CHAPTER 16
ENERGY & INFORMATION INFRASTRUCTURE

16.0 Introduction

This energy chapter focuses primarily on 'energy infrastructure' associated with the production, distribution and use of energy including electricity and the energy used in transport and heating. The importance of energy management in its wider sense is however a cross cutting issue in this plan and is addressed throughout the plan policies and objectives where necessary, in particular with reference to the climate change related actions, development standards and transport objectives.

The word *energy* is used as a synonym of energy resources, and most often refers to substances like fuels, petroleum products and electricity in general. These are sources of *usable energy*, in that they can be easily transformed to other kinds of energy sources that can serve a particular useful purpose.

Ireland's energy requirements have increased significantly over the past two decades due to growth in energy consumption for transport, electricity and heating. Linked with increasing economic growth, Ireland's overall demand for energy continues to rise. In 2018 energy demand grew by 4.5%. Oil continues to be the dominant energy source, increasing from a share of 47% in 1990 to a peak of 60% in 1999, but falling back to 49 % in 2018. Natural gas increased in 2018 by 3.8%, which is 28% higher than in 2005.

Despite the increase in energy demand, energy-related CO2 emissions fell slightly, mainly due to a reduction in the amount of coal used for electricity generation, along with increased contributions from wind generation. The transition from fossil fuels to renewables to generate electricity has led to a fall in the amount of CO2 released into the atmosphere and it is now less than half what it was in the year 2000. Energy demand for heat and transport increased in 2018.

Under the EU Renewable Energy Directive 2009, the National 2020 target for Ireland was to source 16% of all energy consumed from renewable sources. In addition to this Ireland was required to achieve a 10% share of renewable energy in transport consumption by 2020 (known as RES-T). Ireland has committed to a range of renewable energy and efficiency targets many of which are being implemented as Climate Change policy measures to reduce carbon emissions. At a European level, the 20/20/20 commitments agreed under the EU Climate Change and Energy Package set three new targets for 2020:

- A minimum 20% reduction in GHG emissions based on 1990 levels;
- 20% of final energy consumption to be produced by renewable energy resources; and
- 20% reduction in primary energy use compared with projected levels to be achieved by improving energy efficiency.

Ireland's National Renewable Energy Action Plan 2009 details a pathway for Ireland to meet these binding commitments by setting national targets.

A report prepared by the Sustainable Energy Authority of Ireland (SEAI) '*Renewable Energy in Ireland 2020 Update*' found that Ireland was not on track to meet its 2020 renewable energy targets. The Report indicates that overall renewable energy supply was 11% of gross final consumption which falls short of the 16% target. The share of renewable transport energy (RES-T) was 7.2% which is below the 10% target. The share of renewable electricity (RES-E) was 33.2%. Ireland had a national target of 40% by 2020. It is therefore imperative that a significant emphasis is placed on both the issues of supply and demand for energy in the County Development Plan.

The communications sector is essential to the functioning of a modern economy and is a key enabler of numerous other economic activities. Disruptions to communications channels can have significant negative impacts on the economy and the citizen.

The provision of a high quality information and communications networks and digital infrastructure has never been more important in the context of national, regional and local development; this has been demonstrated throughout the period of COVID-19. The increased usage of new technologies and work practices have placed an increased reliance on the provision of such services in all areas for industrial, commercial, tourism and social development.

The communications sector is highly dynamic, with new technologies developing rapidly and with these new technologies, new elements are added to the critical infrastructure network. In addition, the communications sector, including access to broadband and mobile services, is becoming increasingly important for all citizens and businesses of all sizes.

The widespread availability of a high quality telecommunications network throughout County Wicklow will be critical to the development of a knowledge based economy. It will contribute to sustained macro-economic growth and competitiveness, by ensuring that the County is best placed to avail of the emerging opportunities provided by the information and knowledge society and supporting new and innovative forms of distance working including working from home and the development of co-working hubs.

With reference to the desired **Strategic County Outcomes** set out in Chapter 2 of this plan, the delivery of reliable, clean energy and a high level of energy efficiency, as well a high quality communication infrastructure will contribute to numerous goals across the three pillars of 'sustainable healthy communities', 'climate action' and 'economic opportunity' by:

- Promoting and facilitating the development of alternative and renewable sources of electricity to meet electricity demand with policy and objectives for reduction in electricity use, wind energy, solar energy, hydro energy, bio-energy and small scale renewable electricity generation;
- Promoting the circular economy and the 'just transition' to clean energy;
- Facilitating improved access to employment, services and amenities, such as education, healthcare, water services, communication infrastructure, shops, parks, leisure and social interactions;
- Strengthen and broaden the economic base, harness opportunities for economic growth to build economic resilience, strengthen enterprise ecosystems and create quality jobs that align with population growth, ensure a good standard of living and reduce the need for long-distance commuting;
- Supporting education facilities and the knowledge economy, and facilitating and promoting entrepreneurial activity;
- Supporting employment growth around Wicklow's natural resources and supporting key sectors for growth;
- Promoting environmentally sustainable development in terms of location, layout, design and energy and water usage.

