Department for the Economy
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ENERGY STRATEGY FOR NORTHERN IRELAND

CONSULTATION ON POLICY OPTIONS

March 2021

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Ministerial Foreword

We are living in a time like no other, where we are seeking to address climate change in parallel with our economic recovery following the coronavirus pandemic. Whilst there are undoubtedly challenges for us in these, they give us unique opportunities to shape a new future.

We have the **opportunity** to grow a green economy that creates wealth and jobs whilst ensuring our environment is sustainable.

We have the **opportunity** to develop new clean energy technologies, embrace innovation and support new skills as part of a low carbon workforce.

We have the **opportunity** to establish a pathway to end our reliance on imported fossil fuels that damage our environment and, at the same time, become largely self-sufficient.

We have the **opportunity** to ensure energy is resilient, secure and affordable whilst offering consumers the chance to participate in the delivery of a net zero carbon energy future.

And we have the **opportunity** to eradicate fuel poverty and deliver better health outcomes for some of our most vulnerable in our society.

Just one month ago I published an Economic Recovery Action Plan. In this, I presented a range of decisive actions to kick-start our economic recovery from the devastation of COVID-19. Building a greener economy is a key theme within this plan and I am now pleased to launch this consultation on potential options for a new Energy Strategy.

This consultation represents an important step towards implementing a new long-term Energy Strategy for Northern Ireland, which will sit alongside the new Economic Vision and the Skills Strategy as part of a comprehensive and cohesive approach to the future growth of the green economy in Northern Ireland.

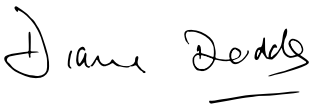
I would like to thank all those who have helped to inform the development of this consultation through the Call for Evidence in early 2020. I am now putting forward an exciting new framework as the basis for the new Energy Strategy and this consultation explores a range of potential future policy options that are still being developed. I would also like to thank those who have participated on the working groups over the last year and the members of our expert panel which has brought external insight and challenge to the development of this consultation.

Our proposed vision is to achieve **net zero carbon and affordable energy** through the delivery of a new Energy Strategy. **You** will be at the centre of this as we grow a green economy, do more with less, replace fossil fuels with indigenous renewables and create a flexible and integrated energy system.

The development and delivery of the new Energy Strategy requires a joined-up approach across the NI Executive. This consultation represents the collective and collaborative efforts of many departments and many others across the public and private sectors, demonstrating our commitment to working together to deliver the best outcomes for the economy and society more widely. I intend to continue to work positively with my Ministerial colleagues both in the development and in the delivery of the Energy Strategy.

I recognise the urgency to address climate change and support our economic recovery in advance of the new Energy Strategy. This is why I have already outlined my ambitions around the hydrogen economy, renewable electricity and energy efficiency. I have also provided funding to trial innovative new hydrogen technology with Northern Ireland Water at their waste water treatment works. I will continue to progress urgent energy issues as necessary.

This is your chance to shape the direction of the new Energy Strategy and I look forward to seeing the responses.



Executive Summary

OUR VISION:
Net Zero Carbon and Affordable Energy

Our Ambition

Addressing climate change is one of the greatest challenges and opportunities facing society. The 2015 Paris Agreement aims to limit global warming to 1.5°C and the UK became the first major country to commit to a legally binding target of "net zero" emissions by 2050. This means that we must remove almost all greenhouse gas emissions from our atmosphere and those that remain must be offset through natural routes that absorb carbon such as tree planting or using new technologies that can capture, use and store carbon.

Northern Ireland will make its fair contribution to this commitment. The body responsible for advising the UK and devolved governments on climate change – the Climate Change Committee (CCC) – has advised that Northern Ireland's contribution is an 82% reduction in all greenhouse gas emissions by 2050. The Department for Agriculture, Environment and Rural Affairs (DAERA) is developing a Climate Change Bill that is consistent with this advice.

