



**Comhairle Contae
Dhún na nGall**
Donegal County Council



Derry City & Strabane
District Council
Comhairle
**Chathair Dhoire &
Cheantar an tSratha Báin**
Derry Cittie & Strabane
Destrict Council

**Derry City & Strabane District Council and
Donegal County Council**

NORTH-WEST REGIONAL ENERGY STRATEGY

Executive Summary Report

INTRODUCTION

This document is an Executive Summary of the full North-West Regional Energy Strategy. The key messages set out within the full strategy document are summarised within this short report.

Executive Summary

Derry City & Strabane District Council (DCSDC) and Donegal County Council (DCC) both recognise the need to transition towards a smart, low carbon economy which can deliver sustainable prosperity for individuals, communities, businesses and the local environment within the North-West Region.

To fulfil this goal, both councils have collaborated, with the support of WSP, to define a clear and structured North-West Regional Energy Strategy for one combined region.

This strategy has been aligned with binding targets set by central governments and the EU and provides a roadmap to a sustainable future for the North-West. This can deliver real reductions in annual carbon emissions, whilst encouraging the growth of a low carbon economy and improving security of supply.

This strategy recommends a Whole Energy System approach and a holistic view on the consumption and management of energy throughout the region. A wide variety of local measures have been recommended as potential opportunities to encourage the adoption of renewable Low Carbon Technologies (LCTs) both for the consumption and generation of energy within the Region.

Moving forward, these local measures will be assessed individually and applied wherever technically and commercially feasible.

A Low Carbon Future Enabled Locally

The need to address climate change has given rise to a Low Carbon Economy which is already having a positive effect on the wider economy. In 2016, the industry turnover in Northern Ireland reached almost £1 billion, supporting 5000 jobs and 4000 businesses.

Decarbonising the energy system will not only address climate change but improve energy security and reduce fuel poverty. Implementing innovative solutions to the decarbonisation of the energy system is critical to ensure the cost to consumers remains affordable.

DCSDC and DCC have therefore joined forces to build a coordinated Regional Energy Strategy for the North-West Region which can deliver real improvements to the energy system within the region.

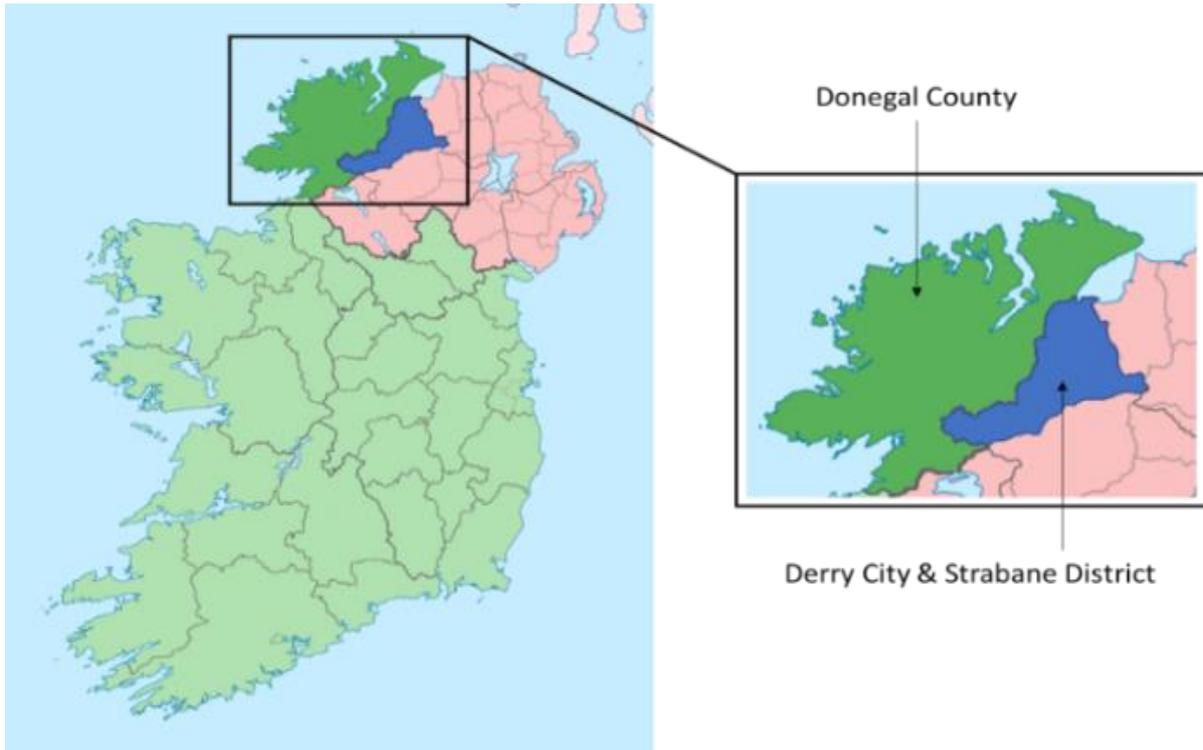
Both Councils have a history of driving energy conservation throughout their organisations, and through the ongoing delivery of this strategy, wish to remain a driving force for innovation in the region. They will bring together the strands necessary within their own organisations, working with the private sector stakeholders and academia to deliver the objectives as set out within the report.

