

Climate Change Audit

2016 - 2022

WICKLOW COUNTY DEVELOPMENT PLAN



Comhairle Contae Chill Mhantáin

APPENDIX 7

CLIMATE CHANGE AUDIT

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SECTION ONE

1.1 Introduction

This appendix sets out the County Development Plan's land use framework approach to mitigation and adaptation to climate change, with the overall objective, in line with the Planning and Development Act 2000 (as amended), of addressing the necessity of adaptation to climate change and reducing anthropogenic greenhouse gas emissions. Section 1 of the audit sets out 'what is climate change' and the strategic context of climate change strategies and policies, with Section 2 presenting an audit of how the plan has integrated mitigation and adaptation to climate change into its policies and objectives.

While the County Development Plan separately deals with the areas of flooding and alternative energy, mitigation and adaptation to the climate change challenge and the relevant development plan objectives are addressed in Chapter 9, Section 9.5 of the main plan document on 'Climate change and energy'. Section 9.5 along with Appendix 11 'Strategic Flood Risk Assessment' and Appendix 9 'Strategic Environmental Assessment' should also be referred to.

1.2 What is Climate Change?

Climate change refers to any change in the climate over time due to change as a result of human activity. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as '*a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.*' The planet is warming up with the 'greenhouse' effect, this is as a result of the increase in Greenhouse Gas Emissions (GHG) causing an increase in global temperatures; this is the main source of the cause of climate change. Many human activities can generate greenhouse gases: manufacturing, farming, running your car or heating your home. The resulting gases are building up in the atmosphere, trapping more and more heat from the sun and slowly warming the planet. This warming is already disrupting climate patterns, and without strong counter-measures this will intensify.

Ireland's climate is changing and the scientific consensus is that further changes are on the way. Incremental changes in climate are already evident, including changes in our average temperature, wetter winters, more intense rainfall, more flooding, summer droughts and rising sea levels, as well as subtle changes to our ecosystem. The impacts are uncertain but concerted action is required to prepare for and deal with these changes in Ireland. We need to implement measures that will help the public to adapt to these changes. An effective response to climate change must combine mitigation and adaptation.

Mitigation

Mitigation means *any human intervention aimed at reducing harmful influences on the earth's climate system, including action aimed at reducing emissions and creating or enhancing sinks*¹.

Adaptation

Adaptation to the effects of climate change requires action to both manage the risks and to make adjustments to reduce our vulnerabilities. It is an essential component of our long term, strategic economic planning.

"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*²

1.3 Strategic Context

Climate change is a global issue and is a matter for all levels of governance to address, from an international level to a local level. A key overall goal is to restrict new emissions of GHG and to enhance carbon sinks, with climate change mitigation and adaptation policy the key tool to facilitate the required action to address climate change. Mitigation requires human action to reduce the levels of GHG emissions being released into the air and adaptation involves taking steps to adjust human and natural systems in response to existing or anticipated climatic change. Scientific research into the impacts of climate change for Ireland has been underway for some time by the Environmental Protection Agency (EPA), DoECLG, DCENR and others. The information gathered provides a broad understanding of the likely temporal and spatial distribution of changes in temperature, precipitation, sea level and flood risk, all which is now beginning to coalesce and this provides the evidence base necessary to inform climate change strategies.

1.3.1 United Nations Framework Convention on Climate Change (UNFCCC)

A number of international climate change agreements, frameworks and programmes have been agreed that provide information on impacts, vulnerability, adaptation to climate change and assessment of these, helping countries make informed decisions on practical adaptation actions and measures to respond to climate change on a sound scientific, technical and socio-economic basis, taking into account current and future climate change and variability. There are a number of bodies that work at a global level understanding climate change. The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. It is an international agreement linked to the United Nations Framework Convention on Climate Change. It sets binding targets for 37 industrialised countries and the European Community for reducing emissions. 'The Paris Agreement' was agreed on 12 December 2015; all 196 parties to 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

¹ Source – Climate Action and Low Carbon Development Act 2015

² Source – Climate Action and Low Carbon Development Act 2015

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.

1.3.2 European Union Adaptation Strategy

Through our membership of the European Union, Ireland is pro-actively supporting ongoing efforts under the United Nations Framework Convention on Climate Change to reach agreement on a comprehensive, global response to the threat of climate change. The EU Adaptation Strategy was published in April 2013. The strategy aims to make Europe more climate resilient. By taking a coherent approach and providing for improved coordination, it will enhance the preparedness and capacity of all governance levels to respond to the impacts of climate change. The Strategy focus on three key objectives:

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

EU adaptation actions include mainstreaming of climate change (mitigation and adaptation) into EU sector policies and funds, including marine and inland water issues, forestry, agriculture, biodiversity, infrastructure and buildings, but also migration and social issues. The EU policy framework on climate change adaptation has guided our national approach as we prepare for the anticipated changes in Ireland's climate.

