are medium and those below 20m are classified as low head³³. Run of the river schemes are those where water is taken from a river from behind a low weir with no facility for water storage and returned to the same water course after passing through a turbine.

11.2.2 Scale

The focus of this chapter is on small scale projects. The International Energy Agency classifies hydropower plants with electrical generating capacity of:

- 10MW to 1 MW as small scale;
- 1MW to 100 KW as mini installations;
- 100kW to 1 kW as micro scale.

Depending on their mode of operation, hydro power systems are classified as reservoir or 'run of the river' schemes. This chapter focuses on run of the river only. Hydro power schemes are further classified according to the geographic characteristics of the site - the vertical distance between the water intake and outlet levels being either a high head or low head.

Planning permission has been granted to build a turbine house and install a micro hydro electric turbine with in take and outfall to the Ballymacrevan river and associated site works at Kilcornan, Ennistymon. Planning permission has also been granted and works commenced for the redevelopment of an existing hydro electric scheme including a new turbine house and all associated ancillaries at the Falls, Ennistymon. 33 SEAI

³² Micro Hydro Electricity Potential in County Clare, The Limerick Clare Energy Agency August 2010

11.3 Micro hydro potential in County Clare

The following data sets and reports were used to inform theoretical potential. It should be noted that many of these documents are dated and were not subject to any environmental assessment, however they provide an important reference resource to inform the County's hydro potential. They include:

- 'A statistical analysis of river flows South West Region' 1987 An Foras Forbatha;
- 'Small scaled hydro electric potential of Ireland' Dept of Energy 1985 which identified 9 sites, 2 of which were operating at the time;
- River flow data OPW and EPA;
- OSI map Ireland and (1:20000 scale maps for Clare) 1842 map to identify historic mill sites;
- 'The Millers and Mills of Ireland' William E. Hoggs Dublin 2011. In this book there are approx. 266 mill entries for Clare (from 1700-onwards). None of these are mapped;
- 'Recorded Monuments (Protected Structures under Section 12 of National Monuments (Amendment) Act 1994. Archaeological Survey of Ireland, OPW. A number of mill entries are identified for Clare (pre 1700);
- Clare County Development Plan 2017-2023, Vol. 4 There are a number of protected structures relating to mill wheels, weirs, fish passes etc. These include Clifden house in Corrofin- industrial in record of protected structures Vol. 4 (RM 433), Balintlea North House and Mill Sixmilebridge, O'Callaghans Mills, Derry Mills Caheraderry Enistymon (RM 557), Kilfenora – industrial mill;
- 'Micro Hydro Potential in County Clare' Limerick Clare Energy Agency, 2010.This report takes a sample of 5 commercial scale and 5 domestic scale projects as examples of possible micro hydro development.

While there is high technical potential for hydro power in Clare, the realisable / accessible potential will be greatly influenced by specific site conditions and how any environmental impacts can be avoided, managed or mitigated. Rehabilitation of existing mills may be more economically attractive than the development of green field sites.

11.4 Planning Issues and Policy

These can be identified under the headings of policy/ legislative, environmental, other uses and infrastructure and data access.

Policy/legislative

- Water Framework Directive and River Basin District Management Plans;
- Civil Rights of way land ownership and Riparian rights;
- Power Purchase Agreements (PPA's);
- Licence to generate electricity (from the Commission for Energy Regulation).

Environmental

- Archaeology;
- Lack of geographic flexibility Only possible to exploit exactly where they occur;
- Water abstraction;
- Fishery interests / migration;
- Hydrological considerations;
- Seasonality of water flow;
- Ecology/ designated sites;
- Biodiversity;
- Heritage;
- Public Rights of Way.

Balancing with other uses

- Fishing sites;
- Tourism and leisure;
- Water sports.

Infrastructure

- Availability of infrastructure proximity to grid and capacity of grid (low voltage 3 phase). If the site is too far from a suitable grid then the cost of extra cabling may render a project non viable;
- General access for repair vehicles etc;
- Financial viability;
- Grid access (if applicable);
- Power purchase agreements;
- Licence to generate electricity (from the CER).

Data access

• For developers of schemes - Lack of baseline data in relation to fish migration and flow, low flow conditions, efficacy of fish passes and details of weir structure affecting fish passage can hamper proper assessment of viability of a project. This information is necessary before proceeding to application stage. See section 16.6.

11.5 Policy

While Clare County Council generally supports micro hydro power in appropriate locations, as a means of contributing towards our renewable energy targets, there may be occasions where some hydro schemes are unacceptable because of potential ecological damage. Clare County Council shall work constructively to find an acceptable solution in cooperation with the environmental prescribed bodies and the applicant / developer.

The following sites have been identified as having potential for commercial hydro power in the County:

- Commercial Sites
 - 1) Old Mill, Ennis,
 - 2) Clondegad, Ballynacally,
 - 3) Moananagh, Inagh; and
 - 4) The Weir, Sixmilebridge

The Planning Authority is also available to give any further guidance or pre-planning advice to prospective developers as and when required. The above example list is typical of the nature of development that the Council would be predisposed to supporting. All future proposed sites for hydro power will be assessed on a caseby-case basis.

Map 11.1 shows potential locations for 4 no. commercial micro hydro facilities in County Clare. It also shows the river systems and existing hydroelectric resources which are operational. (Chapter 16 Development Management Advice section 16.6. sets out guidance on information to accompanying planning applications for micro hydroelectric plants). Details of site specific mitigation, to be complied with, is included in Appendix 2.

11.6 Objectives RES 11.1

Facilitating Micro Hydro Power

It is an objective of Clare County Council: To facilitate the development of micro hydro power developments on a case by case basis, where proposals comply with requirements of the Habitats Directive, the relevant River Basin District Management Plan, the provisions of the Clare County Development Plan 2017-2023, with the 'Guidelines on the Planning, Design, Construction and Operation of small scale hydro electric schemes and Fisheries' DCENR and the Central and Regional Fisheries Board 2007 and other related legislation/ guidance that is available , in accordance with proper planning and sustainable development.

Clare County Development Plan 2017 – 2023 Volume 6 Clare Renewable Energy Strategy 2017-2023

Map 11.1: Hydro-Electric Map







Chapter 12

Waste Resources to Energy



12.0 Strategic Aims

The strategic aims of this chapter are:

- To explain the concept of the 'waste hierarchy';
- To identify waste streams with potential for conversion to energy;
- To identify factors influencing the preferred locations for the installations of A.D. facilities;
- To set out policy and objectives to ensure anaerobic digestion contributes to the attainment of renewable energy targets for the County.

12.1 Introduction

A natural consequence of any activity is the creation of a quantity of material or energy that may be described as "waste". The concept of waste as a material that has no use or economic value is now being re- evaluated. This out dated concept of waste resources is not in keeping with the existing strategies on waste management or creation of low carbon community & commerce.

The cornerstone of European waste policy is the 'waste hierarchy'. The concept is commonly referred to as the 4 Rs. reduce, reuse, recycle, recover followed by final disposal. The waste hierarchy prioritises the prevention and reduction of waste, then its reuse and recycling, then recovery and lastly disposal. The 'waste hierarchy' derives from Article 3 of the EU Waste Framework Directive 1977 subsequently replaced by the Directive 2006/12/EC. This legislation and other supporting legislation such as the Landfill Directive (1993/31/EC) Waste Management Act 1996- 2008, the 'Waste Management (Licensing) Regulations' 2004 (S.I. no. 395) and policy documents such as 'National Biodegradable Waste Strategy' (D. o E.H.L.G. 2006) and the 'Bio-energy Action Plan' significantly influence how waste streams are regulated, managed and treated prior to disposal.

12.2 Waste to Energy / Waste as a Resource

The 'National Strategy on Biodegradable Waste' sets out measures to divert biodegradable municipal waste away from landfill. While substantial volumes of biodegradable municipal waste will be diverted from land fill as a result of recycling and biological treatment, significant quantities of residual waste will remain. To maximise the recovery of useful materials and energy from residual waste the national strategy on biodegradable waste identifies thermal treatment with energy recovery as a preferred option.

While this chapter predominantly focuses on AD technology as the principle method of converting waste to energy, it is acknowledged that there are potentially other waste streams which could also be harnessed for conversion to energy.

Waste resources are not described in detail in the National Renewable Energy Action Plan itself, however the utilization of treatment methods (principally Anaerobic Digestion) for various biomass waste streams is dealt with in the NREAP under

- 1.Biodegradable fraction of municipal solid waste including bio-waste and landfill gas;
- 2 2.Biodegradable fraction of industrial waste (including paper, cardboard, pallets);
- **3** 3.Sewage sludge.

In addition to the waste streams recognized by the NREAP, there are other forms of waste that could be harnessed to provide increased energy efficiency, thermal and or electricity;

- Waste energy streams associated with electricity production;
- Waste energy streams associated with thermal processes;
- Waste energy streams associated with Solid Municipal Waste.

12.3 South Waste Management Region

Clare County Council now forms part of the new South Waste Management Region which was established in 2013. The Southern Region Waste Management Plan 2015 - 2021 sets out preferred waste management and waste treatment options for the region. Technologies which enable thermal treatment with energy recovery present opportunities to meet minimum pre treatment obligations and derive energy from renewable sources thus ensuring that waste to energy projects are compatible with national waste policy.

12.4 Anaerobic Digestion

The efficient utilization of the various waste or waste energy streams would require the investment in suitable capture, conversion, storage and distribution infrastructure. An example of the one technology is Anaerobic Digestion.

The use of Anaerobic Digestion as a means of treating biomass waste streams is also further supported by the Renewable Energy Feed In Tariff (REFIT) scheme. Anaerobic digestion (AD) uses bacteria to convert organic material such as agricultural, household and industrial residues and sewage sludge into bio-gas with high methane content in the absence of oxygen. The methane can be used to produce heat, electricity, a combination of the two or a transport fuel, thereby contributing to renewable energy targets across the three main sectors and ensuring security of energy supply by reducing reliance on fossil fuels and diversifying the national fuel mix.

AD has a number of associated environmental benefits. Energy from AD is effectively carbon neutral. AD also lowers the organic pollution potential of slurries resulting in water quality benefits, the by-products result in better quality fertilizers and reduces the need for artificial fertilizer use. The process also has the advantage of utilising waste substances that are otherwise difficult to dispose of in an environmentally acceptable manner – this management of organic waste contributes towards the achievement of obligations under the EU Landfill Directive.

There are a small number of AD digesters in operation in Ireland however the viability of these systems is dependent on access to an adequate and consistent quantity of supply of suitable wastes, which can require large storage areas. Ideally, digesters should be located in close proximity to both a supply source and a demand market.

12.5 Assessment of Potential for Anaerobic Digestion

Full assessment of potential for AD in Clare requires an estimation of the potential installed capacity from the total available manure resource including cattle, pig and poultry. In addition, it requires assumptions regarding the percentage of animal manure produced which will be captured by AD, together with other waste streams. Such exercises are beyond the scope of this strategy. However, this chapter focuses on the factors influencing the spatial location of AD facilities and associated planning policy and objectives for their provision. Table 3.2 in Chapter 3 outlines targets for anaerobic digestion in County Clare. Planning applications for AD plants should be accompanied by traffic impact assessment and road safety audits.