We propose an overall goal to achieve net zero carbon-energy by 2050. Carbon as in carbon dioxide (CO_2) - is the greenhouse gas that contributes most to warming and the date of net zero carbon is closely linked with when the contribution to rising temperatures ends. The CCC has advised that an 82% reduction in total greenhouse gas emissions is consistent with net zero carbon in Northern Ireland. As almost all (96%) of energy-related emissions are carbon, our focus in the Energy Strategy will be to achieve net zero carbon-energy by 2050.

We must continue to ensure energy is affordable for all consumers. The CCC advises that the cost savings from replacing fossil fuels with cleaner and more efficient clean technologies will entirely cancel out the investment costs of meeting net zero emissions by 2050. Many of the additional upfront investment costs needed to realise longer-term savings will be in energy and therefore we will ensure a focus on affordability for all consumers during the transition to net zero carbon energy.

Our Opportunity

Northern Ireland is a market leader in renewable electricity. In just 15 years, we have transformed our power sector from being almost entirely reliant on fossil fuels to having almost 50% of electricity consumption come from renewable sources. Our existing renewable electricity base provides an outstanding platform upon which we can further decarbonise our power sector and contribute to the decarbonisation of heat and transport.

We have unique strengths that provide us with an advantage. We are a small region that can be proactive, responsive and flexible in the transition to decarbonised energy. Our world-leading wind resource can deliver not only renewable electricity but also the growth of the hydrogen economy. We have a substantial rural agriculture base that can support the growth of biogas and our modern gas network is more suitable for zero carbon gas than older networks elsewhere. We can use our publicly-owned assets such as social housing, public transport and water services to drive new technologies.

Our economy can be built around zero carbon. We already have a low carbon and renewable energy economy with turnover of almost £1.1 billion and 5,300 full time equivalent jobs that we can grow much larger through our clean energy policies.[1] The green economy is a key pillar of our economic recovery and clean energy has been identified as a priority economic sector for investment. We have a world-class advanced manufacturing, materials and engineering base with the necessary skills to be at the forefront of innovation and new technologies needed globally for net zero emissions.

Consumers must be at the centre of the energy system. We must redefine the relationship that consumers have with energy to be seen not just as cost but also an opportunity to directly address climate change. Opportunities can become available for consumers to play a much greater role in the energy system than ever before and, for those who are unable to, there will be appropriate protections put in place.

Our Principles

We have identified five principles for the new Energy Strategy. This consultation is structured around these principles and a series of objectives have been identified under each. These are:

Placing you at the heart of our energy future: We will make energy simple for everyone in society and develop policies that enable and protect consumers through the energy transition. Affordability and fairness will be key considerations in all our policy decisions.

Grow a green economy: We will provide economic opportunities, create new jobs and grow a low carbon skills base through innovation and focusing on our competitive strengths.

Do more with less: We will set clear targets, standards and regulations that drive improvements in energy efficiency. Consumers will be supported to invest in buildings and make changes that reduce their energy use.

Replace fossil fuels with indigenous renewables: We will phase out fossil fuels by growing our indigenous renewable base and using this to decarbonise power, heat and transport.

Create a flexible and integrated energy system: We will create a flexible, smart and digitised energy system that integrates renewables across heat, power and transport, creates value for consumers and enhances security of supply.

1 Low carbon and renewable energy economy, UK - Office for National Statistics (ons.gov.uk)

Our Policies

We have put forward a range of potential policies that could form the basis of the new Energy Strategy. These policies represent potential options being considered at this point in time based on the work carried out to date and are neither exhaustive nor represent final policy decisions. We are focusing on options that we believe offer the best decarbonisation opportunities in the short-term – such as renewable electricity and energy efficiency – whilst ensuring we are at the forefront of trialling and testing new and emerging technologies that have significant potential in the medium to long-term.

Potential policies include:

Placing you at the heart of our energy future:

- Establishing a new "one stop shop" for information, technical advice and relevant support for all energy consumers.
- Shaping energy policies to enable and protect consumers during the transition to decarbonise energy.
- Ensuring affordability and fairness in meeting the investment costs of net zero energy carbon emissions.

