8

Climate Action, Flood Risk and Transition to Low Carbon Economy

8.1 Introduction

Our climate is changing rapidly and the effects on the country and on our lives is becoming more evident. The response to the effects are wide ranging and have economic, environmental and social costs associated with them. The business as usual model, cannot continue and there is a need to reconsider the approach to the way we live our daily lives, in terms of reducing environmental impacts and our carbon footprint. Human activities are increasingly influencing climate change, spurred on by both the need for climate action and energy security. In addition, the question of renewable energy production has assumed greater importance over the last decade.

This chapter will set out the Draft Plan's position in relation to these key issues, in terms of a policy approach to the transition to a low carbon economy and to Limerick becoming climate resilient, with a strong emphasis on reduction in energy demand and emissions, through a combination of effective mitigation and adaptation responses to climate change. The Draft Plan sets out the future growth for Limerick in the core strategy, which will be concentrated in the built up footprint of Limerick's City, towns and villages, in order to achieve compact growth. Developing the 10 minute city/town concept is a key focus for development within Limerick, with reduced travel distances between home, work, education and services and enhanced active modal share, with an overall reduction in emissions. The integration of land use and transport planning and aligning policies are a key element of the Draft Plan.

There has been much commentary on climate change in Ireland over the last twenty years or so and in the last few years the effects have become clearer. One of the most obvious is increased temperature, with reductions in cold days and longer growing seasons. Temperatures have risen by 0.7°C between 1890 and 2008 and most significantly by 0.4°C between 1980 and 2008. There has been an increase in the intensity of rainfall and storm events and this has resulted in increased flooding in some areas. Coastal defences have also come under increased pressure during these events and ongoing sea level rise will contribute to this problem.

Continued production of greenhouses gases has contributed to these issues and Ireland needs to commence the transition to a low carbon economy, with a reduction on reliance on fossil fuels and unsustainable use of resources. Limerick City and County Council recognises the need for a shift away from the traditional methods and play its role as a key stakeholder in making the transition to a low carbon economy. In July 2019, the Council adopted the Limerick City and County Council Climate Change Adaptation Strategy 2019 – 2024. The Climate Adaptation Strategy concentrates on dealing with the effects of climate change, such as flooding, storms or increased temperatures. Climate mitigation on the other hand, refers to efforts to reduce or prevent emission of greenhouse gases. Mitigation can mean using new technologies and renewable energies, making older equipment more energy efficient, or changing practices and behaviours.

Limerick is one of two EU 'lighthouse' cities that have been selected for a major climate-change pilot programme, which will give a lead to the rest of Europe on how to dramatically reduce the carbon footprint of urban areas. The EU +CityxChange Programme (Positive City Exchange) has selected Limerick, along with Trondheim in Norway, to roll out a project that has the potential to revolutionise how we produce and use energy in cities and towns. The programme is funded from the European Union's Horizon 2020 research and innovation programme in the call for 'Smart Cities and Communities' and is led by the Norwegian University of Science and Technology (NTNU), together with the Lighthouse Cities Trondheim and Limerick.

Limerick's selection for the project will see the Georgian Neighbourhood in the heart of the City Centre, become a testbed for data collection and a range of new technologies, that will transform it into a positive energy City Centre where it creates more electricity than it uses.

Limerick is committed to becoming a more climate resilient place and it is at the core of the Draft Plan. While this particular chapter deals with the issue, the theme permeates the entire Draft Plan with a selection of policies and objectives throughout, which will contribute to the transition to a climate resilient and low carbon society.

8.1.1 Integrating Climate Action into the Draft Plan

The Draft Plan has been prepared with climate action and transition to a low carbon economy, as key considerations throughout formulation of all policies and objectives. Table 8.1 below demonstrates how climate action provisions have been incorporated into elements of the Draft Plan and highlights the important and significant role it has to play, in the formulation of policies and objectives for the overall development of Limerick.

Table 8.1:
Incorporation of climate consideration into each chapter of the Draft Plan

Chapter	How Chapters contribute to Climate Change Adaptation or Mitigation
Chapter 1. Introduction	• Identifies the creation of a climate resilient place as an overarching strategic outcome of the Draft Plan.
Chapter 2. Core Strategy	• Supports the compact urban development approach with development focused on accessible locations and minimisation of travel. • Supports the development of brownfield sites and regeneration.
Chapter 3. Settlement and Housing Strategy	• Supports compact growth.Sets out that housing must demonstrate that climate change adaptation has been considered in siting, layout and design. • Climate action measures to be included as part of rural housing applications, to ensure a transition to a low carbon economy. • Establishes that consideration must be given to the impact of the pattern of development associated with one off housing on the climate and environment.
Chapter 4. A Strong Economy	• Supports the transition to a low carbon economy. • Supports employment concentrated on public transport corridors and the proposed intensification and redevelopment of existing strategic employment areas. • Supports new employment which is aligned with climate action and the circular economy. • Supports casual trading, organic foods, local produce, seasonal and craft markets. • Supports home and e-working.
Chapter 5. Environment, Heritage, Landscape and Green Infrastructure	• Emphasis on the need to preserve and protect our Biodiversity and Green Infrastructure (Natural Heritage Supports the National Bio-diversity Action Plan. • Supports the All Ireland Pollinator Plan 2020-2025. • Protection of our Water Quality • Emphasises protection and reuse of building stock where appropriate.
Chapter 6. Sustainable Mobility and Transport	• Emphasis on the pedestrian and cyclist and access to public transport and services. • Supports car and bike sharing. • Integrates land use and transport policies. • Supports Green Infrastructure and Blue ways ecosystems services approach. • Supports the decarbonising of motorised transport including public EV charging network.
Chapter 7. Infrastructure	• Establishes requirement to address climate change in Strategic Planning Infrastructure. • Emphasises the benefits of a 'Smart City' and climate change. • Supports the circular economy with respect to waste. • Supports the matching of enabling water and waste water infrastructure with provision of development. • Supports Sustainable Urban Drainage Systems (SuDS).

Chapter	How Chapters contribute to Climate Change Adaptation or Mitigation
Chapter 8. Climate Action, Flood Risk and Transition to Low Carbon Economy	• Supports the implementation of the Limerick City and County Climate Adaptation Strategy which was adopted in July 2019. • Supports Government and sectoral plans. • Supports renewable energy. • Supports Strategic Flood Risk Assessment and Management. • Supports the transition to a low carbon economy. • Supports district heating and the development of County wide policy. • Supports the decarbonising zones initiative. • Supports the incorporation of climate proofing measures into the design, planning layout and orientation and construction of all developments, including the use of sustainable materials, selection of suitable locations and the use of renewable energy sources. • Supports renewable energy. • Supports Strategic Flood Risk Assessment and Management.
Chapter 9. Sustainable Communities and Social Infrastructure	• Supports the provision of residential development in tandem with public transport, sustainable neighbourhood infrastructure, quality open space, recreation and employment opportunities. • Supports the 10 minute settlement approach and sustainable urban villages. • Supports healthy place-making. • Places an emphasis on adaptability of social and community facilities. Supports Nature Based Play. • Supports locally grown foods – community gardens and allotments.
Chapter 10. Compact Growth and Revitalisation	• Supports the compact urban development approach with development focused on accessible locations and minimisation of travel. • Supports the development of brownfield sites and regeneration and the tackling of dereliction and vacancy. • Places an emphasis on the multi-functional role of village/Town Centres to provide a wide range of services to reduce the need to travel. • Increased emphasis on place-making - enhanced public realm, including improved accessibility for sustainable transport modes.