1.3.3 National Climate Policy

The Climate Action and Low Carbon Development Act 2015 sets out that the manner in which the transition towards a low carbon economy will be achieved through a 'National Low Carbon Transition and Mitigation Plan' (National Mitigation Plan), to lower Ireland's level of greenhouse emissions and a 'National Climate Change Adaptation Framework' (National Adaptation Framework), to provide for responses to changes caused by climate change. These two plans are due to be drafted and submitted to the Government for approval in 2017. They will be renewed every five years and are required to include tailored sectoral plans. The Act makes provision to ensure that public bodies consider fully, and integrate, the objectives set out in the National Low-Carbon Roadmap, national adaptation framework and sectoral adaptation plans in their strategic planning and day-to-day decision making and take the necessary steps in respect of mitigation and adaptation in their areas of responsibility.

The Planning and Development Act 2000 (as amended) sets out objectives that are to be included in the development plan. With regard to climate change the following objective is set out in the Act:

Section 10 (2) (n) - the promotion of sustainable settlement and transportation strategies in urban and rural areas including the promotion of measures to—

- (i) reduce energy demand in response to the likelihood of increases in energy and other costs due to long-term decline in non-renewable resources,
- (ii) reduce anthropogenic greenhouse gas emissions, and
- (iii) address the necessity of adaptation to climate change;

in particular, having regard to location, layout and design of new development;

1.3.4 National Climate Change Adaptation Framework 2012 (NCCAF)

This “National Climate Change Adaptation Framework” provides the policy context for a strategic national adaptation response to climate change in Ireland and is designed to evolve over time as planning and implementation progresses, and as further evidence becomes available. The critical importance of planning and development measures in the overall strategic approach to adaptation to climate change is recognised here and the role of the spatial planning process, with full engagement of key stakeholders, in providing an established means through which to implement and integrate climate change objectives, including adaptation, at 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, all of which are used in this audit assessment as a basis for ensuring this development plan has integrated adaptation to climate change into the land use policies and objectives of the plan.

1.3.5 Regional Planning Guidelines

The RPGs are cognisant of the need to promote measures and actions which seek to address the issue of climate change and its potential impacts on current and future planning. The combined outcome of the integrated policy approach is therefore to create a sustainable region with the capability of changing in response to stress without compromising core functions, a region which could be described in terms of climate change as flexible and adaptable.

A key issue for the RPGs is the importance of climate change and environmental issues and potential impacts at a more intrinsic level. The RPGs take a “thinking globally and acting locally” approach with the policies and recommendations contained in the RPGs are designed to implement the following:

‘promote settlement patterns which are sustainable, cognisant and respectful of their surrounding environment; maximise efficiencies in water service provision, energy supply and waste management; promote sustainable economic growth, low carbon technology and a green business focus; improve transport provision facilitating a modal change to more sustainable and climate friendly modes of transport; increase the supply and provision of renewable energies; and, bolster the robustness and integrity of local and regional ecosystems through a regional green infrastructure strategy’.

Regional Climate Change Strategic Policy (CLIP1) states the following:

CLIP1

While recognising the broad extent of processes which impact on the dynamics of climate change, planning authorities, in so far as possible, should nonetheless seek to provide for the integration of climate change considerations, based on best scientific evidence, into all policy areas relevant to them, including development plans, flood risk assessments, biodiversity and heritage plans and application of relevant particulars of associated plans and projects such as the River Basin Management Plans and ICZM. The development of Local Climate Change Strategies and/or associated Energy Action Plans by the local authorities is supported by the Regional Planning Guidelines.

1.3.6 Local level approach

The NCCAF provides guidance on the role of Local Authorities in local climate change adaptation and guidance on the preparation of Local Adaptation Plans. National guidance in relation to the preparation of Climate Change Adaptation Plans is still to be prepared. Upon publication of the national guidelines, it is envisaged that the preparation of a Wicklow County Adaptation Strategy will, in due course, be carried out by an interdisciplinary team, in liaison with relevant stakeholders. After the publication of the Wicklow County Adaptation Strategy, if deemed necessary, the County Development Plan will be reviewed and varied where necessary to integrate the strategy into the plan.

