Cork County Development Plan Review

Energy

Background Document No 9.

Planning Policy Unit
Cork County Council
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1 Section 1 Introduction

1.1 Introduction

1.1.1 This background document explore issues in relation to energy that will need to be considered as part of the review of the County Development Plan.

1.1.2 The current Plan seeks to ensure that that sufficient energy and related infrastructure is available to meet the existing and future needs of the county. It seeks to optimise the use of the renewable energy resources of the County to address climate change, support job creation and the move to a competitive low carbon Green Economy, while also protecting the environment and amenities of the county.

1.1.3 **Section Two: Policy and Legislation** provides an overview of the key items of legislation and policy at a European, National and Regional level relevant to climate change, energy and renewable energy, and details the various targets that have been set in terms of reducing reliance on fossil fuels and increasing the proportion of our energy that comes from renewable sources.

1.1.4 **Section Three**: **Energy Overview** provide an overview of the current energy trends in Ireland and our energy resources, and highlights the strategic role played by Cork in Renewable Energy provision in Ireland.

1.1.5 **Section Four: Renewable Energy in Cork** looks at the progress being made in the development of renewable energy infrastructure in Cork, especially in the area of wind and solar infrastructure.

1.1.6 **Section Five – Key issues for the Review of the Plan** provides a summary of the key issues to be considered as part of the review of the County Development Plan.

2 Section 2: Strategic Policy and Legislation

2.1 Introduction

2.1.1 Climate change is one of the most pressing issues facing the planet and impacts on habitats, species, fisheries, aquaculture, tourism, water quality, water safety, infrastructure, flood risk and people. The transition to clean energy is essential to address climate change and avoid the risk of long-lasting or irreversible changes to the climate system.

2.1.2 The projected impacts of climate change in Ireland include: increasing average temperatures; more extreme weather conditions including storms and rainfall events; an increased likelihood of river and coastal flooding; water shortages, particularly in the east of the country; changes in types and distribution of species; and the possible extinction of vulnerable species.

2.1.3 Ireland is facing a significant challenge to reduce our reliance on fossil fuels for transport, heating and electricity production. Significant progress has been made, however we still have a considerable way to go to meet our renewable energy targets, particularly for transport and heating.

2.1.4 Since the adoption of the Cork County Development Plan 2014, a number of new policy documents, funding proposals, targets and guidelines have been published to tackle issues that are contributing to Ireland's greenhouse gas emissions. This section provides an overview on the key items of legislation and policy at a European, National and Regional level relevant to climate change, energy and renewable energy and details the various targets that have been set in terms of reducing reliance on fossil fuels and increasing the proportion of our energy that comes from renewable sources.

2.2 Legislation and Policy

International Context

2.2.1 The United Nations Framework Convention on Climate Change (UNFCCC), 2014 is the international legal framework for addressing climate change at a global level. The ultimate objective of the Convention is to stabilise global greenhouse gas (GHG) concentrations. Ireland's target is part of the pledged EU target of at least 40% reduction in domestic GHG emissions by 2030 compared to 1990.

2.2.2 The 2015 Paris Agreement, (12 December 2015), marks the latest step in the evolution of the UN climate change regime and builds on the work undertaken under the Convention. The Paris Agreement seeks to accelerate and intensify the actions and investment needed for a sustainable low carbon future, while individual member state targets have yet to be agreed.

European Context

2.2.3 The European Union (EU) has put in place a framework for energy for all member states called the '2020 Climate and Energy Package'. This is legally binding legislation for all member states so that the EU as a whole will achieve 20% GHG emissions reductions, 20% energy produced by renewable resources, and 20% increase in energy efficiency by 2020. From this overarching EU climate and energy package, the EU Energy Efficiency Directive 2012/27/EU, and Renewable Energy Directive 2009/28/EC have resulted in national level energy actions plans in Ireland.

2.2.4 Under the Renewable Energy Directive, Ireland has been set a target of 16% of all non-Emission Trading Scheme (ETC) energy consumption to come from renewable energy sources by 2020, the sectoral split being 40% electricity, 12% heat and 10% transport energy.

2.2.5 In October 2014, in light of there being no clear framework for post the 2020 target, the EU put in place a new '2030 Framework for Climate and Energy Policies' which has set a 40% GHG reduction on 1990 GHG levels, and an EU-wide target of 27% for renewable energy and energy savings by 2030.

National Context

The Strategy for Renewable Energy 2012 – 2020

2.2.6 The Strategy for Renewable Energy 2012 – 2020 sets out the Government's strategic goals for renewable energy and the key actions underway and planned in the short to medium term for each of the sectors. Strategic goals are designed to address challenges and support the delivery of renewable electricity, heat and transport. The Strategy for Renewable Energy 2012 – 2020 is underpinned by the detailed National Renewable Energy Action Plan and sets out the Government's strategic goals for each of the renewable sectors.

The National Renewable Energy Action Plan 2010

2.2.7 Ireland's National Renewable Energy Action Plan (NREAP) to 2020 is the framework within which Ireland has set out the measures underway and planned to deliver energy growth from renewable sources in line with EU targets. Ireland is obliged to report to the EU Commission on progress (as well as obstacles to progress). The NREAP requires that all sectors, including local authorities, consider the actions and targets in the NREAP and identify how it is intended to contribute to the achievement of these targets.

Energy White Paper, Ireland's Transition to a Low Carbon Energy Future 2015-2030

2.2.8 Ireland's long-term energy policy framework is set out in the 2015 Energy White Paper, Ireland's Transition to a Low Carbon Energy Future 2015-2030. This sets out a framework to guide Irish energy policy in the period up to 2030 and sets out a vision for a profound transformation of Ireland's energy systems; moving to lower emissions fuels and ultimately towards a lower reliance on fossil fuels; significantly increasing renewable generation; achieving change in energy efficiency performance; implementing smart and interconnected

energy systems; strong regulatory structures and markets ; and repositioning energy consumers to have a more active role within the energy sector. An annual review and update is due to be undertaken in 2020.

Strategic Case for Oil Refining Requirements on the Island of Ireland

2.2.9 In 2013, the Government published this report which highlighted the additional security benefits that an operational refinery may offer and underlined that existing oil import facilities on the island of Ireland offer a robust infrastructure that would provide comfortable alternatives in the event of a serious disruption at any of the six principal oil ports.

Climate Action and Low Carbon Development Act 2015

2.2.10 This Act provides for the making of:

- Five yearly National Mitigation Plans to specify the policy measures to reduce greenhouse gas emissions;
- A National Adaptation Framework to specify the national strategy for the application of adaptation measures in different sectors and by local authorities to reduce the vulnerability of the State to the negative effects of climate change.

2.2.11 The first National Mitigation Plan and the National Adaptation Framework have now been published.

2.2.12 The Act also established the Climate Change Advisory Council to advise ministers and the government on climate change matters.

2.2.13 The National Low-Carbon Roadmaps and the National Climate Change Adaptation Frameworks constitute key pillars of the process through which government will develop, and progress, mitigation and adaptation policy in order to enable the State to pursue and achieve transition to a low-carbon, climate –resilient and environmentally sustainable economy in the period to 2050. A series of national plans will be adopted and reviewed on a structured basis, with authority set down in primary legislation, to ensure a coherent and comprehensive policy across all key sectors, and to provide maximum clarity and policy certainty for business and stakeholders generally. The structural basis for national plans on mitigation and adaptation will reflect government commitment to transparency and inclusiveness. Accountability on national policy will include annual reporting to Dail Eireann.

2.2.14 The low-carbon road mapping process will be guided by a long-term vision of low-carbon transition based on:

- An aggregate reduction in carbon dioxide (CO2) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors; and

- In parallel with this, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production, will be agreed.

National Mitigation Plans 2017 (NMPs) and National Adaptation Frameworks 2018 (NAFs).

2.2.15 As provided for in the 2015 Climate Action and Low Carbon Development Act, in order to pursue and achieve the national transition objective, the Minister for Communications, Climate Action and Environment must make and submit to Government a series of successive National Mitigation Plans (NMPs) and National Adaptation Frameworks (NAFs).

2.2.16 The first National Mitigation Plan was published in July 2017 and contains seventy specific mitigation measures and one hundred and six individual actions across Government ministries to support the move to a low carbon economy and society. The Plan contains separate sectoral mitigation transition statements for the four sectors covered under the NMP (Electricity Generation, the Built Environment, Transport and Agriculture) and projections of future emissions.

2.2.17 The first National Adaptation Framework was published in January 2018 and seeks to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts. Under the NAF a number of Government Departments are required to prepare sectoral adaptation plans in relation to a priority area that they are responsible for and local authorities are required to prepare local adaptation strategies.

Local Adaptation Strategies – Local Authorities and Climate Change

2.2.18 Local authorities will play a key role in helping the country to adjust to the effects of climate change. The local government sector plans a pivotal role in planning for, and responding to, emergency situations. Given their close relationship with the community, local authorities can react faster and more effectively to local climate events then other government agencies. This has been demonstrated in their response to extreme weather events in Ireland over recent years. They have essential local knowledge of the natural and manmade environment and have a critical role to play in managing climate risks and vulnerabilities and identifying adaptation actions. They also deliver key services to the public either directly or in partnership with other government departments such as housing, planning, sanitation and maintenance of local roads, parks and waterways.

2.2.19 The Climate Action Regional Offices are being operated by a lead local authority in four different regions that have been grouped together based on climate risk assessment with a focus on the predominant risk(s) in each geographical area. Cork County Council is the lead authority for the Southern Region. The establishment of these offices will enable a more coordinated engagement across the whole of government and will help build on the experience and expertise which exists across the sector.

Climate Adaptation Strategy for Cork County 2019

2.2.20 All Local Authorities were tasked with producing a Climate Adaptation Strategy for their functional areas. The Environment Directorate of Cork County Council developed the Climate Adaptation Strategy for Cork County which was adopted in September 2019.

2.2.21 The Climate Adaptation Strategy will be the main instrument to achieve the overarching commitment by Cork County Council towards a low carbon, climate resilient and sustainable

environment. Each high-level goal can involve a number of Local Authority services and directorates. The Environment Directorate will coordinate the activities of all sections of the Local Authority and will monitor progress.

2.2.22 Cork County Council will address its climate adaptation responsibilities through the following measures and actions:

- Ensuring the effective and efficient delivery of services under changing climatic conditions,
- Continue to integrate mitigation and adaptation strategies into all policy and decision making,
- Respond effectively to emergency situations and extreme weather events,
- Manage climate risks to public assets owned/managed by the Local Authority,
- Integrate and implement cross-sectoral adaptation strategies at a local level,
- Work with communities to build resilience and adaptive capacity.

Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy and Climate Change in 2017 .

2.2.23 In 2017, the DoHPCLG published the Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy and Climate Change. These guidelines require planning authorities, in making, reviewing, amending or varying a development plan or local area plan to :

(a) ensure that overall national policy on renewable energy as contained in documents such as the 'White Paper', 'NREAP', the 'Strategy for Renewable Energy' and the 'National Mitigation Plan', is acknowledged and documented in the relevant development plan or local area plan;

(b) indicate how the implementation of the relevant development plan or local area plan 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; and

(c) demonstrate detailed compliance with item (b) above in any proposal 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.

Draft National Energy and Climate Plan (NECP) 2018

2.2.24 The Minister for Communications, Climate Action and the Environment, published the first draft of Ireland's National Energy and Climate Plan (NECP) in December 2018. It was submitted to the European Commission, with the final NECP due for submission by 31

December 2019. The NECP will contain the policies and measures proposed to reach Ireland's 2030 goals, targets, and contributions. This first draft of the NECP takes into account energy and climate policies developed to date, the levels of demographic and economic growth identified in the NPF process and includes all of the climate and energy measures set out in the NDP 2018-2027.

2.2.25 It is the first step in the process of putting together our final National Energy and Climate Plan and further iterations of the plan will take into account additional policies and measures and the all-of-Government climate action plan.

2.2.26 The draft NECP sets out the impact of many initiatives which are being put in place;

- The investments in the National Development Plan will deliver a cumulative 22MT reduction in CO2. This represents one third of the emissions reduction we need to achieve.
- Renewables in our power system will rise from 30% to at least 55% with a broader range of technologies likely to be deployed, e.g. offshore wind, solar, biomass.
- Coal and peat will be removed from electricity generation which will almost halve the emissions from the electricity sector.
- Use of electric vehicles into our transport fleet will rise to around 20%.
- Energy improvements in newly built homes and energy refits in existing homes will mean that 40%-50% of homes will have high build energy ratings.
- At least 170,000 homes will be supported to switch out oil-fired boilers to heat pumps and solar panels.
- The support scheme for renewable heat (SSRH) will enable the small and medium businesses to change their heat generation away from fossil fuels to renewable generation technologies.

The Climate Action Plan 2019 – To Tackle Climate Breakdown June 2019.

2.2.27 Climate disruption is already having diverse and wide-ranging impacts on Ireland's environment, society, economic and natural resources. The Climate Action Plan sets out an ambitious course of action over the coming years to address the issue.

2.2.28 The Plan identifies the nature and scale of the challenge. It outlines the current state of play across key sectors including electricity, transport, built environment, industry and agriculture and charts a course towards ambitious decarbonisation targets. Reflecting the central priority climate change will have in our political and administrative systems into the future, the Plan sets out governance arrangements including carbon-proofing policies, establishment of carbon budgets, a strengthening Climate Change Advisory Council and greater accountability to the Oireachtas.