This chapter will focus on 3 key areas outlined below. The 3 key areas are interlinked and have a bearing on policy formulation throughout the Draft Plan as follows:

1. **Climate Action and Transition to a Low Carbon Economy;**
2. **Flooding;**
3. **Renewable Energy.**

8.2 Climate Change

8.2.1 International, National and Regional Policy

The European Climate Law established in 2020 sets out the commitment of the European Union to be climate neutral by 2050, which will have implications for Ireland's energy and emission targets and other national targets set out in the Government's *Climate Action Plan 2019 To Tackle Climate Breakdown*. It introduces the requirement to produce and revise annually the Climate Action Plan. The Climate Action Plan will incorporate both mitigation and adaptation measures.

At national level, the National Policy Position on Climate Action and Low Carbon Development Act (2014) sets out the national objective of achieving a transition to a low carbon economy. This was given legislative effect by the Climate Action and Low Carbon Act 2015. The Act provided for the development of a National Adaptation Framework (NAF), which was published in December 2017. The NAF required sectoral and local adaptation strategies, which were prepared in 2019. In 2019, the Government published the *Climate Action Plan 2019 to Tackle Climate Breakdown* and the *National Energy and Climate Plan 2021-2030* was published in September 2020. These Plans identify how Ireland will achieve its 2030 targets for carbon emissions and puts Ireland on a trajectory to achieve net zero carbon emissions by 2050 and also reiterates Ireland's commitment to the UN Sustainable Development Goals.

The Climate Action and Low Carbon Development (Amendment) Bill 2021 will support Ireland's transition to Net Zero and achieve a climate neutral economy by no later than 2050. It will establish a legally binding framework with clear targets and commitments set in law and ensure the necessary structures and processes are embedded on a statutory basis, to ensure we achieve our national, EU and international climate goals and obligations in the near and long term.

Other important legalisation at a national level includes:

- *National Adaptation Framework* (NAF 2018) - Developed under the Climate Action and Low Carbon Development Act 2015 and adopted in 2018, this is Ireland's first statutory national adaptation strategy that builds on the work carried out under NCCAF 2012, outlining a whole of Government and society approach to climate change adaptation in Ireland.
- *National Mitigation Plan* (NMP) 2017 - the Climate Action and Low Carbon Development Act 2015 is a whole of Government plan, which was published in 2017 and is Ireland's first Plan in setting out a pathway to achieve the required level of decarbonisation.
- The White Paper, published in 2015, on Energy Policy - *Ireland's Transition to a Low Carbon Energy Future 2015-2030* sets out a framework to guide energy policy in the period to 2030, in order to meet national, EU and international targets.
- *National Climate Change Adaptation Framework* (2012) - This non-statutory framework was Ireland's first climate change adaptation framework, providing a strategic policy focus aimed at reducing Ireland's vulnerability to climate change, by ensuring adaptation actions were taken across key sectors at national and at a local level.

The National Planning Framework supports commitments to achieve the transition to a low carbon economy and a climate resilient society. National Strategic Outcome 08 sets outs the policy position in this regard. Furthermore, the NPF sets out the principles of sustainable, compact growth coupled with sustainable transport choices, as a means of reducing emissions, delivering more sustainable communities and futureproofing the development of the Country.

In Section 9.2 of the NPF Resource Efficiency and Transition to a Low Carbon Economy, the policy objectives for achieving resource efficiency and the transition to a low carbon economy are outlined. National Policy Objective 54 aims to 'reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emissions reductions'. The NPF goes onto emphasise the need to increase renewable sources of energy, sustainably manage waste streams and to ensure better water quality. The role of waste streams should be examined in order to determine which of these could contribute to energy generation through processes such as anaerobic digestion or perhaps combustion.

All of these are echoed in the Regional Spatial and Economic Strategy for the Southern Region (RSES), where a similar commitment to a more sustainable approach to development is evident. The RSES sets out its commitment to climate action and transition to a low carbon economy and to support measures to build resilience to climate change throughout the region, to address impact reduction, adaptive capacity, awareness raising, providing for nature-based solutions and emergency planning. It also supports the development of a regional decarbonisation plan and measures such as carbon sequestration and carbon capture and storage.

Many established planning principles such as compact growth, integration of land use and transport planning, would also have an effect on helping the transition to a low carbon future and help with the adoption of renewable energy.

Policy CAF P1
Climate Action Policy
It is a policy of the Council to implement international and national objectives, to support Limerick's transition to a low carbon economy and support the climate action policies included in the Draft Plan.

Objective CAF O1
Compliance with Higher Tier Climate Legislation and Guidance
It is an objective of the Council to support the *National Adaptation Framework* 2018 and the *National Climate Change Strategy*, including the transition to a low carbon future, taking account of flood risk, the promotion of sustainable transport, soil conservation, the importance of green infrastructure, improved air quality, the use of renewable resources and the re-use of existing resources. Cognisance shall be had to the *Limerick Climate Change Adaptation Strategy* (2019) and any revised or forthcoming adaptation, mitigation or climate action strategies or plans at local, regional and national level in the formulation of any plans or policies.

The Department of Communications, Climate Action and Environment has made €10 million available over 5 years to establish four Climate Action Regional Offices (CAROs). The establishment of the offices is a key action under Ireland's National Adaptation Framework and National Mitigation Plan and will have an important role in coordinating climate action at local government level in Ireland. The Climate Action Regional Offices, which were established since 2018, are being operated by a lead Local Authority in four different regions that have been grouped together, based on climate risk assessment with a focus on the predominant risk(s) in each geographical area. Cork County Council is the lead authority for the Southern Region, in which Limerick is located. The establishment of these offices will enable a more coordinated response to climate issues across the whole of local government and will help build on the experience and expertise which exists across the sector.

At a local level, Limerick City and County Council's *Climate Change Adaptation Strategy (CCAS) 2019 – 2024* has been developed in line with the Department for Communities *Climate Action and Environment (DCCAE) Local Authority Adaptation Strategy Development Guidelines* and was adopted by Elected Members in July 2019. It is a high-level document designed to mainstream the issue of climate change in Local Authority plans, policies and operations, in order to prepare for the challenges of climate change and adapting to its effects.

Objective CAF O2
Partnership with Service Providers
It is an objective of the Council to work in partnership with existing service providers to facilitate required enhancement and upgrading of existing infrastructure and networks (subject to appropriate environmental assessment and the planning process) and support the safeguarding of strategic energy corridors from encroachment by other developments, that could compromise the delivery of energy networks.

Objective CAF O3
Sustainable Development
It is an objective of the Council to support sustainable travel, energy efficient projects, provision of green spaces and open space and sustainable residential development projects, as a means of addressing climate change.

Objective CAF O4
Climate Proofing
It is an objective of the Council to ensure climate proofing measures are incorporated into the design, planning, layout and orientation and construction of all developments, including the use of sustainable materials, selection of suitable locations and the use of renewable energy sources.

Objective CAF 05
Energy Efficiency in Existing Development
It is an objective of the Council to support the retrofitting of existing buildings over their demolition and the integration of renewables into existing buildings, thereby ensuring a fabric first approach is taken.

Objective CAF O6
Energy Efficiency in New Developments
It is an objective of the Council to ensure that all developments are designed to take account of the impacts of climate change. This will include the installation of rainwater harvesting systems, sustainable urban drainage systems and nature based solutions for water management. Energy efficiency and renewable energy measures should be incorporated, in the cases of large industrial, commercial or newly constructed public buildings. The incorporation of renewable technologies, such as solar energy in the design will be encouraged, subject to compliance with all relevant planning criteria.

Objective CAF O7
Near Zero Energy Buildings
It is an objective of the Council to support and promote climate smart and the Near Zero Energy Building (NZEB) standard of building, or equivalent, for all new developments.