The 'National Low Carbon Transition and Mitigation Plan' and 'National Climate Change Adaptation Framework' (when approved by government) will also provide more clarity and details on local actions required to address Climate Change.

1.4 Climate Change Goals

The table below summarise the climate change mitigation targets and goals for Ireland as set out under national and international commitments.

United Nations
<p>Kyoto Protocol (UNFCCC, 1997)- Limit the increased green house gas emissions to a target of 13% above 1990 levels by 2012</p> <p>Copenhagen Accord (2009) - Endorses the continuation of the Kyoto Protocol (not legally binding)</p> <p>The Paris Agreement (2015) - 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</p>
European Union
<p>European Plan on Climate Change (2008), focuses on emissions cuts, renewables and energy efficiency</p> <ul style="list-style-type: none"> ▪ To reduce emissions of greenhouse gases by 20% by 2020 taking 1990 emissions as the reference ▪ To increase energy efficiency to save 20% of EU energy consumption by 2020 ▪ To reach 20% of renewable energy in the total energy consumption in the EU by 2020 ▪ To reach 10% of biofuels in the total consumption of vehicles by 2020 <p>2030 Climate and Energy Framework (2014). This builds on the 2020 Climate Change and Energy Package:</p> <ul style="list-style-type: none"> ▪ To reduce emissions of greenhouse gases by 40% by 2030 taking 1990

emissions as the reference

- To increase energy efficiency to save 27% of EU energy consumption by 2030
- To reach 27% of renewable energy in the total energy consumption in the EU by 2030

National

National Climate Change Act 2015 - Low-Carbon Roadmap

Primary objective to bring a clear and strong focus on both the challenges and the opportunities of transition to a successful low-carbon future. The following plans are proposed under the Act:

- National Low Carbon Transition and Mitigation Plan (National Mitigation Plan) (due 2017)
- National Climate Change Adaptation Framework' (National Adaptation Framework (due 2017 under 2015 Act),
- National Adaptation Framework (NCCAF, published December 2012)
- Sectoral Adaptation Plans
- National Low-Carbon Roadmap

1.5 Wicklow County Development Plan Approach to Climate Change

Climate change mitigation and adaptation has been integrated into the County Development Plan in a proactive way with the inclusion of relevant policy; a strategic core strategy goal incorporating climate change mitigation and adaptation into land-use planning, land-use policies and objectives that where relevant incorporate objectives that both **mitigate** against the **source** of the causes of climate change and **adapt** to reduce the **impacts** of climate change. Given the development plan's remit as a land use framework not all sources and impacts are addressed in the plan objectives. It is envisaged that a future 'Wicklow County Adaptation Strategy' will have a broader remit in its approach to climate change mitigation and adaptation and will address all aspects of Climate Change, like promotion of climate change adaptation and details of actions required. The Strategic Environmental Assessment also has a key role to play in climate change mitigation and adaptation.

Strategic Goal 10 of the Core Strategy seeks;

To address the climate change challenge, as a plan dynamic, throughout the County Plan, directly in the areas of flooding and renewable energy, and indirectly by integrating climate change and sustainable development into statements of plan policy, strategies and objectives.

1.6 Climate Change Objectives

- 1 To have regard to the EU and national legislation and strategies on climate change in the decision making process, in order to contribute to a reduction in and avoidance of human induced climate change.
- 2 To support the government programme for the development of national climate change legislation.
- 3 To implement the 'National Climate Change Adaptation Framework - Building Resilience to Climate Change' by supporting the preparation of a Climate Change Adaptation Plan.
- 4 To support the development of a Wicklow County Adaptation Strategy and to support the land use aspects of the strategy.
- 5 To have regard to climate change mitigation and adaptation in assessing all large scale development including all critical transport and energy infrastructural developments.

SECTION TWO

2.0 Integrating mitigation and adaptation into the County Development Plan

Climate change has been addressed directly in Chapter 9 and indirectly throughout the plan by integrating climate change mitigation and adaptation into the plan objectives. The approach taken in assessing whether the plan objectives have taken on board climate change mitigation and adaptation is to initially identify what is causing climate change and to ensure the development plan has incorporated objectives that mitigate the source of the causes and secondly to identify the impacts of climate change and to ensure the plan objectives adapt to the impacts of climate change.

