Renewable Energy Strategy

for

County Mayo

2011-2020

Adopted by Mayo County Council on 9th May 2011

Mayo County Council
Comhairle Contae Mhaigh Éo

Forward Planning Section

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Introduction

Renewable energy is energy which comes from natural resources such as wind, rain, sunlight, the ocean and geothermal heat. There is a global focus on the departure from reliance on fossil fuel for our energy needs to renewable options. Renewable energy is seen as a clean and infinite source of energy which can be harvested continuously without damaging the environment, unlike fossil fuels which are finite and release carbon dioxide and other greenhouses gases and harmful pollutants into the atmosphere. However given the nature of Ireland's climate we are unable to rely solely on renewable energy and will continue to require conventional methods of generating energy along with renewable energy to produce a constant reliable energy supply.

County Mayo has extensive renewable energy resources from wind, wave and biomass and to a lesser extent from tides, and this is recognised by the Council and the Mayo County Development Plan 2008-2014 which has extensive objectives to support the development of renewable energy in the County.

Objective O/TI-RE 1 of the Mayo County Development Plan 2008-2014 undertook to review the Wind Energy Strategy for Co. Mayo within one year of the adoption of the County Development Plan. However Mayo County Council decided not only to review the Wind Energy Strategy but to go one step further and prepare a Renewable Energy Strategy for the County.

This Renewable Energy Strategy has been prepared for County Mayo in the context of EU and national renewable energy targets. The Strategy is underpinned by Strategic Environmental Assessment (SEA) and Habitats Directive Assessment (HDA). The SEA has evaluated five potential strategy options and their effects on the environment and designated sites, including Natura 2000 sites, and provides the justification for this Strategy. The HDA assessed the effect the Strategy would have on the conservation objectives of any Natura sites in the County and within 15km of the County boundary. Both the SEA and HDA reports should be read in conjunction with this Strategy.

The Government has set national targets for the provision of renewable energy which include:

- 16% of our energy consumption to come from renewable sources by 2020.
- 42.5% of our electricity consumption to come from renewable sources by 2020.
- 12% of our energy consumption to come from renewable sources for heating and cooling
- 10% of our final energy from renewable sources consumed in transport by 2020.

This Strategy sets out a path to allow County Mayo to contribute to meeting the national legally-binding targets above and sets out opportunities for individuals, communities and businesses to harness renewable energy in a sustainable manner and to assist in combating climate change. The Strategy also clarifies the approach Mayo County Council takes to renewable energy, and should assist direction and reduce uncertainty for the most regarding issues associated with renewable energy developments in Mayo. All major forms of renewable energy are considered in the Strategy, including micro renewables.

Mayo has been identified as having one of the best wind regimes in Europe. Mayo also relies on its natural beauty which is the backbone of attractiveness of the County as a place to live, work, invest and visit, and of its tourism market – an important income for the County. Therefore it is imperative that the provision of energy requirements through renewables takes place in a sustainable manner. Given the large area (c.5560 sq. km) and diverse character of Mayo, a key aspect of this Strategy is recognising that different areas within the County will require different strategic approaches.

It is also worth noting that in order to achieve the national renewable energy targets and the objectives of this Strategy, improvements and the provision of new infrastructure to the electricity transmission network in Mayo is considered imperative for all renewable energy technologies.

Section 1 Renewable Energy Overview

1.1 What is Renewable Energy?

Renewable energy is energy which comes from natural resources such as wind, sunlight, ocean (waves and tide), and geothermal heat, which are naturally replenished. Each source has its own characteristics which influence how and where they are used. Renewable energy sources may be interlinked such as wind and water. County Mayo has extensive renewable energy resources such as wind and wave, and to a lesser extent tides, bio-energy and solar.

1.2 Why do we need Renewable Energy?

Global atmospheric CO_2 levels have nearly doubled in the last 125 years and are predicted to double again in the next 100 years, causing a 3-6 degree rise in global temperature and a significant sea level rise caused by melting of the polar ice caps[1]. It is generally accepted that around 75% of the additional CO_2 has arisen from combustion of fossil fuels (for the provision of electricity, heat and transport) and the other 25% from human alteration of the land uses.[2] Climate Change is recognised as the most serious and threatening global environmental problem. While natural variation in climate over time is normal, humans are contributing to climate change through the emission of substantial amounts of greenhouse gases. This leads to emissions of carbon dioxide - the main greenhouse gas - being released into the atmosphere. Other gases are released as a result of activities in the agricultural, industrial and waste sectors.

Some greenhouse gases exist naturally in the atmosphere and are necessary to keep the earth at the global temperature suitable for ecosystems and life as they have evolved. However, greenhouse gases released into the atmosphere from human activities are building up and trapping extra heat in the atmosphere. The resulting rise in the Earth's temperature contributes to man-made climate change. The changes are not limited to increased average temperatures or warmer weather – they also mean more extreme and unstable weather conditions, more storms and floods, more droughts and more coastal erosion - as well as warmer weather in parts of the world.

[1] IPCC, 2002, Climate Change 2001:3rd Assessment summary report for policy makers, Met Office 2005, Stabilising climate to avoid dangerous climate change

[2] ACIA, 2005 Impacts of a warming Arctic

There is now a scientific consensus that global warming is happening, that it is directly related to man-made greenhouse gas emissions, and that we have little time remaining to stabilise and reduce these emissions if we are to avoid devastating impacts on our planet. There is also an economic consensus that the costs of inaction will greatly outweigh the costs of action, and that progressive climate change policies, based on innovation and investment in low-carbon technology, are consistent with global economic growth.

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The Kyoto Protocol sets binding targets for 37 industrialized countries and the European Community for reducing greenhouse gas emissions. Ireland's National Climate Change Strategy 2007-2012 sets out ways to achieve these targets for the period 2008-2012 and to identify further areas for research and development to meet our 2020 commitment. Expanding the use of renewable energies is one of the ways identified to meet our targets.

Along with reducing CO_2 levels, the main reasons for increasing renewable energy production along with the move away from finite fossil fuel sources are:

- It reduces reliance on imported fossil fuel;
- It is considered to be a clean source of energy which can be harvested without damaging the environment; and
- Its sources are infinite and it can be continuously harnessed.

1.3 Positives and Negatives of Renewable Energy

Positive and negative effects from renewable developments can arise in a number of direct and indirect ways. As with all development pressures, whether from industry, housing, infrastructure etc., renewable energy schemes will impact on many aspects of local communities and the environment. Some of these effects may be negative, others may be positive. Some of the overall positives and negatives of renewable energy developments are outlined below, while the positives and negatives of each source of renewable energy considered relevant in the context of County Mayo are dealt with in Section 4 of this Strategy.

Some Positive Effects of Renewable Energy Production

- **Availability of renewable energy resources**

  Fossil fuels are finite sources of energy which are declining, whereas renewable energy sources are generally infinite and for the most can be easily replenished. Renewable energy sources are available globally.

- **Reducing noxious emissions**

  Most renewable energy sources do not involve the combustion or burning of fossil fuels or other substances, which result in the release of harmful by-products into the atmosphere. Therefore, renewable energy is generally a clean source of energy and one that offers numerous environmental benefits.

- **Security of energy supply**

  Renewable energy sources are readily available and thereby reduce dependency on foreign sources for fuel. This, along with proper management of renewable energy, increases energy security. Renewable energy sources also decentralises electricity supply so that an accident or outage affects a smaller amount of capacity than that at a larger power station.

- **Accessibility to renewable energy sources**

  In local terms, many renewable energy sources (e.g. solar energy) can be exploited very easily and conveniently for domestic use by individual home owners.

- **Community and local ownership/involvement**

  Community and local ownership/involvement normally involves some kind of profit sharing or share ownership in the development. Community ownership implies universal involvement across the community whereas local ownership may be confined to a smaller group within the community.

- **Community benefit**

  Community benefit is a goodwill contribution, from the developer for the benefit of the communities affected by the development where it will have long term effects on the environment. Examples of a developer's community benefit contribution include: a nominated sum per annum per MW of installed capacity; improvements to infrastructure, over and above those which the public sector has a statutory duty to provide; training local people to enable them to enter the renewable energy sector; provide renewable energy technology to the community such as community heat pumps or domestic solar water

heating; matching funding for community projects. Other community benefits may include provisions to reduce fuel poverty[3] in the area.

- **Employment Opportunities**

  As with all development projects, the provision of renewable energy development projects will generate work in the construction, operation and maintenance of such projects. This can have a positive knock-on effect on the local economy.

Some Negative Effects of Renewable Energy Production

- **Natural Energy Flows**

  Reliability and consistency of natural energy flows is a significant drawback with respect to renewable energy. Atmospheric conditions and geographical locations make a huge impact on the efficacy of renewable energy sources. Renewable energy production from sources such as wind power and solar power are variable and intermittent. In addition, interfering with natural energy flows may have an effect on the environment such as coastal erosion, sediment re-suspension, storm surges, transportation of plankton, nutrients in soil, soil erosion etc. – depending on the type and source of renewable energy production.

- **Cost**

  The initial investment or setup cost for renewable energy sources can be significantly high. This may act as a deterrent for the substitution of conventional forms of energy for renewable energy sources.

- **Public concerns**

  The 'NIMBY' ('not in my back yard') effect or general concerns regarding renewable energy developments, particularity large developments, can delay or prevent the construction of renewable energy projects.

- **Land requirements**

  The amount of land area required, particularly for biomass and biofuel, can be significant. Large amounts of land may be required for harvesting renewable energy resources which could be used for other purposes or left in its natural state.

[3] Fuel poverty is defined by Boardman (1991) as 'the inability to heat one's home to an adequate (i.e. safe and comfortable) level owing to low household income and poor, energy inefficient housing and also the need to spend greater than 10 per cent of household income on fuel to achieve an acceptable level of comfort and amenity.' Effectiveness of Domestic Energy–Efficient Programmes. Fuel Poverty Action Research Report 1 SEAI & Combat Poverty Agency December 2009

- **Conservation of Natural and Cultural Heritage and Biodiversity**

  Renewable energy technology has its own set of limitations in relation to the natural and built environment, and ecology. Renewable energy developments can lead to negative impacts on habitats, species and natural features. However in order to reduce the potential impact on habitats, species and natural features, worldwide practice is to locate such developments outside designated or environmentally sensitive sites and areas.

- **Neighbour Interactions**

  Renewable energy technology can lead to impacts such as noise, odour, signal interference and shadow flicker which can cause a nuisance to neighbouring properties.

- **Aesthetics / Visual Amenity**

  Every form of renewable energy has its own set of negative aspects in relation to visual amenity. Many structures are of such a scale that they can be visually obtrusive on the landscape/marine environment. In addition the associated network of transmission wires and pylons which are required to connect into the grid can also have a negative visual impact on the visual amenity of the landscape; more often this element of a renewable energy development can have a greater negative visual impact on a larger area of the landscape.

Section 2 Legislative Context

The context for the Renewable Energy Strategy is set in a hierarchy of international and national legislation, which provides the statutory basis for the preparation of plans and strategies and for the protection of the environment. The implementation of that legislation is carried through national, regional and county level policy guidelines. The major legislative requirements and policy guidelines are set out below. The relevant legislation is listed in Section 6.4.

2.1 Renewable Energy - EU Context

The **Kyoto Protocol** is an international agreement linked to the United Nations Framework Convention on Climate Change. The Kyoto Protocol sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas emissions. The targets amount to an average of five per cent against 1990 levels over the five-year period 2008-2012.

In 2007, the European Union agreed new climate and energy targets: 20-20-20 by 2020 – 20% reduction in greenhouse gas emissions by 2020; 20% energy efficiency by 2020 and 20% of the EU's energy consumption to be from renewable sources by 2020.

Directive 2009/28/EC on the promotion of the use of energy from renewable sources establishes the basis for the achievement of the EU's 20% renewable energy target by 2020. Under the terms of the Directive, each Member State is set an individually binding renewable energy target, which will contribute to the achievement of the overall EU goal. Member states are to achieve their individual target across the heat, transport and electricity sectors. Apart from a sub-target of a minimum of 10% in the transport sector that applies to all Member States, there is flexibility for each country to choose how to achieve their individual target across the sectors. Ireland's overall target is to achieve 20% of energy from renewable sources by 2020[4].

[4] Draft National Renewable Energy Action Plan 2010 Department of Communications, Energy and Natural Resources

2.2 Renewable Energy - National Context

National Development Plan, 2007-2013: Transforming Ireland-A Better Quality of Life for All sets out a programme of investments aimed to ensure Ireland grows in a sustainable manner. The €184 billion Plan is characterised by sustainable economic growth, greater social inclusion and balanced regional development. The NDP promotes the use of renewable energy resources and increased energy efficiency. Emphasis is placed on an increase in renewable energy production in rural areas, especially projects that create environmentally sustainable enterprise and generate employment; and improvements to the national grid to accommodate this. The Sustainable Energy Sub-Programme allocates €276 million to fund the large scale development of wind energy capacity and the development of alternative sources of energy such as bio-mass and bio-fuels, ocean energy and solar and geothermal technologies.