2.2.29 The Plan recognises that Ireland must significantly step up its commitments to tackle climate disruption. The Government and public bodies aim to play a major role in taking early action on climate to achieve decarbonisation goals.

2.2.30 The Climate Action Plan is committed to achieving a net zero carbon energy systems objective for Irish society and in the process, create a resilient, vibrant and sustainable country.

2.2.31 Key aims include:

- A five-year Carbon Budget and sectoral targets with a detailed plan of actions to deliver them;
- A Climate Action Delivery Board overseen by the Department of the Taoiseach to ensure delivery;
- An independent Climate Action Council to recommend the Carbon Budget and evaluate policy;
- Strong accountability to an Oireachtas Climate Action Committee; and
- Carbon proofing all Government decisions and major investments.

2.2.32 While this framework of goals and performance monitoring is crucial, it will be equally important that every public body adopts a Mandate for Climate Action.

2.2.33 Some of the key measures which will help create a framework across the entire public sector and beyond to support change shall include:

- Consistent development of a Green Procurement Strategy;
- Targets of 50% energy efficiency and 30% greenhouse gas emissions reduction;
- A trajectory for the price of carbon to create incentives which help avoid locking in carbon intensive technologies;
- The realisation of the principle underpinning Project Ireland 2040 for compact, connected, and sustainable development; and
- Competitive funding rounds to promote research and innovation to meet the climate challenge.

2.2.34 **Electricity** - Increase reliance on renewables from 30% to 70% adding 12GW of renewable energy capacity (with peat and coal plants closing), put in place a coherent support scheme for micro-generation with a price for selling power to the grid, open up opportunities for community participation in renewable generation as well as community gain arrangements, streamline the consent system, the connection arrangements, and the funding supports for the new technologies on and off shore.

2.2.35 **Buildings** - Introduce stricter requirements for new buildings and substantial refurbishments; design policy to get circa 500,000 existing homes to upgrade to B2 BER and 400,000 to install

heat pumps; build a supply chain and a model for aggregation where home retrofits are grouped together to allow this level of activity to be funded and delivered; deliver two new district heating systems, and implement a roadmap for delivering District Heating potential. Increase attention to Energy and Carbon ratings in all aspects of managing property assets.

2.2.36 **Transport** - Accelerate the take up of EV cars and vans so that we reach 100% of all new cars and vans are EVs by 2030. This will enable achieving our target of 950,000 EVs on the road by 2030. This means approximately one third of all vehicles sold during the decade will be Battery Electric Vehicle (BEV) or Plug-in Hybrid Electric Vehicle (PHEV). Make growth less transport intensive through better planning, remote and home-working and modal shift to public transport. Increase the renewable biofuel content of motor fuels. Set targets for the conversion of public transport fleets to zero carbon alternatives

2.2.37 **Agriculture** - Deliver substantial verifiable greenhouse gas abatement through adoption of a specified range of improvements in farming practice in line with recommendations from Teagasc. Deliver expansion of forestry planting and soil management to ensure that carbon abatement from land-use is delivered over the period 2021 to 2030 and in the years beyond. Support diversification within Agriculture and land use to develop sustainable and circular value chains and business models for lower carbon intensity farming, including, organic production, and protection and enhancement of biodiversity and water quality; and the production of bio-based products and bioenergy through the Common Agricultural Policy and implementation of the National Policy Statement on the Bioeconomy.

2.2.38 **Enterprise and Services** - Embed energy efficiency, replacement of fossil fuels, careful management of materials and waste, and carbon abatement across all enterprises and public service bodies. Mobilise clusters regionally and sectorally to become centres of excellence for the adoption of low carbon technologies. Plan for the delivery of quality employment and enterprise in the new areas of opportunity being opened up.

2.2.39 **Waste and the Circular Economy** - Develop coherent reduction strategies for plastics, food waste, and resource use. Increase the level and the quality of recycling, with less contamination and greater replacement of virgin materials by recycling. Eliminate non-recyclable plastic. Reduce the reliance on landfill with sharp reductions in plastics and compostables entering landfill.

2.2.40 As part of Project Ireland 2040, the government established a Climate Action Fund, designed to stimulate innovation and pioneer efforts across Irish society. The first allocation of funds leveraged four times the contribution from the fund, and has pump-primed the provision of over fifty high capacity charging points, over 60,000 homes on district heating, motor gas production from anaerobic digestion, and a nationwide LED lighting system.
The Climate Action Plan 2019 will ensure that the Climate Action Fund and the three other NPF funds, the rural and urban development funds and for disruptive innovation, are oriented towards supporting low-carbon initiatives.

The Climate Action Plan – First Progress Report – November 2019

2.2.41 The Climate Action Plan published in June 2019 contains 183 actions, broken down into 619 individual measures, which Ireland needs to implement to meet our EU 2030 targets and to achieve net zero emissions by 2050.

2.2.42 The Climate Action Plan commits Ireland to new governance structures that will deliver necessary progress and hold responsible actors to account for their outlined actions. The publication of the First Progress Report demonstrates robust delivery in this regard. A completion rate of 85% has been achieved, incorporating 149 measures across sectors.

2.2.43 The Climate Action Delivery Board will continue to monitor progress and identify challenges to delivering the remaining actions not yet achieved.

2.2.44 Key Milestones reached since the Plan was published include the following:

- New Scheme for 1,200 on-street public charge points for electric vehicles, led by local authorities.
- First Luas tram extension delivered.
- New requirements to ensure all new homes are Nearly Zero Energy Buildings (NZEB) standard. New energy efficiency regulations for home renovations over a certain size.
- Commitment to support net zero emissions at European level.
- Local Authority Climate Action Charter signed with all 31 local authorities, driving forward meaningful change in their local areas.
- Commitment for a Just Transition Plan, with €31m secured in Budget 2020 for new measures.
- New rules for public procurement, meaning €12bn of state investment each year will be invested sustainably.
- A Climate action focussed budget, with a commitment to increase the price of carbon to €80/t in 2030, and ring-fence all the proceeds for climate action, tackling energy poverty and delivering a just transition.
- Climate Action Plan Delivery Board established, led by the Department of an Taoiseach.
- Retrofitting model taskforce established to deliver our new national retrofitting plan which will group homes in the same area together to lower cost, easy pay back models (e.g. through your utility bill), and smart financing.
- Secured €530m from the EU to deliver the Ireland – France Celtic Interconnector, which will link the Irish and French electricity grids and is vital to increasing renewable electricity from 30% to 70%.

- Climate Advisory Council advice accepted to ban all new oil exploration off Irish coastal waters.
- 8 Town Hall meetings across the country to engage with local communities about climate action.

The National Development Plan

2.2.45 The National Development Plan 2018-2027 is the latest Government public capital investment plan. The aim of the (NDP) is to act as a driver for "Ireland's long-term economic, environmental and social progress across all parts of the country over the next decade". The NDP outlines multi-annual funding for the transport, health, education and energy sectors.

2.2.46 The National Development Plan (NDP) 2018-2027 sets out investment priorities of €21.8 billion for energy and climate action for the 10 year period of which €7.6 billion is to come from the Exchequer. The remaining investment is to be made by Ireland's semi-state companies and by the private sector. In addition, some €8.6 billion funding has been made available for sustainable mobility projects, mostly in public transport. This substantial funding increase will facilitate upscaling of investments and implementation of actions needed to move the country towards the 2030 climate targets. The funding will support the implementation of energy efficiency and renewable measures in the electricity, transport and built environment, especially for heating and cooling. In addition, the NDP contains a commitment to establish a new €500m Climate Action Fund to leverage investment by public and private bodies to contribute to the achievement of Ireland's energy and climate targets.

National Planning Framework

2.2.47 The National Planning Framework, sets out a number of priorities for policy in the energy sector including:

- Commitments around decarbonising the energy system,
- Increasing renewable energy and reinforcement of the distribution and transmission network to facilitate planned economic growth,
- Strengthen energy security and to support an island population of up to 8 million people.

2.2.48 Transition to a Low Carbon and Climate Resilient Society is one of ten National Strategic Outcomes (NSO) or priorities to guide future development in the NPF. These will be implemented though the Investment priorities detailed in the NDP.

2.2.49 National Strategic Outcome 8 of the NPF aim is to 'Transition to a Low Carbon and Climate Resilient Society" and sets out the new requirements and policy emphasis relevant to Energy including ; new energy systems and transmission grids for a more distributed and more renewables focused energy generation system, acknowledges that State-owned commercial enterprises are significant players in the energy market, promotion of renewable energy and

green energy, promotion of a national smart grid plan and smart energy systems, the electrification of transport fleets, development of onshore and offshore renewable energy, reinforce the distribution and transmission network, connect Ireland to the EU electricity grid system via interconnection and to advance carbon capture and storage. Overall aim is to deliver 40% of our electricity needs from renewable sources by 2020 with a strategic aim to increase renewable deployment in line with EU targets and national policy objectives out to 2030 and beyond.

2.2.50 The NPF recognises that new energy systems and transmission grids will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave and solar and connecting that energy to the major sources of demand. The NPF highlighted the potential of the region in renewable energy terms from wind and solar to biomass and wave energy.

2.2.51 The National Planning Frameworks includes a number of National Planning Objectives (NPOs) relating to key areas such as; NPO 3a Compact Growth, NPO 27 Alternatives to the car, NPO 33 Prioritise the provision of new homes at locations that can support sustainable development, NPO 42 Offshore Energy, NPO 52 Planning Response to Environmental Challenges, NPO 53 Circular and Bio Economy, NPO 54 Reduce Carbon Footprint, NPO 55 Promote Renewable Energy Use, NPO 56 Sustainably Manage Waste Generation, NPO 58 Integrated planning for Green Infrastructure and NPO 64 Improve air quality,

2.2.52 The planning process provides an established means through which to implement and integrate climate change objectives, including adaptation, at local level. Planning legislation also requires different levels of the planning process to address climate change.

2.2.53 Under the National Planning Framework, the Government will support:

- Integrating climate considerations into statutory plans and guidelines in order to reduce vulnerability to negative effects and avoid inappropriate forms of development in vulnerable areas.
- More energy efficient development through the location of housing and employment along public transport corridors, where people can choose to use less energy intensive public transport, rather than being dependent on the car.
- The roll-out of renewables and protection and enhancement of carbon pools such as forests, peatlands and permanent grasslands. It is necessary to ensure that climate change continues to be taken into account as a matter of course in planning-related decision making processes.
- The development of sustainable supply chains in the bio economy.
- Grey adaptation which typically involves technical or engineering-oriented responses to climatic impacts, such as the construction of sea walls in response to a sea-level rise.

- Green adaptation which seeks to use ecological properties to enhance the resilience of human and natural systems in the face of climate change, such as creation of green spaces and parks to enable better management of urban micro-climates.

2.2.54 Rural areas have significantly contributed to the energy needs of the country and energy production. The NPF highlights the strong role rural areas play in securing a sustainable renewable energy supply. Innovative and novel renewable solutions have been delivered in rural areas over the last number of years, particularly from solar, wind and biomass energy sources. The location of future national renewable energy generation will, for the most part, need to be accommodated on large tracts of land in a rural setting, while also continuing to protect the integrity of the environment and respecting the needs of people who live in rural areas. In relation to peatlands, some of Ireland's cutaway bogs are suitable to facilitate the generation of energy, most notably wind/biomass.

Regional Spatial and Economic Strategies

2.2.55 The RSES supports the development of measures to address the energy sectors outlined in the NPF. Actions to support the transition to a Low Carbon Society will be in the key sectors of Renewable Energy, Energy Efficiency, Sustainable Transport, Agriculture and Forestry and Climate Resilience through Flood Defences. The Decarbonisation Action Agenda will be linked to implementation of the cross-cutting measures set out in the National Mitigation Plan and the National Adaptation Framework in conjunction with the Regional Climate Action Offices.

2.2.56 There are a large number of Regional Policy Objectives RPO's in the South West Regional Spatial and Economic Strategy related to Climate change, Energy, Renewable energy , Marine spatial planning and the transmission network and Interconnection including the following; RPO 54, RPO 85, RPO 86, RPO 87, RPO 88, RPO 89, RPO 90, RPO 92, RPO 93, RPO 94, RPO 95, RPO 96, RPO 97, RPO 98, RPO 99, RPO 100, RPO 101, RPO 102, RPO 103, RPO 106,RPO 211, RPO 212, RPO 213, RPO 214, RPO 215, RPO 216, RPO 217.

3 Section 3: Energy Overview

3.1 Overview of Ireland's Energy Situation

3.1.1 Ireland remains heavily dependent on fossil fuels and there is currently a need to import almost all of the country's energy needs at a significant financial cost to the economy and the environment.