12.5.1 Factors influencing the preferred location for AD plants

Location requirements for AD plants vary depending on the nature of the AD facility proposed and include the following:

- Smaller digesters on farms are subject to Department of Agriculture criteria, including issues relating to access and boundary treatment etc.;
- Sewage sludge digesters these are likely to be built in conjunction with new or existing waste water treatment plants;
- Centralised AD's handling large quantities of agricultural waste, sewage sludge or municipal solid waste raise more complex siting issues. The most acceptable sites are likely to be beside industrial or waste water treatment works, or in the case of digestion using municipal solid waste, in close proximity to land fill sites or waste transfer stations;

- d Centralised AD's may have a traffic impact. It is preferable, if possible, to reduce the distance travelled between feedstock, storage tanks, digester and local markets;
- e Ideal site placement requires proximity to waste sources, and proximity to customers for heat (population centres or one large heat user/customer) and electricity grid;
- f Optimum site placement also depends on the availability of sufficient volumes of waste – a consistent supply in close proximity to the digester.

12.6 Landfill gas utilisation

The production of gas from organic matter is not restricted to Anaerobic Digesters. For example a landfill containing organic matter will produce methane gas naturally. This gas must be processed in accordance with the license issued by the Environmental Protection Agency (EPA). However it would be preferable if the gas could be used in a more productive manner, by contributing to the County's need for electricity, heat or transport fuel.

Map 12.1: Biomass Waste Conversion to Energy



12.7 Objectives

RES 12.1

Facilitating the development of Anaerobic Digestion Facilities

It is an objective of Clare County Council:

To support and encourage the development of AD facilities:

- A Where practical, adjacent to the national or regional road network and where traffic considerations are acceptable and the road network has adequate carrying capacity and in compliance with the provisions of Guidelines on Spatial Planning and National Roads.
- **B** In a central location within the waste stream catchment area in order to minimise road hauls
- **C** Where there are no unacceptable effects on the amenities of existing residents
- Proximate to electricity grid or gas network or large heat demand user
- E Where it can be demonstrated that developments shall not adversely affect species and habitat designated by the Habitats Directive and shall comply with the requirements of the relevant River Basin District Management Plan and other environmental legislation.

RES 12.2

Small-scale Anaerobic Digestion

It is an objective of Clare County Council: To support and encourage in rural areas, proposals for small scale AD close to the source material and where roads have the capacity to carry increased traffic movements. Such facilities shall, where possible, be located within or adjacent to existing farm complexes close to existing agricultural buildings, and in accordance with proper planning and sustainable development.

RES 12.3

AD and wastewater treatment

It is an objective of the Renewable Energy Strategy:

To investigate the feasibility of installing A.D. facilities at municipal wastewater treatment plants in the County. In addition to a feasibility study, an environmental appraisal of all potential impacts will be required for compliance with proper planning. All proposals relating to A.D., waste water treatment, renewable energy and supporting infrastructure must be screened for Appropriate assessment in accordance with Article 6(3) and 6(4) of the Habitats Directive and where judged necessary a Natura Impact Statement must be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential negative impacts on Qualifying Interest Features and their associated Conservation Objectives.

RES 12.4

Waste Energy Resource Utilisation It is an objective of the Renewable Energy Strategy:

To investigate and identify any significant waste energy streams and to determine the feasibility of utilising such waste energy streams locally to increase energy efficiency in the County in accordance with proper planning and sustainable development.

RES 12.5

Energy From Municipal Solid Waste It is an objective of Clare County Council:

To support the Southern Region Waste Management Plan and the policies and objectives contained in any future Regional Waste management Plan and to investigate the feasibility of energy recovery associated with the processing of MSW subject to compliance with environmental legislation.

Map 12.1 shows the wastewater treatment plants, waste transfer stations, waste processing plant, gas pipeline and road network in County Clare.



Chapter 13

Supporting Infrastructure



13.0 Strategic Aims

The strategic aims of this chapter are:

• To ensure that Clare has a robust and efficient infrastructure which not only meets the County's existing and future energy needs, but also enables it to be an exporter of energy.

13.1 Introduction

Large scale renewable energy technologies require appropriate infrastructure to operate successfully. This infrastructure may already exist and have sufficient capacity to facilitate the renewable energy technology or it may need to be upgraded or introduced as a direct result of the new energy development.

Renewable energy installations will have different infrastructure requirements depending on the technology employed, the location and the operating conditions. These include access to and connection to grid infrastructure, distribution networks, accessibility (by road, rail, or sea), ports / yards for crane installation and component assembly and access routes for decommissioning, operation and maintenance.

13.2 Electricity

The National Grid is a nationwide electricity transmission network that consists of both overhead and underground high voltage power cables. When electricity is generated at power plants it is transformed to higher voltage levels and fed into the national grid. The electricity is then passed through transformer stations where the voltage is reduced for onward, local distribution. County Clare is exceptionally well served by the grid with two existing 400kV lines providing a high capacity path for power flows from Moneypoint to the east of Ireland. In addition, there is an extensive 220kV and 110kV network.

Renewable electricity projects are required to make a connection to the grid. The Gate 3 process provides for almost 4,000MW of new renewable energy generation nationally. The Grid 25 implementation strategy makes provision for the future infrastructure required to deliver Gate 3 including upgrading the power lines supplying the large urban centres. However, this Strategy has identified renewable electricity production in excess of the "gate 3" process. The Council will work closely with EirGrid in any future review of the Grid 25 Strategy to ensure that the County has the required infrastructure network to enable it to generate, distribute and export renewable energy.

13.3 Gas

The Bord Gais network owns and operates the gas transmission pipeline running from north to south through County Clare and the adjoining way leave (typically 14m wide). Bord Gais also applies a 400m 'zone of interest' corridor to the gas pipeline whereby the nature and scale of all developments outside the way leave are monitored to ensure compliance with the current code of practice.

At present, seven locations in County Clare are connected to the gas grid namely Bunratty, Clarecastle, Cratloe, Ennis, Killaloe, Meelick, Shannon and Sixmilebridge. If the proposed Shannon Liquefied Natural Gas (LNG) facility is built, it is likely that the gas network in County Clare will be extended.

It is an objective of the Clare County Development Plan 2017-2023 to facilitate the delivery and expansion of natural gas infrastructure throughout the County (CDP 8.32 refers).

Map 13.1 shows the electricity and gas network in County Clare.

13.4 Ports / Harbours / Piers

Development of marine renewables and the associated servicing greatly depend on the capacity of port infrastructure. Water depths of up to 37m can accommodate larger vessels. The Clare County Development Plan 2017-2023 identifies areas of deep water in the Shannon Estuary at Cahircon, Mountshannon West, Moneypoint East, Moneypoint Power Station and Moneypoint. Clare County Council recognises that the maintenance, improvement and, in some cases, construction of new piers and harbours is essential in coastal and estuarine areas in order to provide the necessary infrastructure to maximise the potential of marine renewable energy. Clare County Council will encourage the development of new harbour facilities along the Shannon estuary in order to take advantage of the deep water conditions in the area. Relevant policies are set out under Chapters 8 and 11 of Vol. 1, Clare County Development Plan 2017-2023. The importance of this infrastructure to the development and servicing of off shore marine renewable sector is highlighted in the 'Strategic Integrated Framework Plan for the Shannon Estuary' 2013 - 2020 SIFP. Sections 4.6.3 'Energy Strategy for Shannon Estuary', Section 4.6.4.4. 'Servicing of Off Shore Renewable Energy' and Section 4.6.4.5 'Research and Development'.

Lands at Moneypoint and lands adjacent to Kilrush are identified as having potential for marine related industry and renewable energy.

It is recommended that a feasibility study be undertaken in relation to any new port development and this study would outline all of the potential environmental issues associated with port development at identified sites.

13.5 Roads

Some renewable energy project sites by their nature may be remote. They will require adequate road infrastructure to enable large heavy goods vehicles to transport materials and plant. Access will also be required for operation and maintenance and for decommissioning. The biomass industry and associated technologies of AD and CHP are highly dependent on good road networks between points of supply and demand. Reference is made to objectives set out in Chapter 8 'Physical Infrastructure' of the Clare County Development Plan 2017-2023. Map 13.1 outlines the excellent road network in County Clare, which includes motorway connectivity between Ennis and Shannon, a comprehensive national road network and a high guality regional network.

13.6 Water supply and wastewater

The provision of good quality water supply and effective waste water treatment and disposal infrastructure are critical requirements for the economic development of the County and in particular for attracting inward investment in green/ clean technology. Some renewable energy technologies are particularly dependent on having continuous water supply such as hydro power. The abstraction of water from rivers and lakes can reduce the ability of an ecosystem to continue functioning. The Council will seek to ensure that water serving the renewable energy industry is protected from pollution, and managed in a sustainable manner. Relevant objectives are set out under Chapter 8, Volume 1.

13.7 Energy Storage

Renewable energy sources have vast potential to reduce dependency on fossil fuels and greenhouse gas emissions. Despite this many of the resources have intermittent or variable output, therefore if they are not harnessed the energy goes to waste. As a result there is an increased need for energy storage to store energy when demand is low to be utilised when demand is high. There are a number of storage systems including pumped hydroelectric energy storage (PHES), battery storage and thermal storage.

13.7.1 Pumped Hydro Energy Storage (PHES)

PHES is the most mature and largest storage technique available. It is discussed in more detail under Chapter 14, Section 14.3.1. This strategy, (Maps 14.1, and 14.2A refers), identifies an indicative area for PHES in County Clare.

13.7.2 Battery Storage

Battery Energy storage can be integrated with renewable energy generation systems in either grid connected or stand alone applications. For grid connected systems, batteries add value to intermittent renewable sources by facilitating a better match between supply and demand. Other benefits of this method of energy storage include; power quality assurance, load levelling and integration of renewable energy generation plants. There are no emissions, solid wastes or effluent produced from these battery storage systems. There are a number of different types of battery technologies.

13.7.3 Thermal Storage

Thermal energy storage comprises a number of technologies that store thermal energy in energy storage reservoirs for later use. They can be employed to balance energy demand between day and night time. The thermal reservoir may be maintained at temperatures hotter or colder than the ambient environment. Its applications include the production of hot water, which is used to cool or heat buildings.

13.8 Other Infrastructure Supports

13.8.1 Grid Connection

Large and some small scale renewable energy projects can be connected to the national electricity distribution network. It may be that a site is a considerable distance from the network or that the network is unable to handle extra capacity potential. In such instances network improvements may be required. The cost of connection to grid may be prohibitively expensive especially if cabling has to be laid through difficult terrain. Electricity substations will have a maximum capacity that could limit the connection of larger scale renewable energy developments.

Grid infrastructure (32 KV and 110 KV lines) may require to be reinforced and upgraded in remote and coastal locations in order to facilitate renewable energy projects which may occur at these locations.

13.8.2 Smart Grid

The development of a Smart Grid is an important part of County Clare's ability to maximise energy efficiency and the integration of renewable energy. Elements of the Smart Grid will include:

- Voltage / power management of grid network;
- "Self-healing" correcting grid;
- Integration of renewable energies at all scales;
- Integration of electric transport systems;
- Smart metering for all sectors;
- Sophisticated tariffs;
- Demand side management.