Grow a green economy

- Maximising the economic impact of clean energy policies focused on energy efficiency, renewable energy and the circular economy.
- Supporting the growth of the hydrogen economy by focusing on hydrogen production, demand and supply chain opportunities.
- A pilot green innovation challenge fund to support demonstrator projects that can stimulate growth in the green economy.
- Establishing an energy skills forum to shape skills development for a low carbon workforce.

Do more with less

- Introducing an energy savings target, minimum energy efficiency standards for buildings and uplifted building regulations.
- Comprehensive additional energy efficiency support for domestic and non-domestic consumers.
- A range of approaches to build consumer trust and confidence in energy efficiency work carried out by the industry.
- Measures aimed at supporting consumers to change how they use energy and travel.

Replace fossil fuels with indigenous renewables

- A 70% renewable electricity target by 2030 with flexibility to increase this if it proves achievable and cost effective.
- Extending 'Contracts for Difference' support to Northern Ireland along with a targeted action plan to bring forward offshore & marine renewables.
- A phased approach to removing fossil fuel heating sources.
- Adopting parallel on and off-gas grid approaches to decarbonise heating keeping a range of potential solutions open at this stage.
- Providing pilot support for low carbon technologies alongside trials of heat pumps, decarbonised gas and biofuels.
- Developing an Electric Vehicle infrastructure plan along with demonstrator projects to trial alternative vehicle fuels.

Create a flexible and integrated energy system

- Increasing flexibility in our electricity infrastructure supported by markets that deliver the best outcomes for consumers.
- A new cost benefit analysis of smart meters to gather and utilise energy data as part of a smart energy system.
- Enabling consumers and communities to generate, use, sell and share energy, with access to energy market revenue streams.
- Trials of geothermal, waste and biomass heat networks.

Our Priorities

Delivering an Energy Strategy is just as important as producing one. We have identified six key priorities that will be progressed in parallel with policy development in order to ensure that the new strategy is delivered. These are:

1. **Security of supply:** ensuring that future policies result in a secure and resilient energy system;
2. **Costs:** measuring the whole system costs and benefits of energy policy decisions to ensure the most cost-effective decisions are made;
3. **Intelligence:** developing a comprehensive energy intelligence work programme of technology pilots, research, modelling, data and statistics;
4. **Legislation:** making the necessary changes to legislation to provide the legal basis to deliver the priorities within the Energy Strategy;
5. **Regulation:** reviewing energy regulation to protect consumer interests whilst delivering on the objectives of the Energy Strategy; and
6. **Governance:** delivering a coordinated and joined-up approach to energy decarbonisation across all levels of government.

Our Approach

We are developing a collaborative new Energy Strategy. The development of a new Energy Strategy began with a Call for Evidence in December 2019. This attracted 161 responses with the majority of these coming from outside the energy industry. Five working groups with 68 representatives from 33 different organisations from inside and outside government were established with a focus on evidence. An expert panel was formed bringing external expertise and perspectives on strategy development and additional research and modelling was carried out.

We will put in place a new Energy Strategy by the end of 2021. This consultation represents a key milestone in the development of a new Energy Strategy and we want your input to help shape the policies that are contained in it to supplement additional further research and analysis that we will carry out. We intend for this to be a “living and breathing” strategy which is regularly monitored, reported on and amended to adapt to changing circumstances and opportunities.

We will not wait for the new strategy to progress urgent issues. In parallel with the development of this consultation we are already including £20 million of green recovery interventions as part of the Economic Recovery Action Plan, provided £5 million of funding to Northern Ireland Water to trial innovative new electrolyser technology and provided early direction on renewable electricity, energy efficiency and the hydrogen economy. This will continue to be our approach going forward.

Responses to this consultation must be submitted by **17:00 on 30 June 2021** through the following link:

Energy Strategy Options Consultation

There are a total of 79 questions in the consultation. Please only answer those that are most relevant and important to you.