Location of the North-West Region

The North-West Region consists of two areas; County Donegal located in the northern part of the Republic of Ireland, and Derry City & Strabane (DCS), located in the north-west of Northern Ireland.

Figure 1 shows a map highlighting both areas. Throughout this report, the term 'North-West Region' is used to refer to both County Donegal and DCS. Unless otherwise specified, the entire region is analysed with an overall strategy that applies to both operating councils.

Figure 1 - Location of County Donegal and Derry City & Strabane District



Vision for the North-West: Net Zero by 2045

The North-West Region will become a leader in achieving national and international climate change targets and intends to **become carbon neutral by 2045**.

In doing so, it is important to ensure a sustainable, secure and affordable energy system for all citizens' whilst maximising opportunities for economic growth.

This report intends to encourage a holistic view of the energy system within the North-West Region by coordinating multiple energy vectors together, in order to optimise energy consumption across the area by both minimising greenhouse gas emissions and reducing customer bills.

The vision is intended to deliver sustainable economic growth for the region, whilst minimising the environmental impact of all our activities to realise the low carbon society which is so critical for our future.

REGIONAL ENERGY STRATEGY & ROADMAP

	2020	Short Term	2030	Mid Term	2040	Long Term	2050
	UK Fifth Carbon Budget	Ireland First Carbon Target	UK Fifth Carbon Budget	Ireland Second Carbon Target	Ireland Third Carbon Target	UK Final Carbon Budget	Ireland Final Carbon Target
1) Smart Energy Management The smart control and coordination of regional energy assets to minimise energy bills and unlock new revenue streams.		Objectives: <ul style="list-style-type: none"> The North-West region has a clear view of the lowest cost and smart carbon neutral energy system and have implemented the first smallscale trial of the Smart Energy Management System All assets / buildings with the potential for current and future flexibility with DSR and ANM are identified. The region has implemented its first microgrid as a cost effective alternative to conventional network connection. 		Objectives: <ul style="list-style-type: none"> The design and initial implementation of a regional wide Smart Energy Management System is completed. Further bids are made on flexibility systems meaning DSR and ANM schemes will be wide spread and total energy cost is reduced. Large scale prosumers are actively traded low carbon energy between themselves across the region. Microgrids have been installed as an alternative to network connections 		Objectives: <ul style="list-style-type: none"> A fully integrated and operational Smart Energy Management System that will include all public assets. Consumer energy bills are significantly lower than 2020 prices through DSR and ANM schemes. Microgrid developments are considered for all future developments. Private and virtual private wire connections are common place connecting green generation to the region at low cost. 	
2) Renewable Generation & Energy Storage Maximising the potential for green renewable generation throughout the Region efficiently coupled with energy storage technologies.		Objectives: <ul style="list-style-type: none"> A GIS map of the region identifying all possible locations for renewable generation, with respect to planning policy and sustainable development, will be launched. Locations are identified for the roll-out of solar technology for all private and publically owned buildings. All future renewable development schemes consider battery storage as standard. 		Objectives: <ul style="list-style-type: none"> Solar panels are common place on commercial and domestic buildings Generation mix consists of different locally produced renewable energy Battery storage schemes are common place (both domestic and commercial). 		Objectives: <ul style="list-style-type: none"> 100% of all of the Northwest Region's energy consumption comes from renewable source (power, heat and transport). Energy will be generated from a mixture of sources however wind continues to be the main contributor. Solar panels are installed on all buildings and commercial solar farms are commonplace. Battery storage has become part of every renewable system and is used for time-of-use energy tariffs, creating additional revenue. 	