16.1 Policy Context

16.1.1 Energy Infrastructure

Energy Act 2016

This is an Act that changed the name of the Commission for Energy Regulation and conferred on the Commission powers to carry out investigations and impose administrative sanction. It also gives further effect to different EU Directives and enhances cross-border links with electricity. In general it streamlines the existing energy legislation in Ireland.

National Energy & Climate Plan (NECP) 2021 – 2030

Irelands National Energy & Climate Plan (NECP) 2021-2030 takes into account energy and climate policies developed up to 2019, the levels of demographic and economic growth identified in the National Planning Framework - Project 2040 and includes all of the climate and energy measures as set out in the National Development Plan 2018-2027.

The planned policies and measures that were identified up to the end of 2019, collectively deliver a 30% reduction by 2030 in non-Emission Trading Systems greenhouse gas emissions (from 2005 levels). Ireland is committed to achieving a 7% annual average reduction in greenhouse gas emissions between 2021 and 2030. The NECP was drafted in line with the current EU effort-sharing approach, before the Government committed to this higher level of ambition, and therefore does not reflect this higher commitment. Ireland is currently developing those policies and measures and intends to integrate the revision of the NECP into the process which will be required for increasing the overall EU contribution under the Paris Agreement.

Energy White Paper 'Ireland's Transition to a Low Carbon Energy Future 2015 – 2030' (December 2015)

The Irish Government's Energy White Paper, presents a long-term strategic vision that is intended to guide the direction of Irish energy policy up to 2030. It sets out a high-level framework for Ireland's energy transition to a low carbon economy and society and identifies a range of measures and actions to support the development of renewable technologies. One key action is to explore the scope to provide market support for microgeneration technologies. At its heart is a commitment to transform Ireland into a low carbon society and economy by 2050 and reduce the country's fossil fuel dependency. This ambitious vision for Ireland's energy system envisages a reduction in greenhouse gas emissions from that sector by 80-95% relative to 1990 levels by 2050. The current Government's Climate Action and Low Carbon Development (Amendment) Bill 2020[1] gives further ambition for Ireland to achieve net zero emissions by 2050 by introducing a system of 5-year economy-wide carbon budgets setting a ceiling for total greenhouse gas emissions.

Ireland's National Renewable Energy Action Plan (NREAP 2009)

The National Renewable Energy Action Plan (NREAP) sets out the Government's strategic approach and concrete measures to deliver on Ireland's 16% target under Directive 2009/28/EC. The development of renewable energy is central to overall energy policy in Ireland. Renewable energy reduces dependence on fossil fuels, improves security of supply, and reduces greenhouse gas emissions creating environmental benefits while delivering green jobs to the economy, thus contributing to national competitiveness.

All Member States must submit a report on progress to the European Commission every two years with the final report submitted by 31 December 2021. The 2018 report outlined that Ireland has met the interim target set by the Renewable Energy Directive for 2015-2016, reporting an average final energy consumption of 9.5% over that two year period, against a target level of 8.92%. The share of electricity from renewable energy has increased fivefold between 1990 and 2016 (5.3% to 27.2%), mainly since 2000, and the majority is attributable to wind energy. Electricity generated from biomass accounted for 9% of renewable electricity in 2016.

Bioenergy Plan (2014)

The Draft Bioenergy Plan 2014 sets out the policy areas that must be coordinated to support the development of biomass sector in Ireland. It identifies 19 measures to support the sustainable development of the sector. It also recognises that meeting the demand for biomass from indigenous sources could deliver significant economic and employment benefits and contains measures to stimulate and support the supply of Irish biomass. The draft Plan identifies that an additional bioenergy-focussed measure in the heat sector represents the most cost effective

[1] This Bill was signed into law as the Climate Action and Low Carbon (Amendment) Act 2021 during the making of this Development Plan.

means of meeting a number of different policy goals and recommends the introduction of an incentive for renewable heat for larger heat users to change to heating solutions that produce heat from renewable sources.

The Strategy for Renewable Energy 2012 – 2020 (DoCENR)

The strategy for renewable energy is at the heart of the Government's energy policy recognising that renewable energy reduces dependence on fossil fuels, improves security of supply, and reduces greenhouse gas emissions. This in turn creates environmental benefits while delivering green jobs to the economy and thus contributes to the national competitiveness and the jobs and growth agenda.

The overarching objective of the strategy is to make renewable energy an increasingly significant component of Ireland's energy supply by 2020, so that at a minimum we achieve our legally binding 2020 target in the most cost efficient manner for consumers. To achieve the overarching objective five Strategic Goals reflecting the key dimensions of the renewable energy challenge to 2020 are set out.

Strategic Goal 1	Progressively produce more renewable electricity from onshore and offshore wind power for the domestic and export markets.
Strategic Goal 2	A sustainable bio-energy sector supporting renewable heat, transport and power generation.
Strategic Goal 3	Green growth through research and development of renewable technologies including the preparation for market of ocean technologies.
Strategic Goal 4	Increase sustainable energy use in the transport sector through biofuels and electrification.
Strategic Goal 5	An intelligent, robust and cost efficient energy networks system.