County Clare homes have participated in the pilot roll out of "smart meters". The roll out of Smart meters and several other elements of the Smart Grid are planned by 2020.

13.8.3 Access to fuel storage

Large heat users may require adequate fuel storage, to avoid the need for frequent deliveries.

13.8.4 District heating

District heating is a system for distributing heating comprising of a boiler which generates hot water and a network of connected underground pipes to distribute the hot water. The central boiler can be fired by fossil fuels, biomass, geothermal or nuclear sources. Cofiring occurs where boilers can fire a mixture of fuel sources. District heating plants can provide higher efficiencies when the boiler provides both heat and electricity - this system is known as Combined Heat and Power (CHP). District Heating systems are widespread in Europe. There is no district heating system in operation in County Clare at present, however this strategy supports the Shannon Town and Environs Local Area Plan 2012-2018 which identifies the town as suitable for a District Heating system. There are also opportunities to provide district heating in Ennis where large heat users such as schools, industrial estates, hospitals and existing housing are located proximate to land zoned for new housing. For reasons of economies of scale, such systems are particularly suited to urban areas and industrial zones where the required densities of development are available.



13.9 Objectives

RES 13.1

Renewable Energy and Supporting Infrastructure

It is an objective of Clare County Council:

- A To collaborate with EirGrid over the lifetime of the Strategy to ensure that County Clare has the grid infrastructure in place to maximise its potential for renewable energy generation to meet its own energy needs and to enable export to the demand market;
- **B** To promote and as far as practicable facilitate Eirgrid and ESB Networks in the development and delivery of a Smart Grid with its constituent elements;
- C To support and facilitate the emergence of a competitive supply chain economy that will sustain and assist in further developing a robust renewable energy sector in County Clare;
- D To actively promote the development of Smart Grid Infrastructure and its associated technologies in accordance with proper planning and sustainable development;
- E To require medium and large scale heat / energy users to utilise waste heat and power to meet on site energy requirements and to supply or utilise future district heating networks;
- F To facilitate the expansion or upgrading of existing infrastructure, including roads, ports, piers, power lines and substations etc. to support the development of renewable energy projects, in accordance with the requirements of the Habitats Directive;
- G To ensure that the County's ICT and broadband network enables it to be a leader in renewable energy research and development;
- H To require planning applications for multi unit housing developments, large commercial and industrial developments to be accompanied by a feasibility study setting out the potential for incorporating district heating infrastructure into the proposed development;

All proposals relating to renewable energy and supporting infrastructure must be must be screened for Appropriate Assessment in accordance with Articles 6(3) and 6(4) of the Habitats Directive, and where judged necessary a Natura Impact Statement must be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential impacts on Qualifying Interest Features and their associated Conservation Objectives.

RES 13.2

Biogas potential

It is an objective of Clare County Council:

- A To identify opportunities for the production of biogas from various resources including biomass and waste resource streams including land fill gas in accordance with proper planning and sustainable development;
- B To collaborate over the lifetime of the strategy with Bord Gais Networks to establish where mini connection points to the existing gas infrastructure pipeline could be made to accommodate biogas produced from renewable sources in accordance with proper planning and sustainable development.

RES 13.3

Grid 25

It is an objective of Clare County Council:

To actively participate in any future interim review of EirGrid's Grid 25 Strategy to ensure that the County's potential to export electricity from renewable energy resources is achieved / maximised subject to compliance with all environmental legislation.

Map 13.1: Supporting Infrastructure



Chapter 13 Supporting Infrastructure





Chapter 14

Energy Storage – Pumped Hydro



14.0 Strategic Aims

The strategic aims of this chapter are to:

- Introduce the role of energy storage / load balancing as a key enabling technology in the transition from a fossil fuel based energy system to one based on renewable production;
- Outline the different kinds of energy storage, with a focus on and explanation of pumped freshwater hydro energy storage (PHES);
- Identify one indicative area with potential for PHES;
- Identify constraints to developing PHES and policy gaps;
- Give clear guidance on where PHES development could occur, and set out criteria based objectives for the development of PHES within the identified indicative area.

14.1 Introduction

In electricity systems, supply and demand have to be balanced in real time. Energy storage helps accommodate higher percentages of variable or intermittent renewable energy by balancing supply and demand and improving power quality. To overcome demand fluctuations, load management technology and storage can be used to balance the electricity system. The increasing dispersed nature of energy generation and the increased use of variable sources are changing the way electricity systems have to be operated and managed.

Energy storage can be used in conjunction with interconnection as a means of balancing electricity demand and supply. The Council recognises that energy storage is a critical component in realising the County's potential to become a renewable energy exporter.

PHES acts to regulate the energy load of the national grid. It also avoids the wastage of wind energy by utilising this energy when it is produced at off-peak times (e.g. at night). It can also respond quickly to a peak load demand on account of its large storage capacity.

14.2 Energy storage

Types of electricity storage are categorised as mechanical, electromagnetic, and electrochemical.

- Mechanical pumped hydro, compressed air and flywheel;
- Electromagnetic super capacitors, super conducting magnets;
- Electro chemical batteries, flow batteries, and hydrogen and fuel cell technology.

This chapter focuses on potential for pumped hydro energy storage in County Clare.

14.2.1 Pumped Hydroelectric Energy Storage

A pumped hydroelectric energy scheme is a mechanical device for storing energy. It consists of two large reservoirs located at different elevations, typically between 200-300m and a number of pump/turbine units. Fresh water stored in an upper reservoir is processed in a turbine to recover its energy. The turbine runs a generator which converts the mechanical energy into electricity which is fed to the grid. The processed water is then captured in a lower reservoir. When demand for electricity is low, usually at night, the water is pumped back up into the upper reservoir. A project in which both reservoirs are artificial and in which no natural waters are used is known as 'closed loop systems'. Other systems are 'semi open' consisting of one artificial reservoir, the other with a natural inflow or part of a river system and 'open system' – where both reservoirs have natural inflow or are part of a river system. Turlough Hill in County Wicklow is an example of a PHES system.

'Sea water' PHES is a special type of semi open system which uses sea water as a lower reservoir. Currently there is only one in the world – Okinawa National Park, Yanbaru, Japan built in 1999. This Strategy only assesses the potential for pumped freshwater hydro energy storage in County Clare as, currently, the use of sea/salt water as the lower reservoir is not considered to be environmentally acceptable, having regard to the SEA / AA processes which informed the preparation of this Strategy.

The installation of PHES is dependent on specific geological formations. However, as well as being rare, these geological formations normally exist in remote locations that can be environmentally and ecologically sensitive and where construction may be difficult and costly and where the power grid may not be present.

14.2.2 Other forms of Storage

Whilst the focus of this chapter is on pumped freshwater hydroelectric energy storage, there are other forms of energy storage. Battery Energy storage can be integrated with renewable energy generation systems in either grid connected or stand alone applications. For grid connected systems, batteries add value to intermittent renewable sources by facilitating a better match between supply and demand. Other benefits of this method of energy storage include power quality assurance, load levelling and integration of renewable energy generation plants. There are no emissions, solid wastes or effluent produced from these battery storage systems. There are a number of different types of battery technologies.

Thermal energy storage comprises a number of technologies that store thermal energy in energy storage reservoirs for later use. They can be employed to balance energy demand between day and night time. The thermal reservoir may be maintained at temperatures hotter or colder than the ambient environment. Its applications include the production of hot water, which is used to cool or heat buildings.

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14.3 Assessment of Potential

Assessment of the potential for PHES does not lend itself easily to the supply / demand model. The assessment of theoretical potential is more aligned towards examination of the supply side i.e. where theoretically and technically PHES facilities could be located. This is because PHES systems are strongly dependent on certain geographic requirements and topographical conditions which are place specific. These are easily identifiable and capable of being mapped.

However, the demand side is more difficult to assess. PHES is potentially unviable without a special financial support structure. Questions arise such as how energy storage is defined, who should pay for it, whether it should be viewed as 'grid infrastructure' or as another method of power generation to be built and operated by individual investors. Also, the question arises as to whether the electricity markets need to be structured to accommodate energy storage. Until there is national policy on bulk energy storage, a lack of clarity will remain around the demand side in assessing potential.

Accordingly, this strategy does not set out any targets for PHES power output.

14.3.1 Theoretical Potential

In 2010, the Limerick Clare Energy Agency commissioned a report entitled 'The Potential for Fresh Water Pumped Hydroelectric Storage in County Clare'. This report identified and quantified the characteristics of potential sites for pumped hydroelectric storage utilising fresh water resources that may support the development of renewable electricity generation in the County. It identified the location of potential candidate sites for P.H.E.S. and estimated the power and storage capacity of the most suitable sites. It also estimated the typical capital costs and time scales associated with the most suitable sites. The report however did not provide a feasibility study of any particular site.

Three general areas were identified, including potential sites meeting the required topographical criteria. The result of the study found that the PHES sites analysed had very large storage capacities compared to their power capacities, indicating that County Clare has in theory a significant freshwater PHES resource. This report was not subject to any environmental assessment at the time of its preparation.

14.3.2 Actual Potential

Following a detailed study of the geographical and physical potential for PHES and through the SEA and AA processes, this Strategy has identified 1. no. indicative area, considered to have significant potential to accommodate future pumped freshwater hydroelectric energy storage. This area is outlined on Map 14.1.

The indicative area identified is as follows:

Indicative Area 1 - West Clare (Slieve Callan area)

Map 14.1 shows the indicative area in the context of the location of grid infrastructure in the County. The remainder of the County is classified as not normally permissible for PHES.

Maps 14.2 A, shows the indicative area in greater detail. A specific objective pertaining to this area is set out in section 14.6 below.

14.4 Planning Issues and Challenges

There are a number of key planning issues and challenges to the development of PHES in County Clare, including the following:

- Availability of infrastructure and grid access;
- Strategic Infrastructure Act thresholds for hydroelectric energy production;
- Environmental considerations;
- Technology and spatial constraints;
- Market / regulatory issues;
- Policy / administrative constraints Significant policy gap at National and Regional level- no national policy/ strategy for energy storage, no planning guidelines for energy storage, no best practice guidelines for energy storage/ sustainable site selection etc.;
- Long lead in time for development and construction (approx. 6-12 years);
- High Capital costs;
- No REFIT Scheme is in existence for PHES (at time of writing);
- Interconnection –This may be a threat to energy storage in Ireland. Countries that are interconnected with neighbouring countries buy and sell power during fluctuations without the need to store energy.

14.5 Policy

Appropriate locations for pumped freshwater hydro energy storage facilities are guided by minimum physical criteria that include the following:

- A difference in elevation between the upper and lower reservoir (the head) of at least 200 metres;
- Within close proximity to existing electricity transmission network;
- If possible, in close proximity to a cluster of wind energy developments;
- Within an area which has sufficient hydrological resources;
- Within an area with suitable geology, avoiding karst limestone areas;
- Where the opportunity exists, in close proximity to cluster of wind energy developments.