3.1.2 The National Energy and Climate Plan identified the main trends in national fuel share as follows for 2017:

- Fossil fuels accounted for 90% of all energy used in Ireland in 2017. Demand for fossil fuels fell by 1.6% in 2017 to 13,058 ktoe (kilo tonnes of oil equivalent) but was 15% lower than in 2005.
- Oil continues to be the dominant energy source and maintained a 48% share of our Total Primary Energy Requirement (TPER) in 2017. Oil demand in 2017 was 24% lower than it was in 2005.
- Natural gas use accounted for 30% of our TPER. Natural gas use in 2017 was 23% higher than in 2005.
- Coal use has decreased significantly and now accounts for 7.6% of our TPER. Coal demand has fallen by 42% since 2005.
- Peat accounts for 4.8% of overall energy use and is also declining.
- The overall share of renewables in primary energy stood at 9.3% in 2017 up from 7.9% in 2016. Key sources of renewable energy in Ireland are wind, hydro and biomass.
- Energy from non-renewable wastes accounted for 0.9% of TPER in 2017.
- Ireland continued to be a net exporter of electricity in 2017, exporting 58 ktoe (kilo tonnes of oil equivalent), 4.7% less than in 2016.
- Ireland still has a high reliance on imported energy – our energy import deficiency was at 66% in 2017 (down from 88% in 2015).

3.2 Ireland's Oil and Gas resources

3.2.1 The Energy White Paper acknowledges that oil and natural gas will remain significant elements of Ireland's energy supply in the evolution to a low carbon energy system.

3.2.2 There have been no commercial discoveries of oil to date. However, industry has recently been highlighting the potential of Ireland's indigenous oil in the Irish offshore in recent years. It is still unclear what impact the recent Government decision to ban oil exploration will have on both oil and gas exploration into the future.

3.2.3 The Kinsale fields (Kinsale Head, Ballycotton, Seven Heads) are expected to cease production by 2021 while by 2025/26 Corrib gas supplies will have declined to less than 40% of initial peak production levels. The anticipated reduction in Corrib and Inch gas supplies will re-establish the Moffat Entry Point interconnector from the UK as the dominant supply point from 2018/19. Post-Brexit, Ireland's and the European Union's import dependency will be exacerbated by becoming increasingly reliant on non-EU sources of energy (UK, Norway, Russia, Middle East etc.). The EU28's import dependency for petroleum and its products (oil and derivatives) increased from 74% in 1995 to 89% in 2015; and in respect of natural gas increased from 43% to 69% over the same period.

3.2.4 Natural gas remains an important component in Ireland's energy mix. It is the dominant fuel for electricity generation (48% in 2016). Ireland's natural gas comes from both indigenous production and imports. The indigenous resources include gas fields at Kinsale and Corrib. The balance is imported from the UK. Ireland, Northern Ireland and Great Britain are physically interconnected by two interconnector pipelines under the Irish Sea which deliver safe, secure and competitive energy supplies for consumers.

3.2.5 Natural gas is a clean fuel from an air quality perspective, as it has almost no particulate matter emissions. It has a much lower CO2 content per unit of energy than coal or oil. Long term Irish energy policy is focussed on achieving the transition to a low carbon energy system in a secure and cost effective manner. This envisages that in the short-to-medium term, the non-renewable part of the energy mix will shift away from more carbon-intensive fuels to lower-carbon fuels, like natural gas, and to renewables.

3.2.6 In cost terms, the supply of fossil fuels is not going to last forever and there is considerable uncertainty about the long-term pricing of fossil fuels.

3.3 Renewable Energy

3.3.1 Renewable energy is energy that comes from resources that are continually replenished through the cycles of nature. Unlike fossil fuels, their supply will never become exhausted. The main sources of renewable energy include the sun(solar energy), the wind, moving water (hydropower, wave and tidal energy), heat below the surface of the earth (geothermal energy), biomass (wood, waste, energy crops).

3.3.2 Producers of renewable energy may be generally categorised by their electrical output as follows:

- Commercial or large-scale generation: these are energy projects that produce energy for sale to the national electricity grid. Such projects must apply directly to Eirgird or to ESB Networks for approval for a grid connection
- Auto-generation: Auto-generation is the production of electricity for a consumer's own use on the premises/sale where the energy is to be consumed.

- Micro-generation: Micro-Generation is classified in Ireland as small-scale, grid connected electricity generation where customers produce their own electricity and export the surplus onto the ESB Networks Low Voltage (LV) System. Such generators cannot be used to sell electricity to the electricity grid.

3.3.3 The 2009 EU Renewable Energy Directive sets Ireland a legally binding target of meeting 16% of our energy requirements from renewable sources by 2020. The Directive requires each Member State to adopt a national renewable energy action plan (NREAP) to set out each Member State's national targets for the share of energy from renewable sources consumed in transport, electricity and heating in 2020 that will ensure delivery of the overall renewable energy target. This target is broken into three key sectors with individual targets for each sector including RES-E (electricity), RES-T (transport) and RES-H (heat).

3.3.4 The EU has an overall target of achieving a 20 per cent renewable share of energy use by 2020. It is also bound by the 2030 target to source 27% of EU energy from renewable sources. In order to meet its 2020 obligations.

3.3.5 Ireland's target under the 2009 EU renewable energy Directive (2009/28/EC) is for 16% of the country's total energy consumption to be derived from renewable energy sources by 2020 (compared with 2.8% in 2005). There is a separate target of 40% of final gross consumption of electricity to come from renewables, 10% for transport, and 12% for heat. Ireland is now approximately half way towards achieving these targets. However, concerns exist for Ireland's ability to meet the overall 16% based on projected shortfalls in RES-H and RES-T.

Table 3.1: Ireland's 2020 Renewable Energy Targets

Sector	**Share in gross final consumption per sector***
Overall target	16%
Heating and cooling	12%
Electricity	40%
Transport	10%

Source: National Renewable Energy Action of Ireland (2010). ***Based on calculation methodology detailed in Directive 2009/28/EC

3.3.6 Under the EU effort sharing decision, Ireland must reduce emissions in those sectors outside of the EU emissions trading scheme by 20% compared to 2005 levels by 2020.

3.3.7 It is not yet clear what the cost will be to EU Member States of not achieving their binding targets. If Ireland does not meet the 16% target, the Directive anticipates that there will be a market where Member states will be able to trade renewable energy. SEAI has estimated that the cost implication or fine to Ireland may be in the range of €100 million to €150 million for each percentage point that the country falls short of the 16% target. The Irish Wind Energy Association and others are suggesting that a 3% shortfall is likely based on current developments.

3.3.8 In 2016, the EU had reached a 17 per cent share of energy from renewable sources. Similar to Ireland, the EU has 30 per cent of its electricity from renewable sources and this represents 6 per cent of overall EU Energy. The share of transport and of heat energy from renewables is greater in the EU than in Ireland.

Progress towards 2020 Renewable Energy and Energy Efficiency Targets for Ireland

3.3.9 Ireland's 2020 renewable energy target is to increase the share of final energy consumption that is made up of renewable energy sources (RES) to 16% and will face steep challenges and monetary fines if targets are not met post-2020. In view of this, the White Paper for Energy 2015 has set out a suite of further polices, measures and incentives in support of energy consumption reduction and renewable energy investment for implementation commencing in 2016.

3.3.10 Most recent projections anticipate that Ireland will fall short of its mandatory European target for an overall 16 per cent renewable energy share by 2020, with achievement estimated to be between 12.7 per cent and 14 per cent. Significant contributions to this level of achievement come from wind energy, bioenergy in the industry sector and biofuels blended in transport fuels.

3.3.11 In March 2018 the Government announced an increased ambition and level of delivery targets supporting a sustainable energy transition in its National Development Plan 2018 – 2027.

3.3.12 Ireland's 2030 commitment on energy efficiency and renewable energy targets will be further detailed in the upcoming first National Energy and Climate Plan.

3.3.13 Energy generation and energy related activity in Cork is likely to change significantly over the coming years as the move to a low carbon economy increases. It will be necessary to update climate change, energy and renewable energy objectives in the Draft Cork CDP in order to accommodate this move to a low carbon economy.

3.4 Energy – Carbon Capture and Storage

3.4.1 Globally, Carbon Capture and Storage (CCS) is a technology chain that forms a third pillar, along with renewable energy and energy efficiency, to reduce CO2 emissions to the atmosphere. It works by removing CO2 from the pre- or post-combustion exhaust gas of power stations and other industrial processes and injecting it into underground geological reservoirs of porous rock for permanent storage.

3.4.2 To support the capture of CO2 from major energy users and its injection deep underground , the EU adopted Directive 2009/31/EC [42], which creates a stand-alone regulatory framework for the development of a CCS technology and industry.

3.4.3 Subject to commercial and technical considerations, CCS can facilitate decarbonisation of the electricity sector while allowing an appropriate level of thermal generation to balance intermittent renewable generation. CCS could also be applied to industrial processes with large point-source CO2 emissions, such as cement manufacture and, when twinned with bioenergy, has the potential ability to remove historic CO2 emissions from the atmosphere. CCS applied to hydrogen generation from hydrocarbons can create an emission-free fuel for industry, transport and heating, creating potential for large-scale emissions reductions from sectors that may be difficult to decarbonise otherwise.

3.4.4 Electricity storage is expected to play an important role in facilitating the deployment of intermittent renewable energy technologies like wind, solar PV and ocean energy. The EU's Energy Roadmap 2050 confirms that storage technologies remain critical, and that future integration of RES-E will depend on increased storage capacity. Electricity storage can be deployed in a number of circumstances in Ireland, including at grid-scale and at consumer level.

3.4.5 Although commercial realisation of CCS technology has been limited so far, it is recognised as a potential bridging technology that could support the transition. All geological storage options currently considered in Ireland are offshore.

3.4.6 An Assessment of the Potential for Geological Storage of Carbon Dioxide for the Island of Ireland prepared for the SEAI and others in 2008 identified storage potential in the depleted Kinsale Head natural gas field in the Celtic Sea Basin, with a calculated practical capacity of 330 million tonnes CO2.

3.5 Offshore Gas Storage

3.5.1 Gas Storage is an activity that allows for the storing of gas during periods of low demand (e.g. summer months) in large-scale storage reservoirs, then accessing that gas when demand increases (i.e. in winter). Gas storage in depleted fields is achieved by injecting gas into the reservoir. To maintain pressure within the reservoir a certain amount of gas ('cushion gas') is left.

3.5.2 There is limited gas storage capacity in Ireland despite the role it may play in enhancing security of supply and in electricity generation flexibility. Kinsale Energy operated the first, and to-date the only, offshore natural gas storage facility utilising the depleted Southwest Kinsale gas field. It was converted to an offshore storage facility with a storage capacity of 230 million cubic meters. However, the storage facility closed in 2016 and the last of the storage gas was withdrawn from the reservoir in March 2017.

3.5.3 Gas Network Ireland and EirGrid, with oversight by the (CRU) and DCCAE, are conducting a study into Ireland's resilience to a long term gas disruption, which includes the possible need for gas storage and LNG. This study will inform the formulation of future policy measures to maintain the resilience of Ireland's gas and electricity supply.

3.6 The role of Cork in National Energy Production (Cork Harbour / Whitegate)

3.6.1 Whitegate and Cork play a strategic role in Energy Provision in Ireland. The Energy Hub, located around Cork Harbour, supplies over 25% of Ireland's energy demands and is home to 20% of Ireland's electricity generating capacity.

3.6.2 Cork Harbour is the focal point for key industries such as the pharmaceutical industry and Ireland's only oil refinery at Whitegate. Whitegate -Ireland's Energy Park is the location of the State's only oil refinery, now operated by Irving, supplying almost 40% of transport and liquid heating fuels in Ireland. The refinery is considered a key national and regional asset in terms of developing bio-energy. The Government considers that the continued operation of the Whitegate refinery on a commercial basis is important from a strategic energy security perspective.

3.6.3 Whitegate is also the location of three power stations, state of the art energy efficient technology and gas storage/carbon storage capability. Aghada Generating Plant comprises two stations; the first 528MW was commissioned in 1980. In April 2010, the capacity of the station was increased from 528MW to 963MW when a new state of-the-art 435MW Combined Cycle Gas Turbine by Bord Gáis entered commercial operation. The gas-fired plant is one of the most efficient and cleanest plants in Europe.

Table 3.2: Fossil Fuel Electricity Power Generation in Co. Cork

Name Associated Node and Voltage	Type	MEC (MW)
Aghada 1, 2, 3, 4 Aghada 220KV	Gas	528
Aghada (Combined Cycle Gas Turbine) CCGT Longpoint 220KV	CCGT	435
Marina 110KV	Gas/DO	112.30
Total		**1,075.3**

Source: Eirgrid July 2012

3.6.4 Between fuel and energy production, Whitegate Energy Park has the potential to deliver 25% of the country's energy needs. It is a national asset in terms of developing bio-energy and is responsible for the production of a significant element of the national bio-fuel substitution target.

3.6.5 Many of the largest energy companies in Ireland are represented within the Energy Hub or in the wider Cork region. There is also a strong concentration of engineering service providers in support of these industries. The Energy Hub at Cork Harbour includes a zoned Special Policy Area of 388 ha (960 Acres) at Whitegate, prioritised for major, large-scale energy and renewable energy related development, including port related activities and bulk storage and processing activities. Smaller scale opportunities are also catered for with an additional site of just over 30 Ha zoned for small to medium scale energy related development such as Research & Development, transport and maintenance.

3.6.6 As well as providing energy and fuel that drives our economy, it is an important hub for energy related employment and associated economic activity. It also provides an opportunity to attract foreign direct investment in the broad energy sector.

3.6.7 The Onshore Terminal for the Kinsale Area Gas Fields and associated infrastructure, for many years the only producing natural gas fields in Ireland and with the potential to support further offshore developments, is located in Whitegate.

3.6.8 The Irish Maritime and Energy Resource Cluster (IMERC), Beaufort Laboratory, National Maritime College of Ireland (NMCI) and Marine Renewable Energy Ireland (MaREI) at Ringaskiddy – making Cork a world-class hub of marine renewables and offshore research and training.