National Energy Efficiency Action Plan 4 (NEEAP April 2017)

Article 24 of the Energy Efficiency Directive requires each Member States to submit a NEEAP every three years. Ireland's fourth National Energy Efficiency Action Plan (NEEAP 4) reaffirmed Ireland's commitment to delivering a 20% reduction in energy demand across the whole of the economy by 2020, along with a 33% reduction in public sector energy use. 12% of the national target of 20% was achieved by the end of 2016. The NEEAP outlines the energy efficiency measures that will be implemented to reach the national energy saving targets as well as the progress towards this target. The NEEAPs also include information on the exemplary role of the public sector and on the provision of information and advice to final customers.

Part L of the Building Regulations

All new buildings, extensions to existing buildings as well as material changes of use to existing buildings are subject to Part L of the Building Regulations (Conservation of Fuel and Energy) which sets statutory minimum energy performance requirements. In the case of dwellings, an ambitious programme for upgrading the Regulations has been advanced over the past decade with the 2005 standards being used as a benchmark for further improvements. The Regulations were upgraded in 2007 to achieve improvements in energy efficiency and a reduction in associated carbon emissions.

The 2017 amendment to Part L provides for the implementation of requirements of Articles 2, 3, 4, 6 (part of), 7, 8, 9 (3,b) of the EU Energy Performance of Buildings Directive – EPBD (recast) (2010/31/EU of 19 May 2010).
These requirements include:

- application of a methodology for the calculation of the energy performance of buildings on the basis of a general framework set out in Annex I to the EPBD (recast);
- setting of minimum energy performance requirements for buildings and the application of these requirements to new buildings to achieve Nearly Zero Energy Buildings;

- ensuring where buildings undergo major renovation that the renovated systems and components meet minimum thermal performance requirements in so far as this is technically, functionally and economically feasible;
- ensuring that when a building element that forms part of the building envelope and has a significant impact on the energy performance of the building envelope, is retrofitted or replaced, the energy performance of the building element meets minimum energy performance requirements in so far as this is technically, functionally and economically feasible.

The NZEB (nearly zero energy building) standard will apply to all new buildings occupied after the 31st December 2020. For Public Sector bodies, the standard will apply to all new buildings owned and occupied by the 31st December 2018. As with previous Building Regulations there are transitional arrangements in place where buildings are occupied after these dates but work commenced prior to 31st December 2018 for Non Domestic Buildings and 31st October for Domestic Buildings.

For all new non-residential builds, such as community centres, an equivalent to a 60% improvement in energy performance on the 2008 Building Regulations is required. This means an improved energy performance for the fabric, services and lighting specification. It also introduces a mandatory requirement for renewable sources. The renewable sources must in general provide 20% of the primary energy use, however there is flexibility where the building is more energy efficient than the regulations. This typically corresponds to an A3 Building Energy Rating.

Design Guidelines for Social Housing

In recent years significant efforts have been made to ensure that all new construction projects, including the delivery of social housing stock, are designed and built to high energy efficiency and sustainable development standards.

Local Authorities are responsible for the maintenance and upgrade of social housing which is in Local Authority ownership. In accordance with the Energy Efficiency Directive and the Recast Energy Performance of Buildings Directive, Local Authorities take an exemplar role in the retrofit of social housing. Local Authorities are allocated capital funding each year in respect of a range of measures to improve the standard and overall quality of their social housing stock. The programme includes retrofitting measures aimed at improving the energy efficiency of older apartments and houses by reducing heat loss through the fabric of the building and the installation of high-efficiency condensing boilers.

Standards for Renovation of Existing Buildings - Code of practice for the energy efficiency retrofit of dwellings

A national code of practice for the retrofit of dwellings (Standard Recommendation (S.R.) 54 of 2014) has been developed by the National Standards Authority of Ireland (NSAI), the Department of Housing, Planning, Community & Local Government (DHPCLG), the Department of Environment, Climate and Communications, (DECC previously DCENR and DCCAE) and the Sustainable Energy Authority of Ireland (SEAI). The Standard Recommendation is based on the consensus of an expert panel and was subject to public consultation. This Code of Practice provides guidance to practitioners working on energy efficient retrofit works for dwellings. It provides technical guidance on the retrofit of the building fabric and services, the application of retrofit measures on a whole dwelling basis, general building science and the management of retrofit projects. The Guide is available to download for free from the National Standards Authority of Ireland website.

16.1.2 Communications

The National Broadband Plan (2012)

The National Broadband Plan (NBP) is a Government policy initiative which aims to deliver high speed broadband to every citizen and business in Ireland. The NBP sets out the strategy to deliver high speed broadband throughout Ireland and is overseen by the Department of Environment, Climate and Communications.

The NBP sets out:

- a clear statement of Government policy on the delivery of high speed broadband;
- specific targets for the delivery and rollout of high speed broadband and the speeds to be delivered;
- the strategy and interventions that will underpin the successful implementation of these targets; and
- a series of specific complementary measures to promote implementation of Government policy in this area.

The objectives of the NBP will be achieved through a combination of accelerated commercial investment by telecoms operators, and a proposed state intervention to provide high speed broadband to those parts of the country where the commercial sector will not invest; the 'Intervention Strategy' is the Government's plan of action designed to fund the delivery of high speed broadband to areas where the commercial sector will not deliver service. The strategy explains how the intervention will be implemented and what service will be delivered once the infrastructure is built.

