CHAPTER 10

Climate Change Strategy

10.1 Introduction

This chapter outlines the approach to climate change adaptation and greenhouse gas mitigation, as required by the Planning and Development Act 2000, as amended. This Act highlights the need to reduce the overall quantity of greenhouse gas emissions and to develop an adaptation strategy to manage anticipated future climate risks.
The chapter firstly defines climate change and the known associated risks, which are expected to impact Ireland in both the short and long term, before outlining the statutory context in which climate change is managed from an International, National , Regional and Local perspective.

The chapter examines how mitigation and adaptation strategies have been integrated into the main body of the County Development Plan. This is to ensure that the climate change strategy has been developed collaboratively and is fully integrated and consistent with the Policies and Objectives of the County Development Plan as climate change is one of the cross-cutting themes of the Plan.

A Citizens Assembly in 2018 debated the challenges of climate change and produced a set of recommendations. The Joint Oireachtas Committee on Climate Action issued a comprehensive set of recommendations in 2018. The Committee report was unanimously endorsed by Dáil Eireann in 2019. These recommendations form part of the Climate Action Plan 2019 which is Ireland's response to tacking climate breakdown.

The urgency of the need to address climate issues was highlighted in May 2019 when Dáil Eireann declared a Climate and Biodiversity Emergency. Ireland became only the second country in the world to pass such a declaration.

10.2 What is climate change?

Climate change refers to a long term, large scale change in global or regional climate patterns. In recent years, global temperatures have been rising.. The ever increasing rate of carbon dioxide combustion, and the emission of other greenhouse gases such as methane and nitrous oxide since the industrial revolution, has resulted in the 'greenhouse affect'. Many activities generate these gases; the production of electricity, industrial activity, transportation and agriculture are just a few of the examples contributing high quantities of these emissions. These gases build up in the Earth's atmosphere, and trap a constantly increasing amount of the sun's energy, creating an overall shift in global atmospheric patterns.

As a result, Ireland and Meath's climate is changing and the scientific consensus implies that this is only going to accelerate in the coming years.

Incremental changes in climate are already evident these include:

- increases in average temperatures,
- wetter winters,
- more intense rainfall,
- more flooding,
- increase in summer droughts,
- rising sea levels.
- damage to existing ecosystems and biodiversity.

There may also be some positive impacts, such as fewer very cold days.

Although the type and magnitude of impacts are uncertain, immediate action is required to prepare for and manage these impacts.

10.3 Statutory Context

The Planning and Development Act 2000 (as amended) also sets out provisions for climate change within Section 10 (2) (n). This include requirements to:

(i) reduce energy demand in response to the likelihood of increases in energy and other costs due to long-term decline in non-renewable resources,

(ii) reduce anthropogenic (manmade) greenhouse gas emissions, and

(iii) address the necessity of adaptation to climate change; in particular, having regard to location, layout and design of new development.

10.4 Policy Context

United Nations Framework Convention on Climate Change (UNFCCC) (1992)

A range of international climate change agreements and frameworks have been approved that provide information on climate change impacts, vulnerability and adaptations. The work of the UNFCCC provides countries with detailed technical information, including current and future climate change projections, which enables them to determine practical adaptation actions to improve their long term resilience.

Linked to the work of the UNFCCC – The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and took effect from 16th February 2005. It sets binding targets for 37 industrialised countries and the European Community for reducing emissions. Additionally, 'The Paris Agreement' was agreed on 12 December 2015. All 196 members under the umbrella of the UNFCCC agreed to hold the increase in global temperature to well below 2 degrees Celsius above pre-industrial levels and to keep the more stringent target of below 1.5 degrees in sight. The European Union and its Member States provide funding and support to climate change adaptation in countries within the UNFCCC.

European Union Adaptation Strategy (2013)

The European Union published its Adaptation Strategy in April 2013 with the overall aim of increasing climate resilience across Europe. Through increased coordination and providing a more consolidated approach, the Adaptation Strategy will enhance the preparedness and effectiveness of all governance levels to respond to the impacts of climate change

The Strategy is focused on three key objectives:

- Promoting action by Member States
- 'Climate-proofing' action at EU level
- Better informed decision making

The primary adaptation initiatives promoted by the Strategy are achieved through the provision of mitigation and adaptation requirements within EU sector policies and funding mechanisms. The initiatives run across a range of areas including:

- infrastructure and buildings
- marine and inland water issues
- forestry
- agriculture and
- social cohesion

Climate Action and Low Carbon Development Act (2015)

The Climate Action and Low Carbon Development Act 2015 is the key policy instrument to address the issue of climate change in Ireland. The Act sets out a roadmap for Ireland's transition towards a low carbon economy and details mechanisms for the implementation of the 'National Low Carbon Transition and Mitigation Plan' (National Mitigation Plan) published on the 19/07/2017, to lower Ireland's level of greenhouse emissions and a 'National Climate Change Adaptation Framework' (National Adaptation Framework) final submissions accepted on the 27/10/17 and 27 submissions received, to provide for responses to changes caused by climate change – Both of which were be submitted for approval in 2018. They will be renewed every five years and are required to include tailored sectoral plans.

The Act requires public bodies to actively consider mitigation and adaptation efforts, drawing on the objectives set out in the National Low-Carbon Roadmap, national adaptation framework and sectoral adaptation plans.