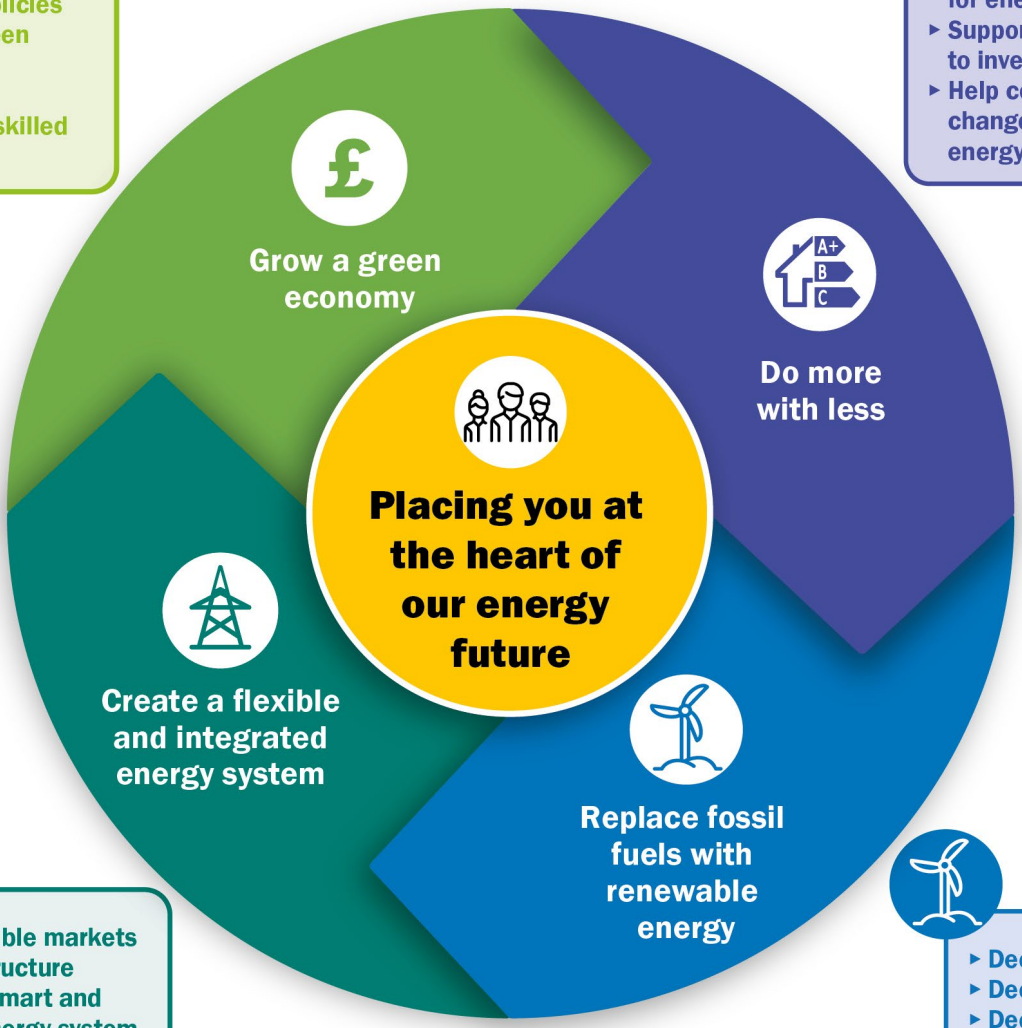
ENERGY STRATEGY FRAMEWORK

VISION: NET ZERO CARBON AND AFFORDABLE ENERGY

- Enable and protect consumers
- Make energy simple for consumers
- Ensure affordability and fairness

- Maximise the economic impact of energy policies
- Invest in green innovation
- Develop a low-carbon skilled workforce

- Set clear direction for energy efficiency
- Support consumers to invest in buildings
- Help consumers to change how they use energy



- Ensure flexible markets and infrastructure
- Develop a smart and digitised energy system
- Facilitate decentralisation

- Decarbonise power
- Decarbonise heat
- Decarbonise transport
- Remove residual emissions

DELIVERY PRIORITIES:

Security of Supply • Costs • Intelligence • Legislation • Regulation • Governance

Our Questions

Q1: Do you agree with the overall goal of achieving net zero carbon energy no later than 2050?