The Intervention Strategy sets out the key elements of the intervention - what services are proposed and how they will be delivered. The Intervention Strategy has been developed following intensive engagement with industry and wider stakeholders. In addition, the European Commission has set out detailed guidelines on what is required to obtain State Aid approval for Government interventions in the broadband sector. The Department has followed these guidelines when formulating the proposed intervention strategy. Given Wicklow's large rural population the proposed state intervention will be key in providing high speed broadband to all rural areas within the County. Broadband Connection Points BCPs have been established at four locations in County Wicklow - at Clermont, Dunlavin, Rathdrum and Ballycoog. County Wicklow is currently on NBI (National Broadband Ireland) rollout plan in terms of surveys for the new high-speed fibre network. In Wicklow, there are 14,871 premises within the Intervention Area (IA), which includes homes, farms, commercial businesses and schools. This equates to 23% of all premises in the County. Under the National Broadband Plan, Wicklow will see an investment of €59m in the new high speed fibre network. This will enable e-learning, remote monitoring of livestock or equipment, e-health initiatives, better energy efficiency in the home, and more remote working – all of which support the National Development Plan (NDP).

The first homes in Wicklow were connected in 2021.

Telecommunications Antennae & Support Structures Guidelines (1996)

These guidelines were published in 1996 to support Government policy on the roll out of a high quality telecommunications service. The overarching aim of these guidelines (and subsequent Circular PL 07/2012) is to ensure a consistent approach by Planning Authorities in the preparation of development plans and in determining applications for planning permission. Since the publication of these guidelines, the planning system has facilitated significant development in telecommunications networks in a manner consistent with proper planning and sustainable development to such an extent that as of 2018, approximately 89% of households in Ireland had access to the internet (CSO 2018). Circular PL 07/2012 indicates that development plans should not specify minimum separation distances between telecommunication structures and other structures as this can inadvertently have a major impact on the roll out of a viable and effective communications network.

It is anticipated that the updates to the guidelines introduced will support the planning system in facilitating the objectives of the National Broadband Plan 2012 (NBP) as detailed above.

16.1.3 Planning & Development Act 2000 (as amended)

The Planning & Development Act requires that a development plan includes objectives for:

- *'The provision or facilitation of the provision of infrastructure including - transport, energy and communication facilities'.*

- *'The promotion of sustainable settlement and transportation strategies in urban and rural areas including the promotion of measures to—*
  (i) reduce energy demand in response to the likelihood of increases in energy and other costs due to long-term decline in non-renewable resources,
  (ii) reduce anthropogenic greenhouse gas emissions, and
  (iii) address the necessity of adaptation to climate change;
  in particular, having regard to location, layout and design of new development'.

16.1.4 Climate Change

The Climate Action and Low Carbon Development Act 2015 sets out that the manner in which the transition towards a low carbon economy will be achieved through a 'National Low Carbon Transition and Mitigation Plan'[2] to lower Ireland's level of greenhouse emissions and a 'National Climate Change Adaptation Framework' (National Adaptation Framework, published 19th January 2018), to provide for responses to changes caused by climate change. More recently the new Climate Action and Low Carbon (Amendment) Act 2021 further enhances Ireland's ambition for net zero emissions by 2050.

The National Mitigation Plan (NMP) aims to set Ireland on a pathway to achieve the level of decarbonisation required. This plan provides guidance on how each responsible government department, incorporates sectoral mitigation measures into the following four sectors:

- Decarbonising Electricity Generation,
- Energy Efficiency in the Built Environment,
- Decarbonising Transport, and
- An Approach to Carbon Neutrality for Agriculture, Forestry and Land Use Sectors.

The mitigation measures set out in the NMP lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. In support of this, the NMP also includes over 100 individual actions for various Ministers and public bodies to take forward through its implementation. These have been considered in the formulation of the objectives of this County Development Plan.

In addition, Adaption Plans for the Electricity & Gas Networks Sector, and for the Communications Sector have been adopted; these plans identify that the critical infrastructure of the electricity and gas systems, and the communications network, play an essential role in ensuring social and economic wellbeing and that risks to this infrastructure both from extreme weather events (such as flooding or extreme wind) and gradual climate change could have significant economic and social consequences. They identify that communications networks are heavily dependent on the electricity and gas networks for their functioning and therefore disruption to the electricity and gas networks often results in knock on disruption to the communications networks. In addition, it is noted that access to vital communications infrastructure is often contingent on the functioning of the transport networks, which are also susceptible to climate impacts.

[2] While this was published 19 July 2017, it was quashed by the Supreme Court on 31 July 2020, because the Plan failed to specify the manner in which it was proposed to achieve the "national transition objective," as required under the 2015 Climate Act.

The Communications Sector plan identifies the following key infrastructure types were identified as being particularly vulnerable to the climate change impacts identified: overhead fibre and copper lines, underground cables, street cabinets and base stations, with secondary impacts on other infrastructure, staff, customers and the economy.