National Climate Change Adaptation Framework (NCCAF) (2012)

The Framework provides the policy context for a strategic national adaptation response to climate change in Ireland. It highlights the role of planning and development in implementing adaptation measures and recognises the benefits of wider stakeholder engagement in achieving climate change objectives at a local level.

The NCCAF provides an overview of challenges for sectors that are impacted from climate change, including:

- water,
- coasts,
- marine,
- agriculture,
- forestry,
- biodiversity,
- energy,
- transport,
- communications,
- insurance,
- heritage;
- and health

National Adaptation Framework

The National Adaptation Framework (NAF), due to be published in 2018, will set out Ireland's first statutory strategy for the application of adaptation measures in different Government sectors, including the local authorities. Submissions closed on the 27/10/17, 27 submissions received. The Framework aims to reduce the vulnerability of the State to the negative effects of climate change but also to promote of any positive effects that may occur.

The NAF will build on the substantial work already carried out under the existing NCCAF and ensure that climate adaptation in Ireland is brought forward in line with EU and international best practice.

National Mitigation Plan

The first National Mitigation Plan, published in 2017, represents an initial step to set Ireland on a pathway to decarbonising its economy. It is a whole-of-Government Plan, which covers the following core sectors:

- Electricity Generation.
- Built Environment,
- Transport and

- Agriculture

The measures set out in the plan lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. In support of this, the Plan also includes over 100 individual actions for various Ministers and public bodies to take forward through its implementation. Action 20 is to finalise the wind Energy Guidelines, completion of same is awaited.

National Planning Framework (NPF)

Sets out the role of the planning system in facilitating mitigation of and adaptation to climate change and ensuring that sustainable infrastructure networks build resilience to climate change.

In this regard National Strategic Outcome 8 is dedicated to achieving transition to a Low Carbon and Climate Resilient Society. This objective will shape investment choices over the coming decades in line with the National Mitigation Plan and the National Adaptation Framework noting that new energy systems and transmission grids will be necessary for a more distributed, renewable energy focused system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave and solar and connecting the richest sources of that energy to the major sources of demand. Regional Spatial and Economic Strategy.

The RSES acknowledges that climate change is a global challenge which requires a strong and coherent response at national, regional and local level. Climate change will have diverse and wide-ranging impacts on the Eastern and Midland Region's environment, society and economic development, including managed and natural ecosystems, water resources, agriculture, food security and bio-economy, human health and coastal zones.

EMRA will work closely with the newly appointed Climate Action Regional Offices (CARO's). The Dublin Metropolitan Region Climate Change Office (run by the four Dublin local authorities assisted by Codema) and the Eastern and Midland Region Climate Change Office (run by Kildare County Council) will be responsible for planning and actions regarding Climate Change mitigation and adaptation in their regions. Climate Action Regional Offices shall ensure coherence and coordination with the RSES when formulating regional climate change adaptation plans.

The following Regional Policy Objectives relate to Climate Change

RPO 7.30:

Within 1 year of the adoption of the RSES, the EMRA shall seek with other stakeholders to carry out an assessment of transport emissions in the Region to identify GHG forecasting and to analyse the emissions impacts of development in the Region.

RPO 7.31:

Within 1 year of carrying out a regional emissions assessment, EMRA shall compile and publish an emissions inventory and, in collaboration with the relevant departments and agencies, agree emissions reductions targets in accordance with agreed national sectoral plans and to support an aggregate 40% reduction in greenhouse gas emissions by 2030 in line with the EU 2030 Framework.

RPO 7.32:

With the assistance and support of the Climate

Action Regional Offices, local authorities shall develop, adopt and implement local climate adaptation and mitigation strategies which shall address issues including local vulnerability to climate risks and identify and prioritise actions, in accordance with the Guiding Principles of the National Adaptation Framework, National Mitigation Plan.

RPO 7.33:

Climate Action Regional Offices shall provide support to the local authorities on the development, adoption and implementation of local climate action strategies (which can address both adaptation and mitigation). Ongoing support should relate to the specific actions, and obligations and timescales for same that must be undertaken by the local authorities in accordance with local climate change adaptation strategies and compliance with national policy.

RPO 7.34:

EMRA supports the National Policy Statement on Bioeconomy (2018) and supports the exploration of opportunities in the circular resource-efficient economy including undertaking a bioeconomy feasibility study for the Region to identify the area of potential growth in the Region to inform investment in line with the national transition objective to a low carbon climate resilient economy.

10.5 Integrating Mitigation and Adaptation into the County Development Plan

Climate change mitigation and adaptation strategies have been incorporated into the core Policies and Objectives of the County Development Plan. This is to ensure that climate change has been consistently integrated into the policy themes addressed by this plan. Only those sources and impacts of climate change within the Statutory remit of the County Development Plan are included. The Draft 'County Meath Adaptation Strategy' explores potential methods of emission reduction and sets out adaptation options.

10.5.1 Climate Change Objectives

1. To support the implementation of the National Climate Change Strategy and to facilitate measures which seek to reduce emissions of greenhouse gases by:
   a. Reducing Meath County Councils emissions by 33% by 2020.
   b. Reducing CO2 emissions of the county by at least 40% by 2030
2. To support the implementation of the National Climate Change Strategy and the National Climate Change Adaption Framework Building Resilience to Climate Change 2012 through the County Development Plan and through the preparation of a Climate Change Adaptation Plan in conjunction with all relevant stakeholders
3. To implement the Regional Spatial and Economic Strategy in regard to the following:

- Compact development in locations served by public transport;
- Control of specultative rural dwellings in the open countryside;
- Increased residential densities adjacent to public transport nodes;

- Provision of 'live work' communities

10.5.2 Climate Change Mitigation

Mitigation is defined as any human intervention aimed at reducing harmful influences on the earth's climate system, including actions which actively reduce emissions and the creation or enhancement of carbon sinks. This can be achieved by using new technologies, making older equipment more energy efficient, or by changing management practices and consumer behaviour.