3) Low Carbon Transport Delivering a low carbon transport system to reduce carbon emissions and improve air quality.		Objectives: <ul style="list-style-type: none"> The charging infrastructure required for EV & Hydrogen vehicles is identified and optimal locations identified Local incentives are in place for ultra low carbon transport. The first Low Emission Zones (LEZ) has been implemented within Derry City, Strabane, Buncrana and Letterkenny. Further Greenways are installed and a car sharing scheme is introduced to reduce congestion. 		Objectives: <ul style="list-style-type: none"> All new petrol and diesel based vehicle sales are banned within the Northwest Region. EVs are commonplace across the region with the charging infrastructure regularly upgraded. Greenways continue to dominate the area with further incentives applied to reduce the number of cars on the road. Hydrogen has become common place for long haul vehicles fueled from locally produced hydrogen. 		Objectives: <ul style="list-style-type: none"> All vehicles on the road within the Northwest Region are low carbon based (either EV or hydrogen). The total number of cars on the road is reduced by 25% with more people using greenways, car sharing and public transport. EV infrastructure is fully operational and the network can handle 100% penetration of EVs (domestic & commercial). Heavy penalties on all fossil fuel based vehicles has made low carbon transport significantly more economically viable. 	
4) Low Carbon Heating Enabling the transition from fossil fuelled heating technologies to low carbon or emission free heating solutions.		Objectives: <ul style="list-style-type: none"> The optimal heating systems have been identified for all buildings across the region (hydrogen, gas, electric) Pilot projects are established and reports published and publicised to show consumers the advantages and disadvantages Locally produced hydrogen gas is injected into the natural gas network Sustainable Heat Pump incentives are in place and 50% of fuel oil boilers are replaced. Biofuels are being produced locally and acting as an alternative to heating oil in boilers. 		Objectives: <ul style="list-style-type: none"> 75% of heating systems within the Region are low carbon alternatives to gas and oil. Up to 50% of the gas in the natural gas network is locally produced Hydrogen. District heating schemes are installed taking advantage of waste industrial heat. Heat pumps will be common place for all off-gas grid residents and businesses. 		Objectives: <ul style="list-style-type: none"> 100% phase out of all oil and natural gas based heating systems in domestic and commercial premises. Northwest Region will have a localised hydrogen gas network that is produced locally and used for transport and heating. All homes not part of gas network will have Heat Pumps as their primary source of heating. A mature industry has grown for locally produced biofuels exporting across the country. 	
5) Energy Efficiency Increasing the efficiency of energy use across the Region to minimise consumption and reduce the associated carbon emissions.		Objectives: <ul style="list-style-type: none"> All buildings that need efficiency improvement are identified and sustainable incentives are in place. An energy efficiency incentive is combined with a heating incentive and all priority buildings are upgraded (worst performing buildings) All new commercial and housing developments are built with an efficiency of at least Band B. All lighting has been replaced with high efficiency LED lighting systems. 		Objectives: <ul style="list-style-type: none"> 75% of all commercial and domestic buildings have an efficiency rating of at least Band B. All public and private lighting including street lighting has been changed to LED lighting. Efficiency improvements have directly pushed down the total energy consumption within the Northwest Region. 		Objectives: <ul style="list-style-type: none"> 100% of all buildings in the Northwest Region will have an efficiency of at least Band B. All homes and businesses will have efficient lighting systems and standard filament lighting will be obsolete. Energy consumption and consumer bills across the region has decreased substantially due to highly efficient public and private buildings 	

ENERGY UTILITY SECTORS

Electricity Networks

There are two Distribution Network Operators (DNO's) that are responsible for distributing electricity in the North-West Region: Northern Ireland Electricity (NIE) Networks in Northern Ireland and Electricity Supply Board (ESB) Networks in Republic of Ireland. The primary role of both is to reliably and safely deliver electricity to both domestic and commercial customers throughout the North-West Region. Both will have a crucial role in the transition to a low carbon energy system within the Region.