3.6.9 The Port of Cork is the key seaport in the south of Ireland, offering six shipping models – lift-on lift-off, roll-on roll-off, liquid bulk, dry bulk, break bulk and cruise liners. The Port has significant advantages as a supply base to the energy industry. The concentration and tradition of activity, employment, innovation and research in the Energy Hub region is unique in Ireland.

4 Section 3 Renewable Energy in Cork

4.1 Introduction

4.1.1 This section provides a more detailed overview of the renewable energy sector and the extent of its development in County Cork.

4.2 Wind Energy

4.2.1 Renewable electricity is an Irish success story and an area of climate action where, as a country, we can claim to be a world leader through our successful deployment of wind energy. Wind Energy is and will continue to be a major contributor to Ireland's rapidly growing renewable energy sector. The International Energy Agency placed Ireland alongside Denmark as the two countries in the world at the most advanced stage of integrating wind power onto an electricity grid.

4.2.2 Most recent data from the Irish Wind Energy Association in 2019 indicates that the total capacity for the Republic of Ireland 26 counties is 3908 MW.

4.2.3 Eirgird has confirmed that sufficient wind farms have accepted offers to connect to the grid to meet the Government's 2020 target of 40% of our final gross consumption of electricity to come from renewable sources.

4.2.4 Wind is providing more than a quarter of Ireland's electricity generated, avoiding 2.7 million tonnes of CO2 emissions in 2017 and reducing the carbon intensity of our electricity system to its lowest level on record. Figures provided by EirGrid show that in 2018 wind energy met 29 per cent of electricity demand in the Irish Republic and 31 per cent in the North.

4.2.5 Turbine technology is continuously evolving, with significant increases in output and efficiency. The typical rated power output of an onshore wind turbine in Ireland in recent years is between 2.5 and 3MW. Turbines in recent developments, in Ireland, have been commonly of 100m in hub height, of up to 50m in blade length and can have a rated output of up to 3MW. However, larger turbines have been deployed in other countries and offshore.

Overview of Irelands total capacity of Wind generated and Total Capacity in County Cork.

4.2.6 Cork has been identified as one of the best located counties in Ireland in terms of on-shore winds. The wind farms were concentrated in three main locations in the county; south of Millstreet in the Derrynasaggart Mountains; east of Millstreet in the Boggeragh Mountains and South of Dunmanway.

4.2.7 At the end of 2019, there were 38 commissioned wind farms in County Cork with total output of 603 MW, which equates to approximately 15.4% of the Republic of Ireland's overall wind energy of 3908 MW. Further development proposals currently in the planning process could potentially deliver an additional wind energy capacity of 200MW. The number of wind farms in the county, and their output has increased by 100% since 2012. (See Appendices A, B and C for further details).

Table 4.1 Onshore Wind Energy in County Cork 2012 -2019		
Status	**Total Power/ Capacity MW 2012**	**Total Power/ Capacity MW 2016**
Commissioned	283 MW	603 MW
Permission Granted/ Pending	451 MW	200 MW

4.2.8 Chapter 9 of County Development Plan 2014 sets out the wind energy policy for the county. At this stage it is not envisaged that any significant changes are required to the policy. However, the department has indicated that revisions to the national wind energy guidelines are due to be published at the end of 2019. The provisions of the revised guidelines will be reflected in the Draft Plan / Amendments as appropriate.

4.3 Solar Energy

4.3.1 The National Renewable Energy Action Plan (NREAP) envisages that solar power will make a contribution to Irelands 2020 renewable electricity requirements.

4.3.2 The potential for capture of energy from the sun in County Cork is limited by the solar radiation available and the current cost of solar energy systems. The annual average global insolation (the amount of energy reaching the surface per square metre) values for Ireland range from 2.6 – 3.0 kWh/m2/Day with County Cork on the higher end on this scale / higher annual solar radiation.

4.3.3 To date, solar energy development in Cork has been limited to domestic installations for solar thermal. This is influenced by the fact that solar energy is the only major renewable energy technology that does not qualify for a REFIT in Ireland (can't give energy to the grid) . In the short – medium term solar energy is set to play an ever increasing role in the form, appearance and construction of buildings as the production of solar energy will focus on the use of solar thermal panels at both the domestic and commercial scale. The design and technologies around solar installations are evolving constantly and there has been research into their installation on roadways and in water bodies. It is expected that over the lifetime of the next CDP solar energy will by primarily ground mounted or roof mounted.

4.3.4 By the end of 2019, planning permission has been granted for 43 ground mounted large scale solar photovoltaic (PV) /solar farms in Cork County. To date none have been constructed. It is expected that development of these solar farms will proceed once the return for energy produced improves and cost of technology decreases. (See Appendix E for further details) .

Table 4.2: Application Status of Solar Farm Planning Applications in County Cork		
Application Status	**No. of solar farm applications**	**Total Power/ Capacity MW**
Commissioned		None to date
Granted	43	358 MW
Pending	4	50MW
Total Potential		408 MW

Solar Farm Guidelines

4.3.5 Ireland's solar energy source is considerable. It is clear that there are some environmental, social and economic constraints on the development of solar energy. Such constraints include factors such as landscape, ecology and affects to human habitation etc. These factors determine the practical capacity of the County to accommodate solar energy developments.

4.3.6 To date, there is no national planning policy guidance or regulations specifically relating to solar arrays, solar farms or solar energy etc., although the National Planning Framework does promote solar energy.

4.3.7 There are a number of guidance documents available in the UK. While they do not have a statutory basis in the Irish context, they are useful in informing the planning and environmental issues which arise in the absence of National Guidelines. The main guidance notes are Planning Practice Guidance for Renewables and Low Carbon Energy (DCLG 2013) and Planning Guidance for the development of large scale ground mounted Solar PV systems (BRE 2013). Both refer to the desirability of preserving good agricultural lands and set out issues and mitigations.

4.3.8 The current Cork County Development Plan 2014 supports the development of solar energy. The policy in relation to solar energy needs to be reviewed and updated to reflect developments in the sector. (See Appendix F for further details.)

4.4 Emerging Renewable Energy Technologies

Energy Storage

4.4.1 Renewable energy sources have vast potential to reduce dependency on fossil fuels and greenhouse gas emissions. Despite this many of the resources have intermittent or variable output, therefore if they are not harnessed the energy goes to waste. As a result there is an increasing need for energy storage when demand is low, to be utilised when demand is high.

4.4.2 The storage of energy generated is a significant consideration for producers of energy in cases where there is no grid connection. Future energy storage on a national and regional scale is an integral aspect of the industry and therefore must be considered in the overall context of planning frameworks for energy. Typical energy storage technologies include:

- Pumped hydroelectric energy storage (PHES) consists of two large reservoirs located at different elevations and a number of pump/ turbine units. During off-peak electrical

demand, water is pumped from the lower reservoir to the higher reservoir where it is stored until it is needed. Once required (i.e. during peak electrical production) the water in the upper reservoir is released through the turbines, which are connected to generators that produce electricity.

- Battery Energy storage can be integrated with renewable energy generation systems in either grid connected or stand alone applications. For grid connected systems, batteries add value to intermittent renewable sources by facilitating a better match between supply and demand. Other benefits of this method of energy storage include; power quality assurance, load levelling and integration of renewable energy generation plants. There are no emissions, solid wastes or effluent produced from these battery storage systems. There three important types of large-scale Battery Energy Storage BES. These are Lead-Acid (LA), Nickel-Cadmium (NiCd), Sodium-Sulphur (NaS). These operate in the same way as conventional batteries, except on a larger scale.

- Heat/Thermal Energy Storage (TES) involves storing energy in a thermal reservoir so that it can be recovered at a later time. This is a common means to store domestic hot water for later use.

- Electrical Storage heaters – can store electrical energy at night when electricity is available at lower cost, and release the heat during the day as required.

- Heat pumps - Pump heat from a low temperature source and release it at a higher temperature.

4.4.3 There has been a number of planning applications lodged with Cork County Council for battery storage compounds and facilities comprising of rechargeable battery units that connect into substations via underground cable. (see Appendix G for further details.)

4.4.4 The ESB have located a c.19 MW capacity battery storage facility located within a secured compound include up to 6 No. battery storage units inside the Aghada Generating Station.

4.4.5 A number of Battery Unit and Storage Units & Battery Storage modules associated with some of the Solar PV developments have also been lodged with Cork County Council and there is likely to be more development of this nature into the future . (see appendix F for more details).

Combined Heat and Power

4.4.6 Combined heat and power (CHP) is a technology that uses the energy produced in the combustion of fuel to produce both useful heat energy and electricity. CHP can refer to gas-fired CHP or biomass CHP. Biomass CHP is a form of renewable energy. In many scenarios, CHP increases the total amount of useful energy that is produced from a fuel when it is burned. However, the ratio of production of heat and electricity from a CHP unit is often fixed.

4.4.7 CHP is the generation of usable heat and power (usually electricity) in a single process and uses the heat produced in electricity generation rather than releasing it into the atmosphere.

CHP can provide a secure and efficient method of generating electricity and heat at the point of use. It is also referred to as cogeneration. Electricity generation from fossil fuels (and some renewable sources such as biomass) involves much of the input energy being lost as waste heat. This may be released to the atmosphere or river systems. CHP systems put this heat to useful purposes such as industrial processes or heating buildings. Therefore, CHP can provide a method of improving the efficiency of energy use leading to emissions reduction. To be classed as a renewable energy CHP plants must be fuelled by renewable sources.

4.4.8 Conventionally CHP applications have been divided into two broad categories, based on design output: Large scale (greater than or equal to 1MW), and, Small scale (less than 1MW). Small Scale CHP is particularly suitable for applications such as hotels, hospitals and leisure centres, where there is a steady demand for heat and power throughout the year. Large Scale CHP Systems are suitable for use in larger industrial and commercial processes such as chemical/pharmaceutical plants, breweries, third level educational institutes and food processing plants. The White Paper for Energy 2015 is supportive of CHP and it is stated that the Department of Communications, Climate Action and the Environment will develop a policy framework to encourage the development of CHP.

4.4.9 Combined Heat and Power pre-gate projects connected in County Cork include Grainger's sawmills CHP , Dairygold Mitchelstown (2), Charleville Goldenvale and Carbery milk products. (See Appendix G)

District heating (DH)

4.4.10 District Heating (DH) is heat distributed from a central boiler or CHP plant often using heated water. District Heating is a system for distributing heating comprising of a boiler which generates hot water and a network of connected underground pipes to distribute the hot water. The central boiler can be fired by fossil fuels, biomass or geothermal sources. Co-firing occurs where boiler can fire a mixture of fuel sources.

4.4.11 District Heat has had low uptake in Ireland due to the relatively mild climate and low density housing that make it impractical to pump warm water over long distances. DH systems are most suited to areas of high heat demand and are cheaper to integrate into new-build scenarios as opposed to retro-fit. It is more likely that successful DH schemes in Cork would be proposed in areas of higher density population and high heat demand from industry or commercial enterprises. District heating plants can provide higher efficiencies when the boiler provides both heat and electricity – this system is know as Combined Heat and Power (CHP). For reasons of economies of scale they are particularly suited to urban areas and zoned industrial lands in larger settlements.

4.5 Bioenergy, Hydro, and Offshore Energy (wind, wave, tidal)

Bioenergy

4.5.1 Bioenergy is the general term used to denote renewable energy derived from organic matter or biomass. Bioenergy sources include, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste. Biomass can be used to generate electricity, heat and transport fuels.

4.5.2 The bioenergy sector will play a key role in the delivery of our renewable heat (RES-H) and renewable transport targets (RES-T). The RE Directive categorises bioenergy into three sub-groups: biomass, bioliquids and biofuels. The development of this renewable is a key component of the Government's objectives under the White Paper which outlines a role for the deployment of bioenergy technologies in order to achieve the central policy objective of progressing towards a low carbon economy by 2030.

4.5.3 In addition, the National Bioenergy Action Plan sets out an integrated strategy for the collective delivery of the potential benefits of bioenergy resources across the agriculture, enterprise, transport, environment and energy sectors. The Renewable Energy Feed in Tariff scheme includes a fixed monetary support for both biomass from landfill and biomass from other sources. The SEAI provide a bioenergy mapping service for Ireland and details of the country's bio-energy resources are detailed at www.seai.ie.

4.5.4 Agriculture has a key role in economic growth in the country with greater emphasis on the role of agriculture wastes, such as slurries to energy processing along with the growth of energy crops in a developing bioenergy sector. The Department of Agriculture, Forestry and the Marine currently administers a Bioenergy Scheme that provides establishment grants to farmers to grow willow for the production of biomass suitable for use as a renewable source of energy. There is a role for the co-treatment of agricultural and biodegradable municipal waste in waste to energy processes. Cork is well placed to contribute strongly to the sustainable production of energy crops and from the recovery of energy from agricultural slurries.

4.5.5 A National Bioenergy Plan is currently being prepared by the DoCAE. It is recognised that meeting the demand for biomass from indigenous sources could deliver significant economic and employment benefits and it is expected that biomass will make a significant contribution to the heat and transport sectors.

4.5.6 The Council encourages the sustainable development of the bio-energy sector in the county due to the positive contribution it can make to the economy and to the achievement of renewable energy targets. There has been a number of recent Bioenergy, Anaerobic Digestion and Biomass planning applications lodged in Cork County Council.