However, even with significant improvements to the efficiency of technology, energy demand will still remain high. It is therefore essential to progress towards an energy system based on low or no carbon fuels. This means moving away from using conventional coal and gas-fired power to electricity generated from renewable sources, and examining new technologies such as carbon capture and storage.

10.5.3 Emissions sources in the County

County Meath completed a Baseline Emissions Inventory in 2012 to determine the major sources of emissions in the county. This generated an indicative picture of Meath's current and projected energy footprint, which equated to a total of 1, 453 CO2 equivalent kilotons.

The sector split of the total emissions is as follows:

Sector	Proportion of Total Emissions
Transport	28.8 %
Agriculture	24.1%
Residential	23.9 %
Industry	14.6 %
Services	7.5 %
Meath County Council	1.2 %

The proportion of emissions split between the different sectors broadly aligns with the results from the National Ireland Greenhouse Gas Emissions Inventory, but with a slightly higher allocation for transport. This is because the number of cars in County Meath is marginally higher than the national average.

10.5.4 Transport

The transport sector is the biggest contributor of GHG emissions in County Meath, The predominant source of this is private vehicle travel, with the majority of the emissions originating from the use of petroleum based fuels - the combustion of which produces carbon and nitrogen dioxide. The County has the highest rates of outbound commuting in the Country[1] much of which is car based.

Encouraging people to move towards a higher uptake of public and active transport will therefore be critical if the emissions from this sector are going to be reduced.

The following areas of mitigation have therefore been addressed in the County Development Plan:

[1] Outside the Dublin Authorities.

Mitigation Strategy	Associated Objectives
• Increasing the efficiency of the transport system and reducing the need for car ownership. • Promoting the development of 'live work' communities, • Focus on consolidation, brownfield, infill development close to public transport nodes	**MOV POL 1:** To support and facilitate the integration of land use with transportation infrastructure, through the development of sustainable compact settlements which are well served by public transport. **CS POL 1:** To promote and facilitate the development of sustainable communities in the County by managing the level of growth in each settlement to ensure future growth is in accordance with the Core Strategy and County Settlement Hierarchy in order to deliver compact urban areas and sustainable rural communities. **CS OBJ 4:** To achieve more compact growth by promoting the development of infill and brownfield/ regeneration sites and the redevelopment of underutilised land within and close to the existing built up footprint of existing settlements in preference to edge of centre locations. **MOV POL 3:** To promote sustainable land use planning measures which facilitate transportation efficiency, economic returns on transport investment, minimisation of environmental impacts and a general shift towards the greater use of public transportation throughout the County. **MOV POL 4:** To promote higher residential development densities in settlement centres along public transport corridors, that are not located in areas sensitive to flooding, or will increase temperatures of urban areas. **MOV POL 9:** To ensure that the design and planning of transport infrastructure and services accords with the principles of sustainable safety, in order that the widest spectrum of needs, including pedestrians, cyclists, the ageing population and those with mobility impairments are taken into account. **MOV POL 11:** To facilitate in conjunction with relevant statutory agencies alternative transport modes to the private car, including enhanced delivery of public transport services along regional corridors (as defined in the NTA's Transport Strategy for the Greater Dublin Area 2016-2035); frequent local bus services linking residential areas to District Centres and Town Centres, and which also serve shopping areas, employment areas and other activity centres, and connecting to key transport interchange points. **MOV POL 13:** To promote and support the provision of Park-and-Ride facilities which improve public transport accessibility without exacerbating road congestion, or which cause increased car travel distances, at appropriate locations within the County.
• Improving the infrastructure necessary for people to be able to work from home or from local technology hubs, to reduce the need for outbound commuting	**INF POL 54:** To facilitate the delivery of a high capacity Information and Communications Technology (ICT) infrastructure and broadband network and digital broadcasting throughout the County. **INF POL 55:** To seek to have appropriate modern ICT, including open access fibre connections in all new developments and a multiplicity of carrier neutral ducting installed during significant public infrastructure works such as roads, rail, water and sewerage, where feasible.
• Encouraging greater uptake of public transport in the region	**MOV POL 4:** To promote higher residential development densities in settlement centres along public transport corridors, that are not located in areas sensitive to flooding, or will increase temperatures of urban areas. **MOV POL 6:** To promote, facilitate and advance the delivery of Phase II of the Navan railway line project and associated rail services in cooperation with other relevant agencies. **MOV POL 7:** To support the DART Expansion Programme including new infrastructure and electrification of existing lines including provision of electrified services to Drogheda, Maynooth, and the M3 Parkway, on the Maynooth/Sligo Line.