Objective CAF O8
Renewable Energy Objective
It is an objective of the Council to promote and support development of renewable energy sources, which will achieve low carbon outputs including on-land and off-shore renewable energy production, which support tidal turbine, PV, community energy companies and battery technology, subject to adequate environmental and ecological protection.

8.2.2 Climate Adaptation and Mitigation and Land Use Planning

Land use planning is one of the most effective processes to facilitate local adaptation to climate change. Tools such as land use zoning, policies in relation to compact growth, sustainable transport and the 10 minute city/town concept all can assist in minimising the development risks in Limerick from increasing greenhouse gas emissions, development in inappropriate locations, such as flood risk or other natural hazards, or risk due to the changing climate.

The land use planning framework set out in the Draft Plan provides opportunities that can assist climate resilience and achieving the long-term goal of low carbon communities. However, it requires a shift from business as usual, towards more sustainable ways of living and working. Key measures include:

- Managing population and employment growth to deliver compact growth in appropriate locations
- Reduced car dependency and a transition to more sustainable modes of transport, including increased walking and cycling.
- Enhanced energy efficiency through developments in renewable energy and electric vehicles is essential.
- Protection of our natural resources, including water supply and utilising blue – green infrastructure measures and nature based solutions to minimise the risk of flooding and address surface water disposal.
- Maintain, restore and enhance the natural heritage of Limerick and seek to improve connectivity of blue – green networks throughout Limerick as a means of improving biodiversity and the health and well being of the citizens of Limerick.

8.2.3 Climate Adaptation

Adaptation is dealing with actions identified to manage and reduce the negative effect of climate change and taking appropriate action to prevent or minimise the damage. Climate adaptation also seeks to take advantage of opportunities that may arise, such as flood alleviation, water conservation, emergency response planning and requiring development to occur in a compact and sustainable manner, or planting crops that may benefit from climate change. One of the main aims of adaptation is to reduce the vulnerability of Limerick's environment and economy to these effects. Adaptation needs to take into account the need to ensure critical infrastructure is protected and will be able to function in this climate altered future, infrastructure such as the provision of necessities such as water, energy and transportation. It is necessary that the following is considered, in terms of addressing climate adaptation:

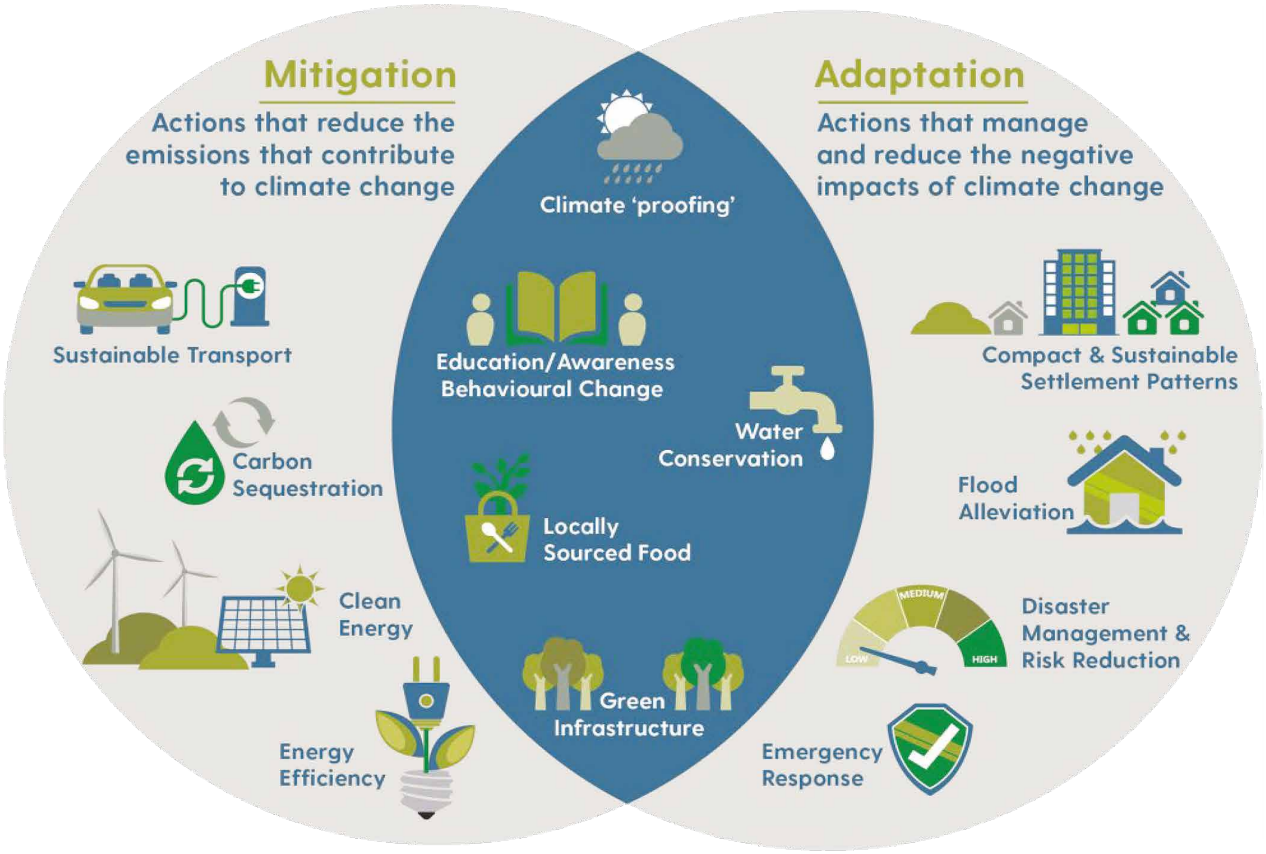
- Ensure new critical infrastructure such as transport, communications, waste and water facilities and energy supply is designed and managed to minimise effects of future climate events, such as severe storms, droughts and coastal or river flooding and/or coastal erosion. Infrastructure in areas such as close to the Shannon Estuary in particular, needs to be designed or modified with future risks in mind.
- Ensure that vulnerable developments are directed away from areas at risk, in particular areas at risk of flooding from rivers or coastal flooding or erosion.
- Encourage the adoption of nature based solutions and the provision of blue – green infrastructure in all situations, where possible, as it provides many benefits, including the regulation of rainfall, reduction in storm flows and provides clean water and air.

- Consider the conversion or maintenance of land at risk of flooding to less vulnerable uses e.g. for natural habitats, or parks, where such land does not form part of the riparian zone or riparian buffer and where it would not interfere with the flood regulation functions of the floodplain.
- Continue to work with the Office of Public Works in the development of flood relief schemes and the maintenance of existing flood defences.
- Require new developments to demonstrate that climate risk and energy efficiency has been considered in the design of buildings and the site layout and ensure that the location, layout and design of new development accommodate predicted future climate change impacts. This approach will require innovative building design, new materials and standards (to accommodate hotter summers, while withstanding changes in precipitation patterns and more intense storms for example).
- When assessing planning applications, the Planning Authority will be cognisant of the requirements of adaptation.

8.2.4 Climate Mitigation

Climate mitigation is the management of resources and activities that contribute to the reduction of greenhouse gases. To date, no mitigation plan has been produced for Limerick, unlike the adaptation plan which was adopted in July 2019. Many core planning functions, such as regulation of development, use of brown field sites or reuse of old buildings are climate mitigation measures in their own right, as they ensure maximum use of existing resources. Mitigation also considers sustainable transport, carbon sequestration, clean energy and energy efficiency, which are tools in addressing climate mitigation. The goal of mitigation is to avoid significant human interference with the climate system and attempt to stabilise greenhouse gas levels in a timeframe sufficient to allow ecosystems to adapt naturally to climate change. The implementation of a number of measures, including delivery of a modal shift in terms of sustainable transport, implementation of blue green infrastructure and nature based solutions and further development of clean energy sources are critical to the delivery of mitigation.