Q2. Do you agree with the proposed outcome of "net zero carbon and affordable energy" for the Energy Strategy?

Q3. Do the five principles identified provide clear direction around the approach that we want to take with the Energy Strategy?

Q4. Are there any key delivery priorities for the Energy Strategy not captured? If so, please outline what you believe should be included.

Q5. Do our proposed indicators adequately allow us to measure success at achieving the proposed Energy Strategy outcome? If not, please advise on what alternative metrics should be used.

a) Carbon emissions from energy-related sectors
b) Jobs and turnover in the low carbon and renewable energy economy
c) Domestic energy costs relative to household income
d) Business energy purchases relative to business turnover
e) Households in fuel poverty
f) Relative electricity & gas prices

Q6. Do you think there are significantly different illustrative scenarios which should be developed? If so, please provide further information.

Placing You at the Heart of our Energy Future

Q7: Do you agree with the four consumer population groups we have identified? Please advise on key considerations within each.

a) Domestic vulnerable consumers
b) Other domestic consumers
c) Small businesses
d) Larger businesses

Q8: Do you agree with the five measures identified to "enable and protect" consumers? If not, please outline what else should be included?

a) Making available information and advice
b) Offering proactive "wrap-around" support
c) Providing financial support measures
d) Driving change
e) Reviewing statutory protections

Q9: Do you agree with the proposed scope of the "one stop shop"? Please advise on any different activities you think should be included.

Q10: Which approach do you think should be taken to create this organisation? Please outline your rationale.

Q11: Do you believe that additional financial assistance to protect certain groups of consumers should be introduced? If so, please identify what consumers should be targeted and what support would be needed.

Grow a Green Economy

Q12: Do you agree with the four identified priority clean energy sectors:

a) Energy efficiency
b) Renewable energy
c) Hydrogen economy
d) Circular economy

Please advise on any additional areas that you believe should be prioritised and your reasons for this.

Q13: Do you agree with the economic growth opportunities identified within energy efficiency? What supporting policies do you believe are needed to take advantage of these?

Q14: Do you agree with the economic growth opportunities identified within renewable energy? What supporting policies do you believe are needed to take advantage of these?

Q15: Do you agree with the economic growth opportunities identified for hydrogen production, demand and manufacturing within the hydrogen economy? What supporting policies do you believe are needed to take advantage of these?

Q16: Do you agree with underpinning principles identified within the circular economy? What supporting policies do you believe are needed to take advantage of the potential economic opportunities?

Q17: Do you agree that we should develop a green innovation challenge fund? If so, what scale and type of innovative projects should this support?

Q18: Do you believe that we should work with the Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation? If so, how can this be done in a way which protects consumers from the higher risks associated with innovation projects?

Q19: Do you agree with a focus on research mapping, research funding, business linkages and UK opportunity scanning to maximise the impact of the local research base with clean energy specialisms? Please identify specific opportunities in the local research base that could be progressed.

Q20: Do you believe that utilising and tailoring existing education and training routes can meet the short-term skills needs of the clean energy sector? How can activities within these routes be shaped to meet the needs of the sector?

Q21: Do you agree with the proposal to establish an Energy Skills Forum to shape the future skills needs of clean energy sector? If so, what do you believe the role, remit and membership of such a group should be?

Q22: Do you believe that there is a need for specific measures aimed at ensuring a just transition in Northern Ireland? If so, please advise on what the focus of these should be in addition to the education and training routes already proposed for a low carbon workforce.

Do More With Less

Q23: Do you agree that an energy savings target should be set for Northern Ireland?

Q24: Do you agree that Minimum Energy Efficiency Standards should be set to drive improvements in energy efficiency? If so, what buildings should be the early priorities for introducing minimum standards?

Q25: Do you agree with the general scale and proposed pace of change outlined in DoF's five phase plan for building regulations? If not, please outline what achievable timescale or programme should be implemented and your rationale for this.