	MOV POL 8: To cooperate with the NTA and other relevant agencies to have ongoing reviews of the network of bus routes in Meath, to support and encourage public transport operators to provide improved bus services in, and through, the County. **MOV POL 10:** To ensure that new developments in Regional Growth Centres, Key Towns, Self-Sustaining Growth Towns and Self-Sustaining Towns are laid out so as to facilitate the provision of local bus services. **MOV OBJ 2:** To improve, in conjunction with the NTA and Irish Rail, facilities at existing stations. **MOV OBJ 4:** To facilitate and encourage the upgrading of existing railway stations, and protect, as required, lands necessary for the upgrading of existing railway lines or stations or the provision of new railway stations throughout the County. **MOV OBJ 9:** To provide bus priority measures on existing and planned road infrastructure, where appropriate, in collaboration with the NTA, Bus Éireann and TII (where relevant). **MOV OBJ 10:** To identify deficits in bus infrastructure and develop a priority list as a basis to secure funding for improvement works, including the provision of bus shelters, bus stops and travel information at stops. **MOV OBJ 12:** To deliver, in conjunction with the NTA and the Department of Transport, Tourism and Sport a Public Transportation Hub in Navan to accommodate national, commuter, regional and local bus services. **MOV POL 13:** To promote and support the provision of Park-and-Ride facilities which improve public transport accessibility without exacerbating road congestion, or which cause increased car travel distances, at appropriate locations within the County. **MOV OBJ 21:** To provide public transport interchange facilities, including facilities for taxis, at appropriate points on the public transport network particularly in the main urban centres in cooperation with the NTA.
• Encouraging greater uptake of active transport in the region	**MOV POL 17:** To identify and seek to implement a strategic, coherent and high-quality cycle and walking network across the County that is integrated with public transport and interconnected with cultural, recreational, retail, educational and employment destinations and attractions. **MOV POL 18:** To support the provision of a long distance inter-connecting walking/cycling route(s) between the Irish Republic and Northern Ireland. **MOV POL 19:** To support the NTA in the development of a strategic pedestrian network plan for the main urban centres of the County. **MOV POL 20:** To encourage, where appropriate, the incorporation of safe and efficient cycleways, accessible footpaths and pedestrian routes into the design schemes for town centres/neighbourhood centres, residential, educational, employment, recreational developments and other uses. **MOV POL 21:** To require that adequate facilities for the secure parking of bicycles be provided at convenient locations close to public transport nodes and public transport interchanges. **MOV POL 22:** To prioritise the safe movement of pedestrians and cyclists in proximity to public transport nodes. **MOV OBJ 25:** To implement the recommendations of the NTA strategy with regard to walking and cycling infrastructure.

	MOV OBJ 26: To revise road junction layouts, where appropriate, to provide dedicated pedestrian crossings, reduce pedestrian crossing distances, provide more direct pedestrian routes, and reduce the speed of turning traffic. **MOV OBJ 27:** To implement at appropriate locations pedestrian permeability schemes and enhancements. **MOV OBJ 28:** To request the submission of pedestrian permeability plans as part of new housing developments. **MOV OBJ 29:** To implement at appropriate locations pedestrianisation schemes, particularly in central areas of high pedestrian footfall, such as core retail areas. **MOV OBJ 30:** To continue the development of a network of Greenways in the County in accordance with the Department of Transport, Tourism and Sport Strategy for Future Development of Greenways. **MOV OBJ 31:** To engage in the Compulsory Purchase Order process when required in order to facilitate the timely delivery of the Greenway programme within the County.
• Encourage the uptake of electric vehicles	**MOV POL 16:** To support the provision of electricity charging infrastructure for electrical vehicles both on street and in new developments in accordance with car parking standards and best practice. **MOV OBJ 23:** To facilitate the provision of electricity charging infrastructure for electric vehicles both on street and in new developments in accordance with car parking standards and best practice. **MOV OBJ 24:** To liaise and collaborate with relevant agencies to support and encourage the growth of electric vehicles and EBikes with support facilities/infrastructure, through a roll-out of additional electric charging points in collaboration with relevant agencies at appropriate locations including retrofit of charging points in existing urban centres and park and ride facilities.

10.5.5 Agriculture and Land Use

Agriculture is the second biggest producer of greenhouse gas emissions, owing to high proportion of both arable and livestock farming occurring in the county. On a farm by farm basis, total emissions vary significantly depending on the nature of outputs produced, farming practices employed, and natural factors such as weather, topography, and hydrology.

Land use change can also be significant. Trees play a very important part in the carbon cycle, absorbing and storing significant quantities of carbon. Deforesting an area for agricultural purposes removes this benefit, but also releases all of the previously stored carbon back into the atmosphere.

Mitigation Strategy	Associated Objectives
• Promotion of environmentally sustainable approach to agricultural practices	**RUR POL 17:** To maintain a vibrant and healthy agricultural sector based on the principles of sustainable development whilst at the same time finding alternative employment in or close to rural areas to sustain rural communities.
• Maintaining and improving the quality of peatland to reduce their emissions	**HER POL 45:** To ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, archaeological, cultural and educational significance.

10.5.6 Residential

Greenhouse gas emissions produced by the residential sector predominantly arise from the activities and processes necessary for heating homes and for producing electricity. Direct residential consumption of primary oils (natural gas, heating oil, coal, kerosene, peat etc.) make up a significant proportion of overall emissions, but CO2 emissions associated with the generation of electric power for household use, including electricity-related losses are also very high.

Building energy standards in residential buildings need to be improved with objectives and policies needed to promote and incentivise reduction and efficiency in residential electricity and energy usage.