Figure 8.1 – Climate Adaptation and Mitigation (Source RSES Southern Region)



Planning policies outlined in this chapter set out the Council's position in ensuring the delivery of renewable energy sources and require a balanced approach to be taken to the development of renewable energy technologies, so it can play a role in climate mitigation. Additional measures such as the creation of new woodlands, conservation of bogs and forested areas, all play a role in carbon sequestration and are also key mitigation measures.

Objective CAF O9
Achieving Climate Resilience
It is an objective of the Council to promote climate resilience in development and economic activities that are regulated by planning. It is important to ensure that any developments are climate resilient as they will need to function in a climate altered environment. This means that they will be able to withstand increased intensity of storm events and rainfall and through adequate design, location and drainage elements, would not contribute to problems elsewhere, such as increased run off.

Objective CAF O10
Woodland Creation, Forestry and Preservation of Bogs
It is an objective of the Council to encourage and facilitate the creation, maintenance and preservation of woodlands, forestry and bogs in response to climate mitigation and in the interest of biodiversity.

Objective CAF O11
Nature Based Solutions
It is an objective of the Council to promote integration and delivery of nature based solutions and infrastructure in new developments, including surface water management, public realm and community projects as a means of managing flood risk and enhancing the natural environment.

Objective CAF O12
Urban Greening
It is an objective of the Council to support urban greening and planting initiatives across the city, towns and villages.

8.2.5 +CityXChange project

The +CityxChange project seeks to enable the co-creation of the future we want to live in. This includes the development of a framework and supporting tools to enable a common energy supply market, supported by a connected community, which leads to recommendations for new policy intervention, market (de) regulation and business models that will deliver positive energy communities and integrating e-Mobility as a service (eMaaS). The +CityxChange project is developing and deploying Positive Energy Blocks and Districts (PEB/PED) and scaling these out as part of the European Clean Energy Transition in cities. Some of the key goals and objectives of the project include:

- Increased energy efficiency to become a low carbon city;
- Development of Positive Energy Block (PEB), which is a designated zone of more than 3 buildings that has the capacity to annually produce more energy than it consumes. The block may benefit from a renewable energy resource(s) located adjacent to the block, producing renewable energy dedicated for the PEB;
- Develop Smart Energy Grid Smart Metering and Smart Energy Grids as part of the energy infrastructure in a low carbon city. The smart energy grid will enable local citizens to take more control over their energy use, to participate in how energy is generated, stored and distributed at a local level;

- Electric Mobility as a service (EMaaS) - the use of fossil fuels for transport is a significant contributor to climate change and poor air quality in cities. Electrification of various modes of transport will make a significant contribution to addressing the quality of life for city dwellers and help businesses to reduce their carbon footprints. Electric Mobility as a service, together with a range of low carbon transport initiatives, will be piloted in Limerick to support the city's low carbon transport.

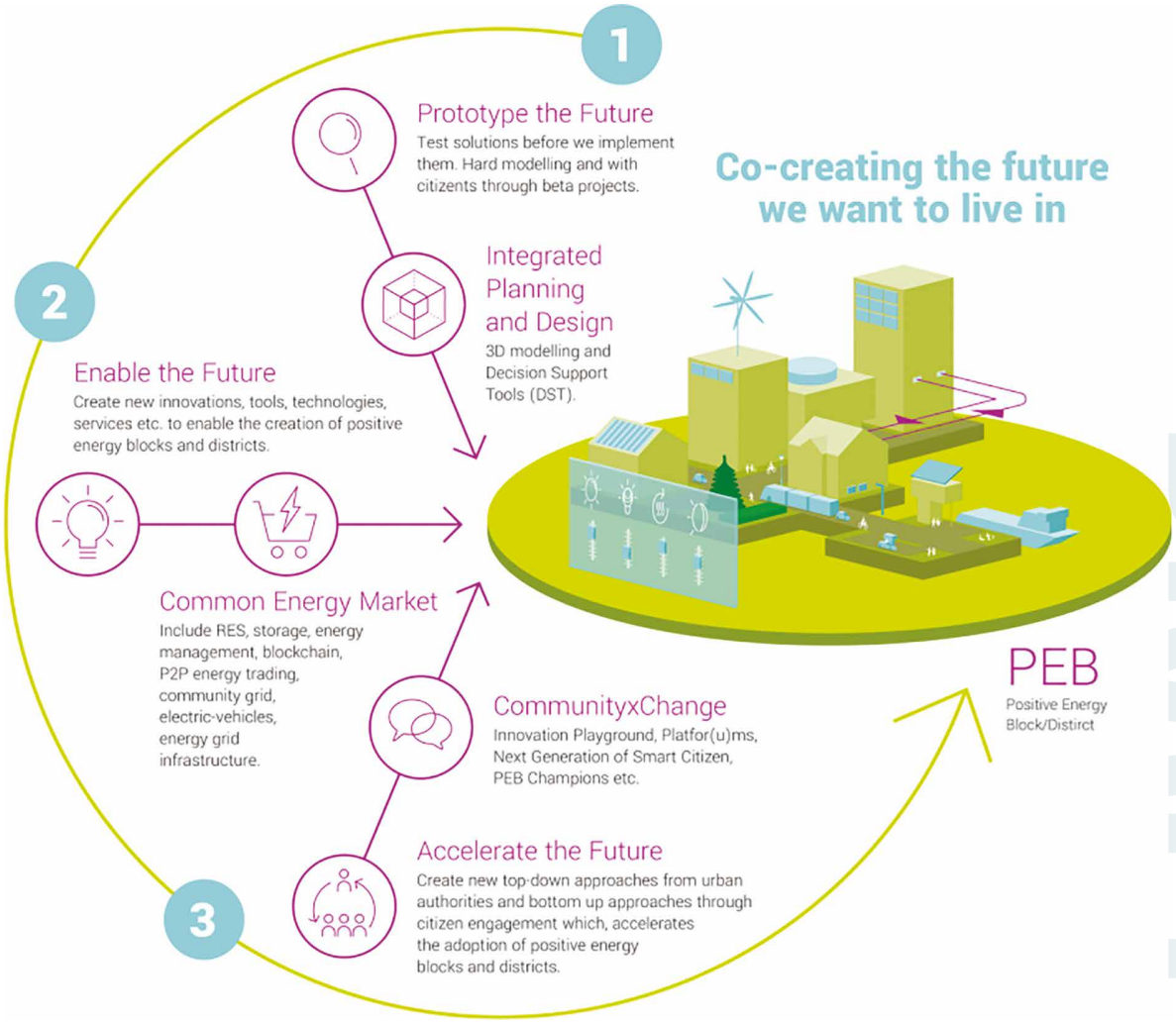
Objective CAF O13
+CityXChange Project
It is an objective of the Council to promote Limerick City to become the First Lighthouse City in Ireland and support the outcomes of the +CityXChange project and the use of digital technologies, in empowering communities and citizens to become more climate resilient.

8.2.6 Transition to a Low Carbon Economy

The transition to a low carbon economy is a complex subject with implications for the whole of society and its entire range of economic activities. Many different sectors will approach it from their own view point and many, like agriculture and forestry, largely lie outside the scope of planning regulation.

Policy CAF P2
Transition to a Low Carbon Economy
It is a policy of the Council to support the transition to a low carbon climate resilient economy, by way of reducing greenhouse gases, increasing renewable energy and improving energy efficiency and will future proof policies and objectives to deliver on this approach, in so far as possible.