14.6 Objectives

RES 14.1

Facilitating Pumped Freshwater Hydroelectric Energy Storage

It is an objective of Clare County Council:

- A Within the Indicative Area identified on map 14.1, to facilitate the development of Pumped Freshwater Hydroelectric Energy Storage;
- B All proposals relating to pumped fresh water hydroelectric energy storage together with any supporting infrastructure must be screened for Appropriate Assessment in accordance with Articles 6(3) and 6(4) of the Habitats Directive, and where judged necessary a Natura Impact Statement shall be submitted and an Appropriate Assessment must be conducted. The AA shall include assessment for potential impacts on Qualifying Interest Features and their associated Conservation Objectives;
- C All pumped fresh water hydroelectric energy storage development applications shall be in line with environmental policies contained within the Clare County Development Plan 2017 - 2023.

RES 14.2

Other forms of Energy Storage

It is an objective of Clare County Council:

To facilitate, where possible, other forms of Energy Storage, including battery and thermal energy storage. All applications must be in accordance with proper planning and sustainable development.

14.7 Mitigation for PHES

An Environmental Impact Assessment or Ecological Impact Assessment should identify all factors, including ecological corridors, and should be accompanied by appropriate surveys, under taken at the correct time of year by a suitably gualified and experienced ecologist. Details of the habitats impacted by the PHES will be required, including descriptions of protected species recorded and mapping of habitat locations and extents. The habitat mapping should be in accordance with Best Practice Guidance for Habitat Survey and Mapping, Heritage Council 2011. There are a number of plant species protected under Flora Protection Order, 1999, which may potentially occur in the indicative area. There may also be breeding sites and resting places of otter, and potentially of bats (both of which are strictly protected under S.I. no. 477 of 2011) within the indicative PHES area. This will require both survey for these and to comply with the Wild Life Acts and Regulations.

A study of potential impacts on the peat soils and risks associated with landslides is required for all PHES sites. This should include a detailed assessment of potential effects on both NHA's and pNHA's which may be affected by any proposed PHES development which should also include an in-combination or cumulative assessment with the development of other renewable energy technologies in the surrounding areas.

Other requirements for proposed PHES development include:

- A hydrological and hydro-geological study;
- A full archaeological assessment;
- A landscape and visual assessment;
- Consultation will be required with the Inland Fisheries Ireland in relation to the development of PHES within the indicative area identified in this strategy.

In addition to the above general mitigation, details of site specific mitigation for the Slieve Callan Indicative Area is included in Appendix 2.



Map 14.1: Indicative Area for Pumped Freshwater Hydro Electric Storage



Map 14.2A: Pumped Freshwater Hydro Electric Storage Indicative Area



Chapter 15

Transportation



15.0 Strategic Aims

The strategic aims of this chapter are:

• To set out policy and objectives for renewable transport in Clare.

15.1 Introduction

The transport sector is the largest fuel consumer and is responsible for more CO_2 emissions than any other sector of the economy. In Ireland there is almost a total dependence on imported oil in transport – over 99% in 2009³⁴. According to the Census of Population 2006 (Vol.12, p.263), 84.8% of private households in County Clare had at least one motor car and 37% of households had use of two motor cars.

It is estimated that the transport sector accounts for 40% of total final energy consumption in County Clare. On a County level, this sector is also accountable for the greatest increase in emissions in Clare since 1990 with a 143% increase to 2005. In 1990, the transport sector accounted for 20% of total emissions and by 2005, this share had increased to 28%. If current trends continue, it is estimated that by 2015 this sector's share of emissions will increase to approximately 38% of total emissions. A combination of energy efficiency measures, electricity vehicles and renewable energy sources can significantly reduce the levels of greenhouse gas emissions from the transport sector contributing to achieving Kyoto Protocol targets.

Electric Vehicles will benefit from the development of a 'Smart Grid' in Ireland as the electric battery storage can act to regulate the energy load of the national grid by utilising energy produced off peak for charging.

By adopting a range of energy efficiency and conservation measures outlined in the National Energy Efficiency Action Plan and policy in 'Smarter Travel – A Sustainable Transport Future: A new Transport Policy for Ireland 2009- 2020', County Clare will endeavour to reduce energy associated with the transport sector by 129 GWh from 2010 to 2020. County Clare will also reduce CO₂ emission over the same period by 32,900 tonnes.

In order to achieve the savings in energy and CO2, all economic and social sectors of the County must play their part. Actions to achieve the reductions will include:

- Use of inter-city public transport services, routes and infrastructure;
- 2 Use of rural / urban accessible transport services, routes and infrastructure;
- 3 Promotion of active living and walking friendly environments;
- 4 Prioritisation of walking and cycling as the preferred mode of transport in built up areas;
- 5 Promotion and development of cycling lanes and associated services through proposals for their provision as per set out in Local Area Plans, Development Plans, and through the preparation of green infrastructure and sustainable urban mobility plans;

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³⁴ SEI Energy in Transport Report, 2009.

- 6 Development of information / awareness systems to coordinate the optimal use of public service resources; e.g. linking of rural, urban and intercity route planning;
- 7 Development of urban parking strategies to minimise congestion, whilst enabling the provision of retail and commercial services;
- 8 Promotion of 'Park and Ride' services near major transport infrastructure centres to facilitate the increased use of public transport;
- 9 Development of distribution and storage infrastructure to facilitate the use of vehicles powered by LPG, CNG, hydrogen and electricity;
- **10**The promotion and facilitation of vehicle use public awareness and optimisation services such as:
 - a Mobility planning for organisations and communities;
 - **b** Use of shared transport assets (car pooling, car sharing);
- c Increased use of cycling to work / school.
- **11** Promotion of energy efficient driver training.



15.2 Objectives RES 15.1

Energy and Transportation

It is an objective of Clare County Council:

- A To facilitate the installation of charging points for Electric Vehicles at suitable public locations throughout County Clare, including:
 - > Ennis town and Shannon town;
 - Service towns of Kilrush, Ennistymon-Lahinch and Scariff–Tuamgraney;
 - > Within the curtilage of all public buildings and schools, where feasible.
- B To carry out a feasibility study over the lifetime of this Strategy to examine the conversion of local authority vehicles to use alternative / indigenous fuel and electricity in keeping with the national targets on alternative fuel vehicles;
- C To promote the development and use of alternative energy and electric vehicles in line with the concept of smarter travel and encourage and facilitate the development of ancillary infrastructure in accordance with proper planning and sustainable development;
- D To promote the development of public transport services and ancillary systems within County Clare in accordance with proper planning and sustainable development;
- E To promote the development of comprehensive information systems to optimise the coordinated use of disparate public transport services;
- F To promote and facilitate the provision of cycling lanes in accordance with the requirements of Habitats Directive;
- **G** To raise the public awareness of the need for energy efficiency in transport services in association with national, regional and local bodies.


Chapter 16

Development Management Advice

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Under Section 247 of the Planning and Development Act 2000 (as amended) a person who has an interest in land and who intends to make a planning application may, with the agreement of the planning authority concerned, enter into consultation with the planning authority in order to discuss any proposed development in relation to the land and the planning authority may give advice to that person regarding the proposed application. In such consultation the planning authority may indicate the relevant objectives of the development plan which may have a bearing on the decision of the planning authority and may also advise regarding general planning procedure and requirements of the permission regulations. The planning authority is obliged to keep a record in writing of the consultation.

16.1 Supporting Documents to Accompany Applications

Supporting documents for planning applications for renewable energy projects may include E.I.S. and AA. It may also include specialist reports relating to particular areas of expertise such as archaeology, noise, traffic impact assessment, accessibility audit, ecology, environmental impact assessment and appraisal, construction management plans, flood risk assessment, flicker analysis, daylight and sunlight analysis etc. This list is not exhaustive and further advice can be given at pre planning stage for particular requirements. Large scale or complex proposals will require a coordinated approach by the Planning Authority with input from various directorates.

16.2 E.I.S

Scoping for E.I.S. is set out in Article 93, Part 10 of the Planning and Development Regulations 2001-2012. Schedule 5 of the Planning and Development Regulations 2001-2012 sets out the developments for the purposes of Part 10, i.e. which will require mandatory E.I.S. Schedule 6 sets out the information to be contained in an E.I.S., while Schedule 7 sets out the criteria for determining whether a development would or would not be likely to have significant effects on the environment, i.e. the criteria for determining if E.I.S. is required for sub-threshold developments.

16.3 Sub Threshold Development

The key issue for consent authorities in the context of the possible need for EIA of sub threshold development is whether or not such development is likely to have a significant effect on the environment. Consideration of significant effects relate to characteristics of the proposed development, location of proposed development and characteristic of potential impacts. Cumulative impact on the environment may also be significant.

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16.4 Types of renewable energy project that require E.I.S

Schedule 5 Article 93 of the Planning and Development Regulations 2001-2012 -Development for the purposes of Part 10 refers.

'3. Extractive industry.

(h) Installation of hydroelectic energy production with an output of 20 megawatts or more, or where the new or extended superficial area of water impounded would be 30 ha or more, or where there would be a 30% change in the maximum, minimum or mean flows in the main river channel.

(i) Installation for the harnessing of wind power for energy production (wind farms) with more than 50 turbines or having a total output greater than 100 megawatts.

Part 2 Agriculture, Silviculture and aquaculture.

(b) The use of uncultivated land or semi natural areas for intensive agricultural purposes where the area is to be used for such purposes would be greater than 100 ha (may apply to planting of bio-energy crops)'.

The requirement for EIA, AA and Ecological Impact Assessment will be assessed in all cases.

16.5 Strategic Infrastructure Development Act 2006

The Strategic Infrastructure Development Act 2006 which amended the 2000 Planning and Development Act provides generally for applications for permission/ approval for specific private and public infrastructure development to be made directly to An Bord Pleanála.

Strategic Infrastructure Developments facilitates a streamlining of the Planning process. Applications above certain thresholds will be made directly to An Bord Pleanála. The board facilitates pre-consultation, scoping of environmental impact assessment and determination of the application.

The Seventh Schedule of the Planning and Development Act (Strategic Infrastructure Act 2006) Section 5 identifies energy infrastructure projects for the purpose of Section 37 A and 37 B of the Act. A number of these relate to renewable energy projects. They include:

- A thermal power station or other combustion installation with a total energy output of 300 megawatts or more;
- An industrial installation for the production of electricity, steam or hot water with a heat output of 300 megawatts or more;
- c Installation of hydroelectric energy production with an output of 300 megawatts or more, or where the new or extended superficial area of water impounded would be 30ha or more, or where there would be a 30% change in the maximum, minimum or mean flows in the main river channel;
- d An installation for the harnessing of wind power for energy production (a wind farm) with more than 50 turbines or having a total output greater than 100 megawatts.

Early liaison with prescribed bodies is advised. Applicants are advised to firstly establish whether the proposed site is located in a designated area, i.e. an NHA, pNHA, SAC (Habitats Directive) cSAC or SPA (Birds Directive). This information can be obtained from the NPWS. If the proposed site is located in or near a designated site, the Council will be obliged to inform a number of statutory bodies including the NPWS, EPA, OPW, Dept of Environment, Community and Local Government (Development Applications unit), Dept of Arts and the Gaeltacht. Having regard to the Environmental Impact Assessment Regulations 2011, the Council shall determine if an EIA is required (mandatory), or shall advise if one is required (sub-threshold). These bodies may recommend that the planning application be accompanied by an E.I.S. and/or an Natura Impact Statement/Appropriate Assessment.