There are a variety of Low Carbon technologies (LCTs) that will have a significant impact on the electricity network, including Heat Pumps (HP's), Electric Vehicles (EV's), embedded renewable generation and microgrids. For example, HP's are an efficient and cost-effective electrical alternative to fossil fuelled heat sources and have an important role to play in reducing carbon emissions. However, connection of HP's to the grid will introduce an additional loading to the network, creating unwanted harmonic problems and increased stress on network infrastructure. This same issue is also prevalent in EV's. EV's are an essential alternative to fossil fuel transport, but the growth in their numbers, without smart solutions, would result in the need for expensive grid reinforcements. At this current time, the network within the region is heavily constrained meaning reinforcements would be required to add additional capacity for renewable generation. Furthermore, connections of renewable sources such as wind farms are constrained by thermal capacity, voltage limits and network harmonics. Innovative solutions alongside well planned network reinforcements are essential to ensure capacity is available for the connection of renewable technologies.

Heat Networks

Both within the region and throughout the rest of the UK and Ireland, domestic and commercial heating makes up a large percentage of the carbon emissions each year. Consequently, it is important that low carbon and efficient heating solutions are pursued and encouraged within the North-West Regional Energy Strategy. The primary fuel source for heating within the region is Heating Oil. The oil is transported to consumers via road and then sorted in oil tanks for use within oil boilers. Fuel oil produces large levels of carbon emissions when burned and its price is volatile. Furthermore, all the Heating Oil used within the region is imported from outside Ireland which puts a risk on energy security and leaves consumers vulnerable to global fluctuations in price.

Heating is also supplied by natural gas via the transmission and distribution gas network which is operated and maintained by Gas Networks Ireland (GNI). However, most of the region is not connected to the natural gas network with only some areas of DCS currently having access. While future projects are planned to increase the number of connections on the gas network, relying upon this fuel source brings similar concerns to that of fuel oil. This fuel source brings with it harmful carbon emissions and increases the regions reliance on imports from abroad as no natural gas is produced locally. It's important that the energy strategy for the North-West Region considers the adoptions of LCT's which reduce the long term environmental impact and cost of heating within homes and businesses. Hydrogen is a potential alternative as it provides clean and efficient energy. HP's are another potential alternative as well as renewable gas from natural waste. District heating schemes may also provide a suitable heating alternative for smaller communities disconnected from the natural gas network, and with limited network capacity for the connection of HP's.

Water Networks

Irish Water are the national water utility in the Republic of Ireland, whilst Northern Ireland Water provide the water and sewerage services for Northern Ireland. In Donegal, DCC act on Irish Waters behalf and are responsible for the maintenance and operation of the network throughout the Donegal region. As a large consumer of energy, the Water Networks across the North-West Region have an opportunity to reduce both their annual energy bill and carbon footprint. Some opportunities to reduce the environmental footprint from water networks could be the installation of renewable generation at pumping sites, improving aged and damaged waterpipes to reduce leaks, and reducing pump sizes where appropriate.

ROLL OF INNOVATION

Both technical, commercial and regulatory innovation is required to enable the strategy and vision described within this document. Both DCC and DCSDC are currently involved in a number of energy related innovation projects, whilst other national and international projects represent “fast follower” opportunities for the region to build upon learnings and accelerate the decarbonisation of the region.

Local Innovation Projects

Both the DCC & DCSDC are involved in several innovation projects that will accelerate the transition to a low carbon energy system. One such example is the DCSDC Funding Deal. This City Deal will provide £50 million in funding to support innovation and the growth of the area’s digital sector within DCSDC. The learnings that are acquired from the innovative projects funded should be applied across the entire region wherever possible. In addition, both LA’s are involved in the following energy related innovation projects:

- **SECURE** – Smarter Energy Communities
- **SmartRENEW** – Smarter Renewable Energy & Heating Management
- **SMARTIC** – Smart Energy Management in Remote Areas
- **STARDUST** – Holistic and Integrated Urban Model for Smart Cities
- **CLIMATE** – Collaborative Learning Initiative Managing & Adapting to the Environment

(See main report section 7 for full details of these)

It is important that the region stays up to date with the latest “State of the Art” and innovations in Energy as the North-West Regional Energy Strategy is implemented.

There are many innovation projects and demonstrators around the world with the goal to reduce carbon emissions. This presents the North-West Region with fast follower opportunities to implement the learnings and developments that arise from global innovation projects as they become available.

As an example, the RUGGEDISED project has brought together six European cities to accelerate a path towards a sustainable future by creating model urban areas. The project is funded under the European Union’s Horizon 2020 research and innovation programme and intends to partner with industry and academia to demonstrate how to combine ICT, e-mobility and energy solutions to design smart future cities. In total, RUGGEDISED has funded 32 innovative projects in areas including Smart Thermal Grid, Smart Electricity and E-mobility and Energy Management and ICT.