4.5.7 Ireland's first Central Grid Injection (CGI) facility for delivering renewable gas into the national gas network is the Graze Gas project, in Mitchelstown, Co Cork. The Mitchelstown facility will be the first of 17 CGI facilities, and Graze Gas will eventually deliver 8% of Ireland's residential gas demand, equivalent to demand from 56,000 homes. It is also planned to fund development of over 70 Compressed Natural Gas (CNG) stations by Gas Networks Ireland, to allow operators of trucks and buses to switch from diesel to renewable gas.

4.5.8 The Mitchelstown location was chosen because of its huge potential for gas from Anaerobic Digestion (AD) plants on farms, fed by materials such as grass, food waste, slurry and other farm wastes. The project is due to be implemented between 2019 and 2022 and has been shortlisted for €8m funding from the government's Climate Action Fund.

4.5.9 Waste Management Policy in Ireland recognises the need to develop efficient ways to extract as much value as possible from waste in accordance with the requirements of the waste hierarchy and the opportunity for waste to be used as an indigenous energy resource. In this regard, three new regional waste management plans for the period 2015-2021 support the development of additional thermal recovery and biological treatment capacity within the State. The REFIT schemes, which support the generation of electricity and CHP technologies including waste-to-energy, anaerobic digestion and landfill gas, continue to support the use of waste as a renewable energy feedstock.

4.5.10 The Southern Region Waste Management Plan 2015-2021 outlines policy for the management of waste arising in the region. It aims to (a) grow the biological composting and anaerobic digestion, by supporting the development of new facilities; and (b) support the development of thermal recovery in the region which meets the need of the region and the State in reducing the export of residential wastes for treatment abroad. There are two main pathways for conversion of organic waste materials to energy, these being combustion/thermochemical, and biological.

4.5.11 Anaerobic Digestion (AD) uses bacteria to convert organic material such as agricultural, household and industrial residues and sewage sludge into bio-gas with high methane context in the absence of oxygen. The methane can be used to produce heat, electricity, a combination of the two or a transport fuel, thereby contributing to renewable energy targets across the three main sectors.

4.5.12 The process of Anaerobic Digestion (AD) involves the breakdown of organic matter by bacteria and enzymes in an oxygen-free environment. This can occur in bogs, landfills, on the bottom of lakes, in stomachs of animals such as cattle or in purpose built vessels. The end product of this process is biogas.

4.5.13 Anaerobic Digestion plants can vary in scale from small schemes treating the waste from an individual farm through medium-sized centralised facilities dealing with wastes from several farms, (potentially supplemented by crops such as maize grown specifically to feed the digester), to sizeable industrial AD plant handling large quantities of municipal solid waste. In the case of small plants it is likely that the plant can be accommodate within the vicinity of existing farm buildings. Some forms of biomass produce digestate and other end products which must be disposed of. Proposals for such uses will be required to specify suitable outlets

for these residues e.g. land banks for landspreading, as part of a planning application.

4.5.14 Anaerobic Digestion WWTP in Cork County are located at Little Island and Mitchelstown.

4.5.15 Bioliquids may be defined as the "liquid fuel for energy purposes other than for transport, including electricity and heating and cooling, produced from biomass". Bioliquid sources include vegetable oils (rapeseed, soya and palm), animal fats and used cooking oils. The liquids may be used to produce heating, cooling and electrical energy.

4.5.16 Biofuels may be defined as the "liquid or gaseous fuel for transport produced from biomass". A number of conversion techniques are used to produce biodiesel, bioethanol and biomethane. The main means of supporting renewables at a European Union (EU) Level is through the Directive on the promotion of the use of biofuels or other renewable fuels for transport (2003/30/EC), also referred to as the Biofuels Directive.

4.5.17 Landfill Gas/Waste- Anaerobic digestion of the organic component of waste occurs naturally, and more slowly than in aerobic digestion, releasing landfill gas (which contains methane and carbon dioxide) into the atmosphere. Gas can be collected at landfill sites and then combusted to extract its energy value. Wells are inserted into the waste to collect the gas through a series of perforated pipes. A suction pump collects the gas, which is then cleaned and ready to be used as a source of energy. In addition to electrical power generation, landfill gas can also be used for combined heat and power (CHP), kiln firing and as a heating or vehicle fuel.

4.5.18 The CDP Review will have to consider how best to support and guide the Bioenergy Industry.

Hydropower

4.5.19 Cork also has a tradition of hydro schemes. Lee Stations comprise two hydro plants at Inniscarra and Carrigadrohid which were built between 1952 and 1957. This development involved the creation of two lakes in the Lee Valley which cover an area of 14km² and have a storage capacity of 45 million cubic meters. Inniscarra and Carrigadrohid generating stations have a combined capacity of 27MW and produce almost 80 million units of electricity a year.

4.5.20 Other hydro projects (pre-gate) in County Cork include Bandon Weir Coolfadda (0.079) connected to Bandon 100kv station and the Lee Road Hydro (0.265MW) connected at Trabeg 100kv station.

Offshore Renewable Energy - wind (fixed and floating), wave and tidal

4.5.21 Ireland has a landmass of around 90,000 square kilometres, but it also has a sea area around 10 times that size at 900,000 square kilometres. With one of the best offshore renewable energy (wind, wave and tidal) resources in the world, there is significant potential in utilising these resources to generate carbon free renewable electricity. The development of this offshore renewable energy resource is central to overall energy policy in Ireland.

4.5.22 The term offshore renewable energy covers a number of technology types and includes wind (fixed and floating), wave and tidal, all of which rely on harnessing the motion of wind or

water to generate energy. Of these technology types fixed offshore wind has reached the commercial stage, while floating wind, wave and tidal technology are still at the experimental stage globally.

4.5.23 The 2014 Offshore Renewable Energy Development Plan (OREDP) sets out the Government's policy for the sustainable development of our abundant offshore renewable energy resources. It found that 4,500 MW of offshore wind and 1,500MW of wave and tidal energy could be sustainably developed in Irish waters. The OREDP identifies policy actions and enablers that are key to the development of this sector. An interim review of the OREDP recently published by the DCCAE evaluates the progress to date and sets out 26 recommendations for the continued implementation of the OREDP's goals out to 2020. A full review of the OREDP will be completed in 2020.

4.5.24 Offshore renewable energy generation is relatively well developed across Western Europe with 90% of worldwide deployment happening primarily in the North Sea and is becoming increasingly attractive for investment as technologies evolve and financial viability improves. Some 5% of the UK's annual demand is now met by offshore wind development.

4.5.25 To date, Ireland has only one offshore fixed wind farm generating electricity in Irish waters. That installation consists of 6 bottom-fixed turbines located on the Arklow Bank (25 MW / 7 turbines erected), around 10 kilometres off the coast of Wicklow. Bottom fixed wind turbines are limited to relatively shallow waters.

4.5.26 Floating offshore wind is still at the pre-commercial stage. It involves a wind turbine supported by a floating structure which is anchored to the seabed by one or more mooring cables. Floating wind has the potential to be deployed in deeper waters and as such could have potential for development off the south and west coasts of Ireland. A number of pilot projects are underway across Europe.

4.5.27 Between 2014 and 2017 capital funding of €17.7 million was allocated by the DCCAE under the OREDP for research and development of offshore renewable energy technology, with a further €4.5 million allocated in 2018. Government funding supports Ireland's commitment to world class test facilities and infrastructure including the Lir National Ocean Test Facility in Cork, the quarter scale Galway Bay Marine Renewable Energy test site and the full-scale Atlantic Marine Energy Test Site (AMETS), off the coast of Mayo. It also supports the Prototype Development Fund, operated by the SEAI, and provides grant aid to support developers in bringing their ocean energy devices from prototype to full-scale commercial viability.

4.5.28 The development of the offshore renewable energy sector in Ireland cuts across a wide range of sectors from consenting, licensing and infrastructure, to energy markets and international cooperation on renewable energy. A range of State bodies and activities will interact with the sustainable development of offshore renewables.

4.5.29 In addition, the provision of a robust consenting regime, investment and development of the electricity grid and investment in port facilities are particularly pertinent. Legislative proposals are being drafted to update the Foreshore Act 1933 and to address the absence of a

regulatory framework to regulate offshore renewable energy developments beyond the limits of the foreshore (12 nautical miles). The Maritime Area and Foreshore (Amendment) Bill will also provide a coherent mechanism to facilitate and manage development in the exclusive economic zone (EEZ) and on the continental shelf, including for the first time, a comprehensive regime for the regulation of Offshore Renewable Energy. This will be an important foundation for investment in the offshore renewable energy sector.

4.5.30 Investment in the electricity grid will be required to reinforce the onshore grid, ensuring that the overall power system is capable of handling potentially large volumes of variable renewable offshore generation.

4.5.31 Offshore wind development may not take place on any significant scale in the short term, but given its potential and rapidly advancing technologies, it must form part of the context for discussions on how much electricity should be generated from onshore renewables in the medium to long term.

4.5.32 The development of offshore wind energy will present a number of challenges and environmental constraints which will need to be considered. Issues will arise in relation to environmental impacts, shipping lanes and recreation and water sports. A number of issues relating to offshore wind development include Landscape and Visual Impact, effect on soils, marine habitats, flora and fauna, infrastructure capacity at harbours and capacity of local roads to cater for construction and decommissioning. At present Cork Harbour could accommodate the transport and deployment of wind energy devices.

4.5.33 It is suggested that the plan should generally support the facilitation of offshore wind energy developments in appropriate locations and scales and with appropriate onshore support infrastructure, including landing stations for land-sea connections, subject to relevant policy, legislation, environmental, landscape, amenity, seascape and technical considerations.

4.5.34 The Climate Action Plan proposes to deliver the connection of at least 3.5 GW of offshore wind, based on competitive auctions, to the grid by 2030. Given that we currently have only 25MW of installed capacity from offshore wind, delivering 3.5 GW by 2030 will be very challenging. On the positive side there are a number of large scale offshore wind farms in the development stage, particularly along Ireland's east coast. In order to stand any chance of realising this opportunity in the medium term it is imperative that the Marine Planning and development Management Bill and supporting secondary legislation is enacted as soon as possible.

Offshore Wind Farm Cork

4.5.35 DP Energy Ireland (DPEI) has plans to develop the largest wind energy project in Ireland off the Cork coast. It is intends to undertake a site investigation to assess the proposed Inis Ealga site and associated seabed. The proposed offshore floating wind farm area will be a minimum of 9.9km from shore and will have a potential output of 720 MW when fully up and running. There are four sites making up Inis Ealga - the smallest of which is 48.7 square kilometres, with the largest area 354 square kilometres. DPEI has applied for an Investigative Foreshore

Licence for Offshore Renewable Energy. The application area is located approximately 16.8km from the Ballycotton Gas Field, and 1.5km from the Helvick field

Ocean Energy – Tidal .

4.5.36 Ocean Energy refers to electricity extracted from the waves and tides (tidal current or tidal barrrage). The tidal barrages are usually located across a tidal inlet, trap the water at high tide and then control the release of the water through turbines. Tidal streams works on the premises that the tide flows and turns stationary turbines positioned under the water using inflow and outflows. Turbines can be positioned parallel or perpendicular to the current flow submerged in water so that they are not seen or heard. Ocean energy has a number of constraints including the following; suitable sites, physical engineering challenges, capital investment, navigation shipping lanes, aquaculture and fishing, designated habitats and ecosystems and access to the grid.

4.5.37 Due to the nature of tidal streams, tidal energy extraction is reliable and predictable. The two main types of tidal devices are tidal barrage systems and tidal stream flow turbines. Tidal stream flow turbines are located beneath the ocean surface and operate on the same principle as wind turbines but as water is a great deal denser than air, tidal turbines are far more efficient than wind turbines.

Ocean Energy – Wave.

4.5.38 Wave energy refers to the kinetic energy stored in the ocean's surface. Waves are created from the movement of wind over the ocean surface. The kinetic energy contained in waves can be extracted and converted into electricity.

4.5.39 Ireland has a national target of installing 500MW of ocean energy capacity by 2020. The SEAI/ Marine Institute Wave Energy Atlas indicate that the west coast of Ireland has considerable resources in relation to tidal and wave energy.

4.5.40 The average wave height off the coast of Ireland is 2.5 to 3 metres and the power generated is a function of the wave height, length, speed and water density. The mean overall power available in deep water (100m) has been estimated at about 25GW, of which 12 GW could be convertible into electricity.

4.5.41 Wave energy devices are at an early stage of development and there are no wave energy devices supplying electricity to the transmission network in Ireland. A test site was established in Galway Bay in 2006 which is being used to test prototype wave energy devices. Another test site is currently being developed off Belmullet in Co. Mayo to test both devices and grid connection.

4.5.42 There are a number of constraints associated with wave energy development which include; commercial viability, physical engineering challenges, high capital investment requirements, navigation shipping lanes, aquaculture and fishing sites, designated protected habitats and ecosystems and access to the grid. The technology required to harness this resource is still being developed in Ireland with a number of different prototype devices for the capture of wave energy developed.

4.5.43 Europe leads globally with more ocean energy technologies developed and patented than anywhere else, while latest forecasts suggest that by 2050 ocean energy will meet the daily electricity needs of 76 million European households.