Figure 8.2 +CityXChange Project



A climate altered future has implications for all aspects of activity that is regulated and informed by land use planning and a wide ranging approach to the topic is required. One of the most important considerations in the transition to low carbon economy is the idea of a just transition. Some traditional sectors of the economy that are heavily dependent on fossil fuels, or carbon intensive raw materials, will be at a disadvantage as a result of the transition. It is important that the burden of change is shared equally and that certain sectors of the economy and society are adequately supported through the transition process.

Managing a successful low carbon transition means investing more in clean energy transition-related technologies, as well as moving towards more sustainable and perhaps localised modes of production and consumption. One of the key challenges for the climate-neutral transition is to reallocate resources from carbon-intensive to climate-neutral developments and infrastructure. Successful economic modernisation requires stimulating local economic diversification towards clean industries through decarbonisation, innovation and digitalisation.

Policy CAF P3
Promote Awareness and Behavioural Change
It is a policy of the Council to promote awareness and support behavioural change in relation to climate change and transition to a low carbon economy.

Policy CAF P4
Co-operation with Relevant Stakeholders
It is a policy of the Council to cooperate with the Climate Action Regional Office (CARO) and other relevant stakeholders, in respect of adaptation and mitigation of greenhouse gas emissions and future climate change adaptation strategies.

Objective CAF O14
Energy Generation
It is an objective of the Council to support the local production of renewable energy and connection to gas network. Where electricity is being generated locally, the Council will support the provision of infrastructure for its transmission to the grid, subject to it fulfilling technical and environmental requirements.

Objective CAF O15
Local Energy Production
It is an objective of the Council to support localised renewable and carbon friendly means of heating and energy provision, including district heating systems. New technologies such as air to water and geo thermal may have a role to play in this regard.

Objective CAF O16
Circular Economy
It is an objective of the Council to encourage the adoption of the circular economy through promotion of the reuse, recycling and reduction of the use of raw materials and resources.

Objective CAF O17
Low Energy Building Materials
It is an objective of the Council to encourage the use of low energy building materials and design in all developments.

8.2.7 Energy and emissions balance

Limerick City and County Council are aware of the importance of managing our energy consumption and emissions outputs, in terms of addressing climate change and the transition to a low carbon economy. The Council have commissioned the preparation of an *Energy and Emissions Balance Report for Limerick*, which considers energy consumption, carbon emissions and fuel costs. The report focussed on energy and emissions generated between 2000 and 2020 and the projected energy demands and emissions from 2021 up to year 2030.

A top-down approach for all sectors is being adopted, in order to proportion the energy consumption data and associated carbon emissions and fuel cost estimates to a Limerick level. This allows for an indicative representation of energy consumption, carbon emissions and fuel costs, within Limerick for each of the reporting years, by sector and by fuel. It has identified an increase in energy consumption between 2000 and 2020 and has predicted a gradual decrease in carbon emissions, as the need to take climate action into account is recognised. One of the most important points raised in the document, is the need for the preparation of a Local Authority Climate Action Plan, following on from the Climate Action and Low Carbon Development Amendment Bill 2021. This will be produced within the lifetime of the Draft Plan. Where necessary the contents of the Plan will align with the contents of the Local Authority Climate Action Plan, which will contain both adaptation and mitigation measures, which are also a feature of the Draft Plan.

Objective TLC O18
Energy and Emissions Balance
It is an objective of the Council to support the *Energy and Emissions Balance Report* and updates of the report as they are prepared. The Council will also support the preparation of a Local Authority Climate Action Plan as outlined in the report.

8.2.8 Decarbonising Zone

Action 165 of the *Climate Action Plan 2019* requires each Local Authority to identify a Decarbonisation Zone (DZ). A Decarbonising Zone is an area spatially identified by the Local Authority, in which a range of climate mitigation measures can co-exist to address local low carbon energy, greenhouse gas emissions and climate needs. The range of policies and projects developed are specific to the energy and climate characteristics of the spatial area covered by the DZ.

A Decarbonising Zone should also address the wider co-benefits of air quality, improved health, biodiversity, embodied carbon, agricultural practices, sustainable land management, lower noise levels, waste, water, circular economy etc. and should integrate with smart data and 'smart cities' initiatives. A Decarbonising Zone can also explore the co-benefits of climate adaptation and examine a range of local measures, such as climate proofing, afforestation, green and blue infrastructure, reducing heat island effects, citizen awareness and behavioural change.

Objective CAF O19
Decarbonising Zones
It is an objective of the Council to support the identification of a Decarbonising Zone by designating a spatial area, in which a range of climate mitigation, adaptation and biodiversity measures and action owners are identified, to address local low carbon energy, greenhouse gas emissions and climate needs, to contribute to national climate action targets and work with statutory agencies and stakeholders as appropriate.

8.3 Flooding, Flood Risk Management and Water Management

The Section 28 Planning Guidelines *The Planning System and Flood Risk Management* (DHPLG/OPW, 2009) and associated Technical Appendices and Circulars, are the basis of the Council's policy in relation to development and flood risk management. It plays a key part in informing zoning decisions and decisions on individual planning applications, where flood risk is identified as a factor. The guidelines ensure that the key principles of flood risk management and sustainable planning are adopted. The sequential approach to managing flood risk within the planning system is one of the first aspects to consider and where uncertainty exists, the precautionary approach is taken. The stages of appraisal and assessment are set out in the 2009 Guidelines.

In the preparation of the Draft Plan, in accordance with *The Planning System and Flood Risk Management, Guidelines for Planning Authorities*, a Strategic Flood Risk Assessment (SFRA) has been prepared to assess flood risk within the plan area. The SFRA is set out in Volume 4 of this Draft Plan. The precautionary approach has largely been employed to land use zoning to avoid directing development towards areas at risk of flooding. Areas identified as being at risk of flooding, which are being put forward for land use zoning, have been subject to assessment through a justification test, to determine its suitability for inclusion and have only been considered, where they are determined to be within or adjoining the core of the City Centre. Where particular areas identified as being liable to flood were examined as being strategically important for the consolidated and coherent growth of Limerick's settlements and zoned accordingly, a site-specific flood risk assessment will be required to accompany development proposals for these areas and mitigation measures for site and building works will be required to be integrated.

Policy CAF P5
Managing Flood Risk
It is a policy of the Council to protect Flood Zone A and Flood Zone B from inappropriate development and direct developments/land uses into the appropriate lands, in accordance with *The Planning System and Flood Risk Management Guidelines for Planning Authorities* 2009 (or any superseding document) and the guidance contained in Development Management Standards. Where a development/land use is proposed that is inappropriate within the Flood Zone, then the development proposal will need to be accompanied by a Development Management Justification Test and site specific Flood Risk Assessment in accordance with the criteria set out under *The Planning System and Flood Risk Management Guidelines for Planning Authorities* 2009 and Circular PL2/2014 (as updated/ superseded). In Flood Zone C, the developer should satisfy themselves that the probability of flooding is appropriate to the development being proposed and should consider the implications of climate change.

Objective CAF O20
Flood Risk Assessments
It is an objective of the Council to require a Site-specific Flood Risk Assessment (FRA) for all planning applications in areas at risk of flooding (coastal/tidal, fluvial, pluvial or groundwater), where deemed necessary. The detail of these Site-specific FRAs (or commensurate assessments of flood risk for minor developments) will depend on the level of risk and scale of development. A detailed Site-specific FRA should quantify the risks, the effects of selected mitigation and the management of any residual risks. The assessments shall consider and provide information on the implications of climate change with regard to flood risk in relevant locations.