It is recommended that the North West Regional Energy Hub project body is established, closely following the excellent examples from Codema in Dublin, and the Midland Energy Hub in England (see section 7 of main report)

REGIONAL ENERGY CARBON ASSESSMENT

An assessment of carbon emissions within the North-West Region has been conducted to establish a carbon baseline for the region. This exercise will allow progress against carbon emission targets to be tracked and allow future carbon reduction initiatives to be prioritised.

The assessment consisted of two parts; quantify the carbon emissions associated with the current energy system and secondly a quantification of the carbon impact associated with the local measures recommended within this strategy. This exercise allows the region to keep track of the carbon emissions arising from the area, set informed carbon targets, and prioritise investments in local measures which accelerate the decarbonisation of the region.

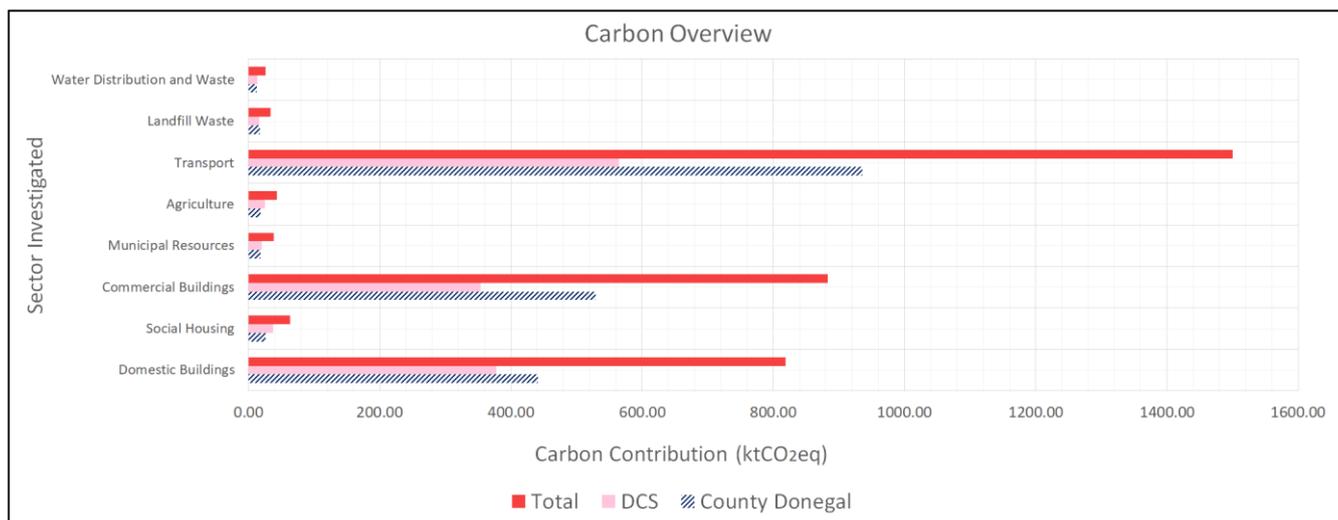
The Carbon Baseline exercise was delivered in collaboration with ERNACT and identifies the main sources of greenhouse gas emissions within the region with an Excel Tool. This includes the emissions associated with the energy consumed by Transport, Housing, Commercial properties, Industry, Waste and Water amongst others.

The second Excel tool allows the impact of the local measures to be quantified across the five key areas of interest; Renewable Generation, Low Carbon transport, Low Carbon Heating and Energy Efficiency. The target sectors have differing methodologies to quantify the total carbon savings, therefore requiring various data inputs specific to the individual carbon saving initiative. When complete, the results will provide evidence to support future investment in low carbon energy initiatives which will have the most significant impact and support the decarbonisation of the region.

Carbon Baseline Results

The total carbon baseline across all sectors for the North-West region was calculated to be **3,407 ktCO₂eq** (kilo tonnes of CO₂ equivalent), of which **1,998 ktCO₂eq** from County Donegal, and **1,409 ktCO₂eq** from the DCS. The carbon associated to each sector disseminated by Figure 2:

Figure 2 – North-West Region Carbon Baseline



Three main sectors; Transport, Commercial Buildings, and Private Domestic Buildings, have significant contribution to the carbon baseline making up 94 % of the total baseline (44%, 26%, and 24% for transport, commercial and domestic buildings respectively).