16.2 Energy Infrastructure

16.2.1 Electricity Generation

Electricity is generated in Ireland from a number of sources such as gas, coal, oil and renewable sources. The share of electricity generated from renewable energy sources (RES-E) has increased between 1990 and 2016, from 4.9% to 27.2%. The National Renewable Energy Action Plan set a target of 40% of electricity demand to be provided by renewable energy by 2020. A report prepared by the Sustainable Energy Authority of Ireland (SEAI) '*Renewable Energy in Ireland 2020 Update indicated that* the share of renewable electricity (RES-E) was 33.2%. It is therefore imperative that further progress is made in this area and that alternative renewable sources are further expanded and developed. As renewable energy sources can only be developed where they occur, it will also be necessary to put in place an electricity transmission and distribution network that can accommodate this change.

In accordance with the provisions of section 28(1C) of the Planning and Development Act 2000 (as amended), and having regard to the Government's commitment in the Climate Action Plan 2021 to achieve 80% of electricity from renewable sources by 2030 (adding 14.5GW – 15.5GW of renewable energy capacity nationally), National Policy Objective 55 which promotes renewable energy use and generation to meet national targets, and Section 28 Wind Energy Development Guidelines 2006 and the Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy and Climate Change 2017, the development plan aims to put in place the appropriate supports that will allow County Wicklow to contribute its share of the additional onshore national renewable electricity target, which estimated to be **285MW – 315MW**[3].

The Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure (July 2012) acknowledges the strategic and economic importance of investment in networks and energy infrastructure. The Government endorses the major investment underway in the high voltage electricity system under EirGrid's Grid25 Programme. The Planning Authority recognises the need for development and renewal of energy networks, in order to meet both economic and social policy goals.

16.2.1.1 Wind Energy

The generation of electricity from wind is the principal renewable alternative being developed in Ireland at present, primarily due to the good wind resources available. The entire Country is richly endowed with wind resources. Although Ireland only accounts for 2% of the total EU land mass, we have some 6% of EU wind resources. Per capita, we are one of the richest countries in the world in terms of wind energy. In 2015 Wind Energy made up 84% of the 27.2% of gross electricity consumption from renewable sources in Ireland.

Access to the electricity transmission grid is an issue for the supply of wind-generated electricity, which is controlled by EirGrid and in some instances the ESB. While a land-use plan cannot impact directly on the manner in which the grid is regulated or developed, through the development of a Wind Energy Strategy, other planning 'bottlenecks' can be somewhat addressed through:

- the identification of locations where wind energy projects will be favoured and supported;
- the setting out of a clear set of parameters to be considered in the locating of wind farms; and

[3] With respect to meeting the County's share of national renewable energy targets, having regard to the national target of 14.5GW-15.5GW, and of this the wind energy targets being +5GW of off-shore wind energy and +8GW of additional onshore wind energy (Source: 2021 Climate Action Plan), County Wicklow should endeavour to deliver 3% of the on-shore growth requirement (Wicklow comprising 3% of the land mass of the Republic of Ireland), which equates to +285MW-315MW.

- providing clear guidance about the design and layout of wind farm projects.

The 2006 Wind Energy Guidelines (DoEHLG) for Ireland offer advice to Planning Authorities on planning for wind energy through the development plan process and in determining applications for planning permission. While an update to these guidelines is anticipated shortly, the 2006 guidance currently forms the sole guide for planning for wind energy development in Ireland. The guidelines set out a step-by-step approach for the identification of key areas where there are good wind energy resources capable of exploitation in a manner consistent with proper planning and sustainable development. This ordered approach involves a sieve mapping analysis of the key environmental, landscape, technical and economic criteria which must be balanced in order to identify the most suitable location for wind energy development.

The development of new Ministerial guidelines with respect to Wind Energy has been ongoing for some years, and in advance of publishing draft new guidelines for consultation (which occurred in 2019), the Department of Housing, Planning, Community and Local Government issued 'interim' guidelines under Section 28 of the Act in 2017 with respect to 'statutory plans, renewable energy and climate change'. These guidelines focussed on administrative procedures and did not replace or amend the 2006 guidelines. These guidelines set out the following Specific Planning Policy Requirements for Planning Authorities in advance of the issuing of new guidelines:

1) Ensure that overall national policy on renewable energy as contained in documents such as the Government's 'White Paper on Energy Policy - Ireland's Transition to a Low Carbon Future', as well as the 'National Renewable Energy Action Plan', the 'Strategy for Renewable Energy' and the 'National Mitigation Plan', is acknowledged and documented in the relevant development plan or local area plan;
2) Indicate how the implementation of the relevant development plan or local area plan over its effective period will contribute to realising overall national targets on renewable energy and climate change mitigation, and in particular wind energy production and the potential wind energy resource (in megawatts); and
3) Demonstrate detailed compliance with item number (2) above in any proposal by them to introduce or vary a mandatory setback distance or distances for wind turbines from specified land uses or classes of land use into their development plan or local area plan. Such a proposal shall be subject to environmental assessment requirements, for example under the SEA and Habitats Directives. It shall also be a material consideration in SEA, when taking into account likely significant effects on climatic factors, in addition to other factors such as landscape and air, if a mandatory setback or variation to a mandatory setback proposed by a planning authority in a development plan or local area plan would create a significant limitation or constraint on renewable energy projects, including wind turbines, within the administrative area of the plan.