Objective CAF O21
Identified Flood Risk
It is an objective of the Council to:

a) Ensure that no development shall commence on the lands identified as being at flood risk adjacent to the Raheen Business Park in the townlands of Ballycummin/ Rootiagh, zoned for High Tech/ Manufacturing, until a Site-specific Flood Risk Assessment, including hydraulic model has been prepared for the lands, which demonstrates that the flood risk for the lands can be mitigated or that a less vulnerable use can be accommodated on site.
b) Ensure that on the Enterprise and Employment lands located to the northwest of the M20/M7/N18 junction, that no encroachment onto, or loss of the flood plain occurs at this location and that only water compatible development should be permitted for the lands that are identified as being at risk of flooding.

Objective CAF O22
Cooperation with Other Agencies
It is an objective of the Council to work with other bodies and organisations, as appropriate, to help protect critical infrastructure, including water and wastewater, within Limerick, from risk of flooding. Any subsequent plans shall consider, as appropriate any new and/or emerging data, including, when available, any relevant information contained in the CFRAM Flood Risk Management Plans and as recommended in the SFRA for the Draft Plan.

Objective CAF O23
Flood Relief Schemes
It is an objective of the Council to support and facilitate the development of Flood Relief Schemes as identified in the CFRAM 10 Year Investment Programme.

Objective CAF O24
Minor Flood and Mitigation Works and Coastal Protections Schemes
It is an objective of the Council to support and facilitate the Office of Public Works Minor Flood and Mitigation Works and Coastal Protections Schemes.

Objective CAF O25
Strategic Flood Risk Assessment
It is an objective of the Council to have regard to the recommendations set out in the Draft Strategic Flood Risk Assessment prepared to support the Draft Plan.

8.4 Water Management

Closely related to the idea of adaptation to flooding and management of water for flooding purposes is the wider idea of water management in a broader sense. Climate projections mention that summers are likely to be hotter and drier and this raises the possibility of drought, such as that in the summer of 2018. It is important that suitable allowance is made for climate change in flood risk responses. In this regard, consideration should also be given to water management in its wider context, not just in relation to flooding but also in relation to water storage and rain water harvesting to provide a reserve of water for possible drought periods.

8.5 Renewable Energy

Renewable energy continues to play an important role in terms of energy production nationally and within Limerick. As technologies emerge and alter, Limerick needs to position itself, to ensure that it has a safe, secure, sustainable and affordable supply of energy, which is central in securing sustainable development. Renewable energy is defined as renewable non – fossil energy sources such as, but not limited to wind, solar, geothermal, wave, tidal, hydropower, bioenergy, landfill gas, sewerage treatment plant gas, bio gases and bio – char, in the EU Renewable Energy Directive.

The *Climate Action Plan* (2019) includes targets to increase the capacity of renewable energy in Ireland. Ireland has a target of 70% of electricity sourced from renewables by 2030. The development of the updated *Wind Energy Guidelines* and the *Renewable Electricity Development Plan* will also facilitate informed decision making in relation to onshore renewable energy infrastructure.

Local Authorities must also be consistent with the following national plans, policies and strategies when considering proposals for renewable energy:

- *The National Renewable Energy Action Plan 2010;*
- *The Government's Strategy for Renewable Energy 2012 – 2020;*
- *The Government's White Paper on Energy Policy - Ireland's Transition to a Low Carbon Energy Future 2015-2030;*
- *Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy and Climate Change (July 2017);*
- *Wind Energy Development Guidelines, Planning Guidelines (2006), as amended or replaced;*
- *National Mitigation Plans (compliant with the Climate Action and Low Carbon Development Act, 2015).*

From a renewable energy production perspective, Limerick has many attributes to support the development of renewable energy sources, sitting on the banks of the River Shannon, there is significant potential to harness the clean energy that could be generated, subject to an appropriate level of environmental and ecological assessment. The emerging concept of the Atlantic Green Digital Basin (GDB) can provide both a mechanism for achieving a green and digitally diversified region. The GDB can support a business cluster leveraging digital technologies powered 100% by our own generated green energy, becoming the centre point for Europe's digital traffic and a global exporter of clean energy.

The project identifies a number of key building blocks to enable the project to be realised and all will need to be considered in an environmentally sustainable manner. This includes the potential for the development of hydro and wind energy, utilising emerging ocean and wind technology, utilising the water to support economic development such as data centres and harnessing the knowledge and experience in the region in terms of bio economy. See Chapter 4: A Strong Economy for further details.

The contribution of both large and small scale renewables, including domestic and agricultural is likely to grow, over the lifetime of the Draft Plan. This has proven to be the case in many European countries, where micro renewables in the form of photo-voltaic installations on houses and other structures make a significant contribution to energy generation.

Policy CAF P6
Renewable Energy
It is a policy of the Council to support renewable energy commitments outlined in national and regional policy, by facilitating the development and exploitation of a range of renewable energy sources at suitable locations throughout Limerick, where such development does not have a negative impact on the surrounding environment landscape, biodiversity, water quality or local amenities, to ensure the long term sustainable growth of Limerick.

Policy CAF P7
Atlantic Green Digital Basin (GDB)
It is a policy of the Council to support the development of Atlantic Green Digital Basin (GDB) proposals within Limerick and the wider region, subject to appropriate levels of environmental assessment and planning considerations and to work with relevant stakeholders to realise its potential.

Policy CAF P8
Community Based Renewable Energy
It is a policy of the Council to support the development of community based renewable energy projects, subject to appropriate levels of environmental assessment and planning considerations.

Policy CAF P9
Renewable Energy Technologies
It is a policy of the Council to consider all emerging renewable energy technologies, such as hydrogen electrolysis, pumped storage and small scale anaerobic digestion and any other source of renewable energy technologies that are viable as a means of energy security, subject to the relevant level of necessary environment and ecological assessments.

8.5.1 Bio-energy Production

This aspect of renewable energy can lend itself well to collective community or district combined heat and power plants. Sources of bio-mass in Limerick can vary from products specifically grown for use as bio-mass fuels, such as Miscanthus or Short Rotation Coppice, to animal waste and by products of the food industry. The Council acknowledges the predominant nature of agriculture, within the rural area, as beef and dairy production and the importance of maintaining sustainable agriculture in line with the European Green Deal. Therefore, the opportunities associated with specifically grown products as sources of bio-mass may be limited. The forestry sector can also make a contribution to the bio-mass sector through the use of by products from the forestry sector as fuel. Forestry thinnings and waste timber can be localised fuel sources.

Objective CAF O26
Bio Energy
It is an objective of the Council to support the development of bio energy and projects in suitable locations and subject to adequate assessment. The development of grid injection, where this is necessary for renewable energy input will also be supported.

Technologies such as anaerobic digestion (AD) and dry digestion can play a role in helping to manage sources of farm waste in particular and can help to provide an outlet for farm waste, municipal solid waste, or by products from the food industry. Anaerobic digestion is the bacterial fermentation of organic waste in oxygen free conditions. The by-product of this is methane and liquid and solid residues, which are high in nutrient values, but are in a more easily handled form than the original wastes. This technology would be particularly appropriate for the treatment of farm wastes.

8.5.2 Hydro-power

Traditionally hydro-power provided energy for mills and other enterprises in Limerick and depends on the harnessing of water power flowing from a higher to a lower level. It is usually only possible to exploit hydro-power resources where they occur. It involves the creation of a head pond and weir to provide sufficient depth to draw off water, a headrace –a pipe or channel to carry the water from source to the generation turbine contained within the turbine house and tail race to return the water to its natural course. Creating these structures will have an effect on the course of the river and may have ecological effects. While many of the locations that would have had mills in the past could be expected to provide suitable locations today, ecological and environmental concerns will have to be taken into account, such as fish passes to ensure that fish are not drawn into the turbine. This is of particular importance for salmonids, which during migration may be particularly vulnerable to this. Consultation with both the Fisheries Boards and the National Parks and Wildlife Service are required in order to ensure that fisheries and other ecological issues are taken into account. Many of the rivers and tributaries in Limerick are protected under the Birds and Habitats Directives and this should be a key consideration during the investigation of any development in or in close proximity to the watercourse.