Q26: Do you think that we should seek to explore how the rates system can be used to encourage energy efficiency? If so, please outline key issues that would need to be considered.

Q27: Do you agree that we should introduce a pilot domestic retrofit scheme by spring 2022, followed by a substantive scheme as part of a "one stop shop" approach? If so, what changes are needed to the wider energy efficiency support landscape to ensure a joined-up approach?

Q28: Do you agree that we should ring-fence the PSO funding for vulnerable consumers including the fuel poor? Please advise on changes you believe should be made to the level and scope of the PSO for energy efficiency.

Q29: Do you believe that green private finance solutions have a role to play in supporting domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Q30: Do you agree that Invest NI should deliver a pilot energy efficiency support scheme for businesses, to be followed by a substantive scheme delivered through the proposed "one stop shop" organisation. If so, what type of support do you believe is most appropriate for different groups of business consumers?

Q31: Do you believe that green private finance solutions have a role to play in supporting non-domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Q32: Do you agree that we should seek to develop skills and capability, enhance quality assurance and standards, and use an accreditation body to provide guarantees on work undertaken by the energy services for retrofit sector? If so, how can we help to prepare the sector for these changes?

Q33: Do you agree that information, awareness and behavioural change should be a key strand of future energy efficiency support? If so, what are the key behaviours that should be targeted?

Q34: What measures do you think can have the most impact to support people to reduce the miles they travel in private vehicles? Please explain your rationale.

Replace Fossil Fuels With Indigenous Renewables

Q35: Do you agree with setting a 70% renewable electricity target by 2030, whilst retaining the flexibility to increase this to 80%?

Q36: Do you agree with the criteria identified that would allow in order to consider any future increases in the renewable electricity target?

a) Projects can be delivered in a cost-effective manner.
b) Offshore wind can be delivered by 2030.
c) Storage technologies can minimise system curtailment of renewables.
d) Greater clarity on electricity demand for heating and transport.
e) Consumers' bills are not disproportionately impacted.

If not, what alternative criteria might be used?

Q37: Do you agree that we should explore with BEIS the possibility of extending the Contracts for Difference scheme to Northern Ireland? If so, what terms would be needed to ensure generation in the region whilst protecting consumers?

Q38: Do you believe it is possible that an offshore wind project in Northern Ireland could be operational before 2030? If so, please outline what targeted actions could be taken to deliver this.

Q39: Do you believe that a fixed platform offshore wind project should be targeted to be part of the renewable generation mix? If so, how would you propose some of the challenges associated could be overcome?

Q40: Do you believe that floating platform offshore wind offers the best long-term opportunities for offshore wind in Northern Ireland's waters? If so, what additional steps could be taken to encourage these projects?

Q41: Do you believe that other marine renewables can play a key role in our renewable generation mix? If so, please identify what technologies offer the greatest potential and what steps can be taken to support these.

Q42: Do you agree that a strategic approach to planning the location of renewable projects should be taken? If so, please outline practical steps that could be taken to deliver this.

Q43: Do you believe that there should be a requirement for renewable developers to share some of the financial benefits of developments with local communities? If so, what share do you think would be reasonable? If not, please provide your rationale.

Q44: Do you agree with taking separate approaches to on-gas grid and off-gas grid consumers? If not, what approach should be taken?

Q45: Do you agree that we should not rule out potential low and zero carbon heat solutions at this stage? If not, please outline your rationale.

Q46: What low and zero carbon heat solutions do you believe we should prioritise for trials? Please identify where such trials should be focused and what key issues should be tested within each.

Q47: Do you believe that the role of heat pumps will be different depending on whether consumers are on or off the gas grid? Please outline what you think the specific roles should be.

Q48: Do you agree that Northern Ireland should develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers? If so, please identify key issues that need to be considered in designing and delivering such a scheme.

Q49: Do you agree that legislative and regulatory steps should be taken to facilitate biomethane injection into the gas network?

Q50: Do you believe that support should be provided to encourage biomethane production for injection into the gas network? If not, please outline what alternative approach should be taken to decarbonising the gas network.