Mitigation Strategy	Associated Objectives
• Promote and facilitate energy efficient building design, environmentally sustainable layout and locations	**INF POL 37:** To seek to improve the energy efficiency of the County's existing building stock in line with good architectural conservation practice and to promote energy efficiency and conservation in the design and development of all new buildings in the County, in accordance with the Building Regulations Part L (Conservation of Fuel and Energy). **INF POL 38:** To encourage that new development proposals maximise energy efficiency through siting, layout, design and incorporate best practice in energy technologies, conservation and smart technology. **INF POL 39:** To encourage the attainment of high standards of energy efficiency and environmental sustainability in development. **INF POL 40:** To support and encourage pilot schemes which promote innovative ways to incorporate energy efficiency. **INF OBJ 43:** To require, where feasible and practicable, the provision of Photovoltaic solar panels in new residential developments, commercial developments, and public buildings for electricity generation/storage and/or water heating purposes so as to minimise carbon emissions and reduce dependence on imported fossil fuels and reduce energy costs. **INF OBJ 49:** To support the use of heat pumps as an alternative to gas boilers, where appropriate, for domestic and commercial development

	SH POL 7: To encourage and foster the creation of attractive, mixed use, sustainable communities that include a suitable mix of housing types and tenures with supporting facilities, amenities, and services that meet the needs of the entire community and accord with the principles of universal design, in so far as practicable.
• Promote the use of lower carbon fuels in the home.	**INF POL 44:** To support Sustainable Energy Communities and local community group initiatives to develop clean energy opportunities within the county. **INF OBJ 40:** To seek to reduce reliance on fossil fuels in the County by reducing the energy demand of existing buildings, in particular residential dwellings. **INF OBJ 41:** To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment. **INF OBJ 42:** To support the recording and monitoring of renewable energy potential in the County in partnership with other stakeholders including the Sustainable Energy Authority of Ireland (SEAI). **INF OBJ 43:** To require, where feasible and practicable, the provision of Photovoltaic solar panels in new residential developments, commercial developments, and public buildings for electricity generation/storage and/or water heating purposes so as to minimise carbon emissions and reduce dependence on imported fossil fuels and reduce energy costs.

10.5.7 Industry and Services

Nationally, the main source of greenhouse gases generated from the industrial and commercial sectors arises from the combustion of fuels used in manufacturing, industrial process emissions and the release of fluorinated gas emissions. Public lighting constitutes a significant proportion of the Councils own energy use.

Although the industrial and commercial sectors are large consumers of energy, there a number of options available to help reduce emissions substantially. These include an increase in the uptake of low-carbon and energy efficient technology, and a transition to low carbon energy supplies.

Mitigation Strategy	Associated Objectives
• Promote and facilitate energy efficient building design, operations, environmentally sustainable layout and locations	**ED POL 15:** To seek to support and facilitate both existing and new businesses who seek to maximise the re-use and recycling of resources, create new business models and promote innovation and efficiency. **INF POL 37:** To seek to improve the energy efficiency of the County's existing building stock in line with good architectural conservation practice and to promote energy efficiency and conservation in the design and development of all new buildings in the County, in accordance with the Building Regulations Part L (Conservation of Fuel and Energy). **INF POL 38:** To encourage that new development proposals maximise energy efficiency through siting, layout, design and incorporate best practice in energy technologies, conservation and smart technology.

	INF POL 39: To encourage the attainment of high standards of energy efficiency and environmental sustainability in development. **INF POL 40:** To support and encourage pilot schemes which promote innovative ways to incorporate energy efficiency. **ED OBJ 69:** To work in partnership with relevant stakeholders to ensure that a sustainable approach is taken to enterprise development and employment creation across all sectors of the Meath economy in accordance with the Green Economy national frameworks relevant to each sector. **ED OBJ 70:** Engage with all relevant government stakeholders, enterprise agencies and sectoral representatives in pursuing 'green' approaches to economic development, and actively collaborate with key industry and educational bodies to promote Meath based initiatives across the economic sectors. **INF OBJ 43:** To require, where feasible and practicable, the provision of Photovoltaic solar panels in new residential developments, commercial developments, and public buildings for electricity generation/storage and/or water heating purposes so as to minimise carbon emissions and reduce dependence on imported fossil fuels and reduce energy costs. **INF OBJ 49:** To support the use of heat pumps as an alternative to gas boilers, where appropriate, for domestic and commercial development **INF OBJ 39:** To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.

10.5.8 Energy

Although emissions from the energy sector are not directly included in the inventory above, indirectly many of the previously discussed emissions sources (particularly the residential and industrial/service sectors) arise from the production of electricity from non-renewable sources. The burning of fossil fuels for electricity generation is a major source of emissions.

Policies and Objectives therefore need to focus on reducing demand and need for fossil fuels and increase uptake of renewable energies.

Mitigation Strategy	Associated Objectives
• Encourage the uptake of more renewable energy sources	**INF POL 34:** To promote sustainable energy sources, locally based renewable energy alternatives, where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities. **INF POL 35:** To seek a reduce greenhouse gas emissions through energy efficiency and the development of renewable energy sources utilising the natural resources of the County in an environmentally acceptable manner consistent with best practice and planning principles. **INF POL 41:** To encourage the development of wind energy, in accordance with Government policy and having regard to the Landscape Character Assessment of the County and the Wind Energy Development Guidelines (2006) or any revisions thereof.

INF POL 42:
To support the identification, in conjunction with EMRA, of Strategic Energy Zones, areas suitable to accommodate large energy generating projects within the Eastern and Midlands Regional area.

INF POL 44:
To support Sustainable Energy Communities and local community group initiatives to develop clean energy opportunities within the county.

INF OBJ 39:
To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.

INF OBJ 41:
To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.