Objective CAF O27
Renewable Energy Production
It is an objective of the Council to encourage and facilitate the production of energy from renewable sources, such as from bioenergy, solar, hydro, tidal, geothermal and wind energy, subject to appropriate levels of environmental assessment and planning considerations.

8.5.3 Solar Energy

Solar energy has been an area, which has seen significant development over the last decade. The basic principal is to harness and gain maximum benefit of solar energy, through the following means passive solar, active solar heating and solar photovoltaic systems. There are a range of technologies available to exploit the benefits of the sun, including solar panels, solar farm and solar energy storage facilities, all of which contribute to a reduction in fossil energy demand.

Limerick has experienced significant interest in the development of solar energy in the form of large scale photovoltaic solar farms, which is an emerging technology in Ireland, with a number of proposed largescale developments granted approval. Normal planning considerations, including impact on landscape, urban design, biodiversity, ecological impact, on-site water management, access to grid, security fencing, decommissioning issues and residential amenity, including potential glint and glare will require assessment.

The Council encourages proposals in relation to solar PV in industrial/commercial settings, where installations can be sited at ground level or on rooftops. The Council encourages, as part of the design and planning process, an evaluation of the potential to incorporate solar PV (or other suitable micro renewable technology) into the design of all new developments, or extensions to existing development, or change of use proposals and to submit this evaluation with any planning application.

Proposals in relation to hybrid installations of large scale solar PV and wind will be assessed by the Council on a site by site basis taking into account ecological, scenic and other normal planning considerations.

8.5.4 Wind Energy

The Council recognises the importance of onshore and offshore wind energy as a renewable energy source and its national energy targets. Improvements are required in the existing transmission network to fully harness the renewable energy potential in Limerick. The Draft Plan supports maximising the potential of accessing new, emerging by-product markets to advance the growth of Limerick and to assist in transition to a low carbon society. The Council recognises the significant contribution that wind energy can make as a clean sustainable solution to energy requirements and the role it can play in helping achieve national targets, in relation to fossil fuel reductions and consequently greenhouse gas emissions.

The Council will continue to support and encourage the principle of wind energy development in accordance with Government policy and having regard to the *Wind Energy Development Guidelines for Planning Authorities*, or any update made thereto during the lifetime of the Draft Plan, subject to the location and siting of such infrastructure and having regard to the extensive designations throughout Limerick in terms of Natura 2000 sites.

Objective CAF O28
Assessment of Renewable Energy Projects
It is an objective of the Council to encourage the development of wind energy, in accordance with Government policy and having regard to the principles and planning guidance set out in the Department of Housing, Planning and Local Government publications relating to *Wind Energy Development* and the DCCAE *Code of Practice for Wind Energy Development in Ireland* and any other relevant guidance, which may be issued in relation to sustainable energy provisions during the course of the Draft Plan.

In terms of wind generation, the Shannon Estuary has significant opportunities for off shore wind development, which presents potential for economic development in servicing these developments within Limerick. The offshore wind industry is projected to grow significantly over the next decade and offshore wind power is expected to account for a large portion of the Country's energy demands in the future. Recognising the importance of offshore wind energy potential is a key consideration of the Draft Plan. The necessary supporting infrastructure will be enabled on land, to facilitate connection to the network, subject to appropriate levels of environmental and ecological assessments.

The port of Foynes is ideally placed to act as a support base for offshore wind, both during any initial exploration phase and also during the subsequent construction and operational and dismantling phases.

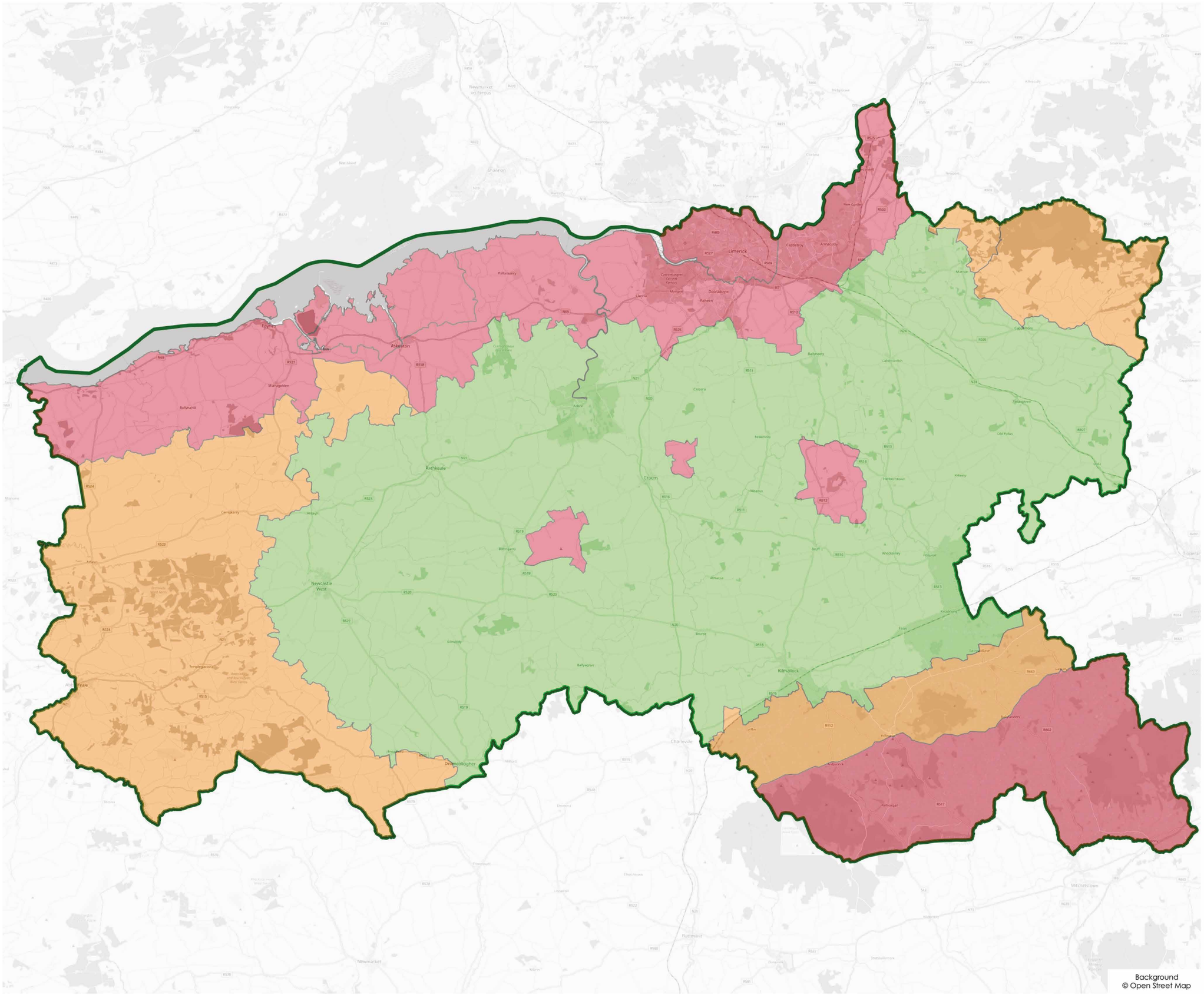
Objective CAF O29
Wind Energy Development and Environmental Considerations
It is an objective of the Council to facilitate the development of wind energy in an environmentally sustainable manner, ensuring proposals are consistent with the landscape character objectives of the Draft Plan, the protection of the natural and built environment and the visual and residential amenities of the area.