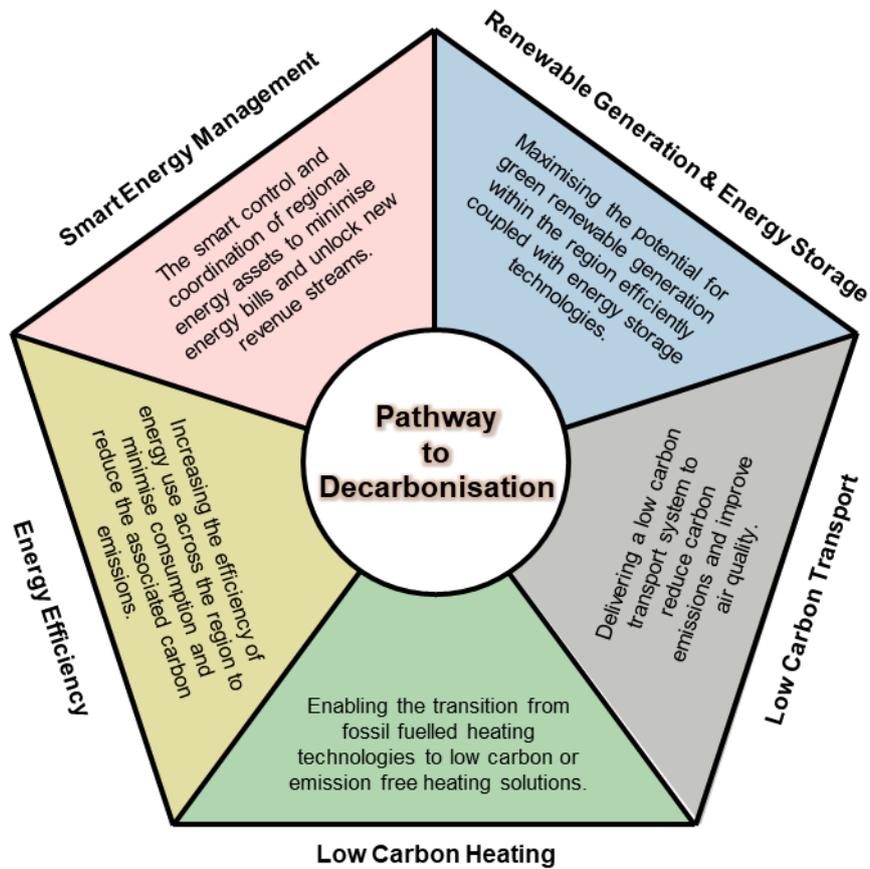
This analysis highlights the key focus areas for DCC and DCSDC to target with low carbon development strategies when attempting to reduce the carbon emissions associated with the region.

CONCLUSIONS

Both Derry City & Strabane District Council (DCSDC) and Donegal County Council (DCC) have joined forces to build a sustainable and low carbon region which can encourage further economic growth whilst reducing the carbon emissions arising from the use of energy within the Region. A Carbon Baseline of **3,407 ktCO₂eq** has been established as the starting point towards “Net Zero”.

This North-West Regional Energy Strategy has defined the current energy system within the Region and potential opportunities to that are available to help meet binding national and European carbon reduction targets. These opportunities have been mapped against five themed areas as described below:

Figure 3 – Themed decarbonisation areas: Pathway to Decarbonisation



It is recommended that a Whole Energy System approach is taken which assesses energy opportunities simultaneously across multiple energy vectors including gas, electricity, heat, and transport. This will allow the generation, consumption and storage of energy across the region to be optimised and the cost to achieve a future carbon neutral community minimised.

The next steps would require more in-depth feasibility studies and planning to be carried out against each of the potential local measures that are recommended within this report. This will allow the region to develop a clearer view and quantify the business case associated with each potential initiative, including all costs and benefits.

This document is an executive summary of the main Regional Energy Strategy report. Please refer to the full report for more detailed description of the content presented within this report and of the North West Regional Energy Strategy as a whole.

It is clear from above that there is a considerable amount of work over many years, which will need to be coordinated in order to develop, and deliver the projects set out within the North West Regional Energy Strategy. We are aware that as we are consulting on this strategy, the NI Energy Strategy is also being developed, and the intention is that both strategies are finalised towards the end of 2020. In keeping with similar organisational arrangements in both Ireland and England, we are confident that such a local delivery body would work well in the North West of Ireland.