The National Spatial Strategy 2002-2020 provides a planning framework for delivering more balanced social, economic and physical development between the regions of Ireland. It proposes a more balanced pattern of spatial development throughout Ireland, with continued growth in Dublin but with significant improvement in the rate of development in nine 'Gateway' locations and nine 'Hub' towns which are considered critical to achieving balanced regional development. The NSS also states that the rural areas have a vital contribution to make to the achievement of balanced regional development by utilising and developing the economic resources of rural areas, particularly in agriculture and food, marine, tourism, forestry, *renewable energy*, enterprise and local services, while at the same time capitalising on and drawing strength from vibrant neighbouring urban areas. The NSS also supports the economic growth and revitalisation of areas in the west region, previously centred on agriculture, to diversify into alternative economies based on the sustainable use of natural resources such as scenic landscapes for tourism, the sea for fisheries and marine–based aquaculture, the land for agriculture, forestry, inland aquaculture (in rivers and lakes) and *renewable energy*.

The **National Climate Strategy 2007-2012** builds on Ireland's first Climate Change Strategy (2000) and its purpose is to limit the growth in greenhouse gas emissions which are causing the earth to warm up and changing our climate resulting in wetter winters, flooding and summer droughts. Targets for the reduction of greenhouse gases were set out in the Kyoto Protocol, and the National Climate Change Strategy 2007-2012 sets out ways to achieve these targets from the period 2008-2012 and to identify the areas in which further measures are

being researched and developed to meet our 2020 commitment. Achieving the targets will be done through a number of means including harnessing more renewable energy and using energy more efficiently.

National Renewable Energy Action Plan (NREAP)

The National Renewable Energy Action Plan (NREAP) sets out the Government's strategic approach and measures to deliver on Ireland's 16% target of energy consumption from renewable sources by 2020 under Directive 2009/28/EC.

The Government has set a target of 42.5% electricity consumption from renewable sources by 2020. Ireland achieved 14.4% electricity consumption from renewable sources in 2009 and is on track to exceed the national target of 15% in 2010. The significant growth in electricity from renewable sources in recent years is largely attributed to onshore wind. The Irish Government is also looking beyond 2020 in terms of the significant opportunities to develop Ireland's abundant offshore renewable energy resources.

Ireland's transport sector is currently dependent on imported oil. The Government is working to transform this dependency by applying a two pronged strategy which combines significant increases in the use of biofuels with the accelerated development and use of electric vehicles in Ireland. In this regard the use of electric vehicles is relevant to this Strategy.

The **National Biofuel Obligations Scheme 2010** obliges all road transport fuel suppliers to use biofuel in the fuel mix to ensure that biofuel represents 4% per annum of their annual fuel sales. This percentage will increase over time. This biofuel obligation will provide an important incentive to domestic biofuel production over the coming years.

The Government has set a target of 10% of all vehicles on the road to be electric vehicles by 2020. In order to achieve this the Government is taking a broad range of initiatives around Electric Vehicles, including signing Memoranda or Understanding with a number of motor manufacturers, committing to a large scale national roll out of Electric Vehicle Infrastructure and appropriate supports for the customer. The size and geography of Ireland make the country uniquely suitable for Electric Vehicles, and the Government is ensuring that Ireland becomes an early test centre for this technology, and that it takes full advantage of the potential benefits associated with using electricity from renewable sources in transport.

The Government has set a target of 12% renewable heat (biomass sources and geothermal) by 2020. The related programmes and supports are designed to support the achievement of this target. For historical, geographical and demographic reasons, renewable heat poses considerable challenges for Ireland, which the Government is determined to address.

The Government's commitment to accelerating the development of renewable energy is set out in the Government's Energy Policy '**Delivering a sustainable energy future for Ireland – The Energy Policy Framework 2007-2020**'; the **Programme for Government** and in the Government's strategy **'Building Ireland's Smart Economy - A Framework for Sustainable Economic Renewal.'**

Ocean Energy in Ireland 2005 & Draft Offshore Renewable Energy Development Plan 2010

Ocean Energy in Ireland 2005 is a document prepared by Sustainable Energy Ireland and the Marine Institute which outlines a strategy to advance Ireland's research and development capabilities so that ocean energy can contribute to meeting Ireland's growing demand for renewable energy from 2005 through to 2016 and beyond. A four phase strategy to capitalise on Ireland's ocean energy resource is proposed.

The Department of Communications, Energy and Natural Resources, with input from SEAI, have prepared a draft Offshore Renewable Energy Development Plan (OREDP) which describes the policy context for development of offshore wind, wave and tidal stream energy in Irish waters for the period up to 2030. Mayo has potential to harness 18,500-19,500MW of renewable energy from fixed wind, floating wind and wave resources. However it is considered that less than half of this (4,900 to 7,900MW) may be exploited in an environmentally sensitive manner. Tidal resources have not been considered for Mayo.

Grid 25 A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future

Grid 25 is a strategy for the development of Ireland's Electricity Grid for a Sustainable and Competitive Future and represents a total investment of €4 billion to the year 2025. The wind and ocean energy resources of the north west region, of which Mayo forms part, results in the Region having the largest renewable capacity[5] in the Country. Grid 25 recognises that the development of renewable energy in the North West is dependant on significant upgrading of the national grid in the area.

[5] Eirgrid estimates the north west region has 35% of the Country's renewable capacity

2.3 Renewable Energy - Regional Context

Regional Planning Guidelines for the West Region 2010-2022

The Regional Planning Guidelines for the West Region 2010-2022 (RPG's) sets out a framework for the long term strategic development of counties Mayo, Galway and Roscommon (the West Region). In relation to energy provision, upgrading the energy supply and energy network infrastructure and support renewable energy are identified as two of the key investment priorities required to support the sustainable development of the west region. The RPG's also identify the Region's natural assets for renewable energy production as one of the strengths of the Region and lists the opportunities this strength provides i.e. promote sustainable renewable energy developments in appropriate locations; develop associated 'green enterprise', pilot other forms of renewable energy production; become a leader in sustainable renewable energy and spin off green industries and green economy. The RPG's indicate that there is potential to produce renewable energy from wind and wood sources in the short term, and wave energy in the long term. This is supported by a number of policies and objectives.

The Western River Basin Management Plan 2009-2015 and Associated Programme of Measures

The Western River Basin Management Plan (WRBMP) aims to protect all waters (surface, ground and coastal) within the district and, where necessary, improve waters and achieve sustainable water use. While the WRBMP does not specifically refer to renewable energy development, a number of renewable energy developments will rely on water resources such as hydropower and wave energy.

Development Plans and Wind Energy Strategies adjoining Mayo County Council

There are a number of policies and objectives in Development Plans and Wind Energy Strategies of Local Authorities adjoining Mayo which promote the development of renewable energy at appropriate locations in their jurisdictions. Adjoining local authorities and town councils include Galway County Council, Sligo County Council and Roscommon County Council, Castlebar Town Council, Ballina Town Council, Westport Town Council and Tuam Town Council.

2.4 Renewable Energy - Local Context

Mayo County Development Plan 2008-2014

The Mayo County Development Plan 2008-2014 (MCDP) sets out a framework for the sustainable development of the County. The MCDP is the 'parent' plan for all other land use plans in the County and must be taken into consideration in the preparation of other land use plans and strategies. The Mayo County Development Plan recognises the County's role in fulfilling the renewable energy commitments made at national level and includes a number of policies and objectives for renewable energy production.

This Renewable Energy Strategy will supersede all polices and objectives in relation to renewable energy in the County Development Plan and will be incorporated into the Mayo County Development Plan, by way of variation, following its adoption by Mayo County Council. This Renewable Energy Strategy has taken all policies and objectives of the Mayo County Development Plan into consideration in its preparation.

County Mayo Heritage Plan 2006-2011 and the Mayo Biodiversity Action Plan 2010-2016

The aim of the County Mayo Heritage Plan is to identify, raise awareness of and promote the conservation of the built, natural and cultural heritage of the county.

The Mayo Biodiversity Action Plan (MBAP) provides a framework for the conservation of biodiversity and natural heritage at a local level. The MBAP is designed to ensure that national and international targets for the conservation of biodiversity can be achieved, while at the same time addressing local priorities.

Flood Risk Plans

The OPW are currently involved in preparing Preliminary Flood Risk Assessments (PFRA's) with the relevant Local Authorities, the Environmental Protection Agency and other key agencies. This will identify Areas with Potentially Significant Flood Risk (APSR's) based on historic and predictive data and consultation with stakeholders. Nationally, the PFRAs will be provisionally completed in 2010 with formal completion in 2011, and will identify areas of potentially significant flood risk. This is a screening exercise based on available and readily-derivable data. Detailed flood mapping will then be prepared for areas deemed to be potentially at significant risk by 2013. The PFRA plans are not yet available for County Mayo.

In the absence of a Flood Risk Assessment for the County, this Renewable Energy Strategy has taken into consideration flood risk sites (reported past floods or flood vulnerable locations) as identified on flood risk maps prepared by the OPW and has guided development away from areas at risk of flooding.

2.5 National Planning Guidelines

A number of national planning guidelines have also been taken into consideration in the preparation of this Renewable Energy Strategy including:

Architectural Heritage Protection Guidelines – Guidelines for Planning Authorities

Implementing Regional Planning Guidelines – Best Practice Guidance (2005)

Landscape and Landscape Assessment (2000)

Implementation of Strategic Environmental Assessment Directive Assessment of the Effects of Certain Plans and Programmes on the Environment (2004)

Habitats Directive Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (2009)

Telecommunications Antennae and Support Structures – Guidelines for Planning Authorities (1996)

Wind Energy Development Guidelines – Guidelines for Planning Authorities (2006)

The Planning System and Flood Risk Management - Guidelines for Planning Authorities (2009)

Section 3 Renewable Energy in County Mayo

Mayo County Council recognises its role in fulfilling the renewable energy commitments made at national level and has included a number of policies and objectives in the Mayo County Development Plan 2008-2014 for renewable energy production. A number of existing renewable energy developments are operational around the County, along with a number of proposed developments, mainly wind farms, which have secured planning permission (wind farm developments outlined on Map 1 Wind Energy). The Council has also nominated Crossmolina town as the location to "Establish Local Enterprises and Create Jobs based on the Generation and Utilisation of Energy from Renewable Energy Resources"[6]. The Council considers that the County has considerable natural resources which have the potential to establish the County as the leading area in renewable energy production and renewable energy research and development. This will also provide an opportunity for job creation in the County. Notwithstanding this, it is considered that promoting the reduction in energy demand through minimising energy waste should be the key to assisting in reducing carbon emissions alongside the promotion of renewable energy.

It is estimated that Mayo's current annual electricity demand is approximately 800GWh, with a winter peak load of approximately 160MW and summer peak load at approximately 100MW.[7]

3.1 Existing Renewable Energy Production in Mayo

Mayo currently has renewable energy related activity, both at macro and micro levels. Renewable energy production is mainly produced from wind energy in the form of wind farms. Bellacorrick was the first commercial wind farm built in Ireland in 1992. There are currently seven wind farms operating at four locations in the County generating approximately 41.3 MW of electricity[8]. Planning permission has been granted for an additional 6 wind farms in the County with an estimated total output of 371.4 MW.

The largest wind farm development in the county with planning consent is that proposed at Bellacorrick, in close proximity to the existing wind farm. It comprises of 180 turbines with

[6] Nomination made to the Oireachtas Committee for Enterprise, Trade and Employment
[7] Mayo Energy Audit 2009-2020 Sustainability Institute
[8] On 31/05/2010 (Source: IWEA website).
Eirgrid have calculated that on 24th May 2010 there was 39.6MW installed wind capacity in Co. Mayo, with a further 6.3MW contracted with a target date of July 2010 (Source: eirgrid.com).

an output of approximately 306MW and although it has not been constructed to date, it is listed on the Gate 3 ITC Programme (see Section 4).

There are two small hydropower stations in Mayo at present, one in Tourmakeady and one in Ballinrobe, generating approximately 0.66MW in total.

As a result of advances in technology, micro-renewables[9] are becoming an increasingly practical way of generating electricity and heat for homes and both commercial and public buildings in the County through the application of micro wind turbines; solar energy (including passive solar design, solar hot water systems and photo-voltaic cells); heat pumps and; biomass technologies. Planning and Development Regulations 2007 and 2008 have classified many of these technologies exempt from planning permission in certain instances.

There are approximately 40,500 watts of wind microgeneration installed and 4,300 watts of solar microgeneration installed in Mayo in October 2010[10]. A further 87,950 watts of wind microgeneration and 2,000 watts of solar microgeneration have been applied for but are not connected to date.

3.2 Mayo County Development Plan 2008-2014

Mayo County Council supports the principles of renewable energy through the policies and objectives in Section 3.1.3 of the Mayo County Development Plan 2008-2014 (MCDP).