INF OBJ 42:
To support the recording and monitoring of renewable energy potential in the County in partnership with other stakeholders including the Sustainable Energy Authority of Ireland (SEAI).

INF OBJ 43:
To require, where feasible and practicable, the provision of Photovoltaic solar panels in new residential developments, commercial developments, and public buildings for electricity generation/storage and/or water heating purposes so as to minimise carbon emissions and reduce dependence on imported fossil fuels and reduce energy costs.

INF OBJ 47:
To investigate the preparation of a Renewable Energy Strategy promoting technologies which are most viable in the County.

INF OBJ 48:
To support Ireland's renewable energy commitments by promoting the use of district heating systems in urban residential and enterprise developments, where such developments will not negatively impact upon the surrounding landscape, environment, biodiversity or local amenities.

10.6 Climate Change Adaptation

A changing climate will have specific impacts on County Meath, with the following predicted changes likely be key concerns for County Meath.

- Mean temperatures are set to increase up to 1.7 °C by 2060, with the largest changes expected in the East of Ireland.
- In the extremes, the hottest summer days could be up to 2.6 °C warmer, with peak winter temperatures increasing 3.1 °C by 2060.
- Extended dry periods in the summer set to increase between 12 – 40% by 2060.
- Frequency of heavy rainfall events set to increase by 20%.

Sea levels are set to rise by 0.55 m by 2050. "Adaptation" means any adjustment to - (a) any system designed or operated by human beings, including an economic, agricultural or technological system, or (b) any naturally occurring system, including an ecosystem, that is intended to counteract the effects (whether actual or anticipated) of climatic stimuli, prevent or moderate environmental damage resulting from climate change or confer environmental benefits.

The climate change risk assessment undertaken

for County Meath, examined specific impacts across a number of sectors and the potential likelihood and magnitude of these impacts in both the short and long term.

These impacts are summarised below, in addition to areas where adaptation considerations are highlighted in the preceding chapters of the development plan.

10.6.1 Transport

Key Risks	Associated Objectives
• Increased damage to asphalt road surfaces in hotter temperatures • Sea level rise increasing the risk of flooding and erosion to coastal roads • Increase in magnitude and frequency of storm surges, increasing the risk of road damage and closure • The occurrence of more frequent flood events after heavy rainfall events damaging and closing roads across the county and damaging road infrastructure such as bridges. This could have significant knock-on implications for businesses and industry in the areas affected. • Increase in disruption to public transport following floods and road closures and damage to public transport infrastructure, such as busses and bus terminals	**INF OBJ 23:** To protect and enhance the County's floodplains, wetlands and coastal areas subject to flooding as "green infrastructure" which provide space for storage and conveyance of floodwater, and ensure that development does not impact on important wetland sites within river/stream catchments. **INF OBJ 30:** To ensure the County's natural coastal defences, such as beaches, sand dunes, salt marshes and estuary lands, are protected and are not compromised by inappropriate works or forms of development. **INF OBJ 32:** To Identify, prioritise and implement necessary coastal protection works subject to the availability of resources, whilst ensuring a high level of protection for natural habitats and features, and to ensure due regard is paid to visual and other environmental considerations in the design of any such coastal protection works. This will include the identification of coastal areas sensitive to climate change and consequent coastal erosion.

10.6.2 Energy and Waste Infrastructure

Key Risks	Associated Objectives
Energy • Potential increase surges in demand for energy to meet cooling requirements during heatwave • Flooding may increase damage/disruption to energy infrastructure and supply • Coastal infrastructure will be at a particular risk of damage, particularly with regard to an increase in storm surges • Reduction in the capacity of distribution and transmission lines in higher temperatures, may reduce efficiency and increase costs • Demand for freshwater for use in cooling is likely to rise significantly during hotter temperatures, which may affect already stretched supply **Waste** • Increased risk of flood damage to waste facilities • Increased waste arising's in the aftermath of flood and heavy rainfall events	**INF POL 37:** To seek to improve the energy efficiency of the County's existing building stock in line with good architectural conservation practice and to promote energy efficiency and conservation in the design and development of all new buildings in the County, in accordance with the Building Regulations Part L (Conservation of Fuel and Energy). **INF POL 38:** To encourage that new development proposals maximise energy efficiency through siting, layout, design and incorporate best practice in energy technologies, conservation and smart technology. **INF POL 40:** To support and encourage pilot schemes which promote innovative ways to incorporate energy efficiency. **INF OBJ 14:** To require the use of SuDS within Local Authority Developments and other infrastructural projects in accordance with the Greater Dublin Regional Code of Practice for Drainage Works. **INF OBJ 15:** To require the use of SuDS in accordance with the Greater Dublin Regional Code of Practice for Drainage Works for new developments (including extensions). **INF OBJ 16:** To ensure that all new developments comply with Section 3.12 of the Greater Dublin Regional Code of Practice for Drainage Works V6 which sets out the requirements for new developments to allow for Climate Change.