2.1 The source and impacts of Climate Change

The planet is warming up with the greenhouse effect. The greenhouse effect is a result of the increase in Greenhouse Gas Emissions (GHG) causing an increase in global temperatures; this is the main **source** of the cause of climate change. In Ireland the EPA are responsible for reporting on GHG emissions to the EU and they have identified six key sectors as the source of GHG emissions. The sectors are agriculture, energy, transport, industry & commerce, residential and waste. There is a need to **mitigate** against GHG emissions.

The NCCAF identifies 5 climate sensitive sectors that climate change **impacts** upon and there is a need to **adapt** to these impacts. The sectors are:

- (a) Water, Coasts and Marine,
- (b) Agriculture, Forestry and Biodiversity,
- (c) Energy, Transport, Communications, Business and Industry (Insurance),
- (d) Heritage, and
- (e) Health.

This section presents the source of GHGs and the impacts of climate change and shows the development plan objectives incorporated in the plan that mitigate against the source of GHGs and adapt to the impacts of climate change.

2.1.1 The source of Climate Change

Greenhouse gas emissions are the main **source** of the cause of climate change. Many of these gases occur naturally and are necessary to keep the earth at the global temperature suitable for ecosystems and life, but human activity is increasing the concentrations of some of them in the atmosphere, in particular:

- carbon dioxide (CO₂)
- methane
- nitrous oxide
- fluorinated gases (F-gases)

CO₂ is the greenhouse gas most commonly produced by human activities and it is responsible for 64% of man-made global warming. Its concentration in the atmosphere is currently 40% higher than it was when industrialisation began. Other greenhouse gases are emitted in smaller quantities, but they trap heat far more effectively than CO₂, and in some cases are thousands of times stronger. Methane is responsible for 17% of man-made global warming, nitrous oxide for 6%³.

³ Source – European Commission – Climate Action, ec.europa.eu

The Environmental Protection Agency is responsible for annually compiling the inventories of greenhouse gas emissions for Ireland and for reporting the estimates to the European Commission and the UNFCCC. The latest publication on GHG emissions for Ireland are from 2012 (EPA, published April 2014). For 2012, total national greenhouse gas emissions are estimated to be 58.53 million tonnes carbon dioxide equivalent (Mt CO₂eq).

The following six sectors⁴ have been identified by the Department of Environment, Community and Local Government and EPA as the key sectors in analysing GHG emissions in Ireland, this table presents the breakdown of emissions in Ireland for 2012 by sector:

GHG Emissions in Ireland 2012		
	Sector	%
1.	Agriculture	31.9
2.	Energy	21.9
3.	Transport	18.6
4.	Industry and Commercial	15.3
5.	Residential	10.6
6.	Waste	1.7

The current global average temperature is 0.85°C higher than it was in the late 19th century. Each of the past three decades has been warmer than any preceding decade since records began in 1850. The world's leading climate scientists think human activities are almost certainly the main cause of the warming observed since the middle of the 20th century. An increase of 2°C compared to the temperature in pre-industrial times is seen by scientists as the threshold beyond which there is a much higher risk that dangerous and possibly catastrophic changes in the global environment will occur. For this reason, the international community has recognised the need to keep warming below 2°C⁵.

2.1.2 Mitigation to reduce the source of Climate Change

GHG emissions are the main source of climate change therefore it is key to reduce these emissions to mitigate against climate change. The six sectors identified by the Department of Environment and EPA as the source of GHG emissions in Ireland are diverse and wide ranging. Different government departments and state bodies have different strategies and actions in place to proactively address these sectors. The County Development Plan has an important role to play in addressing any land use and planning aspect of mitigation to reduce the sources of GHG emissions. The six sectors identified in section 2.1.1 are used here to ensure the county development plan appropriately addresses mitigation to climate change.

⁴ National Climate Change Strategy 2007 – 2012, DoECLG

⁵ Source – European Commission – Climate Action, ec.europa.eu

Source 1. Agriculture Sector

Increasing livestock farming - Cows and sheep produce large amounts of methane when they digest their food. The intensification of farming practices and the removal of farming quotas all lead to the increase of livestock on the farm.

Use of fertilisers containing nitrogen – The use of fertilizer on land is common practice in Ireland for food production for humans and animals. Carbon dioxide, methane and nitrous oxide are produced during the manufacture of nitrogen fertiliser and Nitrogen fertilizer can be converted by soil bacteria to nitrous oxide.

Deforestation - Trees regulate the climate by absorbing CO₂ from the atmosphere. When they are cut down the beneficial effect is lost and the carbon stored in the trees is released into the atmosphere.

Agriculture is a significant source of greenhouse gas and reductions through improved environmental management on farms, with reduced fertilizer use and better manure management is required. Adapting to climate change within the sectors of agriculture and forestry can make a big contribution to reducing greenhouse gases with adaptation measures like expansion of forestry and planting energy-crops.