In summary, the polices of the MCDP support the National Climate Change Strategy 2000; encourage the production of energy from a number of renewable sources including biomass, forestry, wind, solar power, tidal, hydro, wave and geothermal sources; specify renewable energy targets to be met; require social housing be designed and constructed using renewable energy technologies; support community based wind farm initiatives; protect existing Rights of Ways and walking routes; and support the development of a Sustainable Energy Park in the County.

[9] Microgeneration is widely accepted to be the production of heat (less than 45 kilowatt capacity) and/or electricity (less than 50kW capacity) from zero or low carbon source technologies (Planning for microrenewables PAN 45 ANNEX Scottish Executive Development Department)

[10]Source: SEAI. The number of watts received are the number of watts applying for connection (i.e. NC6 form)

The supporting objectives require the Wind Energy Strategy to be reviewed within 1 year of the adoption of the Plan; facilitate wind energy developments on a case by case basis; requires conversion of 20% of the Council's vehicle stock to bio-fuel; require community involvement and benefit in wind farms where possible; encourage wind farms at a number of specified locations; make use of the methane gas at the civic amenity sites in the County and; promote the use of renewable energy techniques into Council housing schemes.

Given that some of the polices and objectives in the County Development Plan are now outdated or are no longer applicable due to this Strategy, this Strategy supersedes the policies and objectives outlined in Section 3.3.1 Renewable Energy of the Mayo County Development Plan 2008-2014.

3.3 Future Renewable Energy Production in Mayo

Mayo has been identified as one of the best located counties in Ireland in terms of on-shore winds. While it may be technically possible to install enough wind turbines in Ireland to meet the future annual total electricity demand of Ireland, given the current technological limitations this would be highly unlikely[11]. This is because Ireland is a relatively small meteorological area and there will be times when generation is extremely low due to very low wind speeds and similarly periods where generation exceeds demand. A possible solution to this problem would be to integrate the national grid with a much larger grid such as Europe where electricity could be imported in times of shortage and exported in times of surplus. An East West Interconnector connecting Ireland to Wales commenced this year and is due to transmit power from 2012. However the Irish Wind Energy Association suggests that the most likely long term sustainable solution to Ireland's electricity needs would be the contribution provided by other renewable energies such as wave, tidal and bio-mass in addition to wind energy[12]. In this context the types, characteristics and positives and negatives of each renewable energy source considered appropriate for Co. Mayo are set out hereunder.

3.3.1 Renewable Energy from Wind

Wind power is currently one of the most developed and cost-effective renewable electricity technologies. Wind power is a renewable source of energy and produces no greenhouse gases during its operation. Wind may be classified as 'off-shore' or 'on-shore'.

[11] Irish Wind Energy Association website
[12] Irish Wind Energy Association website

Off-Shore Wind

Off-shore wind is wind blowing from the land toward the sea. This wind is harnessed for energy by installing wind turbines off-shore. While offshore wind is more technologically challenging and more expensive to harness for renewable energy than onshore wind, it has a larger potential due to a stronger and more consistent wind resource out to sea, leading to higher power outputs per turbine and more hours spent generating each year. However academic research indicates that for feasible off-shore wind farm sites, the necessary conditions are; a seabed slope of not more than 5% and a total water depth not exceeding 35 metres[13].

On-Shore Wind

On-shore wind is wind coming from the sea toward the land. This wind is harnessed for energy by installing wind turbines on land. The Wind Atlas for Ireland 2003[14] indicates that the majority of Mayo has wind speeds that are economically viable for the harnessing of wind energy at heights 75m and 100m above ground level.

The advantages of wind energy is that it produces little or no air pollution; wind farms are relatively cheap to build; the energy used to construct a turbine is generated by the turbine within three months of its operation, with a turbine lasting 20-25 years; and landowners can receive an income from the development while the land can be used for other uses along with the wind farm.

Although the environmental impact of wind energy is far lower than that of conventional energy sources, there are some negative effects on the environment such as impacts upon the landscape; bird life; noise; and electromagnetic interference[15]. However it has become common practice worldwide to identify areas that are environmentally sensitive (e.g. designated habitats, bird migration paths, undisturbed peat lands, noise sensitive locations) and for wind farms to avoid those areas. Other disadvantages of wind energy include the constant need for wind, and a significant amount of land is required for wind farms.

[13] Irish Wind Energy Association website
[14] www.seai.ie
[15] www.seai.ie

3.3.2 Renewable Energy from the Ocean

The ocean is an enormous source of energy. It is estimated that 0.1% of the energy in ocean waves could be capable of supplying the entire world's energy requirements five times over[16]. Due to the direction of the prevailing winds and the size of the Atlantic Ocean, Ireland has wave power levels that are among the highest in the world, with an average wave power of 76Kw occurring off the Irish coast. Wave energy is still at an early stage of development, but in the long term it has as much potential as a renewable energy resource as onshore wind.

Tidal power could also make a valuable contribution to Ireland's electricity system. There are two types of tidal power – tidal range (exploiting the size of the tides) and tidal stream (using the speed of tidal currents). Although well established, tidal range power remains relatively expensive and there are few applications worldwide.

The Department of Communications, Energy and Natural Resources have recently published a draft Offshore Renewable Energy Development Plan (Public Consultation) (OREDP) which describes the policy context for development of offshore wind, wave and tidal current energy in Irish waters for the period to 2030[17]. The plan indicates that Mayo has the potential to harness 18,500-19,500MW of renewable energy from fixed wind, floating wind and wave resources. However it is considered that less than half of this (4,900 to 7,900MW) may be exploited in an environmentally sensitive manner. Tidal resources have not been considered for the west coast in the plan as it appears that the opportunities are limited. Opportunities for tidal resources may arise as technology improves.

However, before wave and tidal technologies become commercially viable researchers and developers must overcome the challenge of developing low cost, highly reliable, integrated systems. Given current efforts to develop technology, ocean energy is not expected to contribute significantly to Ireland's electricity supply before 2020[18].

In the interim Mayo could advance as a centre for research and development in ocean energy. The Sustainable Energy Authority of Ireland plans to develop a National Wave Energy Test Site, which is proposed to be located off Annagh Head, west of Belmullet in County Mayo. The purpose of the wave energy test site at Belmullet is to provide a location for the

[16] European Commission Research website
http://ec.europa.eu/research/energy/eu/research/ocean/index_en.htm
[17] www.dcenr.gov.ie
[18] Ocean Energy in Ireland 2005 Department of Communications, Marine and Natural Resources

temporary mooring and deployment of wave energy machines so that their performance in generating electricity and their survivability can be tested and demonstrated in open ocean conditions. It is proposed that the test site shall operate for up to 20 years with devices on site intermittently throughout the year[19].

The advantages of ocean energy include: the energy produced is clean and non polluting; there is no carbon dioxide or any other by-products released; there are two tides every day and they can be relied on; the electricity supply is constant and efficient; once constructed, the energy is free because it comes from the ocean's power; it needs no fuel; it is not expensive to maintain and; the visual aspects are reduced compared to onshore developments.
As with wind energy, ocean energy may present some negative effects on the environment such as impacts upon the landscape from on-shore ancillary infrastructure; impacts on marine and bird life; impacts on navigation and shipping; and noise.

3.3.3 Renewable Energy from Hydropower

Hydropower is power that is derived from the force or energy of moving water, which may be harnessed for the generation of electricity. Hydropower is a widely used form of renewable energy and is considered to be a reliable and generally a predictable source of renewable electricity and one of the few that is not intermittent. Once a hydroelectric complex is constructed, the project produces no direct waste, and has a considerably lower output level of carbon dioxide than fossil fuel powered energy plants.

Nearly all hydro storage stations are located on rivers. The rivers in Ireland are quite small and provide only limited hydro energy capacity and their capacity is relatively small in comparison to overall demand. Sites using fresh water are difficult to find.[20]

The advantages of hydropower are; following construction it offers recreational benefits such as boating, fishing and walking routes; operational costs are low; and reservoirs have a long life.

Hydropower may pose some negative effects on the environment such as visual impacts upon the landscape; geological impacts; impacts on ground water; impacts on terrestrial and marine wildlife and; impacts from noise generated during construction and at operational stage. Also, although rare, there can be catastrophic effects to the environment and a locality in the event of reservoir wall failure.

[19] www.seai.ie
[20] www.spiritofireland.org

3.3.4 Renewable Energy from Bio-energy

Generally bio-energy is divided into a number of sub-groups depending on the fuel source and method used to create energy. Bio-energy includes biomass, biogas and bio-fuel.

The bio-energy sector has the potential to expand without detrimental effects on food production and the environment if carried out in a sustainable manner. Greater recovery of wood from managed and unmanaged woodland, increasing the planting of energy crops, and better exploitation of the existing supply of organic waste materials, could make a significant contribution to renewable energy targets, particularly in the electricity and heat sectors.

Biomass is the use of plants for energy production. It is considered a form of renewable energy as the plant material releases the sun's energy when burned. Plants may be grown specifically for energy use or, the residue of plants used for other things may be used.

In Mayo the primary sources of biomass that have potential to generate electricity on a sufficient scale is wood. Approximately 10.45% of Mayo's land area is under forestry.

The main advantages of biomass are that it is very abundant and it may be grown on areas of unused agricultural or marginal land.

The main disadvantages of biomass are that large amounts of land are required to harvest plants; burning biomass can result in air pollution; it may not be cost effective or reduce carbon emissions if the 'fuel' required is transported over a considerable distance; it requires large storage areas and; transport handling costs are high.

Biogas is produced by the anaerobic digestion of organic matter such as farm wastes, food processing waste, sewage and organic wastes from municipal sources. Biogas can be used for renewable heat or electricity. This can be done through small scale plants based at the source of the waste such as on farms or at a larger scale transporting large volumes of materials to one central digester.

In Mayo the primary sources of biogas that have potential to generate electricity on a sufficient scale are agricultural and municipal wastes. It has been estimated that Mayo could

generate approximately 24MW in a centralised anaerobic digestion unit from the 193,000 tonnes[21] of organic waste material generated each year.

The main advantage of biogas is that it can be used to burn waste products. The main disadvantages is the potential odours arising from the 'fuels' used.

Biofuel is generally either bioethanol or biodiesel. Bioethanol is produced by fermenting the sugar components of plant material and can be used as a fuel for vehicles. Biodiesel is made from vegetable oil, animal fats or recycled greases and can be used as a fuel for vehicles.

There may be potential in Mayo to expand its production of biofuel in the future.

The main advantage of biofuel is that it can be manufactured from a wide range of materials including crop waste, manure, and other by products, making it an efficient step in recycling.

The main disadvantage of biofuels is the amount of land required for growing the plant material, where plant material is required. In addition, biofuels have a lower energy output than traditional fuels and therefore require greater quantities to be consumed in order to produce the same energy level.

3.3.5 Renewable Energy from Solar and Solar Thermal Energy

Solar energy is derived from the sun. Solar thermal energy is a technology for harnessing solar energy for thermal energy (heat).

Solar energy can be captured in two ways; through active solar techniques which include the use of photovoltaic panels and solar thermal collectors to harness energy, or through passive solar techniques including orientation of a building towards the sun and using materials with favourable light dispersing properties.

A solar thermal roof installation can generate a proportion of a household's annual demand for hot water. Photovoltaic panels can generate renewable electricity for on-site use, or for export to the grid, even when the sky is overcast. Thermal energy can also be harnessed through the use of heat pumps.

[21] The Replacement Connaught Waste Management Plan 2006-2011 estimates that in the period 2000-2002 over 193,000 tonnes of organic waste material was generated per annum.

Both practises (active and passive) are currently used in households and buildings throughout the County.

The main advantage of solar energy is that passive energy can be inexpensive if built into a development.

The main disadvantages of solar energy are that some forms are currently not cost effective; and given that reliability depends on sunlight, storage and backup are necessary.

3.3.6 Renewable Energy from Geothermal

Historically linked to areas with tectonic activity, geothermal energy is the extraction of power from heat stored in the earth. Granite is a particularly good rock type for geothermal energy extraction. Geothermal energy is a non-variable source of energy but there is a finite lifespan on geothermal wells of approximately 20-30 years[22].

Mayo has large bands of granitic type rocks located to the north east of Castlebar (in the general vicinity of Foxford) with other significant areas near Louisburgh and on the southern end of the Mullet Peninsula. The potential of these areas for the production of electricity from geothermal sources should be further examined.

The advantages of geothermal energy are that it is inexpensive to operate and there is little or no pollution, if liquids are contained.

The disadvantages of geothermal energy include that where deep drilling is required it is costly; there tends to be an increase in seismic events and subsidence; and a possibility of toxic chemical run-off in a non-closed system, where the water extracted from the drilled wells will have a higher level of Mercury, Arsenic, Boron etc due to the mineral make up of the rock.

3.3.7 Technologies for Load Balancing

Pumped storage hydroelectricity

Pumped storage hydroelectricity is used by transmission system operators for load balancing. The method stores energy in the form of water, pumped from a lower elevation reservoir to a

[22] www.geothermalassociation.ie

higher elevation. During periods of high electrical demand, the stored water is released through turbines. Pumped storage is a form of grid energy storage.