16.6 Guidelines on the general type of information to accompany applications for micro-hydroelectric

power

In addition to detail specified as per Planning and Development Regulations 2001 (as amended):

- Maps, diagrams and drawings showing the location and design of intake pipeline and turbine house, tailrace and security fencing;
- Details of intake no water should be abstracted at dry weather flow;
- Details of flow rates, in particular low flow values. There must be sufficient water to facilitate the passage of fish;
- Grid connection works including transformer and transmission lines;
- Provision for fish pass;
- Details of vehicular access and movement;
- Landscaping provision;
- Details to minimise construction disturbance (water becomes clouded with silt or mud) site management measures to be adopted to minimise this;
- Site management measures during the construction phase.

The following additional reports may also be required to be submitted (this can be established at pre-planning stage)

- Archaeological impact assessment (if site is located within 30m of a recorded monument).
 A full archaeological impact assessment may be required in relation to any proposed application for micro hydro power;
- Architectural impact assessment (if works to a protected structure are proposed- such as existing bridge, millrace, fish pass and weir;
- Appropriate Assessment pursuant to the Habitats Directive;

- EIS (Environmental Impact Assessment);
- Ecological Impact Assessment-This should • identify all ecological factors, including ecological corridors, be accompanied by appropriate surveys, undertaken at the correct time of year and be under taken by a suitably gualified and experienced ecologist. Details of the habitats impacted by the MHP will be required, including descriptions of protected species recorded and mapping of habitat locations and extents. The habitat mapping should be in accordance with Best Practice Guidance for Habitat Survey and Mapping, Heritage Council 2011. There are a number of plant species protected under Flora Protection Order, 1999, which may potentially occur in some of the identified areas. Also there are breeding sites and resting places of otter, and potentially of bats (both of which are strictly protected under S.I. no. 477 of 2011) within the MHP areas. This will require both survey for these and to comply with the Wild Life Acts and Regulations.

Consultation for micro-hydroelectric plants

Development of MHP must be undertaken in a sustainable manner with regard to fishery resources within the river. In this regard, applicants are advised to consult the NPWS and Inland Fisheries Ireland before lodging planning applications for micro hydroelectric plants. Consultation will be required with Inland Fisheries Ireland in relation to the development of micro-hydroelectric sites identified in this strategy. The development of MHP must ensure that they do not impede the ability of fish to migrate upstream. Should a weir be required to be constructed in order to manage the flow to the turbine a fish pass will be required to be integrated to ensure that there is an attractive upstream path for the fish. Each fish pass will be required to be designed in accordance with the fish species contained within the relevant river. All fish passes will be designed and agreed with Inland Fisheries Ireland.

Chapter 17

Community Consultation and Community Benefit



17.0 Community Consultation

Numerous definitions of consultation can be found. The following one appears most suitable for the context of this strategy.

'A dynamic process of dialogue between individuals or groups, based on a genuine exchange of views, and normally with the objective of influencing decision, policies and programmes of action' (The Consultation Institute, 2003, in 'Monaghan Community Forum's Guide to Good Practice in Community Consultation' 2005).

(http;//www.monaghancommunityforum.ie/ uploads/Resources/monaghanmodel.pdf)



17.1 Introduction to Community Consultation

There are many different types of community consultation exercises and methods, which can be tailored and adapted to the particular unique set of circumstances presenting. Consultation tools include newspaper notice, press release, written correspondence, flyers/ pamphlets, door to door survey, telephone survey, social media, suggestion boxes, public exhibition, public meeting, questions and answers forum, focus groups, seminars and conferences. It is likely that a combination of a number of methods will be required at different stages of a project.

A well planned and facilitated community engagement process conducted with integrity and fairness will improve the likelihood of community acceptance of proposed renewable energy projects. Community engagement which continues through the construction, operation and possible decommissioning stages of a project is highly recommended. Equally projects without proper consultation run the risk of negative reactions, misinformation, damage to credibility, objections in the planning arenas, appeals and cynicism.

The Planning Authority encourages both developers and host communities to engage in meaningful consultation with one another.

17.1.1 Context – Legislation and Policy for Community Consultation

The legislative requirement for community engagement is based on the requirements set out in Environmental Impact Assessment Directive (85. 337/ EEC)



17.1.2 Best Practice Examples of Community Consultation

Best practice examples of community consultation are set out under the Irish Wind Energy Association IWEA' Best Practice Guidelines for the Irish Wind Energy Industry' March 2012, prepared by Fehily Tomoney & Co. and under 'Monaghan Community Forum's Guide to Good Practice in Community Consultation' 2005. The latter document is written both for 'consultor' and 'consultee'. It includes a tool kit of consultation techniques suited to different scenarios.

17.1.3 Community Consultation and Plan Making

Under the Planning and Development Act 2000 (as amended) provision is made for community consultation and public display at various stages of the plan making process. The Act makes provision under Section 11 for submissions and observations regarding objectives and policies to be made in writing. This would include inter alia any objectives or policies for renewable energy projects. The Planning Authority is required to hold public meetings and seek written submissions regarding all aspects of the proposed plan. The Planning Authority may invite oral submissions. In addition the Planning Authority shall take whatever measures it considers necessary to consult with energy providers and other relevant infrastructure providers to ascertain the long term plan for provision of infrastructure in the area. Under Section 12, the draft plan and any subsequent amendments to the draft plan are available for inspection by the public. Written submissions with respect to the draft and subsequent amendments are taken in to consideration in the making of the plan.

17.1.4 Community Consultation and Development Management

When determining a planning application for proposed renewable energy projects the Planning Authority is restricted to considering the proper planning and sustainable development of the area having regard to legislation including EU Directives, Ministerial guidance, and the policies and objectives of the development plan. The determination process makes provision for third party participation which includes the right to be notified of the application, the right to view the application, and the right to make written submission or objections. It also includes the right to appeal decisions to An Bord Pleanala who may hold an oral hearing if necessary. The process for determining the application has built into it a strong provision for procedural justice and transparency.

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17.2 Introduction to Community Benefit

Renewable energy developments can produce significant environmental, economic and social benefits. They also produce impacts, particularly on the local communities within which they are located. The benefits of renewable energy developments tend not to be concentrated in the area around the development, for example, the benefits of reduced carbon emissions are global.

The starting point of any discussion on community benefit is that there is no entitlement - either to development of a renewable energy project or to gain financially from someone else doing so in a particular locality.

17.2.1 Context – Legislation and Policy for Community Benefit

There is no national policy framework in relation to securing and/or enforcing the provision for financial benefit to a community from renewable energy developments. Clare County Council has a duty to safeguard the impartiality of the planning process having regard to National Planning Guidelines, Regional Planning Guidelines, the County Development Plan, and the proper planning and sustainable development of the area. Community benefit is not a material consideration of the planning assessment and decision at Local Authority level. However, in accordance with the Planning and Development (Strategic Infrastructure) Act 2006, An Bord Pleanála may attach a condition requiring the construction or financing of a facility or service in the area in which the renewable energy project would be situated that the Board considers would constitute a substantial gain to the community.

17.2.2 Local Government Act 1991 -General Power of Competence

Clare County Council may take such measures, engage in such activities or do such things as it considers necessary and desirable to promote the interests of the local community - social inclusion or the social, economic, environmental, recreational cultural community or general development of the area.

Notwithstanding the foregoing, Clare County Council considers that the following points offer a useful starting point to those interested in pursuing community benefit associated with a renewable energy project, outside of the remit of the planning system.

This section considers different models for the sharing of the rewards from renewable energy projects with communities in the vicinity of the developments.

17.2.3 Defining Community

A key issue which will require resolution is defining the communities involved or affected by a proposal. Communities may be defined by a number of criteria, which can include locality, shared outlook and common interest.

17.2.4 Who Benefits?

It may be those most proximate to the renewable energy development, those most greatly affected and/or those who invested in the project.

A key issue will be what constitutes fairness, reasonableness or a meaningful level of benefit for the local community.

There are a number of different models for the sharing of the rewards from renewable energy projects with communities in the vicinity of the developments. These include:

- Benefit in kind where the developer directly provides or pays for local community facilities improvements, environmental improvements, sports, social, educational or recreational facilities etc;
- Community funds occurs where the developer pays a lump sum or regular payments into a fund for the benefit of the local community;
- Local contracting occurs where there is associated local employment during construction and operation;
- Local ownership of shares in the project by local people, either through their own investment, profit sharing or part ownership designed to tie community benefit directly to the project performance.

17.2.5 Need for National Guidance on Community Benefit

Clare County Council seeks the provision of national guidance and statutorily based regulation on the matter so that the Council can play a full part in assisting the realisation of community benefit through facilitating bringing interested parties together; influencing – through policy, and making it happen – direct action.

17.2.6 Community Owned Renewable Energy Projects

Some renewable energy technologies lend themselves particularly well to a cooperative model of ownership and operation. These include AD, biomass supply chain, wind farm, and geothermal and district heating. The Planning Authority will assist communities in understanding the planning issues which need to be addressed when developing a renewable energy project. Community groups interested in pursuing projects are encouraged to work with the development plan process, to ensure their proposal is in accordance with the plan when they submit their application(s). The Planning Authority welcomes community ownership models but cannot give preferential treatment to an application for renewable energy that is lodged by a community group.

Community owned renewable energy projects present the opportunity to create a regular income stream which can be used to fund local improvements to enhance and strengthen communities. They can generate wider benefits such as investment in local communities, local job creation and raising local awareness and interest in other types of renewable energy. Additionally, by developing their own renewable energy schemes, communities can have more control over the scale and location of local developments. They will need to establish a legal identity to progress their plans. However, it should be noted that community ownership does not guarantee that objections will be eliminated, particularly from residents who are not part of the schemes, or from competitive schemes

17.3 Objectives RES 17.1

Community Consultation

It is an objective of Clare County Council: To require that developers of proposed large scale renewable energy projects carry out community consultation in accordance with best practice and to commence the consultation at the commencement of project planning.

RES 17.1

Community Benefit

It is an objective of Clare County Council: To ensure that, wherever possible, community benefits are derived from all renewable energy development in County Clare.



Appendix 1

Legislation and Policy

a) Micro Generation

The Planning and Development Regulations 2007 (S.l. no. 83) set out details in respect of domestic micro renewable technology considered to be exempted development for the purposes of planning subject to certain limitations. These include:

- the construction, erection or placing of wind turbines within the curtilage of a house;
- b the installation or erection of a solar panel on, or within the curtilage of a house, or any building within the curtilage of a house;
- the installation on or within the curtilage of a house of a ground heat pump system (horizontal or vertical) or an air source heat pump.

Micro generation in industry, commerce, public and agricultural sectors 2008 are provided for by SI no. 83 of 2007, SI no. 235 of 2008 and SI no. 256 of 2008 Planning and Development Regulations 2001-2012.

These regulations provide for exemptions in respect of certain renewable technologies for dwellings, industrial buildings, business premises, and agricultural holdings. Any proposals within Architectural Conservation Areas or to buildings on the Record of Protected Structures will require planning permission before works commence. However, the Council will endeavour to work with applicants in this situation to ensure a balanced approach is taken – attaining micro renewable technology for the property whilst preserving existing character.

b) Bio energy -Biomass

European

The EU Directive on Renewable Energy 2009/28/EC splits bioenergy into three sub-groups: biomass, bio-liquids and biofuels. This chapter focuses on dry biomass.