Mitigation in the County Development Plan	Relevant Section/ Objectives
<p>The County Development Plan provides policy, objective and standards that promote and facilitate an environmentally sustainable approach to practicing agriculture.</p>	<ul style="list-style-type: none"> ✓ Key Strategic Goal 6 – Enhance the rural area ✓ SS1, SS8 ✓ Section 8.2.2 Wicklow's Rural Economy, Agriculture, objectives AGR1, AGR2, AGR4, AGR5 ✓ Section 8.2.2 Wicklow's Rural Economy, Forestry, objectives FTY1, FTY2, FTY7 ✓ Development & Design Standards – Section 3 Business, Commercial and Employment Developments – Agriculture – Environmental Control ✓ 10.3.3 Woodlands, Trees & Hedgerows ✓ Development and Design Standards, Section 9 Waste and Emissions – Agriculture ✓ Soils & Geology, Objective NH25

Source 2. Energy Sector (production of electricity)

The source of GHGs from energy sector is essentially from the processes used for the production of electricity. The burning of fossil fuels, coal, oil, peat and gas producing carbon dioxide and nitrous oxide, for electricity generation is a principal emission source. Oil / gas refining is also a key source of GHG emissions. The heavy reliance on fossil fuels must be reduced with the expansion of the use of renewable energies, like wind, wave, solar and biomass.

Mitigation in the County Development Plan

The County Development Plan provides policy, objective and standards that promote and facilitate the development of alternative and renewable sources of electricity to meet the electricity demand with policy and objectives for reduction in electricity use, wind energy, solar energy, hydro energy, bio-energy and small scale renewable electricity generation.

Relevant Section/ Objectives

- ✓ Key Strategic Goal 7 – Infrastructure
- ✓ Key Strategic Goal 8 – Communities
- ✓ Chapter 5, FTY7
- ✓ Chapter 9.4.3.1 Electricity
- ✓ Chapter 9.4 Wind Energy Objectives CCE6, CCE7, CCE8
- ✓ Chapter 9.4 Solar Energy Objectives CCE9, CCE10, CCE11
- ✓ Chapter 9.4 Hydro Energy Objectives CCE12, CCE13
- ✓ Chapter 9.4 Bio-Energy Objectives CCE14, CCE15
- ✓ Chapter 9.4 Small-scale renewable electricity generation Objectives CCE16
- ✓ Chapter 9.4 Electricity Demand Objectives CCE20, CCE21

Source 3. Transport Sector

Transport emissions are a principal emission source. Biofuels have been introduced to displace petrol and diesel use in the transport sector. The combustion of fossil fuels for road, rail, sea and air navigation produces carbon dioxide and nitrous oxide. Public transport needs to be expanded and improved to encourage a switch from private cars.

Mitigation in the County Development Plan	Relevant Section/ Objectives
<p>The County Development Plan provides policy, objective and standards that promote and facilitate a sustainable approach to transportation with strategies and objectives in place to facilitate the necessary actions, such as:</p> <ul style="list-style-type: none"> - reduction in the need to use vehicles, increased opportunities for walking and cycling; - reduction in journey length and times, reduction in congestion; - higher intensity of use of public transport; - development and increased usage of alternative vehicle fuel sources, such as electricity, hydrogen and biofuels. 	<ul style="list-style-type: none"> ✓ Key Strategic Goal 3 – Transport ✓ Key Strategic Goal 7 – Infrastructure ✓ SS3 ✓ HD5, HD11, HD7 ✓ Chapter 5 EMP1, EMP5 ✓ Development & Design Standards – Section 3 Business, Commercial and Employment Developments – Business/ industrial developments – Mobility management plans ✓ Chapter 9.4 Transport energy objectives CCE22, CCE23 and CCE24 ✓ Chapter 9.1 Roads & Transportation Strategy ✓ Chapter 9.1 Public Transport Objectives ✓ Chapter 9.1 Ports, Harbours, Marinas & Aviation, Objectives TR40

Source 4. Industry and Commercial Sector (activities and processes)

The source of GHGs from the industrial and commercial sectors is essentially from the activities and processes used in the manufacturing process. The combustion emissions from industrial and commercial activities, industrial process emissions (e.g. cement manufacturing) and fluorinated gas emissions all contribute to GHG emissions. Emissions are produced from industrial categories like non-ferrous metals, chemicals, food and drink. Fossil fuels are also used heating and cooling of industrial and commercial buildings.