There are proposals to investigate the possibility of constructing pumped hydroelectricity energy storage facilities, using seawater, in Mayo. There is only one such development in the world operating to date, namely Okinawa, Japan.

Although there is limited research available on pumped storage, the advantages of pumped storage are similar to that of hydropower along with the advantage of the provisions of load balancing.

The disadvantages of pumped storage are similar to that of hydropower. In addition, the economics of pumped storage is uncertain given the significant costs in providing pumped storages.

The existing and theoretical potential amount of renewable energy generation in Co. Mayo is set out in Table 1 hereunder. The total output is estimated to be in the region of 10304-12770 MW but this does not take into consideration the additional amount that could be generated from sources where the potential is unknown. Putting this in context, County Mayo's current electricity demand is estimated to be approximately 800GWh. This would equate to approximately 400MW from wind energy alone, or 3-4% of the existing and theoretical potential on-shore wind energy generation in the County.

Table 1 Existing and Theoretical Potential Renewable Energy in Co. Mayo

Source → **Status ↓**	**On-shore Wind**		**Off-shore Wave & Wind**	**Biomass**	**Biogas**	**Biofuel**	**Micro Wind**	**Micro Solar**	**Micro Hydro**	**Geothermal**	**Hydro**
Installed MW	41.3		0	Yes a/n/k	n/k	n/k	0.04	0.0045	n/k	n/k	0.66
Consented MW	371.4		0	Yes a/n/k	n/k	0	0.9*	n/k	n/k	n/k	0
Potential MW	Tier 1 (Large)	658-1315♦	6400**	Yes a/n/k	24+	Yes a/n/k	Yes a/n/k	Yes a/n/k	Yes a/n/k	Yes a/n/k	Yes a/n/k
	Tier 1 (Cluster)	577-1155♦									
	Tier 2	2231-4462♦									
Source Total	**3878.7 – 6344.7**		**6400**	**n/k**	**24+**	**n/k**	**0.94+**	**0.0045+**	**n/k**	**n/k**	**n/k**
TOTAL	**10304 – 12770 MW (to the nearest figure) with additional unknown potential**										

n/k Not Known
a/n/k Amount not known
* Applied for a connection but not yet connected.
** 6400MW is the mean of 4,900MW and 7,900MW
♦ Between 5 and 10MW generated from each Sq. km of land (SEAI estimate to Mayo County Council)

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A summary of the advantages and disadvantages of renewable energy developments are outlined in Table 2.

Table 2 Summary of Advantages and Disadvantages of Renewable Energy Developments	
Advantages of Wind Energy	**Disadvantages of Wind Energy**
• Produces little or no water/air pollution • Landowners receive an income while land can have other uses • Relatively cheap to build • Energy used to construct a turbine is generated by the turbine in three months of its operation • Turbines have a relatively long life of 20-25 years	• Constant wind is required • Significant visual impact over a large area • Impacts on bird life • Electromagnetic interference • Require a lot of land
Advantages of Ocean Energy	**Disadvantages of Ocean Energy**
• Abundant, clean, and safe • Tides are very reliable • Visual aspects reduced compared to onshore development.	• Not commercially viable at present • Shipping and navigation could be disrupted • Impacts on marine life • Coastline topography can cause difficulties for landing electrical cables • Limited power production at present
Advantages of Bio-energy	**Disadvantages of Bio-energy**
• Abundant and renewable • Can be used to burn waste products	• Large amounts of land required to harvest plants • Burning biomass can result in air pollution • May not be cost effective

Table 2 Summary of Advantages and Disadvantages of Renewable Energy Developments (cont.)	
Advantages of Hydroelectricity	**Disadvantages of Hydroelectricity**
• Eliminates the cost of fuel • Easily stored in reservoirs • Offers recreational benefits like boating, fishing, walking route etc. after construction • Low operating costs • Long life	• Can have a significant environmental impact such as disruption of aquatic ecosystems and bird life • Noise impacts during construction • Can be used only where there is a water supply • Dislocation of people living where reservoir is planned • Catastrophic failure of the dam wall (rare) • Release of significant amounts of CO_2 at construction stage
Advantages of Solar Energy	**Disadvantages of Solar Energy**
• No water or air pollution • Passive practices can be relatively inexpensive	• Reliability depends on sunlight • Some forms are not really cost effective at present • Storage and back-up are necessary
Advantages of Geothermal	**Disadvantages of Geothermal**
• Low running costs • Little or no pollution (if gases contained)	• Possible seismic events and subsidence • Possible toxic chemical run-off • Exploration and drilling very expensive

Section 4 The National Grid

4.1 The National Grid

The National Grid is Ireland's power transmission system and is a meshed network of high voltage, overhead lines and underground cables and transmission stations. It delivers power to bulk transfer points all over Ireland where power can be taken onwards on lower voltage lines to customers' premises. The power is generated by power plants and wind farms throughout the country, utilising a variety of fuel or energy sources – including gas, oil, coal, peat, hydro, wind and other sources such as biomass and landfill gas, and all feed into the national grid and power is transmitted nationwide[23].

4.2 Responsibility for Ireland's Power Transmission System

EirGrid is the independent electricity Transmission System Operator for the Republic of Ireland. The distribution system is separately managed by the Distribution System Operator, **ESB Networks** and brings power directly to Ireland's domestic, commercial and industrial customers[24].

4.3 Gate 3

The "Gate 3" process which is now underway will deal with connections for over 3900 MW of renewable generation, which is designed to meet the Government's renewable target. The Gate 3 process is based on achievement of the forward-looking Grid Development Strategy. Gate 3 can be defined as the third "group processing" directive for renewable connection offers issued by the Commission for Energy Regulation (CER). Specifically in relation to Mayo, under this directive EirGrid and ESB Networks as the Transmission System Operator and Distribution System Operator respectively are to issue connection offers to approximately 20 proposed on-shore wind farms with a total generation capacity of approximately 720 MW which are based in the county. As part of Gate 3 analysis undertaken by EirGrid it was demonstrated that the delivery of the Grid25 network is key to realising the full potential of these Gate 3 projects.

[23] www.eirgrid.com
[24] www.eirgrid.com

4.4 Future Development of the National Grid (Grid 25)

As Ireland moves towards achieving 42.5% renewable energy sources for electricity by 2020, the Irish national grid increasingly has to cope with the challenges posed by large amounts of intermittent power. The Irish Transmission System Operator (EirGrid) is involved in detailed examination of this issue. All key national agencies, including the Energy Regulator, the distribution and transmission system operators and the renewable energy sector are working with the Government to deliver the 2020 target through grid connection and grid development strategies.

The strategy for the development of Ireland's Electricity Grid for a Sustainable and Competitive Future is set out in Grid 25 and represents a total investment of €4 billion between now and 2025[25].

4.5 Future Development of the National Grid in Co. Mayo

Mayo forms part of the North West Region in Grid 25 – an area which has been identified as having the largest (35%) expected regional distribution of the renewable generation capacity, as the area is particularly rich in wind and ocean renewable energy resources[26].

The upgrading of the national grid is imperative for the future development of renewable energy production in Mayo. According to EirGrid, the consequences of non-action means that "*by the second half of the next decade there will be no capacity in the network to cater for new customers and the reliability of supply to existing customers will fall below international standards and there will not be enough capacity in the network to connect further renewable generation; as the north west is a renewable-rich region this will have severe consequences on the ability of Ireland to meet its renewable energy targets and its long term sustainable energy supplies*"[27].

[25] Grid 25 - A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future. EirGrid
[26] Grid 25 - A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future. EirGrid
[27] Grid 25 A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future. Eirgrid

The potential for energy generation from renewable resources in the County is enormous:

- Planning permission has been granted for 6 additional wind farms in the County, consisting of 210 turbines with an estimated total output of 371.4MW (see Map 1).
- A number of additional wind farm developments are listed on the Gate 3 ITC programme during the period 2010 to 2023, generating a total of 500.25MW of electricity.
- It has been estimated that the western Irish coastal waters have potential to harness 4,900 to 7,900MW of renewable energy from fixed wind, floating wind and wave resources in an environmentally sensitive manner[28].
- It is considered that the County will also be in a position to generate renewable energy from bio-energy.
- The potential of renewable energy generation from geothermal is not known at present.
- Certain micro renewables are also expected to contribute to the overall energy needs of the County.

Having regard to the existing and theoretical potential renewable energy output in the County, detailed in Table 2 (Section 3), along with conventional forms of energy production, it can be stated that energy generation potential is growing in the County.

However it will not be possible to utilise Mayo's natural resources for renewable energy (or efficiently produce energy from conventional sources) without essential upgrades to the national grid. Having conservatively estimated the amount of renewable energy that can be generated in the County (outlined above) it is reasonable to state that a 400kV line will be required to harness the County's natural resources and to achieve the policies and objectives of this Strategy. The corridor for a 400kV transmission line is to be assessed in accordance with best international practice following a detailed analysis of routing options incorporating technical and environmental considerations. Building one 400kV circuit avoids the need for building a multiplicity of 220kV lines and so has less long-term impact on the environment and local communities.[29] Securing the provision of a 400kV line and associated infrastructure in the County will be a priority for Mayo County Council.

[28] Assessment Area 5 in the draft Offshore Renewable Energy Development Plan (Public Consultation) 2010 which include the western coastline from north Mayo to north Kerry.
[29] Grid 25 A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future. Eirgrid

Other upgrades to existing voltage lines or new voltage lines/underground cables may be required throughout the County to facilitate the movement of power generated from renewable energy. The Council will require that routes and wayleaves of existing voltage lines/underground cables should be the first option considered for any new voltage line/cable proposals. Any upgrades to existing voltage lines or new voltage lines/underground cables will be considered on a case by case basis having regard to the principles of proper planning and sustainable development.

Section 5 Integrating Environmental Considerations

This Renewable Energy Strategy is underpinned by Strategic Environmental Assessment (SEA), Habitats Directive Assessment (HDA) and Flood Risk Assessment (FRA), all of which inform decision makers and interested parties of the likely impacts of implementing the Strategy on different aspects of the environment. A description of each assessment, and how it was integrated into the Strategy, is outlined below. This Strategy should be read in conjunction with the SEA Environmental Report, HDA Natura Impact Statement and Flood Risk Report, which are available at Mayo County Council.

In preparing this Strategy, a detailed and in depth planning and environmental analysis of the County was prepared using Geographical Information Systems. Areas deemed highly sensitive in planning and environmental terms were identified and excluded from Map 1 Wind Energy. Where locations for all other renewable energy technologies are not identified on Maps in this Strategy, this GIS mapping system developed for this Strategy will be used to assess the suitability of any proposed sites for renewable energy development. The GIS mapping system will be continuously updated as new / revised data becomes available to the Council.

5.1 Strategic Environmental Assessment

Strategic Environmental Assessment is a statutory systematic process of predicting and evaluating the likely environmental effects of implementing a plan or programme in order to ensure that these effects are appropriately addressed at the earliest stage of decision making. Following the compilation of baseline data[30], existing environmental problems are identified. Environmental protection objectives (EPOs) for each baseline data are then created based on international and national legislation and standards. Five potential Renewable Energy Strategy Scenarios were assessed against the baseline data and the EPOs namely;

Scenario 1: Do nothing scenario – Retain Current Wind Energy Strategy and Mayo County Development Plan Renewable Energy Policies and Objectives

Scenario 2: Ad-hoc planning for renewable energy development

Scenario 3: Offshore Renewable Energy Development only

Scenario 4: Strategically Planned Off-shore and On-shore Renewable Energy Development

Scenario 5: Renewable Energy Development along the Mayo coastline only

[30] Baseline information assessed in the SEA Environmental Report included Biodiversity, Flora and Fauna; Population and Human Health; Landscape; Material Assets (Transportation, Piers and Harbours, Drinking Water, Wastewater, Waste, Energy Infrastructure, Commercial Forests); Freshwater Ecology and Water Quality; Waste; Soils and Geology; Climate Change; Air and Noise

The SEA process identified Scenario 4 Strategically Planned Off-shore and On-shore Renewable Energy Development as the preferred Scenario and this Strategy has been prepared based on that Scenario. The Strategy, its policies and objectives, have been assessed by the SEA team and where mitigation measures were required, such measures were incorporated into this Strategy.

Section 6.5 sets out the SEA mitigation measures required and applicants/developers will be required to demonstrate that any proposed renewable energy developments comply with the requirements set out in the mitigation measures, along with development management standards set out in the Mayo County Development Plan or appropriate Local Area Plan.

5.2 Habitats Directive Assessment

Habitats Directive Assessments is a procedure that requires the competent authority to assess the possible nature conservation implications of any plan or project, along or in conjunction with other plans or projects, on any Natura 2000 site. The obligation to undertake Habitats Directive Assessment derived from Articles 6(3) and 6(4) of the Habitats Directive and it involves a number of steps and tests that need to be applied in sequential order.