In light of these requirements, for the purpose of this Development Plan, it is not intended to update, amend or review the Wind Energy Strategy (WES) as set out in the 2016 County Development Plan until new guidelines are made, and the 2016 WES is herewith subsumed in this County Development Plan. Upon the making of any new guidelines, the WES and the provisions of the County Development Plan relating to Wind Energy will be updated if required.

The Wind Energy Strategy for the County supports a plan led approach to wind energy development in Wicklow and sets out areas 'Most Favoured', areas 'Less Favoured' and areas 'Not Favoured' for Wind Energy Development within the County. It is the policy of the Council to maximise wind energy development within the County in all three of these areas, on a case by case basis, subject to meeting specific requirements and guidance contained within the strategy.

16.2.1.2 Solar Energy

The current principal application of solar energy is use in heating. Therefore this aspect of solar power is addressed in Section 16.2.3 to follow. However, as technology advances, solar power is increasingly being used to generate electricity through the use of photovoltaic (PV) cells. Photovoltaic systems use semiconductor materials to convert light into electricity. This technology is widely used in consumer products such as solar calculators, watches or

garden lights, and is increasingly used as a cost-effective solution in Ireland for stand-alone applications where a grid connection is too expensive (e.g. parking meters, caravans or remote holiday homes). Solar PV can also be used to provide free solar electricity to houses as well as for commercial and industrial applications. It is now possible to connect solar PV systems to the grid, opening up a new era for solar PV in Ireland. Applications are also being made for commercial scale ground mounted solar PV 'Solar Farms' and such developments are supported, subject to suitable locations being selected and environmental criteria being satisfied.

16.2.1.3 Hydro Energy

Hydro generated power contributes almost 6% of total renewable energy produced in Ireland, generated from hydropower stations on dammed river or reservoir and lake systems. In Wicklow, hydroelectric generating stations are located at Poulaphouca, Blessington and Turlough Hill, Wicklow Gap (technically 'pumped storage' generation). While there are no current plans in County Wicklow to install new river dammed hydro plants, subject to ecological considerations, this still remains a viable form of renewable electricity generation. Hydroelectricity also plays an important role in electricity management in the grid as additional electricity can be brought in swiftly from hydro plants during demand spikes.

Wave and tidal power are also considered hydropower sources. Though often confused, wave power is distinct from the tidal power and the steady gyre of ocean currents. Wave power is the transport of energy by ocean surface waves and it is the energy encapsulated in the motion of the waves themselves that can be converted to electrical power. Tidal systems for the most part make use of the kinetic energy of moving water to power turbines, in a similar way to windmills that use moving air.

16.2.1.4 Bio-Energy

Bio energy is energy derived from biomass. Biomass is all organic material and can be either the direct product of photosynthesis i.e. plant matter such as leaves or stems etc or the indirect product of photosynthesis e.g. animal mass resulting from the consumption of plant materials. Types of biomass that are used to provide bio energy include residues from forestry and related industries, recycled wood, agricultural residues, agri-food effluents, manure, the organic fraction of municipal solid waste, separated household waste, sewage sludge and purpose grown energy crops.

Biomass can be burned to produce heat that is used to create steam to turn turbines and produce electricity. Therefore energy from biomass can produce electricity and/or heat. Liquid bio-fuels can also be derived from biomass crops such as oilseed rape.

There is large scale potential for biomass in Ireland. The industry is currently modest in scale; however, with Ireland's growth rate, technological advances and the deregulation of the electricity industry and in conjunction with stricter controls on waste management, an increase in the development of biomass installations is likely.

16.2.1.5 Small-Scale Renewable Electricity Generation

With the development of new technologies, the generation of electricity on a small scale from renewable or low carbon sources is becoming more viable. Small-scale installations are available in the form of PV cells (solar panels), single stand-alone or wall mounted wind turbines and biomass converters. The Planning & Development Regulations (2001 as amended) set out exemptions for certain small scale renewable installations.

16.2.1.6 Geothermal

Geothermal energy refers to heat energy stored in the ground. Heat is supplied to the ground from two sources, namely the hot core of the planet and the sun. It can be classified as either 'deep' or 'shallow' depending on the depths from which it is sourced. Heat transfer from groundwater is an example of a shallow geothermal source. The

deep geothermal energy can only be accessed through geological processes or by drilling through the surface. The second source of heat in the ground is from radiation from the sun. This energy can be regarded as stored energy which stays relatively warm throughout the year. This heat can then be extracted by using a ground source heat pump.

16.2.1.7 Electricity Transmission & Distribution

Electricity generation installations require grid connection (obviously other than small scale projects). Depending on the amount of electricity generated, grid connections can be either through direct connection to the transmission network (110KV/220kV), controlled by EirGrid or to a local distribution system (normally 38kV), controlled by ESB networks. The Commission for Energy Regulation (CER) regulates grid connections. Physical proximity to the grid is a consideration in the siting of new installations, but will not on its own normally determine the viability of any project, as new transmission lines can be constructed to virtually any location.

In order to facilitate the expansion in electricity generation installation, particularly wind farms, the grid itself will require development and expansion. In Wicklow, the grid has three lines – from Fassaroe in the north to Arklow in the south (roughly along the N11 corridor), from Turlough Hill in the Wicklow Gap down to Hollywood and from Baltinglass to Hollywood. It is important for the future development of electricity in the County that these strategic pieces of infrastructure are protected from inappropriate development in their immediate environs and that their scope for development is maintained. The corridors along these routes can therefore be considered 'strategic infrastructure corridors'.