• Flooding of landfill sites can increase ground water surface water contamination	**INF POL 19:** To implement the findings and recommendations of the Strategic Flood Risk Assessment prepared in conjunction with the County Development Plan review, ensuring climate change is taken into account. **INF POL 20:** To require that a Flood Risk Assessment is carried out for any development proposal, where flood risk may be an issue in accordance with the "Planning System and Flood Risk Management – Guidelines for Planning Authorities" (DoECLG/OPW, 2009). This assessment shall be appropriate to the scale and nature of risk to and from the potential development and shall consider the impact of climate change. **INF POL 24:** To ensure that flood risk management is incorporated into the preparation of Local Area Plans in accordance with 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities (2009)'. **INF POL 26:** To undertake a review of the 'Strategic Flood Risk Assessment for County Meath' in light of the completed flood mapping which has been developed as part of the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study. **INF OBJ 25:** To require the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks. **INF OBJ 27:** To encourage the use of Green Roof technology particularly on apartment, commercial, leisure and educational buildings. **INF POL 29:** To facilitate the provision of new, or the reinforcement of existing flood defences and protection measures where necessary and in particular to support the implementation of flood schemes being progressed through the planning process during the lifetime of the Plan. The provision of flood defences will be subject to the outcome of the Appropriate Assessment process. If adverse effects on European Site integrity are identified, alternative locations and/designs will be developed to ensure that flood defence structures will not adversely affect the integrity of European Sites, either alone or in combination with any other plans or projects. If, despite the implementation of mitigation measures, there remains a risk that the proposals will adversely affect the integrity of the European Sites, the project will not be progressed unless an alternative solution can be implemented which avoids/reduces the impact to a level that the integrity of the European Site(s) is(are)_unaffected. It is reasonable to assume that at the detailed design stage any potential for a project to impact on European Sites could, and will, be resolved through the exploration of alternatives locations or designs while still fulfilling their function/role. **INF OBJ 30:** To ensure the County's natural coastal defences, such as beaches, sand dunes, salt marshes and estuary lands, are protected and are not compromised by inappropriate works or forms of development.

10.6.3 Water Resource Management

Key Risks	Associated Objectives
• Surges in demand for water with hotter temperatures may extend beyond capacity. Increased demand for water for cooling energy and industry infrastructure may be particularly significant.	**INF POL 1:** To liaise and work in conjunction with Irish Water in the development and upgrade of water supply systems to ensure that the County has an adequate, sustainable and economic supply of suitable quality piped water for all users.

- Increased pressure on current abstraction points during droughts may be unable to sufficiently match demand.
- Water quality risks are most likely to be exacerbated during extreme weather events, particularly if timing coincides with fertilisation of agricultural land
- Increased risk of sewerage flooding overflow

INF POL 2:
To utilise the existing water supply in an efficient and equitable manner and in the best interests of the proper planning and sustainable development of the County.

INF POL 3:
To seek to secure water resources for the County in conjunction with Irish Water from any project supplying water to the Greater Dublin Area from the River Shannon or any other water source.

INF OBJ 6:
To liaise and work with Irish Water's in their implementation of water Conservation measures.

INF POL 31:
To protect and develop, in a sustainable manner, the existing groundwater sources and aquifers in the County and to manage development in a manner consistent with the protection of these resources.

10.6.4 Built Environment: Residential, Business and Industry and Services

Key Risks	Associated Objectives

- Surges in demand for water with hotter temperatures may extend beyond capacity. Increased demand for water for cooling energy and industry infrastructure may be particularly significant.
- Increased risk of buildings overheating in the summer, particularly for new homes meeting strict energy efficiency regulations
- Risk of household water disruptions during both drought and flood events. May lead to a decrease in quality which can cause health and well-being concerns
- Existing drainage capacity may be exceeded with more extreme rainfall occurrences.
- An increase in the prevalence of storm surges puts coastal infrastructure at risk
- Increased risk of flooding may cause damage, damp and mould in buildings.
- Severe flooding may also damage stock and machinery. Road damage and closures will also reduce accessibility and demand for shops and amenities, which could generate significant economic impacts.
- Damage to/inaccessibility of critical amenities such as health services.

SOC OBJ 2:
To promote and assist in the provision of lifetime adaptable housing units to meet the needs of all in society taking account of climate change.

INF OBJ 14:
To require the use of SuDS within Local Authority Developments and other infrastructural projects in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

INF OBJ 15:
To require the use of SuDS in accordance with the Greater Dublin Regional Code of Practice for Drainage Works for new developments (including extensions).

INF POL 19:
To implement the findings and recommendations of the Strategic Flood Risk Assessment prepared in conjunction with the County Development Plan review, ensuring climate change is taken into account.

INF POL 20:
To require that a Flood Risk Assessment is carried out for any development proposal, where flood risk may be an issue in accordance with the "Planning System and Flood Risk Management – Guidelines for Planning Authorities" (DoECLG/OPW, 2009). This assessment shall be appropriate to the scale and nature of risk to and from the potential development and shall consider the impact of climate change.

INF POL 24:
To ensure that flood risk management is incorporated into the preparation of Local Area Plans in accordance with 'The Planning System and Flood Risk Management -Guidelines for Planning Authorities (2009)'.

INF POL 26:
To undertake a review of the 'Strategic Flood Risk Assessment for County Meath' in light of the completed flood mapping which has been developed as part of the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study.

INF OBJ 21:
To restrict new development within floodplains other than development which satisfies the justification test, as outlined in the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).

INF OBJ 14:
To require the use of SuDS within Local Authority Developments and other infrastructural projects in accordance with the Greater Dublin Regional Code of Practice for Drainage Works.

INF OBJ 15:
To require the use of SuDS in accordance with the Greater Dublin Regional Code of Practice for Drainage Works for new developments (including extensions).

INF OBJ 27:
To encourage the use of Green Roof technology particularly on apartment, commercial, leisure and educational buildings.