This Renewable Energy Strategy has undergone Habitats Directive Assessment and the assessment has indicated that although this Strategy avoids Natura 2000 sites in Map 1 (Wind Energy) and ensures protection of Natura 2000 sites for all other renewable energy developments arising from this Strategy, mitigation measures have been outlined to preclude indirect effects on any Natura 2000 sites from proposed renewable energy developments outside designated areas. Notwithstanding a Habitats Directive Assessment being carried out on this Strategy, individual renewable development proposals may be subject to a Habitats Directive Assessment at the project stage.

5.3 Flood Risk Report

All plans and programmes need to be assessed for flood risk assessment. Preliminary Flood Risk Assessments are being carried out by the OPW nationally. Preliminary Flood Risk Assessments are currently not available for Co. Mayo. However flood risk identification in Co. Mayo has been carried out as part of the SEA process and integrated into this Strategy. Areas identified as ‘flood vulnerable locations’ in the County have been avoided.

Section 6 The Renewable Energy Strategy for Co. Mayo

6.1 A vision for Renewable Energy Development in Co. Mayo

Energy generation and energy related activity in Mayo is under-developed. This is likely to change significantly over the coming years as the Corrib Gas Field becomes operational and as the move to a low carbon economy increases. It is clear from the Mayo County Development Plan 2008-2014 that the County aspires to become a key player in the energy sector, in particular to be a centre for renewable energy production and to share in the benefits that could arise. It is also recognised, however, that there are constraints on the development of renewable energy such as significant impacts on nearby residents; the natural environment; landscape; and built and cultural heritage.

There is, nevertheless, a clear vision for Mayo to be part of a wider national sustainable development strategy. Based on the factors above the following elements compose a balanced vision for the development of renewable energy in Mayo:

- Renewable energy can help to develop an energy focus within the Mayo economy, while making a positive contribution to the reduction of greenhouse gas emissions.

- Improved awareness of energy issues should lead to a greater commitment to reducing power consumption. Underlying improvements in energy efficiency will have beneficial effects for the environment and the economy.

- The clear benefits of renewable energy cannot, however, be realised at any cost and a balance needs to be struck between economic, social and environmental interests or pressures. A key challenge is to manage this balance within a changing world. Other influences on technological change, economic expectations, social trends and ecosystem dynamics mean that each of these factors will change over the lifetime of a strategy. Dynamic judgements need to be made about what is appropriate and acceptable change.

- This Strategy recognises that our environment is evolving constantly. Those changes have helped shape the environment as it is today and will continue to mould it for the future.

- Renewable energy will add a new dimension to the landscape, the economy and the availability of energy in communities. This Strategy aims to ensure that, overall, the advantages presented by renewables outweigh the disadvantages for most people and for the wider environment.

- By actively engaging in the use of renewable energy technologies, Mayo is supporting the wider aspirations of Ireland to be a world leader in the development and deployment of renewable technologies.

- Renewable energy will not solve all of our energy related problems, but it can make a significant contribution.

This rationale can be summarised in the following Vision statement:

The renewable energy development vision for County Mayo is to harness the energy and economic potential of County Mayo presented by renewable technologies in order to provide benefits for both local communities and the global environment. In doing so, the elements of the natural, cultural (architectural and archaeological) and landscape heritage that define Mayo for local people and visitors alike will be protected. It is recognised, however, that change is an integral part of cultural heritage and that in order for communities and businesses to thrive Mayo needs new developments. Renewable energy projects will, therefore, be developed in ways that protect the integrity of environmentally designated sites; maximise local and regional benefits; and minimise or avoid negative impacts on the environment and society.

6.2 The Aim of the Strategy

The aim of this Strategy is to develop the plan led approach to the location of renewable energy development at a more detailed level than that outlined in the Wind Energy Strategy (2008) and renewable energy policies and objectives in the Mayo County Development Plan 2008-2014. This Strategy also revises and replaces the Mayo Wind Energy Strategy 2008 and the Renewable Energy policies and objectives of the Mayo County Development Plan 2008-2014.

6.3 Policies and Objectives of the Strategy

In order to achieve the vision and aim of this Strategy the policies and objectives in this section shall apply. Policies and objectives have been prepared in accordance with the principles of proper planning and sustainable development, including reduction of green houses gases, maximising community benefit, ensuring minimal adverse environmental impact and taking full account of the presence and requirement to protect all Natura 2000 sites. All relevant policies and objectives in the County Development Plan 2008-2014 (or subsequent plan) will also apply when assessing planning applications for renewable energy developments.

Policy 1 Climate Change

It is the policy of the Council to support the National Climate Change Strategy 2007-2012.

Objective 1.1

It is an objective of the Council to assist in achieving national targets for reducing greenhouse gas emissions associated with energy production by encouraging and promoting the reduction in energy consumption and by encouraging renewable energy developments at appropriate locations within the County, having regard to relevant planning guidance and the principles of proper planning and sustainable development and through the implementation of this Strategy.

Objective 1.2

It is an objective of the Council to encourage renewable energy production from wind, wave, tide, biomass, biofuel, biogas, solar power, tidal, hydro and geothermal sources in the County, particularly at locations set out in the Maps accompanying this Strategy and having regard to principles of proper planning and sustainable development.

Objective 1.3

It is an objective of the Council to assist in achieving the target that a minimum of 16% of the County's overall energy requirements and 42.5% of the County's electricity requirements will be provided from renewable sources by 2020 by implementing this Strategy.

Objective 1.4

It is an objective of the Council to encourage energy efficiency, low energy design and integration of renewable energy techniques into new and existing developments.

Objective 1.5

It is an objective of the Council to continue to ensure energy efficiency, low energy design and integration of renewable energy techniques into the Council's own operations, construction programmes and running of vehicle stock.

Objective 1.6

It is an objective of the Council to utilise renewable energy technologies at the sites of its major infrastructure (e.g. sewage treatment plants, water treatment plants etc) where feasible.

Policy 2 The Natural and Built Environment

It is the policy of the Council to ensure that a balance between the provision of renewable energy developments and the preservation and conservation of the natural and built environment is maintained, subject to compliance with the requirements of the Habitats and Birds Directives.

Objective 2.1

It is an objective of the Council to ensure full compliance with European and National legislation in relation to renewable energy production and protection of the environment.

Objective 2.2

It is an objective of the Council to follow a sustainable plan led approach to renewable energy development within County Mayo through the implementation of this Strategy, in particular guiding renewable energy developments to preferred locations as set out in Section 6.4 and requiring all renewable energy developments to comply with standards and mitigation measures outlined in Section 6.5

Objective 2.3

It is an objective of the Council that all proposed renewable developments will be assessed on the principles of proper planning and sustainable development, ensuring minimal adverse environmental impact to biodiversity, flora and fauna; population and human health; soil; water; air and climatic factors; material assets; cultural heritage; and landscape. Full account shall be taken of the presence and requirement to protect all Natura 2000 sites, natural Heritage Areas, proposed Natural Heritage Areas, the national Park and Nature Reserves. Projects will be subject to Habitats Directive Assessment where considered appropriate.

Objective 2.4

It is an objective of the Council to ensure that renewable energy developments do not interfere with, damage, remove, or impinge on the visual amenity of, existing rights of way, public walking and cycling routes, scenic routes and scenic views, architectural heritage including protected structures and Architectural Conservation Areas, archaeological heritage including recorded monuments, Ballycroy National Park and vulnerable or sensitive landscapes in the County.

Policy 3 Strategic Infrastructure

It is the policy of the Council to encourage and assist in the provision of strategic infrastructure at appropriate locations to facilitate the provision and exporting of renewable energy.

Objective 3.1

It is an objective of the Council to actively pursue the upgrading of the national grid and for the provision of a 400kV line in Mayo with the Minister, The Commission for Energy Regulation and EirGrid.

Objective 3.2

It is an objective of the council that the final route of any new 110/220 or 400 kV transmission lines be selected in line with best International Practice. Among other things, this process will require that a highly detailed study be carried out incorporating technical and environmental considerations to assist in selecting the most appropriate route. As part of this process the feasibility of using all existing linear infrastructure corridors such as road and rail as well as the existing transmission corridors for the 110 kV and 38 kV circuits or their established way leaves should be given due consideration. The existing transmission corridors for the 110kV and 38kV circuits shall be followed as far as technically and environmentally practicable.

Policy 4 Community Benefit

It is the policy of the Council to require that renewable energy developments are carried out in a manner that promotes economic and social benefits for the community of Mayo as a whole.

Objective 4.1

It is an objective of the Council to ensure that the advantages presented by renewable energy development outweigh the disadvantages for the majority of the community residing in the area of any proposed renewable energy development, and for the wider environment, when assessing planning applications for renewable energy development.

Objective 4.2

It is an objective of the Council to encourage community based renewable energy developments in the County having regard to the principles of proper planning and sustainable development.

Objective 4.3

It is an objective of the Council to require developers to incorporate the concept of community benefit into any renewable energy development proposal. Details of the particular form/model of community benefit proposed by the developer shall be submitted with the planning application for agreement by the Council at planning stage.

Objective 4.4

It is an objective of the Council to facilitate reducing fuel poverty in the County.

Policy 5 Research & Development

It is the policy of the Council to facilitate renewable energy research and development within the County.

Objective 5.1

It is an objective of the Council to support and encourage the development of a Sustainable Energy Park at a suitable location in the County, for the display of working examples of sustainable energy sources, the creation of public awareness regarding the benefits and advantages of renewable energy, and the provision of educational, training, research and development facilities relating to renewable energy and the sustainable development of renewable energy.

Objective 5.2

It is an objective of the Council to facilitate marine renewable energy research at suitable locations along the Mayo coastline.

6.4 Location of Renewable Developments

Introduction and Methodology

The key element in preparing this Strategy was to ensure that the harnessing of renewable energy for the production of electricity and the economic potential presented by renewable technologies in Mayo will provide benefit for the global environment and local communities whilst ensuring protection of the natural and built heritage of the County and protecting the residential amenities of the existing population in Mayo.

The methodology used in identifying suitable locations for renewable energy developments in this draft Strategy is similar to that set down in the national planning guidance – the Wind Energy Development Guidelines: Guidelines for Planning Authorities June 2006 DoEHLG & SEI.

A detailed study was carried out to identify potential areas for different types of renewable energy developments in the County. An evaluation of the landscape and its sensitivity for renewable energy developments was prepared. Planning considerations such as designated natural heritage areas[31], built heritage[32], scenic views/routes, cycle/walking route and populated areas and infrastructure constraints were identified. Environmental considerations arising from the strategic environmental assessment and Habitats Directive Assessment (e.g. water quality, flooding etc.) were also identified. All planning and environmental considerations in the County were plotted using GIS. Planning constraints within 15km from the Mayo county border with any adjoining local authority (i.e. Galway, Sligo and Roscommon) and town council (Castlebar, Westport, Ballina and Tuam) were also considered.

Having had regard to the above, the mapping exercise identified areas having no or low planning constraint[33]. The Wind Atlas of Ireland was also considered ensuring that the areas selected for wind farm developments have adequate wind speeds for wind related renewable energy development.

[31] Candidate Special Areas of Conservation, Special Protection Areas, proposed Natural Heritage Areas
[32] Architectural Conservation Areas, Protected Structures, Recorded Monuments
[33] Low planning constraint for the purpose of this exercise may be defined as an area which presents one or two planning constraints but that can be easily mitigated against.

The areas identified as suitable for particular renewable energy developments are outlined in the maps accompanying this Strategy and/or in the text below.

It should be noted that by identifying lands suitable for renewable developments in the Maps attached to this Strategy, this does not preclude other forms of development from taking place on the lands. The permission of other forms of development on the lands identified in the Maps may have a consequential impact on the viability of the lands for renewable development. Each proposed development will be assessed on its impacts on the Renewable Energy Strategy.

The Council will consider all proposed renewable energy developments submitted through the planning system through the pre-planning process. The proposals will be examined and assessed using the GIS system developed by Mayo County Council outlined in Section 5 of this Strategy. The areas identified in this document and on the Maps accompanying this Strategy are considered the most appropriate for renewable energy developments. Other areas are likely to have planning and environmental constraints which would make them less suitable for renewable energy developments. In compliance with the Habitats Directive and the fact that there are alternative sites available for renewable energy development in the County, no renewable energy development will be considered on Natura 2000 sites.

6.4.1 Wind Energy

On-shore wind energy

Map 1 Wind Energy classifies potential areas for on-shore wind energy development. There are 4 classifications identified:

- **Priority Areas** are areas which have secured planning permission and where on shore wind farms can be developed immediately.
- **Tier 1 - Preferred (Large Wind Farms)** are areas in which the potential for large wind farms is greatest.
- **Tier 1 - Preferred (Cluster of Turbines)** are areas identified as being most suitable for smaller clusters of wind turbines (clusters of up to three to five turbines depending on site conditions and visual amenity).
- **Tier 2 - Open for Consideration** identifies areas which may be considered for wind farms or small clusters of wind turbines but where the visual impact on sensitive or vulnerable landscapes, listed highly scenic routes, scenic routes, scenic viewing points and scenic

routes[34] will be the principal consideration. The Tier 2 classification will be reviewed by the Council following a determination by EirGrid of grid infrastructure for the County.