Energy efficient gains are achievable in this sector with low-carbon technology and eco-efficient technology opportunities.

Mitigation in the County Development Plan	Relevant Section/ Objectives
<p>The County Development Plan provides policy, objective and standards that promote and facilitate the development of industry and commercial developments that are environmentally sustainable in their location, design and daily workings.</p>	<ul style="list-style-type: none"> ✓ Chapter 5 – Objectives for Economic Development EMP4, EMP16, EMP 17 ✓ Development and Design Standards – Section 3 Business, commercial and employment development - Lighting, Noise and Air emissions ✓ Chapter 5- Extractive Industry, Objective EX1 ✓ Development & Design Standards – Section 3 Business, Commercial and Employment Developments – Commercial/industrial development in rural areas ✓ Centres and Retail Objectives, RT10, RT11, RT23, RT32 ✓ Chapter 9.3 Emissions to air ✓ 9.5.3 Heating Objectives CCE25, CCE26 and CCE27 ✓ Development and Design Standards Section 10 Design standards for improved energy efficiency ✓ Chapter 9.3 Hazardous Waste & Emissions, Objectives ✓ Chapter 9.3 Emissions to air objectives WE9, WE10 and WE11 ✓ Design and Development Standards – Section 9 Waste and emissions

Source 5. Residential Sector (heating of homes)

The source of GHGs from the residential sector is essentially from the activities and processes used in the heating of the home. Combustion of fossil fuels, coal, kerosene, oil, peat and gas for domestic heating. The process produces carbon dioxide and nitrous oxide.

Building energy standards in residential buildings need to be further expanded with increased further incentives for reduction and efficiency in daily electricity and energy usage.

Mitigation in the County Development Plan	Relevant Section/ Objectives
<p>The County Development Plan provides policy, objective and standards that promote and facilitate energy efficient building design, environmentally sustainable layout and locations.</p>	<ul style="list-style-type: none"> ✓ Key Strategic Goal 4 – Housing ✓ Key Strategic Goal 8 – Communities ✓ HD3, HD4 ✓ Development and Design Standards – Section 1 Mixed use and housing developments in urban areas - green issues ✓ 9.4.3.3 Heating Objectives CCE25, CCE26 and CCE27 ✓ Development and Design Standards – Section 10 Energy and Telecommunications – Design Standards for improved energy efficiency

Source 6. Waste

Emissions from the waste sector; primarily methane gas released from landfills and urban waste-water treatment plants, methane emitted at landfill, landfill gas utilisation and on-site flaring continues produces methane, solid waste disposal, wastewater treatment and waste incineration all contribute to GHG emissions.

Schemes in support of waste prevention, minimisation, reuse and recycling need to be expanded. There is also the potential for the use of waste biomass in energy production and of waste-to-energy projects.

Mitigation in the County Development Plan

The County Development Plan provides policy, objective and standards that promote and facilitate the provision of high quality, environmentally sustainable waste disposal, treatment and incineration.

Relevant Section/ Objectives

- ✓ Key Strategic Goal 7 – Infrastructure
- ✓ Settlement Strategy Objectives SS1 SS2 SS3
- ✓ Housing Objectives - HD8
- ✓ Rural development design standards
- ✓ Chapter 9.2 Waste Water Objectives
- ✓ Chapter 9.3 Solid Waste Management Objectives

2.1.3 Identifying the impacts of Climate Change

The National Climate Change Adaptation Framework 2012 identifies 5 climate sensitive sectors⁶ that climate change **impacts** upon. These 5 sectors have been used as the basis for the audit of whether the County Development Plan adapt to the impacts of climate change in these sectors. Given the plan's remit as a land use framework, the impacts of climate change on 'settlements', 'buildings' and 'infrastructure' have also been incorporated into the climate sensitive sectors that have been audited here. The sectors covered here are as follows:

IMPACTS (Sectors that are vulnerable and need to adapt to Climate Change)
CLIMATE SENSITIVE SECTORS
1. Water, Coasts and Marine
2. Agriculture, Forestry and Biodiversity
3. Energy
4. Infrastructure; Transport, Communications
5. Settlements; Buildings, Residential, Retail, Community, Business and Industry
6. Heritage
7. Health

2.1.4 Adaptation to the impacts of Climate Change

The seven sectors identified as climate sensitive sectors are broad and wide ranging, many of the sectors are the same as the sectors identified as being the source of GHG emissions. Different government departments and state bodies are responsible for many of these sectors and they have different strategies and actions already in place to proactively address these sectors. The County Development Plan has an important role to play in addressing any land-use and planning aspect of adaptation to the impact of climate change in these sectors. The seven climate sensitive sectors identified in section 2.1.4 are used here to ensure the county development plan appropriately addresses adaptation to climate change.