16.2.1.8 Electricity Demand

Coupled with the provision of alternative, renewable sources of electricity, it is considered imperative to reduce the amount of electricity consumed. This will entail electricity saving measures to be built into existing and new structures and behavioural changes in the use of power.

16.2.2 Transport Energy

The energy utilised in transport comes from both the fuel burned in vehicles and the electricity used in electrically powered vehicles, such as electric cars or electrified tram / light rail systems. While electricity can be sourced from renewable and non-polluting sources, the use of petrol and diesel in trains, buses and cars is more difficult to address but a combination of actions will be required, such as:

- reducing the need to use vehicles, increased opportunities for walking and cycling;
- reductions in journey length and times, reduction in congestion;
- higher intensity of use of public transport; and
- development and increased usage of alternative vehicle fuel sources, such as electricity, hydrogen and biofuels. As part of the Climate Action Plan, the government has set a target to have 936,000 EVs (including battery EVs and plug-in hybrid EVs) on Irish roads by 2030. This is equivalent to one-third of around 2.8 million vehicles that are currently on the road in Ireland. The National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland, published in May 2017, sets out the need to develop publically accessible fast chargers to support growth in electric vehicles (EVs).

16.2.3 Heating Energy

The energy used in the generation of building heating accounts for a third of all energy consumed in Ireland. Heat has traditionally been generated from fossil fuel sources such as oil, gas and coal and from electricity, which also has been dependent on fossil fuels for production. The technology is now available to make considerable savings in heat use.

Methods of reducing heat generation and use are currently focused on individual buildings, but it is also possible to construct district heating system that might serve a housing or commercial development.

Heat generation: There are a number of more efficient and renewable methods now available to heat spaces and water in buildings. In particular, solar panels, biomass burners, heat exchangers and geothermal heat pumps are widely available, relatively easy to install and available for all types of buildings.

Heat demand: The key to reducing heat demand is to make buildings more efficient. This may mean only heating the minimum amount of water or space required at any time of the day or for a particular use or designing a structure so that it can maximise solar heat gain**.**

16.3 Energy Infrastructure & Communications Objectives

General Energy Objectives

CPO 16.01 To support and facilitate to the highest degree possible the development of alternative and renewable sources of energy, particularly in the generation of electricity / heating and for use as transport fuel.

CPO 16.02 To support and facilitate the co-location of renewable energy developments and technologies to ensure the most efficient use of land identified as suitable for renewable energy generation.

CPO 16.03 To support and promote the development of 'Sustainable Energy Communities' and in particular to encourage and facilitate developments that are energy neutral / low emission, integrate renewable energy technology or involve local renewable energy production.

CPO 16.04 To support the research and development of green hydrogen as a fuel for power generation, manufacturing, energy storage and transport.

Wind Energy Objectives

CPO 16.05 To encourage the development of wind energy in accordance with the County Wicklow Wind Energy Strategy and in particular to allow wind energy exploitation in most locations in the County subject to:

- consideration of any designated nature conservation areas (SACs, NHAs, SPAs, SAAOs etc) and any associated buffers;
- consideration of collision risk species (bird and bats);
- impacts on Wicklow's landscape designations;
- particular cognisance and regard being taken of the impact on wind turbines on residential amenity particularly with respect to noise and shadow flicker;
- impacts on visual and recreational amenity;
- impacts on 'material assets' such as towns, infrastructure and heritage sites;
- consideration of land cover and land uses on or adjacent to the site;
- best practice in the design and siting of wind turbines, and all ancillary works including access roads and overhead cables.

CPO 16.06 To facilitate and support the development of off-shore wind energy projects insofar as onshore facilities such as substations/connections to the grid may be required and the development of Operations and Maintenance (O&M) bases as may be required.

CPO 16.07 To support community-based wind energy projects.

Solar Energy Objectives

CPO 16.08 To facilitate and support the development of solar generated electricity.

CPO 16.09 To positively consider all applications for the installation of building mounted PV cells at all locations, having due regard to architectural amenity and heritage.

CPO 16.10 To support the development of commercial scale ground mounted solar PV 'Solar Farms' subject to compliance with emerging best practice and available national and international guidance[4].

Hydro Energy Objectives

CPO 16.11 To facilitate the development of expanded or new river / lake based hydroelectricity plants, subject to due consideration of ecological impacts, in particular, the free flow of fish and maintenance of biodiversity corridors.

CPO 16.12 To facilitate the development of off shore hydroelectricity projects insofar as onshore facilities such as substations/connections to the grid and the development of Operations and Maintenance (O&M) bases as may be required.

Bio-Energy Objectives

CPO 16.13 To facilitate the development of projects that convert biomass to gas or electricity, subject to demonstration that such projects are resource efficient having regard to carbon emissions resulting from the growth, harvesting and transport of inputs, and do not result in unsustainable climate damaging agricultural intensification.

CPO 16.14 Other than biomass installations that are location specific to the rural area, biomass conversion installations / facilities shall be located on suitable zoned industrial land in settlements.