Any proposals for on-shore wind farm developments will be determined in accordance with the Wind Energy Development Guidelines (DoEHLG) 2006 or any subsequent guidelines and the requirements set out in Section 6.5

Off-shore Wind Energy

The main bodies with responsibility for the development of off-shore wind are the SEAI, the Marine Institute and Department of Communications, Marine and Natural Resources.

Responsibility for dealing with the provision of on-shore infrastructure associated with off-shore renewable energy developments lies with Mayo County Council. Much of the required infrastructure will be located on an environmentally designated coastline.

Any proposals for on-shore infrastructure associated with off-shore wind farm developments will be determined in accordance with the principles of proper planning and sustainable development and in accordance with the requirements set out in Section 6.5

6.4.2 Ocean Energy

Ocean energy, both wave and marine tidal is not expected to contribute significantly to Ireland's electricity supply before 2020[35]. The SEAI and associated partners have proposed to build a National Wave Energy Test Site at Annagh Head, Belmullet demonstrating that the off shore conditions along certain parts of the Mayo coastline are suitable for research and development for ocean energy. Building on this potential Mayo is a suitable location for the establishment of a centre for further research and development of the ocean as a source of renewable energy.

Any proposals for on-shore infrastructure associated with off-shore wave energy developments will be determined in accordance with the principles of proper planning and sustainable development and in accordance with the requirements set out in Section 6.5

[34] As defined in the Landscape Appraisal for Co. mayo and the Mayo County Development Plan or appropriate Development Plan or Local Area Plan.
[35] Ocean Energy in Ireland 2005 Department of Communications, Marine and Natural Resources

6.4.3 Hydropower

The scope of new medium to large hydro-electrical schemes in Mayo is likely to be limited. The rivers in Mayo are quite small and provide only limited hydro energy capacity.

Mayo's coastline is environmentally sensitive with much of it designated as proposed Natural Heritage Areas. It is recommended that any hydropower energy developments avoid such areas.

Any proposed small scale hydro-electric schemes will be assessed having regard to the Planning, Design, Construction & Operation of Small Scale Hydro-Electric Schemes and Fisheries or adapted on the recommendation of the Inland Fisheries Ireland to facilitate local conditions. All hydropower developments will be determined in accordance with the principles of proper planning and sustainable development and the requirements set out in Section 6.5

6.4.4 Bio-energy

Generally bio-energy is divided into a number of sub-groups depending on the fuel source and method used to create energy. It is considered that due to the nature and scale of developments for the provision of energy from bio-energy resources, development proposals will have to be considered on a case by case basis.

The Council will encourage combined heat and power (CHP) plants for individual industries to allow the industry to generate its energy requirements where it can be demonstrated that the development will not have a negative impact on the surrounding area. Shared CHP plants will also be encouraged between industries where site conditions allow.

The Council will also consider CHP plants which export power to the grid on a case by case basis.

In general terms sites will be considered in all areas of low planning constraint[35] taking into consideration factors such as transportation of biomass 'fuel', residential amenity, access to the national grid, visual amenity and protection of the environment.

Any proposals for bio-energy developments will be determined in accordance with the principles of proper planning and sustainable development and the requirements set out in Section 6.5

6.4.5 Solar and Solar Thermal Energy

Solar energy shall be encouraged throughout the County, especially for generating electrical/heating needs of public infrastructure (e.g. solar panels to power traffic warning signs) and new domestic buildings in accordance with the principles of proper planning and sustainable development. Proposals for solar renewable developments will have to demonstrate that the proposals will not have an adverse effect on protected species and their habitats (e.g. bats) and on protected structures.

Any proposals for renewable energy developments from solar sources will be determined in accordance with the principles of proper planning and sustainable development and the requirements set out in Section 6.5

6.4.6 Geothermal

Mayo has a large band of granite located near Foxford, with other significant areas near Louisburgh and on the southern end of the Mullet Peninsula (Map 4).
It is not expected that this technology will be exploited in Mayo during the lifetime of this Strategy. However Mayo County Council will support any proposed geothermal research and exploration in these areas subject to the principles of proper planning and sustainable development and a licence being obtained by the Department of Communications, Energy and Natural Resources.

Any proposals for renewable energy developments from geothermal sources for the purpose of generating electricity will be determined in accordance with the principles of proper planning and sustainable development and the requirements set out in Section 6.5

6.4.7 Micro Renewables

Certain micro renewables serving domestic houses, industrial premises, commercial premises and agriculture holdings are exempt from planning permission subject to a number of conditions. Where an individual wishes to install any class of micro-renewable technology that does not fall within exemptions they are required to apply for planning permission.

New low carbon development, through use of energy efficient micro generating renewable energy systems and construction methods, will be encouraged throughout the County having regard to the principles of proper planning and sustainable development.

Any proposals for micro-renewables that require planning permission will be determined in accordance with the principles of proper planning and sustainable development and the requirements set out in Section 6.5

6.4.8 Research and Development

The Council will support and encourage the development of a Sustainable Energy Park at a suitable location in the County for the display of working examples of sustainable energy sources, the creation of public awareness regarding the benefits and advantages of renewable energy, and the provision of educational, training, research and development facilities relating to renewable energy and the sustainable development of renewable energy. It is considered that the most suitable location for the renewable Energy Park is Belmullet town as this area would compliment the overall Renewable Energy Strategy which supports large scale wind farms, marine energy testing sites and a possible hydro storage facility in north Mayo. It would also assist in bringing economic benefits to the town and area.

The Council shall also encourage the introduction of courses in disciplines of, or related to, renewable energy along with renewable energy research and development in Galway Mayo Institute of Technology (GMIT) based in Castlebar, which is directly linked to National University of Ireland Galway (NUIG).

6.4.9 Load Balancing Developments

The size and distribution of high level lakes in the County limits the potential for pumped freshwater storage hydroelectric schemes. Sites for pumped storage hydroelectricity using seawater are currently being investigated throughout Ireland, including Mayo.

Mayo's coastline is environmentally sensitive with much of it designated as proposed Natural Heritage Areas. It is recommended that any pumped storage developments avoid such areas.

All pumped storage developments will be determined in accordance with the principles of proper planning and sustainable development and the requirements set out in Section 6.5

6.5 Environmental Considerations and SEA Mitigation Measures

Notwithstanding the potential areas identified in this Strategy all proposed renewable developments will be assessed on the principles of proper planning and sustainable development, ensuring minimal adverse environmental impact, including flooding, and taking full account of the presence and requirement to protect all Natura 2000 sites and (proposed) Natural Heritage Sites. Projects will be subject to Habitats Directive Assessment where considered appropriate.

A number of mitigation measures were identified through the Strategic Environmental Assessment of this Renewable Energy Strategy. Mitigation is a measure to avoid/prevent, minimise/reduce or as fully as possible offset/compensate for any significant adverse effects on the environment as a result of implementing a plan. Mitigation involves ameliorating significant negative effects. Where there are significant negative effects, consideration is given in the first instance to preventing such effects or, where this is not possible for stated reasons, to lessening or offsetting those effects. Mitigation measures can be roughly divided into those that: avoid effects; reduce the magnitude or extent, probability and/or severity of effect; repair effects after they have occurred, and; compensate for effects, balancing out negative impacts with other positive ones.

In addition to the mitigation measures detailed below, additional more detailed mitigation measures are also likely to be required through development management (i.e. the planning application stage of a development and/or by Environmental Impact Assessments and Habitats Directive Assessments of individual projects).

Mitigation measures shall be addressed for all stages of any proposed renewable energy development. Stages include: site preparation and excavation; construction and development; energy production; and decommissioning and restoration phases (where relevant).

The mitigation measures will assist in the development management process and could assist in assessing planning applications for renewable energy developments. In turn these mitigation measures can be useful to potential applicants as they provide guidance on the key environmental issues to be addressed.

Applicants/developers applying for planning permission for renewable energy developments will be required to demonstrate that any proposed renewable energy developments comply with the requirements set out in the mitigation measures below, along with requirements set out in the Mayo County Development Plan 2008-2014 or relevant Local Area Plan (or subsequent plans) and any national guidelines in relation to the location of renewable energy developments.

Mitigation Measures

6.5.1 Biodiversity and Flora and Fauna

All proposed renewable energy developments with the potential to impact on Natura 2000 or Ramsar Sites will be subject to Habitats Directive Assessment under Article 6(3) and 6(4) of the Habitats Directive taking direct, indirect and possible in combination effects into account.

Proposals for renewable energy developments must be accompanied by an Ecological Impact Assessment (EcIA) and Hydrological Impact Assessment, where appropriate, to assess impacts on protected sites including Natural Heritage Areas, proposed Natural Heritage Areas and also Local Biodiversity Areas, including in-combination effects. The EcIA must address impacts associated with construction, operation and decommissioning stages of the proposed project. Where adverse significant effects are identified, the EcIA must also include, a full and detailed description of the proposed mitigation measures to be undertaken to avoid, reduce or remedy those effects. Assessment of the likely effectiveness of mitigation measures must also be included.

Any EIA/EcIA prepared for proposed renewable energy developments must examine and provide a robust assessment of the proposal including lands in the immediate and surrounding environment and the short, medium and long-term effects/impact of the proposal on flora, fauna and geology – e.g. loss of and damage to habitats and plant and animal species and impact on habitats, and habitats of species.

Proposals for renewable energy developments shall identify all ecological factors on the site, including ecological corridors, and be accompanied by pre-construction ecological surveys, carried out at the appropriate time(s) of year. Full details on the habitats impacted by proposed renewable energy developments shall be provided both in terms of detailed

descriptions of species recorded and the location and extent of habitats on accompanying maps. The presence of rare and protected species must be identified.

The EIA project team should consult with the Department of Environment, Heritage and Local Government (National Parks and Wildlife Service) at scoping or pre-planning stage via the Development Applications Unit, IFI and the National Biological Records Centre, and other relevant bodies to ensure that the EIA 'baseline' contains up-to-date information.

All proposals for renewable energy developments shall include a robust Environmental Management Plan as part of the EIA, which must include inter alia details of a work plan describing the responsibilities and authorities involved in the implementation of mitigation measures and monitoring requirements.

There is the potential for the spread or introduction of invasive species during construction activities or where large movements of earth are required for developments. Detailed soil management measures must be specified to avoid the spread or introduction of invasive species.

To ensure potential impacts to bats and birds arising as a result of the construction and operation of turbines/windfarms are avoided and reduced, surveyors contracted to undertake survey work shall have relevant expertise and experience. Construction works shall be designed and timed so as not to disturb breeding birds and mammals.

Proposals for renewable energy development on cutaway peatlands shall take into consideration any rehabilitation plans which have been prepared for these sites.

6.5.2 Population and Human Health

Development proposals for renewable energy developments will have to demonstrate that the proposed development will not seriously injure the amenities or cause emission nuisance to residential properties, places of worship, health buildings or schools within 500m of the proposed development. Wind farm developments (including small clusters of single turbine developments) will only be considered within 500m of the aforementioned locations where the developer has received witnessed written consent from the owner/occupier of such properties consenting to the location of the development within 500m of their property.

6.5.3 Soils and Geology

IGH sites identified by the Geological Survey of Ireland and listed in the Environmental Report accompanying this Strategy and the Mayo County Development Plan 2008-2014 shall be avoided, and in cases where there could be an adverse effect, a comprehensive study of the area in consultation with the GSI will be required.

In areas of peat, minimal removal of vegetation shall take place to reduce areas of bare peat/soil, and there shall be minimal disturbance of peat, which will help prevent alteration to the water table and prevent surface water run-off.

Landslide susceptibility and slope stability risk assessments shall be carried out by a suitably qualified person(s) in conjunction with the GSI.

Any surface excavations required shall be carried out in a manner that results in the surface vegetation being removed in sods. The sods shall be stored and protected, and shall be replaced when the development is completed or as conditioned by the Planning Authority to ensure rapid re-vegetation and to help reduce erosion.

Any Environmental Impact Assessment required to be carried out for renewable energy developments shall assess the effects all stages of the development (see above) will have on soils and geology. Input into the EIA shall be carried out by a qualified soils specialist and a qualified geologist, in consultation with the Geological Survey of Ireland.

6.5.4 Water Protection

Freshwater

All effluents shall be appropriately treated during site preparation including excavation works, energy production stage and decommissioning stages (if required).

The developer will be required to ensure that the proposed development will not have a negative impact on freshwater pearl mussel and its habitat; fish spawning grounds; fish migration routes; access to fishing grounds; and water quality during installation, operation and maintenance of any renewable energy development.

Any proposals for hydropower generation sites will be required to address issues such as fish passage; fish protection / grating; retention of natural watercourse levels; and water quality.

Care will have to be taken to assess the suitability of sites for forestry, due to runoff and slope stability when clearing.