4.5.44 Ireland's ocean resources are crucial to delivering on the target of generating 70 per cent of electricity in the State from renewable energy by 2030. The Government's climate action plan estimates there is long-term potential to generate 70GW of power from ocean energy (which comprises wind – including floating turbines – wave and tidal) across 100km of the Irish coastline.

4.5.45 To date, SEAI has awarded more than €20 million to 125 projects relating to ocean energy, as well as providing supports through EU co-funded projects. Wave energy was particularly suitable to Ireland but the technology was "still slow in development". That said, a prototype developed by the SEAI, the US Department of Energy and Ocean Energy Buoy in Cork was about to be tested in Hawaii before being moved to Ireland for further testing. The platform can generate 0.5 megawatts of electricity at present; enough to power 500 homes.

Marine Planning and Development Management Bill (MPDM)

4.5.46 The General Scheme1 of the Marine Planning and Development Management Bill (MPDM) was published in August 2019 by the Department of Housing, Planning & Local Government. The MPDM represents a significant change in how the marine planning system in Ireland will be managed and developed. It is part of an ambitious suite of reforms which will modernise and streamline the process for approving maritime infrastructure projects, including offshore renewable energy.

4.5.47 It has long been recognised that the existing system for approving maritime infrastructure projects under the Foreshore Acts 1933-2011 is outdated and no longer fit for purpose. A 2012 Government report "Harnessing our Ocean's Wealth" identified the need for an overarching national marine spatial plan underpinned by an efficient planning and licensing system. A previous attempt was made to reform the law in this area under the proposed Maritime Area and Foreshore Amendment Bill (MAFA) which was introduced in 2013.

4.5.48 Much of the reform in this area is being driven by the European Maritime Spatial Planning Directive (Directive 2014/89/EU) which sets 31 March 2021 as the date by which member states must have in place a Marine Spatial Plan (MSP) for their territorial seas.

4.5.49 The Department of Housing, Planning and Local Government has recently published a Draft National Marine Planning Framework for public consultation. NMPF is a national plan for Ireland's maritime area, setting out, over a 20 year horizon, how we want to use, protect and enjoy our seas and includes various proposalsin relation to energy.

4.5.50 In addition to the draft NMPF, the Government has put forward a series of proposed reforms in this area as set out in the: Climate Action Plan 2019, Draft Marine Planning Policy Statement, Draft MPDM Bill and the Proposed Maritime Jurisdiction Bill.

5 Infrastructure and Supports

5.1 Introduction

5.1.1 This section examines the infrastructure and renewable electricity support schemes that support energy and renewable energy in Cork. It is recognised in the White Paper for Energy 2015 that ongoing market support is needed to deliver investment in meet 2020 targets.

5.2 National Electrical Infrastructure

5.2.1 The national grid is a nationwide electricity transmission network that consists of both overhead and underground high-voltage power cables. EirGrid plc is the licensed Transmission System Operator (TSO) in Ireland and is responsible for connecting both generators, and large electricity users to the transmission system. ESB Networks as the Distribution System Operator (DSO) is responsible for connecting typically smaller generation and users of electricity. Both EirGrid and ESB Networks are licensed by the Commission for Energy Regulation (CER). The Grid25 Implementation Programme 2011–2016 provides the framework to build a more cost-effective and efficient system to cater for the shift towards the integration of increasing amounts of renewable generation over time.

5.2.2 In March 2015, EirGrid published a Draft Strategy on Ireland's Grid Development Strategy. Central to the draft strategy is the provision of a strong and reliable electricity supply to the Southern region. This will ensure that the region is equipped for investments by both energy intensive indigenous and multinational companies seeking to locate or expand in the region.

5.2.3 Cork has a very strong electrical grid and substation network and this network will be instrumental in supporting the development of the renewable energy industry in the county.

5.3 National Gas Infrastructure

5.3.1 Bord Gáis Networks develop, operate and maintain the natural gas transmission and distribution networks in Ireland and provide gas transportation services to suppliers and shippers, including Bord Gáis Energy. Cork is supplied by the natural gas network (Bord Gáis Networks) in the towns.

5.3.2 At the moment there is no biomethane injection into the Irish natural gas grid. However, the CER is planning to issue a consultation on biogas, with regard to the technical and regulatory aspects.

5.4 Transport and Electric Vehicles

Biofuels and Electric Vehicles (EVs)

5.4.1 The Climate Action Plan indicates that transport accounted for 19.8% of Ireland's greenhouse gases in 2017. It also notes that 96.7% of our transport energy demand in 2017 was served by fossil fuels. The most efficient roadmap for Ireland would include a 45-50% reduction in transport emissions by 2030, with substantial acceleration in the second half of the decade. While existing policy has banned the sale of new non-zero emissions small vehicles by 2030, the forecast envisages on average only a little over 25% of new vehicles sold will be EVs over the 12 intervening years. This needs to be pushed up closer to 40%.

5.4.2 The 2030 decarbonisation ambition in the Climate Action Plan will require transport to step-up a level. This means a significant ramp-up in EVs from their current numbers (circa 10,000), increased penetration of cleaner, alternative fuels, and an irreversible shift to low-emission mobility. These changes will need to be underpinned by policy tools such as vehicle and fuel taxation measures, and a strong carbon tax trajectory.

5.4.3 The Climate Action Plan proposes the following targets in Transport to meet the required level of emissions reduction, by 2030;

- Reduce CO2 eq. emissions from the sector by 45–50% relative to 2030 pre-NDP projections.
- Increase the number of EVs to 936,000, comprised of: 840,000 passenger EVs, 95,000 electric vans and trucks, 1,200 electric buses.
- Build the EV charging network to support the growth of EVs at the rate required, and develop our fast-charging infrastructure to stay ahead of demand.
- Require at least one recharging point in new non-residential buildings with more than 10 parking spaces.
- Raise the blend proportion of biofuels in road transport to 10% in petrol and 12% in diesel.

5.4.4 The Climate Action Plan notes that the transition from petrol and diesel cars to electric vehicles will make a big impact on our emissions. It will also improve our air quality. We are already seeing a big increase in the number of electric vehicles being sold. By the middle of the 2020s EVs will reach Total Cost of Ownership parity with diesel and petrol engines. This means that when a consumer factors in both up-front cost and on-going running cost, it will be as cheap to have an EV as a petrol/diesel vehicle. Measures include:

- Continue supporting the expansion of the EV charging network as well as the refuelling network for alternatively fuelled vehicles to address freight emissions.
- Deliver charging infrastructure under the Climate Action Fund, to include over 90 highpowered chargers at key locations on the national road network, installation of 50 new fast chargers, and replacement of over 250 standard chargers.

- Require new non-residential buildings with more than 10 parking spaces to have at least one recharging point installed by 1 January 2025.
- Require the installation of a minimum number of recharging points for all existing non residential buildings with more than 20 parking spaces by 1 January 2025 at the latest, and review the level of provision to ensure it is ahead of demand.
- Work with the motor sector and retailers to rapidly expand the charging network on garage forecourts.
- Frontload public investment to drive consumer confidence in the availability and reliability of public charging infrastructure, and set a strategy for EV charging stations with a defined target to stay ahead of demand, coupled with clear planning rules that facilitate installation and increase the obligation over time.

5.4.5 Ireland's settlement patterns and low population density limit cost effective options for decreasing transport energy consumption. However, recent research from SEAI provides strong evidence that smart driving can reduce energy use in the sector. It involves adopting a driving style that reduces fuel consumption, GHG emissions, noise pollution and accident rates. These smart, smooth and safe driving techniques lead to an average fuel saving of 5-10%. Such behavioural change will be an important element in improving transport energy efficiency and Government has identified the potential for a national smart driving programme to deliver energy savings.

5.4.6 It is an objective of Cork County Council to facilitate the installation of charging points for Electric Vehicles at suitable public locations throughout County Cork in line with the Climate Action Plan proposals. There is an opportunity for the CDP to integrate EV charge policy with public realm considerations.

5.5 Electricity Interconnection and Transmission System

5.5.1 Ireland's peripheral location at the edge of mainland Europe means that it is naturally isolated from the wider European electricity grid. This fact, combined with the small size of the market, leads to risks to security of supply and reduced competition. Steps have been taken to address this isolation by building interconnection infrastructure that links Ireland to larger cross border markets and brings direct benefits to Irish consumers through lower energy costs.

5.5.2 Ireland currently has trans-marine electricity interconnection with the UK (the East West Interconnector linking Ireland to Wales) - ie the new 500MW HVDC connection has been recently commissioned between Ireland and Britain – the East West Interconnector. Further trans-marine interconnection between Ireland and Britain and also with France is currently proposed.

5.5.3 DCCAE feel that it is important to put in place solid national policy in order to give policy certainty to developers and to the Irish public. The 2018 National Policy Statement on Electricity Interconnection sets out Government policy on the development of electricity interconnection between Ireland and neighbouring countries. This policy statement builds on

various commentary and commitments in the Government's Energy White Paper.

5.5.4 Interconnection is viewed as critical infrastructure by the European Union. The second pillar of the EU's Energy Union Strategy is the delivery of a fully-integrated Internal Energy Market using interconnectors to allow energy to flow freely across the EU.

5.5.5 European policy is therefore explicit in its support of electricity interconnection between Member States and interconnection projects are facilitated under the EU Projects of Common Interest (PCI) process. PCIs are key infrastructure projects that link the energy systems of EU countries. They are intended to help the EU achieve its energy policy and climate objectives.

5.5.6 In its 2014 European Energy Security Strategy the European Commission committed to working with Member States to ensure speedy implementation of PCIs and other measures to meet the target of achieving interconnection of at least 10% of installed electricity production capacity for all Member States by 2020 and 15% by 2030. Ireland's interconnection level is currently at 7.4% as reported by the European Commission.

5.5.7 Two existing electricity interconnector project proposals – Celtic linking Ireland with France and Greenlink linking Ireland with Wales – will, if constructed, deliver important electricity connectedness with neighbouring countries. Both projects have been recently selected as PCI's . Such connectivity has a range of benefits not least its positive impact on Ireland's security of electricity supply.

5.5.8 If the proposed interconnectors proceed, they have the potential to provide reliable high-capacity electricity links between Ireland and France and Ireland and the UK that would have significant benefits for the people of Ireland. Access to the EU and UK electricity markets would lead not just to expected increased competition and lower prices in Ireland, but it would also improve security of electricity supply and facilitate increased capacity for renewable energy here via export access to these markets.

5.5.9 Both projects have published details of marine route investigations undertaken within associated feasibility studies. CRU is responsible for awarding the licences to the project promoters to transport electricity and maintain an interconnector.

5.5.10 CRU has also recently issued an information note and direction to Eirgrid – Ireland's Transmission System Operator - to progress to the next stage grid applications from interconnectors with PCI status.

5.5.11 Recent scenario planning by EirGrid (EirGrid's Tomorrow's Energy Scenarios 2017) estimates that Ireland requires between 500 and 1950 MW of interconnection by 2030 in order to deliver on its renewable energy ambitions.

5.5.12 The greater the scale of RES ambition and demand for renewable energy the higher the level of interconnection needed. Therefore the scale of increased interconnection needs to dovetail with government policy on decarbonisation and renewable energy targets being developed as part of the National Energy and Climate Plan.

5.6 Supporting Infrastructure

Ports, Harbour/Piers

5.6.1 The coastline of County Cork extends for 1,118km, which is 20% of that of the country. This coastline is home to 65% of the County's populations who live on or adjacent to the coast. The coastline also contains centres of important economic activity of national significance such as Cork Harbour, Whitegate Oil Refinery, Bantry Bay, Whiddy Island Oil Trans-shipment Terminal and Castletownbere fisheries port. The coastal region supports many harbours, beaches and biodiversity areas of national importance. Cork Harbour is the most significant port outside of Dublin and has an important role in the leisure, recreation and tourism sectors in County Cork. This infrastructure will support the development and future maintenance of our offshore energy resource.

5.7 Other

Auto-generation and Micro-generation

5.7.1 Auto-generation of energy – the key determinant of an auto generator is that the energy is produced on site for use on site. An auto-generator may be of a micro-generator scale or may be a much greater energy installation to contribute to the energy needs of a large commercial enterprise in an urban or rural area. Typical technologies for the auto-production of energy include: Natural gas fuelled CHP, Biomass CHP, Anaerobic digestion CHP, Small hydroelectric installation, Wind turbine, Solar photovoltaic arrays. Investment in auto-generators of renewable energy has been limited in Cork at both the domestic and commercial level. However, four turbines have been constructed and are operational serving the pharmaceutical industries on Cork Harbour.

5.7.2 In addition to date, there are a limited number of autoproducer installations using biomass, solar and wind for the production of energy for use on site. It is evident that the lack of REFITT for autoproducers and micro-generators in Ireland, especially when compared to the Northern Ireland Renewables Obligation Scheme feed in tariffs, has been a limiting factor to development.

Micro Generation:

5.7.3 There are numerous definitions of micro generation. ESB classification of micro generation is classified as grid connected electricity generation up to a maximum of 11kW when connected to three phase portion of a distribution grid (400 v). The vast majority of domestic and agricultural customers are connected to the single phase portion of the distribution grid (230v) and for these customers to be classified as micro-generators the maximum technical rating permitted is 5.75kW.