⁶ The NCCAF identifies the following sectors; (a) Water, Coast and Marine, (b) Agriculture, Forestry and Biodiversity, (c) Energy, Transport, Communications and Business and Industry (Insurance), (d) Heritage and (e) Human Health

1. Impact on Water, Coasts and Marine

Water

- Drier summers could make water resources vulnerable, especially in the East and South East.
- Water shortages in the summer leading to greater pressure on groundwater sources.
- Increased pressure on sewer networks and water purification during extremes.
- Increased microbial activity increase.
- Increased risk of flooding in river systems which could lead to a risk of contamination and pollution of water supplies

Coast and Marine

- Stress to aquaculture/fish stocks due to extreme water temperature.
- Local flooding in estuarine regions.
- Change in sea level to worsen impacts of changing storm and wave patterns in coast areas.
- Coastal wetlands, flood plains and estuaries at risk from salt water.
- Coastal erosion and danger to coastal settlements and infrastructure.

Relevant Section / Objectives

- ✓ Key Strategic Goal 9 – Heritage
- ✓ Key Strategic Goal 10 – Climate Change
- ✓ Development and Design Standards – Section 1 Mixed use and housing developments in urban areas - Flood routing
- ✓ Chapter 9.2: Water Infrastructure and Flooding
- ✓ Chapter 9.2 Waste water objectives
- ✓ Chapter 9.2 Flood Management objectives
- ✓ Chapter 10.3 Natural Heritage - Water Framework Directive & Groundwater Directive
- ✓ Chapter 10.3.4 Water Systems Objectives
- ✓ Chapter 11 Coastal Zone Management Objectives CZM1-CZM7

2. Impact on Agriculture, Forestry and Biodiversity

Agriculture

- Warmer temperatures will increase the risk of pest survival and could attract new pests.
- Improved conditions for plant growth may increase yields; however, risks to water availability may offset any gain.
- Potential benefits for animal husbandry related to shorter housing periods.
- Increased drainage and irrigation requirements.
- Fewer cold snaps will result in less frost damage to spring crops.

Forestry

- Increased productivity in forestry but also increased threat of pests and pathogens.
- Timber quality impacted due to rapid growth.

Biodiversity

- Phenological studies across Europe suggest both animals and plants respond to temperature changes in a variety of ways; this will have implications for ecosystems.
- Many ecological systems may suffer increased stresses due to heat waves and extreme events.
- Potential arrival of exotic and alien species.
- Destruction of fragile ecosystems; in particular coastal ecosystems could be more vulnerable.
- Increased pathogens and pests.
- Disruption of food web and stress on breeding cycles.
- Species decline or extinction.

Relevant Section/ Objectives

- ✓ Key Strategic Goal 6 – Enhance the rural area
- ✓ Key Strategic Goal 7 – Infrastructure
- ✓ Key Strategic Goal 9 – Heritage
- ✓ Key Strategic Goal 10 – Climate Change
- ✓ Chapter 3 Settlement Strategy objective SS8
- ✓ Chapter 10 Heritage – Biodiversity objectives NH1-NH12
- ✓ Chapter 10 Heritage – Woodland, trees and hedgerows objectives NH14-NH19
- ✓ Chapter 10 Heritage – Soils and Geology objectives NH25-NH30
- ✓ Chapter 10 Heritage – Green Infrastructure Objectives NH31-NH38

3. Impact on Energy

- Possible increase in summer electricity demand for air conditioning.
- Increased solar power generation potential coinciding with lower wind generation potential.
- Water cooling of power stations will be impacted.
- Heating energy demand.
- Cooling energy demand.
- Potential for greater damage to wave and tidal systems in extreme events.
- Threat of damage to energy infrastructure in extreme events.