Any developments proposed using biofuel to generate electricity shall be in accordance with the relevant Department of Agriculture, Fisheries and Food guidance and requirements of the European Communities (Good Agricultural Practise for Protection of Water) Regulations, 2009.

Projects will be subject to Habitats Directive Assessment where considered appropriate, following a preliminary screening assessment.

Effluent treatment and the provision of appropriate infrastructure for the optimal treatment of point discharges from renewable energy projects will be required.

Marine Waters

While only works above the high water mark are the responsibility of the Council, where projects involve a land-based component the following will apply:

All proposed renewable energy development in marine waters or associated landward elements shall be subject to an ecological impact assessment.

Marine-based renewable energy developments shall be assessed on a case-by-case basis to identify proximity to key migration routes, nursery or breeding areas for whales, dolphins and seal species. These areas should be avoided where possible and suitable mitigation measures shall be undertaken to reduce and avoid noise, vibration and collision impacts where possible. These mitigation measures shall be established in consultation with the NPWS and Irish Whale and Dolphin Group (IWDG).

Appropriate mitigation shall be undertaken during the construction and operation of marine-based renewable energy installations so that such works or operations do not breach the water quality of receiving waters.

The siting of marine renewable energy projects shall avoid known important fish spawning grounds and appropriate mitigation shall be undertaken to reduce impacts on fishing grounds, migration routes and important fishing grounds.

Groundwater

Karst groundwater (the water in a karst aquifer) is a major water resource in many regions. Karst aquifers have specific hydraulic and hydrogeologic characteristics that render them highly vulnerable to pollution from human activities. Karst groundwater becomes polluted more easily and in shorter time periods than water in non-karstic aquifers. Thus, arising from the karstified nature of an aquifer, additional precautionary measures should be implemented to ensure that groundwater quality will not be negatively impacted on.

Mitigation measures shall relate to the preservation of the existing subterranean drainage regime and the protection of groundwater.

6.5.5 Noise

Prior to the development of renewable energy projects or the integration of renewable energy projects and energy efficiency technologies into existing developments, assessments shall consider the potential impacts at noise sensitive locations at all stages (see above).

Impacts from noise during the construction phase and the operation phase of renewable energy projects shall be considered to avoid, prevent and reduce on a prioritised basis exposure to unacceptable levels of environmental noise.

The construction of wind farms, marine related energy projects and hydro energy projects require increased traffic volumes particularly during construction, while traffic volumes to biomass sites generally require increase traffic volumes in an area during construction and operational phases both in terms of the energy generating site and the product source location. Given the low background noise levels in rural areas, along with noise sensitive locations, mitigation measures such as traffic management plans, road gradients, and road surfaces shall be considered.

Due regard shall be taken of the parameters outlined in the Noise Action Plan for the County Mayo and Noise Regulations 2006.

An assessment of potential noise emissions from substations and the transmission lines will be required for the upgrading of the National Transmission Network.

For Wind Energy developments due regard shall be taken of noise assessment, mitigation and thresholds outlined in the Planning Guidelines for Wind Energy Developments for Planning Authorities 2006.

Building regulations PART E shall be considered to control noise at sensitive receptor locations to provide for reasonable resistance to both air borne and impact sound.

6.5.6 Climatic Factors

Developers shall provide a systematic assessment of the carbon balance of the development during construction, operation and decommissioning demonstrating how this balance has been maximised. This assessment shall consider using local products, minimise area of disturbance, use excavated material for infill where possible, avoid contamination, avoid triggering erosion by wind or water, avoid desiccation of peat through direct or indirect changes to drainage, and avoid loss of carbon sinks and carbon release by disturbance to peat.

6.5.7 Flooding

Renewable energy developments must comply with the provisions of the DEHLG/OPW publication 'The Planning System and Flood Risk Management: Guidelines for Planning Authorities 2009'. Sites will be required to avoid areas of flood risk and that where there is a strategic case for allowing development in such areas, that these proposals be subject to the' justification and sequential tests' in the Flood Risk Management Guidelines and assessed to ensure that flood risk can be reduced and mitigated as appropriate.

Renewable energy developments will support the provision of adequate surface water drainage infrastructure, promote the use of a sustainable drainage system (SUDS) approach and techniques and manage flood risk through the protection of natural drainage systems, the appropriate location and design of different types of development and the incorporation of flood risk assessments and works where necessary.

Development in areas at risk of flooding, particularly floodplains, shall be avoided by not permitting development in flood risk areas unless: it is fully justified that there are wider sustainability grounds for appropriate development; unless the flood risk can be managed to an acceptable level without increasing flood risk elsewhere; and, where possible, it reduces flood risk overall.

Flood risk assessments shall accompany planning applications for renewable energy developments and these assessments shall be incorporated into the process of making decisions on planning applications and planning appeals.

6.5.8 Transport Infrastructure

Roads and Transportation

Traffic management plans shall be submitted with renewable energy development planning applications to address impacts on residents in relation to construction activities.

Where the construction of new roads is required to construct/service renewable energy developments, adequate and appropriate drainage measures will be required.

The carrying capacity, operational efficiency, safety and national investments in national roads shall be protected in relation to the implementation of the Renewable Energy Strategy. Environmental Impact Assessments may be required to demonstrate same.
There will be a clear presumption in favour of protection of the national road network and direct access onto national roads outside a 50kph speed limit will be restricted.

General mitigation measures which will be required for RES developments are as follows:
(1) Road widening and Road strengthening.
(2) Realignment of existing Road network.
(3) Access visibility improvements.
(4) Drainage improvements and maintenance.
(5) Contributions for road improvements where necessary.
(6) Structural Analysis of Roads and Bridges, before and after heavy loads of materials have traversed same.

New access roads should be kept to a minimum where possible. If a new access road is required it shall be provided out of sight of popular viewing points, away from watercourses and sensitive habitats and designed to reflect the contour gradient. Access tracks should be designed to allow recreational use of the track where possible.

Piers and Harbours

Development proposals for improvements to piers, harbours and landing places shall be required to demonstrate that the proposed improvements can be carried out in a sustainable manner such as not to create any adverse impact on the environmentally designated sites.

Ireland West Airport Knock

Any renewable energy development, including the provision of associated infrastructure, within the airport exclusion zone shall consult with the Airport Authority and the Irish Aviation Authority to ensure that the proposal does not compromise aircraft safety.

6.5.9 Waste Infrastructure

Waste management plans for construction and operational phases of renewable energy developments shall be submitted. Waste management plans should include details of waste arisings and specific details on how these will be managed. Best Practice Guidelines on the preparation of waste management plans for construction and demolition projects 2006 shall be used.

Waste facilities for dealing with the waste arisings must be identified or put in place if they are not available. Construction and demolition waste is best managed in close proximity to works.

Authorised waste facilities, in accordance with the Waste Management Act 1996 to 2010, shall only be used.

Other wastes generated shall be managed through authorised waste collectors.

6.5.10 Energy Infrastructure

Development proposals for renewable energy development shall be required to demonstrate that connection to the national grid can be carried out in a sustainable manner.

6.5.11 Waste Water Infrastructure

All Renewable Energy Developments shall be assessed on a case by case basis. Trade effluent discharging to a public sewer is required to have a discharge licence from the Local Authority.

6.5.12 Drinking Water Infrastructure

Designate buffer zones around sources of drinking water abstraction shall be required. This shall be carried out in consultation with Mayo County Council Environment Section.

Appropriate perimeter controls at the edge of development sites shall be established to retain runoff from sites (e.g. silt traps). This shall be agreed in consultation with Mayo County Council Environment Section and factored into any proposals for renewable energy developments.

Minimal removal of vegetation shall take place to reduce areas of bare peat/soil, which will help prevent alteration to the water table and surface run-off.

Soil compaction shall be avoided by limiting heavy machinery on site and ensuring materials are stored in a correct manner.

6.5.13 Cultural Heritage

Archaeological Heritage

An Archaeological Assessment shall be carried out where the proposed development is:

- On or within the Zone of Archaeological Potential of a site included in the Record of Monuments and Places;

- On or within a National Monument in the ownership or guardianship of the State;
- On or within any National Monuments subject of Preservation Orders or their setting in the landscape;
- Extensive in terms of area (0.5 hectare or more) or length (1 kilometre or more);
- Required to be accompanied by an Environmental Impact Statement.

Where the proposal has the potential to impinge upon the integrity of significant cultural landscape resources the developer shall commission an Archaeological Assessment of the potential landscape and visual impacts.

Archaeological Assessment involves a desk top study and a site visit and may also require one and/or all of the following:

- Geophysical and/or other invasive surveys (including architectural survey)
- Licensed pre-development testing
- Licensed archaeological excavation
- Archaeological monitoring of ground works

The Archaeological Assessment shall establish the extent of archaeological material associated with the monument or site and the potential impacts (if any) on the monument or site. The assessment shall also define the buffer area or area contiguous with the monument which will preserve the setting and visual amenity of the site.

All archaeological monuments included in the RMP, any sites and features of historical and archaeological interest and any subsurface archaeological features that may be discovered during the course of infrastructural/development works shall be preserved in-situ or by record.

The stated policy of the Department of the Environment, Heritage & Local Government with regard to the preservation in-situ of archaeological remains is as follows:

“There should always be a presumption in favour of avoiding development impacts on the archaeological heritage. Preservation in-situ must always be the first option to be considered rather than preservation by record in order to allow development to proceed, and preservation in-situ must also be presumed to be the preferred option.” (Framework and Principles for the Protection of the Archaeological Heritage, Duchas The Heritage Service, 1999)

Architectural Heritage

In order to ensure the protection of the architectural heritage, renewable energy proposals will be required to demonstrate that they are sensitively sited and designed, are compatible with the special character of any protected structure, ACA or other architectural heritage, and are appropriate in terms of proposed scale, mass, height, density, layout, materials. In this regard, planning proposals must be accompanied by an appropriate Architectural Heritage Impact Assessment, undertaken by a certified conservation professional detailing the impacts of the relevant development upon the special interest and character of the ACA, Protected Structure, and/or its setting. The planning authority must be consulted in order to determine whether there is a need for such an assessment. Reference shall be made to Architectural Heritage Protection Guidelines for Planning Authorities.

The route for construction traffic in relation to any proposed renewable energy development shall not cause damage to heritage infrastructure such as heritage bridges.

6.5.14 Landscape

Renewable energy developments shall avoid sensitive and vulnerable landscapes, listed highly scenic views, scenic views, scenic viewing points and scenic routes where detailed visual analysis demonstrates that the development will have an adverse affect on those landscapes.

Renewable energy developments shall be sited and designed to minimise the visual amenity of the surrounding area.

Appendices

Appendix 1 - Legislation

This Renewable Energy Strategy has had regard to the following environmental legislation:

The Planning and Development Acts 2000 -2010

Planning & Development Regulations 2000-2010

The Wildlife Act, 1976 and the Wildlife Amendment Act 2000

EU Birds Directive (79/409/EEC) Council Directive 79/409/EEC

EU Habitats Directive (92.43/EEC)

The Flora (Protection) Order 1999

UN Convention of Biological Diversity 1992 (ratified 1996)

Convention on Wetlands of International Importance (Ramsar Convention 1971)

The Local Government Water Pollution Acts 1977 as amended

Water Services Act 2007

The Directive 2000/60/EC establishing a framework for Community action in the field of water policy (also known as the Water Framework Directive)

S.I. No. 9 of 2010 – European Communities Environmental Objectives (Groundwater) Regulations 2010

European Communities (Water Policy) Regulations 2003

European Communities Environmental Objectives (Surface Waters) Regulations 2009

European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009

European Communities (Quality of Salmonid Waters) Regulations 1988

European Communities (Quality of Shellfish Waters) Regulations 2006 (and subsequent Regulations)

Urban Waste Water Treatment Regulations 2001

Bathing Water Quality Regulations 2008

European Communities (Good Agricultural Practise for Protection of Waters) Regulation, 2009

Waste Water Discharge (Authorisation) Regulations 2007

Air Pollution Act 1987 as amended

The Environment Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 and the Air Quality Standards Regulations 2002

Protection of the Environment Act 2003

Emissions of Volatile Organic Compounds from Organic Solvents Regulations 2002

Waste Water Discharge (Authorisation) Regulations 2007

Dangerous Substances Regulations (S.I. No. 12 of 2001)

Environmental Protection Agency Act 1992

Environmental Noise Regulations 2006

European Communities (Registration and Regularisation of Unauthorised Facilities) Regulations 2006

The Waste Management (Amendment) Act, 2000

Waste Management (Waste Electrical and Electronic Equipment) Regulations 2005

Waste Management (Collection Permits) Regulations S.I.820 of 2007

Waste Management (Collection Permits) Amendment Regulations S.I. no. 87 of 2008

Waste Management (Facility Permit & Registration) Regulations 2007

Waste Management (Facility Permit & Registration) (Amendment) Regulations 2008

Waste Management (Movement of Hazardous Waste Regulations 1998 -2000

Waste Management (Use of Sewage Sludge in Agriculture) Regulations 2001

Waste Management (Food Waste) Regulations 2009

Waste Management (Prohibition of Waste Disposal by Burning) Regulations 2009

1999 EU Directive on the landfill of waste 99/31/EC

The European Directive on the Assessment and Management of Flood Risks (2007/60/EC of 23 October 2007) (The Floods Directive)

EIA Directive (85/337/EEC as amended by 97/11/EC and 2003/35/EC) EIA Directive

(85/337/EEC as amended by 97/11/EC and 2003/35/EC)

The Heritage Act 1995

European Convention on Protection of the Archaeological Heritage 1992 (Valletta Convention)

Convention for the Protection of the Architectural Heritage of Europe (Granada Convention), European Treaty Series no.121, 1985

The Venice Charter 1964

The Washington Charter 1987

The Burra Charter 1979/ 1981/ 1988

The Nara Document on Authenticity 1994

The European Landscape Convention

Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999

National Cultural Institutions Act 1997

The National Monuments Acts 1930 to 2004

Renewable Energy Strategy MAPS

Index of Maps:

Legend:

- Existing Wind Farms
- Priority Areas
- Tier 1 - Preferred (Large Wind Farms)
- Tier 1 - Preferred (Cluster of Turbines)
- Tier 2 - Open for Consideration
- ESB Networks 110kV Line
- ESB Networks 38kV Line
- Ireland West Airport Knock

Micro-renewable energy technologies for domestic, business, industrial and agricultural use may be exempt from planning permission under the Planning & Development Regulations 2007 (S.I. No. 83 of 2007) and Planning & Development Regulations 2008 (S.I. 256 of 2008).
Where planning permission is required for micro-renewable technologies, such developments will be considered in all areas in the County subject to compliance with the policies and objectives of this Strategy and the proper planning and sustainable development of the area.