INF POL 29:
To facilitate the provision of new, or the reinforcement of existing flood defences and protection measures where necessary and in particular to support the implementation of flood schemes being progressed through the planning process during the lifetime of the Plan.

INF OBJ 30:
To ensure the County's natural coastal defences, such as beaches, sand dunes, salt marshes and estuary lands, are protected and are not compromised by inappropriate works or forms of development.

10.6.5 Agriculture

Key Risks	Associated Objectives
• Heat stress in plants may result in lower crop yields. Warmer temperatures may also introduce new and invasive pests and diseases for both crops and livestock • Increase in animal stress due to both water shortages and heatwaves • Iirrigation requirements may increase during more frequent droughts • Increase in crops loss/damage during floods and inaccessibility of farming machinery. Increased risk of livestock mortality, and loss of grazing land • Water damage to fodder stores can decrease availability for livestock • Damage to/loss of farm infrastructure during heavy rainfall and flood events	**HER POL 43:** To promote best practice in the control of invasive species in the carrying out its functions in association with relevant authorities including TII and the Department of Transport, Tourism and Sport. **HER POL 44:** To require all development proposals to address the presence or absence of invasive alien species on proposed development sites and (if necessary) require applicants to prepare and submit an *Invasive Species Management Plan* where such a species exists to comply with the provisions of the *European Communities (Birds and Natural Habitats) Regulations 2011-2015.* **RUR POL 17:** To maintain a vibrant and healthy agricultural sector based on the principles of sustainable development whilst at the same time finding alternative employment in or close to rural areas to sustain rural communities. **RUR POL 21:** To work with the the Eastern and Midlands Regional Assembly and other relevant stakeholders in identifying areas of high value agricultural land in the County to address the need for sustainable food supplies. The consideration of future climate scenarios and water availability for agricultural purposes shall form part of this assessment. **RUR OBJ 30:** To facilitate the development of agriculture while ensuring that natural waters, wildlife habitats and conservation areas are protected from pollution.

10.6.6 Ecosystems and Biodiversity

Key Risks	Associated Objectives
• Increase in prevalence of invasive species in warmer temperatures, both through the spread of existing and introduction of new. Increased risk of loss of native species	**INF OBJ 22:** To ensure flood relief measures are suitably designed to protect the conservation objectives of Natura 2000 sites, and to avoid direct or indirect impacts upon qualifying interests or Natura 2000 sites that would result in adverse effects on site integrity.

• Increase in risk of forest fires during drought episodes • Increased risk of damage and loss to habitats during flood events and a significant increase in erosion rates • Ecosystems in the coastal zone (and the services/functions they provide) are at a high risk of loss/damage	**INF OBJ 23:** To protect and enhance the County's floodplains, wetlands and coastal areas subject to flooding as "green infrastructure" which provide space for storage and conveyance of floodwater, and ensure that development does not impact on important wetland sites within river/stream catchments. **INF OBJ 31:** To employ soft engineering techniques as an alternative to hard coastal defence works, as appropriate. **INF OBJ 32 :** To Identify, prioritise and implement necessary coastal protection works subject to the availability of resources, whilst ensuring a high level of protection for natural habitats and features, and to ensure due regard is paid to visual and other environmental considerations in the design of any such coastal protection works. This will include the identification of coastal areas sensitive to climate change and consequent coastal erosion. **INF OBJ 35:** To prohibit development along the coast outside existing urban areas where such development is not adequately safeguarded over the lifetime of the development without the need to construct additional coastal defences. **HER POL 45:** To ensure that peatland areas which are designated (or proposed for designation) as NHAs, SACs or SPAs are conserved for their ecological, climate regulation, archaeological, cultural and educational significance. **HER OBJ 43:** To maintain and enhance our natural coastal defences to increase resilience to climate change. **HER OBJ 44:** To investigate how the County's natural coastal defences, can be enhanced to increase climate resilience of our coastal communities. **HER POL 43:** To promote best practice in the control of invasive species in the carrying out its functions in association with relevant authorities including TII and the Department of Transport, Tourism and Sport. **HER POL 44:** To require all development proposals to address the presence or absence of invasive alien species on proposed development sites and (if necessary) require applicants to prepare and submit an *Invasive Species Management Plan* where such a species exists to comply with the provisions of the *European Communities (Birds and Natural Habitats) Regulations 2011-2015.*

10.6.7 Heritage and Tourism

Key Risks	Associated Objectives
• Heat stress in plants may result in lower crop yields. Warmer temperatures may also introduce new and invasive pests and diseases for both crops and livestock • Increased risk of erosion and damage to heritage sites, decreasing tourist attraction following heavy rainfall and storm events • Increased risk of land damage/footpath erosion around popular sites • Loss/damage of coastal attractions-particularly for more vulnerable small businesses which are clustered here • Damage/closure to roads/rail, both within the county and in the surrounding areas, may limit the accessibility of Meath	**HER OBJ 4:** To encourage the management and maintenance of the County's archaeological heritage, including historic burial grounds[2], in accordance with best conservation practice that considers the impact of climate change **MOV OBJ 55:** To undertake a risk assessment of County Meath transport infrastructure to identify areas at high risk of climate change impacts (e.g. flooding), over the life of the Development Plan. **MOV OBJ 56:** To ensure that any transport maintenance and improvement strategies ensure future climates are considered, to allow appropriate selection of materials and prioritisation of road for repair

[2] Heritage Council (2011). Guidance for the Care, Conservation and Recording of Historic Graveyard