The EU Energy Efficiency Directive was adopted in October 2012. One of the proposals requires each Country producing a detailed heat map. This provides the opportunity at County level to identify areas of high heat load to focus district heating viability studies.

National

Bio-energy Action Plan for Ireland (2007)

This plan develops the energy use of bioenergy for the electricity, heat and transport markets and outlines the roles of the various government departments. In tandem with the Energy White Paper it establishes the following targets:

- 12% renewable energy share in the heating sector by 2020;
- 30% co-firing in peat stations by 2015;
- 10MWe to 15MWe of biomass CHP 2007-2013.

The Energy White Paper (2007)

This sets out an intention to set a target for co-firing at Moneypoint by 2010; however no target has been set at the time of preparing this strategy.

In addition, The Dept of Agriculture, Fisheries and food launched a new bio-energy scheme in 2010 to grant aid miscanthus and willow planting to end 2012. Approved costs will be grant aided up to 50% subject to a maximum grant of €1300 per ha for both crops.

Regional

The following documents at Regional level have informed the preparation of this strategy:

- Bio-energy Strategy and Action Plan for the Midwest Region (2009);
- Energy Crop Opportunities in the Western Region Western Development Commission 2011;
- Bio-energy and the Western Region

 Contributing to the attainment of
 County Development Plans February
 2012, RASLRES;
- Resource Assessment for County Clare – Clare Fuel Resource Survey and Biomass Demand, Nov 2012;
- Bio-mob Biomass mobilisation project: a joint action plan has been prepared which will inform local and regional policy makers in the four partner regions (the Mid-West Region of Ireland, the North Great Plain Region of Hungary, the North Central Planning Region of Bulgaria and the Mid-Juttland Region of Denmark).

National Targets	• Aim to achieve 800MW from Combined Heat and Power with a particular emphasis on biomass fuelled CHP by 2020.
	• Bio-energy Action Plan for Ireland (2007)
	• 12% renewable share in heating sector by 2020
	• 30% co-firing in state owned peat stations by 2015
	10% biofuel target for 2020
	10 MWe to 15 MWe of biomass CHP between 2007-2013
Regional Targets	• Bio-energy Strategy and Action Plan for the Mid-West Region (2009)
	 MWRA interim target: 7% share of the heat market to be met by biomass by 2015 > Required installed capacity to meet target: 203 MW > Required biomass: 162.785 tonnes
	 MWRA target 2020: 12% share of the heat market to be met by biomass by 2020 > Required installed capacity to meet target: 349MW
	 Required biomass: 279,060 tonnes To install 0.85MWe to 1.275MWe biomass CHP by 2013

County

Refer to Clare County Development Plan 2017-2023, Volume 1, Chapters 8 and 10.

c) Geothermal and Ground Source Heat Pumps

EU Directive 2009/28/EC on the 'Promotion of the Use of Energy from Renewable Sources' sets out mandatory national targets, 12% of thermal energy in Ireland is to come from renewable sources by 2020. Renewable heat accounted for 3.6% of all thermal energy in 2008.

In 2008, the residential sector accounted for the largest share of final thermal energy use at 44%, followed by industry at 33%, services at 18% and agriculture at 5%³⁵.

Geothermal and ground source energies therefore have the potential to make a significant contribution to meeting thermal energy targets.

At present there is no legal framework governing geothermal energy development in Ireland. In 2010, the Government approved the heads for a Geothermal Energy Development Bill 2010 and this is currently being drafted. The significant features of the heads include:

- Defining geothermal energy;
- Giving effect to the assertion of State ownership of geothermal energy under Article 10.1 of the Constitution by vesting such ownership in the Minister for Communication, Energy and Natural Resources;
- Exploration Licenses for exploration of geothermal resources similar to those for minerals;
- Production Licenses to allow the private sector to develop geothermal resources including provision for ancillary rights;
- Provisions for exempted development to avoid over-regulation of the sector.

d) Solar

National Building Regulations Part L – Dwellings.

This section of the regulations requires that for new dwellings a minimum quantity expressed in kWH/m.sq/year, of delivered energy consumption as calculated using the dwelling energy assessment procedure (DEAP) is provided using a renewable source.

SR50-2: 2010 Code of practice for building services part 2 Solar panels

e) Marine Renewables

European The Marine Strategy Framework Directive

The aim of this Directive is to achieve good environmental status in the EU marine waters by 2020. This is the first EU binding law designed to preserve, protect, and restore marine ecosystems. Ireland is obliged to complete an initial assessment of Irish marine waters and establish environmental targets and indicators by July 2012 and a monitoring programme by July 2014, together with a programme of measures to achieve GES by 2015, and to implement these measures (2016). The significance of this Directive is that marine renewable energy projects will have to comply with provisions made on foot of the assessment of Irish marine waters.

Developing a Maritime Strategy for the Atlantic Ocean Area (EU Communication Nov 2011)

This is an EU Communication which is intended to give a significant boost to the development potential of the entire European sea basin region. It identifies problems and challenges, assesses existing measures already implemented and provides for extensive stakeholder participation in the development of an Action Plan, to be implemented from 2013 onwards. The following documents have also informed the preparation of this strategy.

• Integrated Maritime Policy for the European Union 2007

National

The National target as set out in the National Renewable Energy Action Plan is 555MW to be generated from ocean energy by 2020. The Electricity Supply Ireland's strategy is to develop 150MW of electricity from ocean energy by 2020.

The Foreshore Act 1933

The Foreshore has the meaning assigned to it in the Foreshore Act 1933 but includes the land between the line of high water of ordinary medium tide and the land within the functional area of the planning authority concerned that adjoins the first mentioned land. It extends outwards to the limit of 12 nm. The Act requires that a lease or licence must be obtained from the Minister of Environment, Community and Local Government for the carrying out of works, placing of structures or material, or removal of material from the foreshore.

Section 225 of the Planning and Development Act 2000 (as amended) sets out details of the obligation to obtain permission in respect of development on the foreshore, Section 226 relates to Local Authority development on the foreshore and Section 227 relates to acquisition of land on the foreshore.

The D. o E.C.L.G. is in the process of reforming this Act. No Bill has been published at the time of preparing the strategy but the following is anticipated:

- Likely integration of foreshore consent process within the existing planning system;
- Likely integration of the foreshore consent process with the S.I.D.;

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 Application for foreshore licences will then have to be assessed against appropriate plan led policy such as the Draft Offshore Renewable Energy Development Plan (OREDP), any possible future national marine spatial plan which may emerge, together with County level Renewable Energy Strategy.

'Initial Development Zones – To focus on realising Ireland's ocean energy potential' - White Paper, MRIA, August 2010.

The Marine Renewable Industry Association (MRIA) proposes in this paper that four initial development zones (IDZ's) for ocean energy be prioritised by Government and that efforts to achieve the 2020 targets be focused in these zones. The report calls for Ireland to progress to a marine consenting round. It argues that the consenting round needs to be backed up by policy guidelines at national regional and local level. The regulatory environment needs to provide certainty for investors.

One of the four IDZ's is located off the coast of west Clare from Loop Head to Hags Head extending to the 12nm limit (refer to map 9.1). Before projects in these zones can be considered, substantial survey and investigation work is required to establish resource viability, technical safety and to ensure projects will adhere to environmental constraints.

The following publications have also informed the preparation of this strategy:

- 'A new Planning and Consent Architecture for Development in the Marine Area – Consultation Paper' DoECLG 2012;
 - 'Harnessing Our Ocean Wealth An Integrated Marine Plan for Ireland' Govt. Marine Coordination Group, July 2012;
 - 'Draft Offshore Renewable Energy Development Plan' (OREDP), DCEHR Nov 2010;

- 'Assessment of the Irish Ports and Shipping Requirements for the Marine Renewable Energy Industry' June 2011 SEAI;
- SEAI Ocean Energy Road Map 2050, October 2010';
- > 'An Ocean Energy Strategy for Ireland 2005' - aimed at advancing Irelands R&D in marine energy technologies. The Ocean Energy Development unit in the SEAI was set up to promote and develop the sector;
- 'Tidal and current energy resources in Ireland' (Dec 2004) SEAI - states that the majority of Ireland's tidal power potential lies in the west coast of Ireland with most potential concentrated in the Shannon estuary;
- Atlas of the Irish Marine Environment (not yet available).

Regional Mid West Regional Planning Guidelines

The Forfas regional competitiveness agenda, set out in the Mid West Regional Planning Guidelines 2010-2020 identifies wind, tidal energy and research centres at University of Limerick as a key asset of the region.

County

Strategic Integrated Framework Plan for the Shannon Estuary (SIFP)

This inter-jurisdictional framework plan contains the following in support of marine renewable energy in the estuary:

- The presence of energy infrastructure at Moneypoint and Tarbert power stations has created a strategic energy hub within the Shannon Estuary, facilitating the growth of strategic grid infrastructure and other synergistic industries, including renewable energy;
- The Shannon Estuary's location on the south-west provides an ideal gateway to Ireland's marine renewable energy activities off the South and West coast, Europe's closest point to some of the worlds best wind, wave and tidal resources;

- Identified link between maritime transportation, existing port infrastructure and increasing the development potential of new maritime industries, including offshore renewable energy;
- To harness the full potential of the Shannon Estuary for appropriate development of renewable energy sources to meet renewable energy targets, whilst ensuring all developments comply with the Habitats Directive and all other relevant EC Directives;
- Recognition of the critical link between grid infrastructure and supporting of new connections to the grid in order to allow increased integration of renewable energy into the Irish electricity system;
- Exploration and pursuit of opportunities to service the renewable energy sector at existing ports and facilitating associated development;
- R&D potential of the Shannon Estuary catchment area, including UL, NUI Galway, Limerick IT and Tralee IT.

Whilst it is not intended to reiterate the objectives of the Clare County Development Plan pertaining to the marine renewable industry, it is considered important to note here that section 13.5 of the Clare County Development Plan 2017 - 2023 detail the seascape character areas of the County. The assessment identifies 12 seascape character areas which should be taken into account when planning to bring associated marine renewable support infrastructure on shore – these are also shown on map 9.1 of this document.

f) Micro Hydroelectric Power

European

EU Water Framework Directive 2000/60/EC

The EU Water Framework Directive 2000/60/EC aims to improve water quality in rivers, groundwater, estuaries and coastal waters. Under this Directive, authorities are required to take measures to ensure that water with high quality status remains as so, and those of poorer quality are improved. To this end the country is divided into a series of river basin districts with a plan of measures prepared for each district. These are called River Basin District Management Plans. The purpose of the River Basin Management Plan is to protect and improve where necessary surface, ground, and coastal waters by implementing a programme of measures for each district. The Shannon International River Basin District Plan and the Western River Basin District Plan apply in County Clare. The Development of hydro schemes can have significant impact on a water bodies. Proposals for development of hydro power will be required to demonstrate compliance with the River Basin Management Plan for the district.

European Communities Directive 85/337/EEC (as amended by directive 97/11/EC) Statutory instrument no. 93 of 1999.

This specifies that an E.I.A. is required for the following hydro electric schemes.