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

5.7.5 It is acknowledged that on-site / decentralised heat and electrical micro generation can have a significant impact on reducing carbon emissions from dwellings and businesses. Micro renewable technologies include: Solar photovoltaic panels (PV); Small free standing wind turbines; Micro scale CHP plants; Hydro electric schemes; Solar hot water panels; Micro scale biomass heating and wood burning stoves; Ground source heat pumps; Air source heat pumps.

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

5.7.7 Micro generation of heat and electricity is exempt from the requirement for planning permission under certain conditions. Domestic Renewable Energy Installations – SI 83 – 2007, Planning and Development Regulations 2007; Commercial – SI 235 – 2008, Planning and Development Regulations 2008

5.7.8 CCC will actively promote the use of micro-renewable technologies throughout the County for all redevelopment / extension / expansion projects.

Community Investment and Community Benefit

5.7.9 Renewable energy developments can produce significant environmental, economic and social benefits. They also produce impacts, particularly on the local communities within which they are located. The starting point of any discussion on community benefit is that there is no entitlement - either to development of a renewable energy project or to gain financially from someone else doing so in a particular locality.

5.7.10 There is no national policy framework in relation to securing and/or enforcing the provision for financial benefit to a community from renewable energy developments. Cork County Council has a duty to safeguard the impartiality of the planning process having regard to National Planning Guidelines, Regional Planning Guidelines, the County Development Plan, and the proper planning and sustainable development of the area. Community benefit is not a material consideration of the planning assessment and decision at Local Authority level.

5.7.11 However, in accordance with the Planning and Development (Strategic Infrastructure) Act 2006, An Bord Pleanála may attach a condition requiring the construction or financing of a facility or service in the area in which the renewable energy project would be situated that the Board considers would constitute a substantial gain to the community.

5.7.12 National guidance and statutorily based regulation on the matter is required. As part of a targeted review of the 2006 Guidelines, the DHPCLG published proposed draft revisions to the sound or noise, visual amenity setback distance, community obligation/ community dividend and grid connections plus shadow flicker aspects of the 2006 Guidelines for public consultation in December 2013. These guidelines are due at the end of 2019 and the intention of the government is to provide National guidance and statutorily based regulation on community obligation/community dividend as well as other revisions.

5.7.13 As part of the review of the County Development Plan the Council can consider how best to support community investment in renewable energy in Cork. The White Paper for Energy 2015 places emphasis on the need for people to be supported in a change 'From Passive Consumers to Active Citizens', and outlines that community-based energy initiatives will emerge to facilitate and drive the energy transition. In this respect, the Council supports the principle of a circular economy with local energy, created and used in the local economy.

5.7.14 Community investment is encouraged at the design and conception stage for all renewable energy installations, and particularly in large scale proposals. The Council will seek to support communities in identifying the potential for local renewable energy as an investment, employment and socio-economic opportunity.

5.7.15 There are a number of ways that local communities can invest in and/or benefit from energy development;

- Community Ownership/Investment - where the community either own a renewable energy development in full or own a percentage of the investment.
- Community Benefits Scheme - the establishment of a community benefits agreement (between the developer and the local community), with funds contributed annually by the developer.

6 Section 6: Key Issues for the Plan Review

6.1.1 The County Development Plan needs to continue to support investment in sustainable energy production in Cork to meet local and national needs and to support jobs and investment. In addition to meeting its own energy needs, Cork will benefit through its contribution to national renewable targets, in a renewable energy framework that will also ensure the protection of local environmental assets.

6.1.2 Key issues for review to consider are as follows:

- The need to update policies and objective of the Plan as appropriate to reflect recent national policies, including the actions and targets in the Climate Action Plan and the National Energy and Climate Plan (NECP), to support the transitioning to a low carbon economy.
- How the plan can support appropriately located renewable energy developments and energy efficiency generally in all sectors of the economy, whilst balancing the need for new development with the protection of the environmental, cultural and heritage assets of the county.
- The need to support improvements to the transmission network including electricity transmission grid, gas infrastructure, the storage and distribution network and international energy interconnection infrastructure (e.g. the Celtic Interconnector project between Ireland and France). The Plan also needs to safeguard strategic energy corridors from encroachment by other developments that could compromise the delivery of energy networks.
- How can the plan support the sustainable development of renewable energy generation and demand centres such as data centres, to spatially suitable locations to ensure efficient use of the existing transmission network.
- Need for more guidance /policies on a number of issues including:
    - Cork Wind Energy Strategy to be updated subsequent to revisions to the National Wind Energy Guidelines.
    - Incorporate policies and objectives, including locational guidance as appropriate, in relational to solar energy, bioenergy and battery storage.
    - Support the delivery of charging points for electric cars in new development.
- The importance of Cork Harbour and Whitegate Energy Hub will continue to be acknowledged in the CDP.
- Ensure that the strategic development requirements of ports of regional significance and smaller harbours are recognised.

Appendix A: County by County Wind Energy Installed Capacity from IWEA

Wind Energy Installed Capacity from IWEA by county		
	Ireland Counties	**ROI: Installed Capacity (MW)**
1.	Kerry	609
2.	Cork	603
3.	Donegal	408
4.	Tipperary	389
5.	Galway	326
6.	Limerick	199
7.	Wexford	179
8.	Roscommon	118
9.	Cavan	138
10.	Offaly	98
11.	Mayo	245
12.	Clare	152
13.	Wicklow	99
14.	Leitrim	69
15.	Waterford	60
16.	Kilkenny	52
17.	Sligo	74
18.	Monaghan	27
19.	Laois	21
20.	Louth	24
21.	Carlow	8
22.	Westmeath	0
23.	Dublin	1
24.	Kildare	0
25.	Meath	9
26.	Longford	0
Total MW		3908

Appendix B: List of Commissioned Wind Farms in County Cork

	Wind Farm Table	Generator Ref	Status	Installed Capacity (MW)	Connection Year	Company Name
1.	Currabwee Wind Farm	DG964	Operating	4.62	1999	Gaelforce Energy Ltd.
2.	Milane Hill Wind Farm	DG973	Operating	5.94	2000	RES Gen Ltd.
3.	Gneeves Wind Farm	DG947	Operating	9.35	2005	Brookfield Renewable
4.	Coomatallin Wind Farm	DG939	Operating	5.95	2005	SSE Renewables
5.	Kealkil Wind Farm (Curraglass)(1)	DG05	Operating	8.5	2006	Framore Ltd. Mukdar
6.	Kilvinane Wind Farm	DG16	Operating	4.5	2006	Kilvinane Wind Farm Ltd.
7.	Lahanaght Hill	DG21	Operating	4.25	2006	Lahanaght Wind Farm Ltd
8.	Taurbeg Wind Farm	DG26	Operating	26	2006	RES Gen Ltd.
9.	Coomacheo	TG18	Operating	41.4	2008	SSE Renewables
10.	Glanta Commons Wind Farm (Ballybane)	DG14	Operating	19.55	2008	Greencoat Renewables
11.	Curragh Wind Farm (Coomacheo Ext)	DG187	Operating	18.4	2009	SSE Renewables
12.	Ballybane 2 Wind Farm	DG48	Operating	8.4	2009	Greencoat Renewables
13.	Boggeragh (1)	TG29	Operating	57	2009	Enerco (Craydel Group)
14.	WEDcross Wind Farm (Lacka Cross (1))	DG226	Operating	4.5	2009	Wind Energy Direct
15.	Reenascreena Wind Farm	DG54	Operating	4.5	2010	Reenascreena Wind Farm ltd.
16.	Bawnmore (Burren/Carraignimma)	DG58	Operating	24	2011	Enerco (Craydel Group)
17.	Carraigcannon Wind Farm	DG19	Operating	20	2011	Carrigcannon Wind Farm Ltd
18.	Crocane Wind Farm	DG167	Operating	1.7	2011	Alpha Wind Energy
19.	Clydaghroe Wind Farm (Cummeennabuddoge)	DG174	Operating	4.99	2012	Clydraghroe Wind Farm Ltd
20.	Caherdowney Wind Farm	DG85	Operating (Energised)	10	2012	Neoen
21.	Garranereagh Wind Farm	DG133	Operating	9.2	2013	Greencoat Renewables
22.	Pluckanes Wind Farm	DG166	Operating (Energised)	0.85	2013	Kedco PLC
23.	Sigatoka Wind Farm	Unavailable	Operating	8.75	2013	Statkraft
24.	Knockacummer	TG24	Operating	105	2013	Greencoat

	Wind Farm Table	Generator Ref	Status	Installed Capacity (MW)	Connection Year	Company Name
			(Energised)			Renewables
25.	Wind Energy Project (Janssen)	DG997	Operating (Energised)	2	2014	Janssen Biologics
26.	GlaxoSmithKleine	Unavailable	Operating	3	2014	GlaxoSmithKleine
27.	DePuy 3MW Wind Turbine	DG1000	Operating (Energised)	2.5	2014	DePuy Ltd.
28.	Ballybane 2A	DG222B	Operating (Energised)	11.5	2015	Greencoat Renewables
29.	Killaveenoge Windfarm	DG121	Operating (Energised)	7.8	2016	Enerco (Craydel Group)
30.	Boggeragh 2 (Knockduff + Killavoy [DG200])	TG102	Operating	65.7	2016	Enerco (Craydel Group)
31.	Ballybane 2A (Extension)	DG222B	Operating (Energised)	1.55	2017	Greencoat Renewables
32.	Ballybane 3 Wind Farm	DG222A	Operating (Energised)	4.45	2017	Greencoat Renewables
33.	Castlepook (1)	TG31	Operating	33.1	2017	ESB Wind Developments
34.	Kilberehert Wind Farm	DG303	Operating	4.799	2017	Metro Energy Ltd.
35.	Killaveenoge Windfarm_2	DG75	Operating (Energised)	17.25	2017	Enerco (Craydel Group)
36.	Knocknatallig Wind Farm (Buttevant Windfarm)	DG224	Operating	18.3	2017	Buttevant Wind ltd. (DP Energy)
37.	Ballyhoura	TG31	Operating	19.2	2018	Brookfield Renewables
38.	Rathnacally Wind Farm (Freemount)	DG115	Operating	4.45	2018	NTR
				603 MW		

Note:

1. There are a large number of individual turbines granted in Cork County Council as autoproducers/ microgeneration serving factories eg Kepak in Watergrasshill and other serving agricultural developments with other individual turbines permitted serving individual dwellings. A couple of water turbines have also been permitted as microgenerators in County Cork with one serving Glenilen Farm.

Appendix C: List of Wind Farms Granted Permission by Cork County Council

	Wind Farm Table	Status	Potential Installed Capacity (MW)	Company Name
39.	Glentanemacelligot Windfarm Limited (12.5 MW) Brookfield RE(South of Taurbeg)	Granted	18	SWS Energy Glentanemacelligot Windfarm Limited
40.	Foiladaun WF Cordal Rockchapel	Granted	11.5	Four Seasons Energy Ltd/ or Kemar Limited
41.	Barraboy Windfarm, Barraboy,Goulacullin, Dunmanway	Granted	6.5	George O'Mahony DP Energy Ireland
42.	Dromleena Windfarm	Granted	9.9	Organic Power Limited
43.	Cleanrath Windfarm Ltd	Granted	23.5	Macroom Windfarm Ltd Enerco Energy
44.	Barnadivane	Granted	60	Barna Wind Energy Ltd
45.	Esk Windfarm Ltd,	Granted	24 MW	Barrboy Wind Limited
46.	Derreenacrinnig West, Drimoleague	Granted	5.95	
47.	Derragh Wind farm Framore Limited	Granted	13.8	Framore Limited Rathgaskig, near Ballingeary,
48.	Shehy More Windfarm Ltd Dunmanway	Granted		Energy Limited Keel
49.	Knockeenboy/ Cashloura Dunmanway	Granted	6	James O'Regan (5 landowners)
50.	Coolea	Granted	3	Sean Twomey
51.	Novartis, Ringaskiddy Cork Harbour	Granted	3	
52.	Charleville Foods Ardnageehy, Charleville	Granted	2	Charleville Foods plant
53.	Boolard Wind Farm Newtownshandrum Boolard,Dromina	Granted	5	Aerie Renewables Ltd.
54.	Youghal, Knocknagappagh	Granted	2	Browne Thomas
55.	Teddy Creedon, Milleeny	Granted	2	
	TOTAL		**200 MW approx.**	

Appendix D: List of Pending Wind farms

	Wind Farm Table	Status	Potential Installed Capacity (MW)	Company Name
56.	Slievereagh and Coomnaclohy, Ballyvourney 19/4972	Pending Due 19th Nov	7 Turbines and 70,000 sq.m solar voltaic array	Knocknamork Limited

Appendix E : Solar Farm Applications Lodged with Cork County Council 2014 -2019.