Objective CAF O30
Location of Wind Energy Developments
It is an objective of the Council to promote the location of wind farms and wind energy infrastructure in the 'preferred areas' as outlined on Map 8.1, to prohibit such infrastructure in areas identified as 'not open for consideration' and to consider, subject to appropriate assessment, the location of wind generating infrastructure in areas 'open for consideration'.

Objective CAF O31
Wind Energy supporting Infrastructure
It is an objective of the Council to support the development of appropriate land-based infrastructure and facilities at suitable locations, in order to facilitate the necessary connections for off- shore renewable energy projects.

Objective CAF O32
Off Shore Wind
It is an objective of the Council to support:
a) The development of off shore windfarm developments, subject to normal planning considerations, including in particular the impact on areas of environmental or landscape sensitivity.
b) Terrestrial developments along the coastline to ensure adequate provision for connection to the national grid for off-shore wind farms.

Map 8.1 Wind Energy Locations



Draft Limerick Development Plan 2022 -2028

Wind Energy Development Areas

LEGEND

- Preferred Areas
- Areas Open for Consideration
- Areas Unsuitable
- Limerick County Boundary

DATE	DWG. No.
June '21	CDP-C8-WED

OSI LICENCE No.

Comhairle Cathrach & Contae Luimnigh
Limerick City & County Council

Objective CAF O33
Development of Foynes Port
It is an objective of the Council to support the development of Foynes Port, as a support base for offshore wind, both during any initial exploration phase and also during the subsequent construction and operational and dismantling phases, subject to appropriate levels of environmental and ecological assessments.

Objective CAF O34
Wind Energy Development
It is an objective of the Council to ensure that wind energy developments on sensitive or sloping sites, or any significant alterations to them, are accompanied by adequate assessment of the effects of the development on soil stability.

Objective CAF O35
Community Based Energy Initiatives
It is an objective of the Council to support community energy-based initiatives, subject to adequate assessment, to help achieve low carbon communities.

8.5.5 Tidal and Wave Energy

Tidal energy can provide reliable and predictable energy sources, due to the predictability of tidal events. The two main types of tidal energy extraction are tidal barrage systems and tidal stream flow turbines. Barrages are usually located across a tidal inlet and capture the energy of the tidal movement, by creating a barrier and channelling it through the turbines.

Tidal stream flow turbines are located beneath the water surface and can be submerged so they are not seen or heard. Similar to wave devices, there are currently a broad and diverse range of technologies under development for harnessing tidal energy.

The Shannon Estuary has the largest tidal range on the Irish coast and as a result has considerable potential as a tidal energy resource. The *Strategic Integrated Framework Plan for the Shannon Estuary*, prepared in 2012 has identified a number of sites with potential for tidal energy development along the Shannon Estuary. These sites have potential to be developed, with consequential benefits for the delivery of renewable energy. The ecological implications of the development of these sources of energy requires careful examination as they can pose a risk to marine life and fish passage. This is true of barrage type structures in particular.

8.5.6 Geothermal Energy

The recent publication by the Geological Survey of Ireland of *An Assessment of Geothermal Energy for District Heating in Ireland* in late 2020, indicates the potential for geothermal energy in Ireland. Such energy is available at different depths, but to date in Ireland, it is only sources of shallow geothermal energy that have been exploited. Geothermal resources are categorised in terms of depth ('shallow' or 'deep') and/or temperature. A more precise way to categorise geothermal resources is by the enthalpy, or total heat content, that is available. Traditional volcanic geothermal systems have been termed high enthalpy and any other systems termed low enthalpy. One of the huge advantages of geothermal energy is that it can provide a consistent supply of energy, unlike wind or photovoltaic, which can be limited by weather conditions or daylight hours.

Objective CAF O36
Geothermal Energy
It is an objective of the Council to facilitate geothermal energy generating developments, both standalone and in conjunction with other renewable energy projects in suitable locations.

Geothermal energy is usually captured using a heat pump. The heat pump operates in a similar fashion to a refrigerator, however the purpose of the heat pump is to harness large quantities of low grade thermal energy (from water, air or soil) and boost the energy to deliver it at higher temperatures to a building heating system. It is suitable for both single and multiple buildings.

8.5.7 Emerging Technologies

One of the technologies that has emerged over the last decade or so is air to water. Similar to geothermal, it works by extracting heat from air transferring it to liquid, which when heated can be pumped through a structure. This technology is often used as underfloor heating and for the provision of hot water.

Further development of existing technologies, such as solar, more efficient geothermal and future development of marine energies are also likely to play a greater role during

the lifetime of the Draft Plan. The Council encourages the small scale generation of heat and electricity by individuals, small businesses and communities to meet their own needs and as an alternative to, or to supplement, grid connected power. Exemptions set out in the Planning and Development Regulations 2001 (as amended) permit small scale generations for residential and commercial operations, subject to certain conditions.

Objective CAF O37
Emerging Technologies
It is an objective of the Council to facilitate and encourage future renewable energy technologies, such as hydrogen electrolysis, pumped storage and small scale anaerobic digestion and any other source of renewable energy technologies, that are viable as a means of energy security, subject to compliance with all relevant planning criteria.

8.5.8 Carbon Capture and Storage

The closest large scale carbon capture and storage project that has received funding from the EU is Ervia's (Gas Networks Ireland parent company) Cork Carbon Use and Storage project, which will use the depleted Kinsale gas fields to store carbon. In a Limerick context, established means such as afforestation can play a role but should the opportunity arise to support or to use elements of carbon capture and storage in older infrastructural facilities, these options will be considered by the Council.

Objective CAF O38
Carbon Capture
It is an objective of the Council to support investment in initiatives to develop innovation, advances in technology and pilot projects for the sustainable development of energy storage and carbon capture within the region and to work with key stakeholders in developing sustainable forestry, including initiatives for native tree planting, conservation of peatland and better soil management, subject to suitable ecological assessment, to support carbon sequestration and enhancement of biodiversity.

Objective CAF O39
Energy Storage
It is an objective of the Council to promote the use of efficient energy storage systems and infrastructure that regulates energy supply and helps even out the variable nature of some renewable energy supply sources.

8.5.9 District Heating

District Heating Network (DH) is a means of transporting heat as hot water through a network of highly insulated pipelines, delivering heat (rather than fuel) directly to buildings. This type of system can service multiple buildings on a local network with heat exchangers installed in each structure to distribute the heat internally. DH systems have been mainly powered by fossil fuels in the past, but renewable networks are now common throughout Europe. DH networks have the potential to decarbonise the heat sector where the heat demand is high enough.

8.5.10 Combined Heat and Power

Combined Heat and Power (CHP) also known as 'Co-generation', is the simultaneous production of electricity and heat usually in the form of hot water or steam, from a primary fuel such as natural gas. Electricity is generated on site by driving an alternator connected to a turbine or engine. The heat from the combustion is harvested to provide steam or hot water that can be used on site. In a Limerick context, anaerobic digestion is perhaps one of the best examples where heat can be used on the farm, while electricity generated can be exported to the grid.

8.5.11 Community Investment in Renewable Energy

In recent years community supported renewable energy projects have had access to the energy market. There are many benefits to this approach towards renewable energy development, not least local control and local support for these projects. The Council will support such developments, as diversity of ownership and control of energy resources by local communities has a huge role to play in a just transition to low carbon economy.

Objective CAF O40
Community Renewable Energy
It is an objective of the Council to support and strengthen sustainable local/community renewable energy networks, micro renewable generation, climate smart countryside projects and connections from such initiatives to the grid. The potential for sustainable local/community energy projects and micro generation to both mitigate climate change and to provide for local fuel need is also supported.