'Installation for hydro electric energy production with an output of 20 megawatts or more or where the new or extended superficial areas of water impound would be 30 ha or more, or where there would be a 30% change in the maximum, minimum or mean flows in the main river channel'.

Most small scale hydro schemes would have an output well below 20 megawatts and may not impound any water. However a change in 30% of mean river channel flow is likely to occur and it is in this context that an EIA can be required.

The Habitats Directive and Birds Directive are relevance also, details of which are set out in Chapter 2.

National

National Guidelines

- 'Small-scale Hydro electric potential of Ireland' - identified 568 sites thought suitable for possible development (Anon, 1985) Dept of Energy;
- 'Guidelines on the Planning, Design, Construction and Operation of Small Scale Hydro-electric Schemes and Fisheries' Oct 2007, Dept of Communication, Energy and Natural Resources.

National Legislation

- Fisheries Consolidation Act 1959 (subsection 115 subsection 2 and 3);
- The Fisheries Act 1980 (which charged the fisheries boards with the protection, conservation and management of fisheries);
- The Fisheries (Amendment) Act 1999

National Targets

In the policy document 'Renewable energy: A Strategy for the Future' targets were set to acquire 3MW generating capacity from hydro power by the end of 1999 and to secure and additional 10MW generating capacity through further competition held up to 2010. It is not clear if these targets were attained.

County

'Micro Hydro Electricity Potential in County Clare', The Limerick Clare Energy Agency August 2010'

This report highlights the potential for micro hydro electric generation in County Clare looking at the technical feasibility of 10 no. potential sites (5 commercial and 5 domestic). For the purpose of the report, a turbine typically rated at greater than 50 kW is considered suitable for commercial application, and a turbine rated at less than 50 kW is considered suitable for domestic application (p3). The report does not include any environmental assessment of the sites, but it set out the estimated cost of the project, the CO₂ avoided per annum and the annual power output. It outlines a number of actions that the Council could pursue in order to facilitate the development in this sector including; acting as a facilitator, raising public awareness, encouraging cooperation with relevant statutory bodies and providing preplanning enquiry meetings with interested parties.

g) Biomass waste conversion to energy – anaerobic digestion

European and National

Key European policy instruments relating to renewable energy, agriculture and environmental protection are increasingly forcing us to consider alternative options for treatment and disposal of waste. Anaerobic digestion offers opportunities to achieve our obligations under many of these directives, some of which are set out below. These Directives have been transposed into Irish law.

They include:

- The Nitrates Directive (91/676/EEC)

 and Nitrate Directive Derogation 2010;
- The Wastes Framework Directive;
- EU Landfill Directive 1991/31/EC- ;
- The Sludge Directive;
- Shellfish and Bathing Waters Directive;
- The Water Framework Directive.

Regional

The 5th Annual report on the Replacement Waste Management Plan for the Limerick/ Clare/Kerry Region 2006- 2011 identifies that segregation of organic / food waste and a move away from disposal of organic waste at landfill is occurring in the region. This would suggest opportunities for anaerobic digestion as an alternative method of disposal.

County

CDP 8.23 states it is an objective of Clare County Council to encourage and facilitate the development of new alternatives and technological advances in relation to waste management. Anaerobic digestion is one such technology. Chapter 8 of Volume 1 is also relevant.

h) Supporting Infrastructure

National

There are several National policy documents relating to provision of key infrastructure to serve the Country. Many of these have been referred to under chapter 2.

EirGrid 'Grid 25 - Strategy for the Development of Irelands Electricity Grid for a Sustainable Competitive Future'.

EirGrid is a state owned company. It is the independent electricity transmission systems operator (TSO) in Ireland and the market operator of the wholesale electricity trading system. Its role is to deliver connection, transmission and market services to electricity generators, suppliers, and customers utilising the high voltage electricity system (Source: Grid 25 p1).

Grid 25 states that Clare falls within the West region, where the proposed investment of \in 315M is estimated. The report states that:

'The region features an availability of natural resources for wind and ocean energy technologies. Hydro generated electricity is already produced on the Shannon estuary. The area (west region as defined by Grid 25) has already a large scale power station in Tarbert, Moneypoint and Tynagh and has a gas transmission pipeline from Galway to Limerick which passes close to a number of potential locations suitable for gas fired generation projects. There are 400 kV, 220kV number of 110 kV circuits in the region.' ³⁶

The report also states that:

'By 2025, peak demand for electricity is expected to increase by 60% (estimated in 2007) the region is expected to have up to 440 MW of wind generation and 75 MW of wave generation. Grid developments in the region will include:

- An additional investment of approximately €315m in regional transmission network;
- Upgrade network supplying the large urban centres of Ennis and Limerick;
- Up-rating over 250 km of existing network to facilitate higher capacity power lows, using existing corridors where possible;
- Strengthening the transmission capacity across the Shannon Estuary'.

It argues that the benefits of such infrastructure will provide for A substantial increase in demand into the future, and will allow for renewable resources from both wind and wave to feed into the National Electricity Grid.

It warns that the consequences of nonaction are:

- 'Within the next five to ten years there will be no capacity in the network to cater for new customers and the reliability of supply to existing customers will fall below normal international standards;
- There will be no capacity in the network to allow further renewable generation to be connected, this will have severe consequences on the ability of Ireland to meet its renewable targets and its long terms sustainable energy supplies'.

Regional Mid West Regional Planning Guidelines 2010 – 2022

This document states that in general favourable consideration should be given to renewable energy projects provided that – connection to and reinforcement of the national grid has been taken into account and appropriate consent acquired or likely to be acquired.

County

Particular attention should be given to Chapters 8, 11 and 12 Volume 1, Clare County Development Plan 2017-2023.

³⁶ EirGrid - Grid 25, Pg 31

i) Energy Storage – Pumped Hydro Energy Storage

European

Key policy instruments at European level impacting on PHES are set out below:

- Water Framework Directive 2000/60/ EC (specifically article 4, 6 and 9;
- Habitat Directive 92/43/EEC in particular Articles 6(3) and 6(4);
- Strategic Environmental Assessment Directive 2001/42/EC;
- Environmental Impact Assessment Directive 85/337/EE;
- Directive 2003/87/EC: GHG Emissions Trading;
- Directive 2007/60/EC : Flood Risk;
- Renewable Energy Directive 2009/28/EC
- Birds Directive 2009/147/EC.

StoRE project EU

The StoRE project is an EU initiative which aims to facilitate the realisation of the ambitious renewable energy targets for 2020 and beyond by unblocking the potential for bulk energy storage infrastructure such as PHES. Energy storage helps accommodate higher percentage of intermittent renewable energy by balancing the supply and demand and improving power quality. The objective is to create a framework of conditions that will allow energy storage infrastructure to be developed. The project is supported by Intelligent Energy Europe.

National and Regional

There is no national or regional spatial policy, national planning guidelines or best practice guidance pertaining to pumped hydro storage. This policy gap at National level requires to be addressed. Clare Co Council will work with the relevant bodies in this regard.

County

Refer to section 8.5.7, Volume 1 of the Clare County Development Plan 2017-2023. It includes Map 10A which outlines indicative areas that are considered to have the appropriate characteristics for freshwater PHES, subject to environmental assessment.

j) Transport and Access

European

EU and National targets have been set to ensure renewable energy penetration in the transport sector. By 2020, 10% of energy used in road transport should come from renewable energy sources. It is envisaged that this target will be met by the deployment of Electric Vehicles (EV) and the use of biofuels.

National

Below are listed the key national documents informing policy for renewable energy in transport, further details of which can be found in the Clare County Development plan 2017-2023, Chapter 8, Volume 1.

- 'Transport 21';
- 'National Spatial Strategy 2002-2020';
- 'Smarter Travel A Sustainable Transport Future- A New Transport Policy for Ireland 2009- 2020';
- 'The National Cycle Policy Framework';
- The 'Strategy for Renewable Energy DCENR 2012-2020' (May 2012) states that Ireland together with all member states is required to achieve a target of 10% renewable energy in transport by 2020. The National Biofuels Obligation which currently requires 4% of biofuels in the road transport fuel mix, is the key mechanism for delivering on this target.

Key actions being pursued under the Strategy for Renewable Energy 2012-2020, DCENR 2012-2020 include:

- Progressively increasing the percentage level of biofuels in the transport fuel mix (in line with general biofuel limits outlined in the fuel quality directive and the European standards for vehicle fuels, EU market developments generally and in consultation with all stake holders);
- Continuing the incentives for electric vehicles;
- Ensuring the continued national rollout by the ESB of electric vehicle recharging infrastructure in this pilot R&D phase, as well as ensuring that an appropriate regulatory and cost recovery framework is put in place for the long term;
- Pursuing in Europe, the introduction of the necessary EU wide regulations and standards to underpin the rollout of vehicle recharging infrastructure throughout the EU.

Regional

The Mid-West Regional Planning Guidelines 2010-2022 contain extensive policy in relation to transport. They stress the need for an integrated and balanced overall transport strategy.

County

Clare County Development Plan 2017-2023, Vol 1 contains a suite of objectives supporting sustainable environmentally friendly modes of transport that are informed by national and regional strategies and guidelines. They include Section 8.2.10 Cycling and walking.

The Council recognises that transport is the largest energy consumer in the County. The Council will promote energy efficiency in transport in line with national policy through a combination of infrastructure, innovation and incentives.



Appendix 2

Site Specific Mitigation



Old Mill Wheel, Ennis (River Fergus): Proposed mitigation measures

Lower River Shannon SAC (Site Code 002165)

Mitigation

All MHE proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the gualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Significant challenges are likely to be associated with the development of any MHEP site within this location, with regard to ensuring that the construction and operation (including any associated infrastructure) result in no adverse impacts on the Lower River Shannon SAC.

Specifically certainty is required that there will be no hydrological or indirect disturbance effects that would adversely affect the range, structure and function or conservation status of any Annex II species within the SAC. Detailed surveys will be required to determine the importance of the study area at a project level with regard to the occurrence of Annex II species in order to accurately inform the evaluation of the potential for significant effects within the SAC. Mitigation, informed by detailed field survey will be required, in particular for the following species: Sea/River/Brook lamprey; Atlantic salmon; Otter.

Any development will require an evidence based solution to maintaining and restoring fish passage within the Fergus catchment; facilitating the passage of anadromous lamprey species and salmon through or around the scheme. Flows and compensation flows will be required to avoid significant effects with regard to the requirements of the Water Framework Directive and the requirement to achieve at least "good status" in all waterbodies by 2015 (Please refer to Section 4.2.2 of the AA NIR for a breakdown of the current status and corresponding WFD objectives). Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to integrity of the site) any impacts identified with regard to the SAC; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Ballyallia Lake SAC (site code 000014) Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the qualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development. Significant challenges are likely to be associated with the development of any MHEP facility within this location, with regard to ensuring that the construction and operation (including any associated infrastructure) result in no adverse impacts on the Ballyallia Lake SAC. Specifically certainty is required that there will be no hydrological or indirect disturbance effects that would adversely affect the structure and function or conservation status of the Annex I habitat for which the SAC is designated. Detailed assessment will be required to determine the hydrological connectivity between the SAC habitat and the potential for effects arising from any MHEP facility.