	Solar Farm	Address	Planning Reference	MW	Area	ABP Decision
	2014					
1.	Reeve Wave Ltd	Ballytrasna, Lissarda.	14/06644	0.7MW	1.77 ha	Granted CCC Granted ABP
	2015					
2.	Trainman Ltd	Knockglass & Kilberrihert, Coachford.	15/5424	5MW	11.19ha	Granted CCC Granted ABP
3.	Amerenco Solar Kilmoney Ltd	Curraleigh, Inniscarra.	15/06625	5MW	10.5ha	Granted CCC No Appeal
4.	Amerenco Solar Kilmoney Ltd	Shanagraigue, Carrigaline.	15/6675	5 MW	10.2ha	Granted CCC No Appeal
5.	Amerenco Solar Timoleague Ltd	Kilshinahan, Timoleague.	15/6968	5 MW	8.6ha	Granted CCC No Appeal
6.	Amerenco Solar Mallow Ltd	Gortnagross,Mallow.	15/7003	5 MW	15.38ha	Granted CCC No Appeal
	2016					
7.	Green Mills Energy Ltd.	Farrangalway, Knocknahilan, Mullandunny, Kinsale	16/4204	5 MW	12.97 ha	Granted CCC No Appeal
8.	Amarenco Solar Whitechurch Ltd	Dromgarriff South Whitechurch	16/4185	5 MW	10.24 ha	Granted CCC No Appeal
9.	Amarenco Solar Rathcormac Ltd	Corrin/Kill-Saint-Anne-North, Castlelyons, Fermoy	16/4570	5 MW	8.7 ha	Granted CCC Granted ABP
10.	Amarenco Solar Kanturk Ltd	Dromalour, Coolclogh,Kanturk	16/4601	5 MW	12.23 ha	Granted CCC No Appeal
11.	IQ Solar Ltd	Crocane,Cloyne	16/05269	5.7MW	13.95ha	Granted CCC No Appeal
12.	Highfield Solar Ltd	Curraduff, Glenlara, Newmarket	16/7215	4MW	8 ha	Refused CCC Granted ABP
13.	Highfield Solar Ltd	Kilcummer Upper Castletownroche	16/6410	10 MW	22 ha	Granted CCC No Appeal
14.	Premier Solar Ltd	Derrclough Upper and Lahanaght Drinagh	16/441	5 MW	14.10ha	Granted CCC No appeal.
15.	Amarenco Solar Ballinvarrig Ltd	Ballinvarrig East & Deerpark, Castlelyons	16/5414 16/4290 original refused on site	5 MW	8.86 ha	Granted CCC Granted ABP
16.	Amarenco Solar Beal na mBlath Ltd	Currabeha, Crookstown,	16/4783	5MW	8.5 ha	Granted CCC No appeal
17.	Reeve Wave Ltd (No.39	Carragraigue, Rathcool	16/05455	4.77MW	15.28ha	Granted CCC **No appeal**

	Solar Farm	Address	Planning Reference	MW	Area	ABP Decision
	extension to this plg app)					
18.	Temporis Ltd	Tead More, Ballynacorra,Midleton	166302	4MW	10.2 ha	Granted CCC **No appeal**
	2017					
19.	Temporis Ltd	Barryscourt Carrigtwohill	17/04596	5 MW	20.5ha	Granted CCC **No appeal**
20.	Amarenco Solar	Derrigra West, Balineen	17/724	5MW	10.18 ha	Granted CCC **No appeal**
21.	Terra Solar II Ltd	Ballinrea, Carrigaline	17/6784	20MW	40 ha	Granted CCC **Granted ABP**
22.	Amarenco Solar Ireland Ltd	Carrigaline East, Church Road, Carrigaline	17/6351	10MW	25.8 ha	Granted CCC **No appeal**
23.	IGP Solar 8 Ltd	Fiddane, Ballyhea	17/5799	30.6MW	67.8 ha	Granted CCC **Granted ABP**
24.	Terra Solar II Ltd	Ballyspillane West Midelton	17/5498	14.1MW	27.53 ha	Granted CCC **Granted ABP**
25.	Grianan Solar 002 Ltd	Knocknacarracoosh Meenskena, Cullen	17/4308	18 MW	32.2ha	Granted CCC **No appeal**
26.	Premier Solar Ltd	Callatrim Bandon	17/4098	5MW	12.74ha	Granted CCC **No appeal**
27.	BNRG Neoen Holdings Ltd.	Townlands of Finnis and Mishells	17/06111	12.5MW	40 ha	Granted CCC **Granted ABP**
28.	Lightsource Renewables Ireland	Knockraha, Leamlara	17/05370	25.7MW	48.4ha	Granted CCC **Granted ABP**
29.	Reeve Wave Ltd	Coumaclovane Coolea,Macroom	17/04167	5.9MW	13.6ha	Granted CCC **No appeal**
30.	Power Capital RE	Youghal Mudlands Youghal	17/05245	5MW.	5.44ha	Granted CCC **No appeal**
31.	Meridiem Renewables Mohera Ltd	Mohera, Castlelyons Fermoy	17/04369	5MW	11.0ha	Granted CCC **Granted ABP**
32.	Power Capital RE Ltd	Teadies Upper Enniskeane	17/6441	5MW	6.6ha	Granted CCC **No appeal**
33.	Meadhill Farm	Meadstown Kildorrery	17/7043	0.5MW	0.854 ha	Granted CCC **No appeal**
34.	Temporis Ltd	Piercetown and Ballginnane Near Carrigaline	17/04039	5MW	12.4ha	Granted CCC **No appeal**
	2018					
35.	BNRG Neoen Holdings Ltd.	Ballyduff Near Cloyne	18/4258	7MW	15.90 ha	Granted CCC **No appeal**
36.	Terra Solar II	Kilnaglory, South of Ballincollig	18/05760	14MW	19.9ha	Granted CCC **Granted ABP** (1st party)
37.	Amarenco Solar	Beanhill South	18/00406	5MW	11.7 ha	Granted CCC

	Solar Farm	Address	Planning Reference	MW	Area	ABP Decision
	Clonakilty Ltd	Clonakilty				**No appeal**
38.	Amarenco Solar Kill Saint Anne Ltd, Castlelyons	Kill Saint Anne, Castlelyons	18/6010 (adjoins 16/4570)	5MW	8.83ha	Granted CCC **Granted ABP**
39.	Reeve Wave Limited An Extension to no.17 16/5455.	Carragraigue Inchamay North and Crinnaloo South Near Rathcool	18/06562	8MW	16 ha	Granted CCC **No appeal**
40.	Terra Solar II Ltd	Lysaghtstown. North of Carrightwohill and NW of Midelton.	18/6769 This project will connect with 19/05729	29.95 MW	56.7ha	Granted CCC **No appeal**
41.	Engie Developments (Ireland) Ltd	Berrings Co. Cork	18/07280	12.6 MW	21.3 ha	Granted CCC **No appeal**
42.	Amarenco Solar, Midleton		18/07164	10 MW	19.72ha	Granted CCC **No appeal**
	2019					
43.	Amarenco Solar, Cloyne.	Demesne Cloyne 1km east of Cloyne Village	19/04869	5 MW	11.25 ha	Granted CCC **Granted ABP**
				358.02 MW		

- 16/4290 refused. Repeat application on site then see No.15.
- No. 39 is an extension of No.17 (counted as individual solar farm given the scale)
- No. 44 will connect with No.40 (counted as individual solar farm given the scale)

2019 Pending Solar Farms						
	Solar Farm	**Address**	**Planning Reference**	**MW**	**Area**	**Decision / ABP Decision**
44.	Terra Solar II Ltd	Lysaghtstown, North of Carrightwohill & NW of Midelton.	19/05729 project will connect with 18/6769.	28.18 MW	56.1ha	Further Information - Pending decision
45.	Terra Solar II Ltd	Ballinvuskig Douglas 5km from Cork City Centre and c.2.5km east of Cork airport	19/05371	5 MW	44.4 ha	Granted CCC. Pending decision ABP
46.	Amarenco Solar, Cobh	Ballynacrusha Cobh	19/05706	5MW	12ha	Granted CCC. Pending decision.
47.	Knocknamork Ltd.	Slievereagh and Coomnaclohy Ballyvourney	19/04972 Renewable energy	12 MW is the output of the solar farm element of this	82.68ha for wind and solar. The solar is up to	Granted CCC. Pending decision.

2019 Pending Solar Farms						
	Solar Farm	**Address**	**Planning Reference**	**MW**	**Area**	**Decision / ABP Decision**
	Pending Solar farm co- locating with wind farm	c.3km northwest of the settlement of Ballyvourney and c. 11km southwest of Millstreet.	Project with 7 Turbines and 70,000 sq. m solar array	wind and solar co-location planning application.	70,000sq.m solar photovoltaic array.	
				50.18MW		

Appendix. F : Solar energy considerations of the Review of the County Development Plan

Large Scale photovoltaic - Solar Installations

Factors influencing preferred location for large scale photovoltaic installations (exceeding 50 square metres) may include the following:

- The term 'large scale' shall be taken to mean an area that is greater than the area that is exempt under S.I. 235 – 2008;
- Installations should be generally south facing, with an angle of 15-55 degrees. Some installations may have tracking technology with sensors and motors to track the motion of the sun and maximise electricity production;
- Typically suited to low lying-lands due to the need for level sites.
- South facing aspect with either flat terrain or sloping gently.
- Site area of at least 10 hectares.
- Ability to achieve a network connection, typically via a 10kV or 20KV overhead cable on the distribution system. In general, it is not viable to locate solar farms over 1km from network infrastructure.
- Vacant brown field sites in predominantly industrial areas which have not been developed to date with access to grid, vehicular access and with associated transformers and power cables. Such sites may occur in the Cork Energy Park, Cork Harbour, Cork Towns /Settlements, and other industrial areas in the County;
- Land diversification, solar farms could be developed on agricultural land where proposals include the continued agricultural use of the site or incorporate biodiversity measures within the project;
- Industrial / commercial/agricultural sites with large available roof space.
- Office developments may have good PV potential because their electricity demand is significant year round (including summer) and because demand is highest between 9am and 5pm. Thus the match between demand and supply is good;
- Sufficient hours of day light;
- Land free from obstacles that may cause shading. Secure un-shaded site (shadow from buildings, trees and other structures can significantly reduce the performance of PV's)
- As they are relatively new, solar farms are not specifically identified in the classes of Environmental Impact Assessment (EIA) development listed either in the EIA Directive or in Schedule 5 to the Planning and Development Regulations.

Key considerations for solar PV installation can include:

- Site aspect, area and topography,
- Availability and method of grid connection,
- Impact on sensitive receptors including roads, residential development, areas of tourism and landscape amenity value, airfields and ecology,
- The visual impact of the proposal and other permitted large-scale solar PV developments on the visual character of the area having regard to the provisions of the Cork County Draft Landscape Strategy 2007 and the High Value Landscapes in Chapter 13 of the CCDP2014.
- Management, fencing and upkeep of the site,
- Construction phase activities and impacts,
- Proposed lifespan of the development,
- Decommissioning and reinstatement of the site.

Possible policy considerations for Large scale/Utility scale Solar – Photovoltaic Panels may include

- The use of brown field sites in predominantly industrial / commercial areas;
- The role of solar farms in supporting farm diversification. Considerations may include ecological impacts, impacts on the amenity of adjoining properties, glint/glare, landscape impact assessment, cable trenching, sustainable drainage systems for the management of surface water disposal on site, decommissioning and site restoration;
- To need for ecological, environmental, flood risk and heritage assessment .
- temporary nature of the land use.

Other Planning Issues may include

- impact on landscape, urban design, biodiversity, ecological impact, on-site water management, access to grid, security fencing, decommissioning issues and residential amenity including potential glint and glare;
- impacts on Architectural Conservation Areas or the Record of Protected Structures;
- need for an exclusion zone / restrictions around Cork Airport, due to potential conflict between aircraft radar systems and large PV tracker technology; also potential reflection / glare issues;
- The need to have sufficient areas of solar modules to produce the required energy output

from the system;

- Functional effectiveness of the solar units in Ireland's climate;
- Shadow from buildings, trees and other structures can significantly reduce performance of PV's.

Appendix G Energy Storage

Recent Energy Storage planning applications in Cork			
1.	18/00242 granted CCC & granted ABP302579-18	Curranashingane, Drinagh.	5 no. battery storage units.
2.	18/4550 granted CCC & Granted ABP 301676 -18	Carrogogna, Midleton.	Battery storage modules.
3.	18/4256	Crinnaloo South, Macroom.	4 no. battery storage units.
4.	18/4664 & ABP 302498	Engie Developments Ireland Limited. Shanabally , north of Ringaskiddy.	20 MW Battery Storage facility- housed in 8 no. metal containers.
5.	18/04182	Kinbrace Caherdowney, Millstreet.	Comprise of rechargeable battery units contained within up to 39 No. 40 foot containers on site.
6.	18/5686	Redfaze Ltd, Caherdowney, Millstreet.	2 no. battery storage buildings.
7.	18/0524	Kilberrihert, Coachford.	4 no. battery storage units.
8.	18/05659	The Electricity Supply Board (ESB). Located inside Aghada Generating Station, Whitegate.	19 MW capacity battery storage facility. Up to 6 No. battery storage units, each typically comprising a containerised battery.
9.	174308, 175498, 176784, 185760	Associated with some of the Solar PV developments	Battery Unit and Storage Units & battery storage modules associated with some of the Solar PV developments
10.	Redfaze Ltd townland of Ballynahulla, Cork – Kerry Border	The compound would capture surplus energy from wind farms during high winds.	40 battery storage units a planning application lodged with Kerry County Council.

Appendix H Combined Heat and Power Facilities in County Cork.

List of CHP in County Cork					
Project	Type	MEC MW	110kv station	Status	Offer type
Grainger's sawmills CHP	CHP	2.7	Bandon	Connected	Pre-gate
Dairygold Mitchelstown (2)	CHP	0	Barrymore	Connected	Pre-gate
Carbery milk products	CHP	6	Dunmanway	Connected	Pre-gate
Golden vale	CHP	4.465	Charleville	Connected	Pre-gate

Source: ESB tables