Q51: Do you agree that the local Gas Network Operators should develop and publish a plan to decarbonise gas out to 2050? If so, what key issues must be considered within it?

Q52: Do you agree that the sale and installation of new oil boilers should not be allowed for consumers on the gas grid? Please outline your rationale and, if you agree, what a viable timeline for introducing this might be?

Q53: Do you believe that off-gas grid consumers should have the option to retain oil boilers for use with biofuels? If not, what is a viable timeline for introducing a ban on the use of all oil boilers?

Q54: Do you agree that the local Oil Industry should develop and publish a plan on how biofuels could play a role in decarbonising heat out to 2050? If so, what key issues must be considered within it?

Q55: Do you believe that support should be introduced to promote the uptake of biomass for off-grid consumers? If so, please advise on what support is needed and where it should be focused.

Q56: Do you agree that the sale of coal and wet wood should be banned in Northern Ireland? If so, do you believe this should be extended to include other solid fuels with the exception of kiln dried wood?

Q57: Do you agree that we should develop a Northern Ireland specific strategy that sets an overarching, long-term plan for cleaner, greener transport and shows how we will meet net zero emissions within the transport sector? If so, what Northern Ireland specific issues need to be factored into this in order to accelerate the uptake of Zero Emissions Vehicles?

Q58: Do you agree that an EV communication campaign should be run in Northern Ireland? If so, what key messages would be most impactful for consumers as part of this?

Q59: Do you agree that the private sector and local government have a key role to play in developing EV infrastructure? If so, what barriers can government address to ensure that such projects are commercially viable?

Q60: Do you agree that we should develop an EV Charging Infrastructure Plan in collaboration with public and private partners? If so, what should the key priorities of the plan be?

Q61: Do you agree that public sector contracts can be a key driver for developing technologies and markets for alternative fuel vehicles? If so, what specific opportunities are there that could be progressed?

Q62: Do you agree that collaborative research will be important to demonstrate alternative fuels? If so, what are the best routes to identify and progress potential projects?

Q63: Do you believe that Compressed Natural Gas/Liquid Natural Gas and/or and synthetic fuels can play a role as an interim measure to decarbonising transport? If so, how can government help to encourage the private sector to trial and use these fuels?

Q64: Do you believe that CCUS can play a role in Northern Ireland? If so, what potential applications could be the initial focus for demonstration projects?

Q65: Do you believe that our approach to petroleum licensing should change in line with our commitment to decarbonise energy?

Create a Flexible and Integrated Energy System

Q66: Do you agree that the Electricity Network and System Operators should produce a pathway to creating a flexible and integrated energy system? If so, please provide evidence to demonstrate what the initial priorities of such a plan be?

Q67: Do you agree that conventional power generation can play an important role in the pathway to decarbonised energy? If so, what opportunities and barriers exist for such plants?

Q68: Do you believe that further interconnection will be needed in the future? If so, is a new revenue mechanism needed to bring forward this investment?

Q69: Do you agree that our power system should be based around flexible solutions to align demand and supply? If so, please advise on what key decisions are needed to achieve this.

Q70: Do you believe that the SEM and DS3 offer sufficient market routes to support the deployment of flexible technologies for generators of all sizes? If not, please provide evidence to demonstrate what additional market routes may be needed.

Q71: Do you agree that a policy framework should be put in place to enhance access to and use of consumer data? If so, please outline key considerations that need to be factored into this framework.

Q72: Do you believe that we should take forward the Energy Data Taskforce recommendations in Northern Ireland? If so, please advise on key differences with Great Britain that need to be factored in.

Q73: Do you agree that a Cost Benefit Analysis of smart meters should take into account the broader benefits they can bring to consumers as an enabler of energy data and a smart system? If the CBA for smart meters is not positive, what alternative approaches can be taken to deliver these benefits for consumers?

Q74: Do you believe that financial support should be provided for micro-generation to increase the number of active consumers in Northern Ireland? If so, what should this support look like? If not, what are the alternatives?