Relevant Section/ Objectives

- ✓ Key Strategic Goal 7 – Infrastructure
- ✓ Key Strategic Goal 10 – Climate Change
- ✓ Chapter 9.4.3.1 Electricity
- ✓ Chapter 9 Wind Energy Objectives
- ✓ Chapter 9 Solar Energy Objectives
- ✓ Chapter 9 Hydro Energy Objectives
- ✓ Chapter 9 Bio-Energy Objectives
- ✓ Chapter 9 Small-scale renewable electricity generation Objectives
- ✓ Chapter 9 Electricity Demand Objectives

4. Impact on Infrastructure; Transport, Communications, Sanitary Services

- There is significant potential for impacts on transport infrastructure, especially from storms and flooding.
- Dangerous road conditions.
- Heavier driving rain/snow/hail.
- Infrastructure in coastal areas could be severely threatened e.g. rail network could be vulnerable.
- Increase risk of storm and flood damage to infrastructure systems.
- Reduced water availability/ shortage.
- Reduced water quality/ waste water output quality.
- Threat of damage to communications infrastructure pipelines/masts (loss of network)
- Shipping navigation problems/ impact on tidal ports.

Relevant Section/ Objectives

- ✓ Key Strategic Goal 3 – Transport
- ✓ Key Strategic Goal 7 – Infrastructure
- ✓ Key Strategic Goal 10 – Climate Change
- ✓ Chapter 3 Settlement Strategy
- ✓ Development and Design Standards – Section 3 Business, commercial and employment developments - Mobility Management Plans
- ✓ Chapter 9.1 Roads and Transportation Strategy
- ✓ Chapter 9.1 Public Transport Objectives
- ✓ Chapter 9.1 Ports, Harbours, Marinas & Aviation, Objectives
- ✓ Chapter 9.4 Transport energy objectives
- ✓ Section 14.4 Telecommunications objectives

5. Impact on Settlements; Buildings, Business and Industry

- Industries with high water demand will be impacted.
- Increased risk of storm and flood damage to structures.
- Reduction in productivity as a result of employees' inability to get to work, as a result of extreme events.
- Insurance availability and cost.
- Increased temperatures in urban areas
- Reduced air quality
- Increased energy leakage
- Water damage to buildings

Relevant Section/ Objectives

- ✓ Key Strategic Goal 3 – Transport
- ✓ Key Strategic Goal 4 – Housing
- ✓ Key Strategic Goal 5 – Vibrant Settlements
- ✓ Key Strategic Goal 6 – Enhance the rural Area
- ✓ Key Strategic Goal 8 – Communities
- ✓ Key Strategic Goal 10 – Climate Change
- ✓ Chapter 3 Settlement Strategy
- ✓ Chapter 4 Housing HD3
- ✓ Development and Design Standards – Section 1 Mixed use and housing developments in urban areas – Green Issues
- ✓ Chapter 5 – Economic Development – EMP1, EMP5

6. Impact on Heritage

- Loss/change of certain natural heritage assets
- Loss of biodiversity in built up areas
- Decrease in tourist numbers to certain areas
- Increase rainfall

Relevant Section/ Objectives

- ✓ Key Strategic Goal 7 – Infrastructure
- ✓ Key Strategic Goal 9 – Heritage
- ✓ Key Strategic Goal 10 – Climate Change
- ✓ Chapter 3 Settlement Strategy, Objective SS8
- ✓ Chapter 7 Tourism
- ✓ Chapter 7.8 Tourism & Recreation Themes and Products Objectives
- ✓ Chapter 10.3.7 Recreation Use of Natural Resources Objectives
- ✓ Chapter 10 Heritage – Landscape Characterisation Objectives

7. Impact on Human Health

- Decline in winter deaths as a result of milder winters.
- Changing infectious disease patterns due to changes in ecosystems.
- Increased water temperatures leading to possible water pollution illness.
- An increase in skin cancers and heat wave related morbidity and mortality.
- Increase in food borne diseases.
- Increase in psychological problems relating to extreme weather events
- Potential population displacement with associated health risks.
- Spread of disease
- Extreme weather events
- Increase in temperature related illness

Relevant Section/ Objectives

The development plan does not directly deal with human health as it is a land use framework however the plan objectives, the core strategy and Strategic Goal 10 all seek to facilitate the provision of an environment that allows for a high quality of life standard which in turn has an impact on human health.

3.0 Conclusion

It is considered that the Wicklow County Development Plan 2016 – 2022, as a land-use plan, addresses the challenges of mitigation and adaptation to climate change from a land-use perspective. This audit clearly shows how the plan has integrated measures to address climate change mitigation and adaptation into the plan's core strategy, policies and objectives.

It is recommended that after the approval by Government of the 'National Low Carbon Transition and Mitigation Plan' and the 'National Climate Change Adaptation Framework' and a Local Adaptation Plan is adopted, a review of the County Development Plan should be undertaken to ensure the plan policies are in compliance with the provision of the Act and if not, then consideration should be given to whether a variation of the county plan is required.