Small-Scale Renewable Objectives

CPO 16.15 To facilitate and support the development of small-scale electricity generation installations.

Geothermal Objectives

CPO 16.16 To facilitate the exploration of geothermal energy where such development does not have a negative impact on the surrounding environment, landscape, biodiversity or local amenities.

CPO 16.17 To ensure that any proposal for geothermal technologies or any other subsurface exploration does not impact on groundwater quality.

[4] It should be noted that there is currently no national guidance available on the appropriate location and design of solar farms. However there are a number of excellent examples of such guidance provided in other jurisdictions and these will be utilised in the assessment of any applications; for example 'Planning guidance for the development of large scale ground mounted solar PV systems' produced by BRE National Solar Centre and Cornwall Council in the UK.

Transmission & Distribution Objectives

CPO 16.18 To support the development and expansion of the electricity transmission and distribution grid, including the development of new lines, pylons and substations as required.

CPO 16.19 To facilitate planned growth and transmission / distribution of a renewable energy focused electricity generation across the main demand centres.

CPO 16.20 To support roll-out of the Smart Grids and Smart Cities Actions enabling new connections, grid balancing, energy management and micro grid development.

CPO 16.21 To facilitate high energy demand development only at appropriate locations, most accessible to the National Grid.

CPO 16.22 To suitably manage development within 35m of existing 110KV/220kV transmission lines.

CPO 16.23 To support and facilitate the development of landing locations for off shore generated wind energy and for any cross channel power interconnectors.

CPO 16.24 Proposals for the undergrounding of cables should demonstrate that environmental impacts including the following are minimised:

- Habitat loss as a result of removal of field boundaries and hedgerows by topsoil stripping;
- Short to medium term impacts on the landscape where, for example, hedgerows are encountered;
- Impacts on underground archaeology;
- Impacts on soil structure and drainage; and
- Impacts on surface waters as a result of sedimentation.

Electricity Demand Objectives

CPO 16.25 To require all new developments during the design process to incorporate sustainable electricity technologies in accordance with Part L of the Buildings Regulations and as part of any application for permission, to demonstrate how these requirements will be met.

CPO 16.26 To facilitate retrofitting of existing buildings with electricity saving devices and installations, where permission is required for such works.

Transport Energy Objectives

CPO 16.27 Through coordinated land-use and transport planning, to reduce the demand for vehicular travel and journey lengths.

CPO 16.28 To encourage car pooling and facilitate park and ride facilities for public transport.

CPO 16.29 Through sustainable planning and investment in transport infrastructure, including roads and public transport systems, to reduce journey; times, length, congestion and to increase the attractiveness of public transport.

CPO 16.30 To facilitate the development of services and utilities for electric vehicles and other low emission alternative vehicles / fuel types, including the roll-out of additional electric charging points and alternative fuel distribution infrastructure in collaboration with relevant agencies at appropriate locations.

CPO 16.31 To require the provision of EV charging points in new developments as follows:

Building type		Requirement
New buildings and buildings undergoing major renovation	Non-residential buildings with more than 10 parking spaces within property boundary.	Installation of at least 1 recharging point. Installation of ducting infrastructure for at least 1 in 5 parking spaces.
	Residential multi-unit buildings.	Installation of 1 recharging point for every 10 car parking spaces (with a minimum 1 for developments under 10 spaces) Installation of ducting infrastructure for every parking space within property boundary.
New (single-unit residential) buildings	New 'own door' dwelling with car parking space located within the property boundary.	Installation of recharging points for electric vehicles on site.
New (single-unit residential) buildings	New 'own door' dwelling served by shared car parking areas or car parking spaces not within the dwelling site boundaries.	Installation of 1 recharging point for every 10 dwellings (with a minimum 1 for development under 10 dwellings) which is available to all residents. Installation of ducting infrastructure for every parking space within development.

Heating Objectives

CPO 16.32 To require all new developments during the design process to incorporate sustainable heating technologies in accordance with Part L of the Buildings Regulations and as part of any application for permission, to demonstrate how these requirements will be met.

CPO 16.33 To facilitate retrofitting of existing building with heat saving devices and installations, where permission is required for such works.

CPO 16.34 To support the development of district heating systems, particularly those generating heat from renewable sources.

Communication Objectives

CPO 16.35 To facilitate and support the roll out of the National Broadband Plan and the development/expansion of communication, information and broadcasting networks, including mobile phone networks, broadband and other digital services, subject to environmental and visual amenity constraints.

CPO 16.36 To support the national objective to promote Ireland as a sustainable international destination for Information Communications Technology (ICT) infrastructure such as data centres and associated economic activities at appropriate locations[5].

CPO 16.37 The development of new masts and antennae shall be in accordance with the development standards set out in Appendix 1 of this plan.

CPO 16.38 Facilitate and support the development of public Wi-Fi zones at appropriate public spaces where possible.

CPO 16.39 To support and facilitate to the greatest extent possible the development of new structures and the conversion of existing structures for the development of co-working spaces / hubs providing access to reliable high quality ICT infrastructure within towns and villages, including smaller rural settlements, subject to normal planning criteria.

[5] RPO 8.25 of the RSES MERA