Sligo

Roscommon

Galway

MAYO

MAP 1 WIND ENERGY

Renewable Energy Strategy for Co. Mayo 2011-2020

LEGEND

- Marine Test Site (Proposed)
- Marine Test Site Land Point (proposed)
- Airport
- Main Harbours
- Piers
- ESB Networks 38kV Line
- ESB Networks 110kV line
- Area of Potential Wave Energy

Micro-renewable energy technologies for domestic, business, industrial and agricultural use may be exempt from planning permission under the Planning & Development Regulations 2007 (S.I. No. 83 of 2007) and Planning & Development Regulations 2008 (S.I. 256 of 2008). Where planning permission is required for micro-renewable technologies, such developments will be considered in all areas in the County subject to compliance with the policies and objectives of this Strategy and the proper planning and sustainable development of the area.

Ballina

Newport

Clare Island

Westport

Roonagh

Inishturk

Sligo

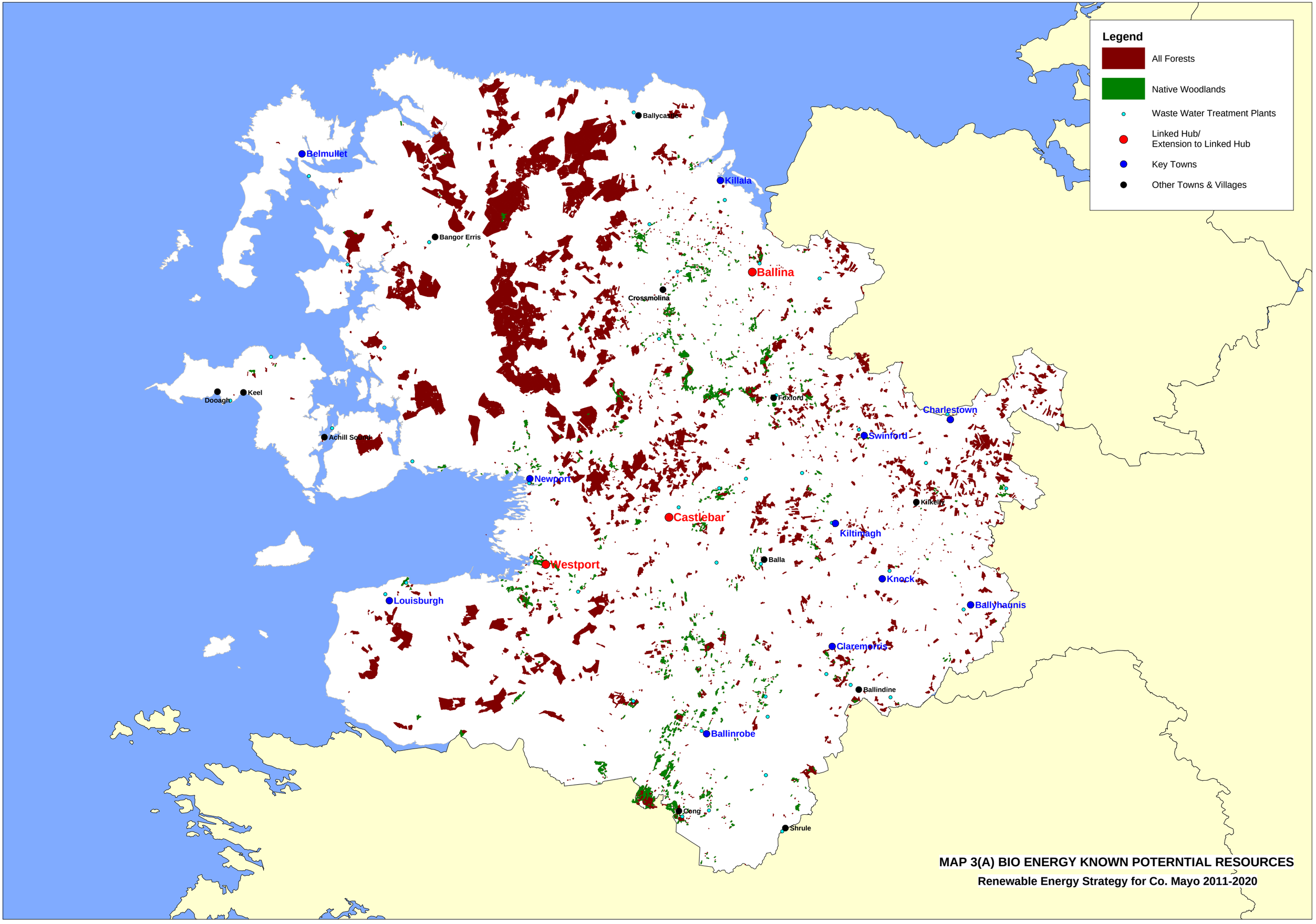
Roscommon

Galway

MAYO

MAP 2 OCEAN ENERGY

Renewable Energy Strategy for Co. Mayo 2011-2010


Legend
All Forests
Native Woodlands
Waste Water Treatment Plants
Linked Hub/
Extension to Linked Hub
Key Towns
Other Towns & Villages
Belmullet
Ballycastle
Killala
Bangor Erris
Ballina
Crossmolina
Dooagh
Keel
Achill Sound
Foxford
Charlestown
Swinford
Newport
Kiltimagh
Castlebar
Westport
Balla
Knock
Louisburgh
Ballyhaunis
Claremorris
Ballindine
Ballinrobe
Cong
Shrule
MAP 3(A) BIO ENERGY KNOWN POTERNTIAL RESOURCES
Renewable Energy Strategy for Co. Mayo 2011-2020

LEGEND

Brownfield Industrial Sites

Land zoned for Industrial Use

Note other lands used for industrial purposes but are not currently zoned for industrial use in any development plans or local area plans will be considered subject to the proper planning and sustainable development of the area

Landfill Sites

Micro-renewable energy technologies for domestic, business, industrial and agricultural use may be exempt from planning permission under the Planning & Development Regulations 2007 (S.I. No. 83 of 2007) and Planning & Development Regulations 2008 (S.I. 256 of 2008). Where planning permission is required for micro-renewable technologies, such developments will be considered in all areas in the County subject to compliance with the policies and objectives of this Strategy and the proper planning and sustainable development of the area.

Ballycastle
Belmullet
Killala
Bangor Erris
Ballina
Crossmolina
Keel
Achill Sound
Foxford
Charlestown
Swinford
Newport
Kilkelly
Castlebar
Kiltimagh
Balla
Westport
Knock
Louisburgh
Ballyhaunis
Claremorris
Ballindine
Ballinrobe
Cong
Shrule

MAP 3(B) PREFERRED LOCATIONS FOR BIO-ENERGY PLANTS

Renewable Energy Strategy for Co. Mayo 2011-2020

LEGEND

- Granite Regions
- ESB Networks 38kV Line
- ESB Networks 110kV Line
- Towns

Micro-renewable energy technologies for domestic, business, industrial and agricultural use may be exempt from planning permission under the Planning & Development Regulations 2007 (S.I. No. 83 of 2007) and Planning & Development Regulations 2008 (S.I. 256 of 2008). Where planning permission is required for micro-renewable technologies, such developments will be considered in all areas in the County subject to compliance with the policies and objectives of this Strategy and the proper planning and sustainable development of the area.

Belmullet
Bangor Erris
Crossmolina
Ballina
Foxford
Achill Sound
Castlebar
Westport
Louisburgh
Claremorris

Sligo
Roscommon
Galway
MAYO

MAP 4 GEOTHERMAL ENERGY

Renewable Energy Strategy for Co. Mayo 2011-2020

Wind Resource for County Mayo

N
W E
S

Constrained Onshore Windspeed at 75m above ground level (m/s)

- 7.75 - 8.25
- 8.25 - 8.75
- 8.75 - 9.25
- 9.25 - 9.75
- 9.75 - 10.5
- 10.5 - 11.25
- 11.25 - 12
- 12 - 12.5
- 12.5 - 13.25
- 13.25 - 14

Roads

- Primary Route
- Other Roads

Belmullet
Achill
Louisburgh
Crossmolina
Ballina
N27
Foxford
N5
N17
Castlebar
Westport
Ballintober
Ballyhaunis
Claremorris
Ballinrobe
Cong

MAP 5 WIND SPEEDS AT 75M IN CO. MAYO

Renewable Energy Strategy for County Mayo

Wind Resource for County Mayo

N
W E
S

Constrained Onshore Windspeed at 100m above ground level (m/s)

- 7.75 - 8
- 8 - 8.5
- 8.5 - 9
- 9 - 9.5
- 9.5 - 10
- 10 - 10.5
- 10.5 - 11
- 11 - 11.5
- 11.5 - 12
- 12 - 12.5
- 12.5 - 12.75
- 12.75 - 13.5

Roads

- Primary Route
- Other Roads

Belmullet
Achill
Louisburgh
Crossmolina
Ballina
Foxford
Westport
Castlebar
Ballintober
Claremorris
Ballyhaunis
Ballinrobe
Cong
N27
N5
N17

MAP 6 WIND SPEEDS AT 100M IN COUNTY MAYO

Renewable Energy Strategy for County Mayo

Legend

110kV ESB Network Line

38 kV ESB Network Line

Sligo

Roscommon

Galway

MAYO

MAP 7 EXISTING ENERGY INFRASTRUCTURE
38kV and 110kV lines

Renewable Energy Strategy for Co. Mayo 2011-2010

Belmullet
Ballycastle
Killala
Bangor Erris
Crossmolina
Ballina
Sligo
Keel
Achill Sound
Foxford
Charlestown
Swinford
Newport
Castlebar
Kilkelly
Kiltimagh
Westport
Balla
Knock
Ballyhaunis
Louisburgh
Claremorris
Ballindine
Ballinrobe
Cong
Shrule
Galway

Legend

- Granite
- Landfill Sites
- Brownfield Industrial Sites will be considered for biomass plants subject to the proper planning and sustainable development of the area

Land zoned for Industrial Use

- Note other lands used for industrial purposes but are not currently zoned for industrial use in any development plans or local area plans will be considered for bioenergy plants subject to the proper planning and sustainable development of the are a
- Marine Test Site (Proposed)
- Marine Test Site Landing Point (Proposed)
- Area of Potential Wave Energy
- Existing Windfarms
- Priority Areas
- Tier 1 - Preferred (Large Wind Farms)
- Tier 1 - Preferred (Cluster of Turbines)
- Tier 2 - Open for Consideration
- ESB Networks 110kV Line
- ESB Networks 38kV Line
- Ireland West Airport Knock
- Piers / Harbour
- Rail Network
- National Primary Road
- National Secondary Road
- Regional Road

Micro-renewable energy technologies for domestic, business, industrial and agricultural use may be exempt from planning permission under the Planning & Development Regulations 2007 (S.I. No. 83 of 2007) and Planning & Development Regulations 2008 (S.I. 256 of 2008). Where planning permission is required for micro-renewable technologies, such developments will be considered in all areas in the County subject to compliance with the policies and objectives of this Strategy and the proper planning and sustainable development of the area.

MAP 8 Renewable Energy Potential and Existing Infrastructure in County Mayo

Renewable Energy Strategy for Co. Mayo 2011-2020