Flows and compensation flows may be required to avoid significant effects with regard to the requirements of the Water Framework Directive within the River Fergus catchment and this is identified as a key mitigation measure for the protection of the hydrological and eco-hydrological character and ecological status of the Ballyallia Lake SAC, upstream of the study area.

Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to integrity of the site) any impacts identified with regard to the SAC; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

River Shannon and River Fergus Estuaries SPA (Site Code 004077) Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the gualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Mitigation measures will be required for any MHEP development at this location with regard to ensuring that the construction and operation (including any associated infrastructure) phases result in no adverse impacts to the River Shannon and River Fergus Estuaries SPA. Specifically certainty is required that there will be no hydrological or indirect disturbance effects that would adversely affect the range, timing or available habitat and the intensity of its use within the SPA. Reference to the avoidance of significant effects with regard to the requirements of the Water Framework Directive and the requirement to achieve at least "good status" in all waterbodies by 2015 (Please refer to Section 4.2.2 for a breakdown of the current status and corresponding WFD objectives).

Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to integrity of the site) any impacts identified with regard to the SPA; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Ballyallia Lough SPA (site code 004041) Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the gualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Mitigation measures will be required for any MHEP development at this location with regard to ensuring that the construction and operation (including any associated infrastructure) phases result in no adverse impacts to the Ballyallia Lough SPA. Specifically certainty is required that there will be no hydrological or indirect disturbance effects that would adversely affect the range, timing or available habitat and the intensity of its use within the SPA. Mitigation for the protection of these habitats is required with reference to the conservation objectives of these habitats, and taking account of the Water Framework Directive and the requirement to achieve at least "good status" in all waterbodies by 2015 (Please refer to Section 4.2.2 of the AA NIR for a breakdown of the current status and corresponding WFD objectives).

Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to integrity of the site) any impacts identified with regard to the SPA; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Moananagh, Inagh (Inagh River): Proposed mitigation measures

Inagh River Estuary SAC (Site Code 000036) Co. Clare

Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the gualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Proposals for the development of any MEHP facility at this location will require detailed assessment with reference to the potential for the alteration of the hydrological regime and the hydrogeomorphology of the Inagh River, with reference to the intertidal Annex I habitats within the Inagh River Estuary SAC downstream. Mitigation for the protection of these habitats is required with reference to the conservation objectives of these habitats, and taking account of the Water Framework Directive and the requirement to achieve at least "good status" in all waterbodies by 2015 (Please refer to Section 4.2.2 of the AA NIR for a breakdown of the current status and corresponding WFD objectives). Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to *integrity* of the site) any impacts identified with regard to the SAC; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Clondegad, Ballycally (Owenslieve River, tributary of the River Fergus estuary): Proposed mitigation measures

Lower River Shannon SAC (Site Code 002165)

Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the qualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development. Mitigation measures will be required at project stage for the development of any MHES within this location, with regard to ensuring that the construction and operation (including any associated infrastructure) result in no adverse impacts on the Lower River Shannon SAC.

Specifically certainty is required that there will be no water quality impacts that would adversely affect the range, structure and function or conservation status of any Annex I habitat or Annex II species within the SAC. Detailed surveys will be required to determine the importance of the study area at a project level with regard to the occurrence of Annex II species in order to accurately inform the evaluation of the potential for significant effects within the SAC. Mitigation, informed by detailed field survey will be required, in particular for the following species: Sea/River/ Brook lamprey; Atlantic salmon; Otter. Mitigation for the development of any MHES at this location should include an assessment of the potential for providing fish passage solutions where feasible in order to increase the range and catchment area for anadromous Annex II species including salmon and lamprey species.

Flows and compensation flows within the Owenslieve River may be required to avoid significant effects with regard to the requirements of the Water Framework Directive and the requirement to achieve at least "good status" in all waterbodies by 2015 (Please refer to Section 4.2.2 of the HDA NIR for a breakdown of the current status and corresponding WFD objectives).

Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to *integrity* of the site) any impacts identified with regard to the SAC; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

River Shannon and River Fergus Estuaries SPA (Site Code 004077) Co. Clare

Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the qualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Mitigation measures will be required for any MHEP development at this location to ensure that the construction and operation (including any associated infrastructure) phases result in no adverse impacts to the River Shannon and River Fergus Estuaries SPA. Specifically certainty is required that there will be no hydrological or indirect disturbance effects that would adversely affect the range, timing or available habitat and the intensity of its use within the SPA. Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to *integrity* of the site) any impacts identified with regard to the SPA; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Weir at Sixmilebridge (Owenagarney (Ratty) River): Proposed mitigation measures

River Shannon and River Fergus Estuaries SPA

(Site Code 004077) Co. Clare Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the qualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Mitigation measures will be required for any MHEP development at this location with regard to ensuring that the construction and operation (including any associated infrastructure) phases result in no adverse impacts to the River Shannon and River Fergus Estuaries SPA. Specifically certainty is required that there will be no hydrological or indirect disturbance effects that would adversely affect the range, timing or available habitat and the intensity of its use within the SPA.

Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to *integrity* of the site) any impacts identified with regard to the SPA; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Lower River Shannon SAC (Site Code 002165) Mitigation

All MHEP proposals must be screened for Appropriate Assessment at detailed design stage, in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the gualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Mitigation measures will be required at project stage for the development of any MHEP within this location, with regard to ensuring that the construction and operation (including any associated infrastructure) result in no adverse impacts on the Lower River Shannon SAC. Specifically certainty is required that there will be no water quality impacts that would adversely affect the range, structure and function or conservation status of any Annex I habitat or Annex II species within the SAC. Detailed surveys will be required to determine the importance of the study area at a project level with regard to the occurrence of Annex II species in order to accurately inform the evaluation of the potential for significant effects within the SAC. Mitigation, informed by detailed field survey will be required, in particular for the following species: Sea/ River/Brook lamprey; Atlantic salmon; Otter. Mitigation for the development of any MHEP facility at this location should include an assessment of the potential for providing fish passage solutions where feasible in order to increase the range and catchment area for anadromous Annex II species including salmon and lamprey species.

Flows and compensation flows within the Owenagarney River may be required to avoid significant effects with regard to the requirements of the Water Framework Directive and the requirement to achieve at least "good status" in all waterbodies by 2015 (Please refer to Section 4.2.2 of the AA NIR for a breakdown of the current status and corresponding WFD objectives).

Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to *integrity* of the site) any impacts identified with regard to the SAC; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Indicative Area 1 West Clare (Slieve Callan area): Proposed mitigation measures

Inagh River Estuary SAC (Site Code 000036) Co. Clare

Mitigation

Taking account of the proximity of this indicative area to this SAC it is considered that any proposed PEHS development within this area must be screened for Appropriate Assessment at detailed design stage in accordance with Article 6(3) and 6(4) of the Habitats Directive, and, where the potential for significant effects are identified, an Appropriate Assessment must be conducted. The Appropriate Assessment shall include an evaluation of the potential for negative impacts on the gualifying interests of this site and their associated Conservation Objectives during construction and operation phases and must include any associated infrastructure associated with the development.

Depending on the technology used at a project specific level and the extent and exact location of development within Indicative Area 1 further surveys will be required to determine the impact (if any) to the Inagh River Estuary SAC habitats <u>downstream</u>.

Proposals for the development of PEHS within Indicative Area 1 will require detailed assessment with reference to the potential for the alteration of the hydrological regime and the hydrogeomorphology of the Inagh River, with reference to the intertidal Annex I habitats within the Inagh River Estuary SAC downstream. Mitigation for the protection of these habitats is required with reference to the conservation objectives of these habitats, and taking account of the Water Framework Directive and the requirement to achieve at least "good status" in all waterbodies by 2015 (Please refer to Section 4.2.2 of the NIR for a breakdown

of the current status and corresponding WFD objectives).

Any development associated with the PHES must maintain the key targets associated with this habitat as per the NPWS detailed Conservation Objectives for this SAC (September 2012):

- Area stable or increasing, subject to natural processes, including erosion and succession;
- No decline, subject to natural processes;
- Maintain or where necessary restore natural circulation of sediments and organic matter, without any physical obstructions;
- > Maintain natural tidal regime;
- Maintain/restore creek and pan structure, subject to natural processes, including erosion and succession;
- > Maintain natural tidal regime;
- Maintain the range of coastal habitats including transitional zones, subject to natural proceeses including erosion and succession;
- Maintain structural variation within sward;
- Maintain more than 90% of area outside creeks vegetated;
- Maintain the presence of speciespoor communities with typical species listed in Saltmarsh Monitoring Project (McCorry and Ryle, 2009);
- No significant expansion of common cordgrass (*Spartina anglica*), with annual spread of less than 1%.

Specific mitigation measures will be required at a project-level to avoid or reduce (to within acceptable levels with reference to integrity of the site) any impacts identified with regard to the SAC; with reference to Article 6(3) of the Habitats Directive and taking account of the ECJ ruling C-127/02.

Appendix 3

Glossary of Terms



Anaerobic Digestion

The process whereby bacteria break down organic material in the absence of oxygen yielding a biogas containing methane.

Bio-fuels

Fuels derived from biomass

Biomass

Biological material derived from living or recently living organisms which can be converted into fuel for electricity, heating or transport.

Combined Heat and Power (CHP)

Combined heat and power is the simultaneous production of heat and electricity.

District Heating (DH)

District heating is a local heating network facilitated through underground pipes and a centralised heat source.

Electric Vehicle (EV)

Electric vehicles refer to battery electric vehicles and plug-in hybrid electric vehicles.

Environmental Appraisal

A report which sets out significant environmental issues which are of particular relevance to the zone of influence of the project.

Fossil Fuels

Fuels that arise from organic matter over geological timescales.

Greenhouse Gases (GHG)

The gases that are responsible for trapping the solar radiation in the Earth's atmosphere. The most significant impact comes from carbon dioxide and methane.

Grid Capacity

The technical/physical ability of the electricity transmission or distribution network to accommodate new electricity generation or usage.

Installed Capacity

The theoretical instantaneous output of electrical power if all generators are working at full capacity.

MRIA

Marine Renewable Industry Association.

NM

Nautical miles

Pumped Hydroelectric Energy Storage (PHES)

A facility designed to generate electricity during peak periods with a hydroelectric plant utilising water pumped into a storage reservoir during off-peak periods.

Smart Grid

An evolution of the existing electricity grid with added monitoring, analysis, control and communication capability that maximises the efficiency of the electricity system.

Renewable Energy

Energy from renewable non-fossil sources.

Total Final Consumption (TFC)

The total energy used by the final end user. It excludes energy used in the energy sector such as electricity generation or heat production.

Units of Power

Watt (W) Unit of power output.

Kilowatt (kW) 1,000 Watts.

Kilowatt Hour (kWh)

1kW output over one hour, the unit of electricity on a standard bill.

MW (Megawatt) 1,000kW of power.

MWh (Megawatt Hour)

1MW of power output expended in one hour.

GW (Gigawatt) 1,000 MW of power.

GWh (Gigawatt Hour)

1 GW of power output expended in one hour.

TW (Terawatt) 1,000 GW of power.

TWh (Terawatt Hour)

1TW of power output expended in one hour.



clare county development plan 2017 2023





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Clare County Development Plan 2017–2023 Clare Renewable Energy Strategy 2017-2023

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