Q75: Do you agree that network charging in a decentralised energy system will need to change? If so, what are the principles that should be adopted in distributing future network costs across consumers?

Q76: Do you believe that a new regulatory framework is needed to protect consumers who engage in decentralised arrangements? If so, what consumer protection measures should be part of this?

Q77: Do you believe that energy communities have a role to play as part of the energy transition? If so, what support is needed to progress these? If not, what are the alternatives?

Q78: Do you agree that the potential of geothermal energy should be further explored, supported by a legislative and regulatory framework? If so, what applications do you believe there are for geothermal energy in Northern Ireland?

Q79: Do you agree that further trials of heat networks should be carried out? If so, what key issues do you think should be tested through these?

Chapter 1: Context

1.1 Introduction

This document represents the second stage of public consultation in the development of a new Energy Strategy for Northern Ireland.

The first stage of the strategy development was a Call for Evidence published in December 2019 which closed on 3rd April 2020. This process also involved thematic workshops, stakeholder engagement and collaboration across government. A report on the Call for Evidence along with all the individual responses was published on 30 June 2020.[2] The Department for the Economy (DfE) simultaneously launched a regular e-bulletin[3] to inform stakeholders about progress on key issues arising from the Call for Evidence and policy areas that were being developed to address these. This now reaches 621 stakeholders on our mailing list.

This consultation builds on the evidence received and the key issues identified through the Call for Evidence process. Five working groups covering energy efficiency, heat, power, transport and consumers were established to review the Call for Evidence responses, contribute additional evidence and help to identify and shortlist potential policy options. An expert panel was also established to provide external insight and challenge to the development of this consultation.

A strategic framework that we intend to put in place for the Energy Strategy forms the basis of this consultation, along with potential pathways to meeting our objectives and a range of potential policy options currently being considered. Whilst DfE is leading on the development of the Energy Strategy, the options put forward in this consultation draw on all the evidence gathered to date and represent the collective input of many of government departments involved in this work programme.

Responses to this consultation must be submitted by 17:00 on 30 June 2021 through the following link: Energy Strategy Options Consultation

There are a total of 79 questions in the consultation. Please only answer those that are most relevant and important to you.

The views and information provided through the consultation will be used to inform the continued development of energy policies that will feature within **a new Energy Strategy to be published before the end of 2021.**

1.2 Ambition

The 2015 Paris Agreement aims to limit global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels. It requires all parties to put forward their best efforts through "nationally determined contributions", to strengthen these efforts in the years ahead, and to report regularly on their emissions and implementation efforts.

2 Energy Strategy - Call for Evidence | Department for the Economy (economy-ni.gov.uk)
3 Northern Ireland Energy Strategy 2050 | Department for the Economy (economy-ni.gov.uk)

The UK Climate Change Act 2008 is the basis for the UK's approach to tackling and responding to climate change. It requires that emissions of carbon dioxide (CO_2) and other greenhouse gases (GHGs) are reduced and that climate change risks are addressed. This Act was amended in 2019 to require the UK to have a 100% reduction in GHGs by 2050 from 1990 levels, commonly referred to as the 'net zero 2050' target.

As a first step to setting climate change targets for Northern Ireland, the Department of Agriculture, Environment and Rural Affairs (DAERA) has issued a discussion document[4] regarding the development of policy proposals for a Northern Ireland specific Climate Change Bill in December 2019. This outlined two options:

1. Setting interim emission reduction targets and a long-term target of net zero emissions in Northern Ireland by 2050; or

2. Setting interim emission reduction targets and a long term target by 2050 where the target is an equitable contribution to achieving UK-wide net zero by 2050.

Climate Change Committee

The Climate Change Committee (CCC) advises the UK and devolved governments on emissions targets and reports to Parliament on progress made in reducing greenhouse gas emissions and preparing for and adapting to the impacts of climate change.

The Climate Change Committee (CCC) published recommendations on the Sixth Carbon Budget on 9th December 2020.[5] In this, they maintained their advice that the UK should aim to reach net zero GHG emissions by 2050 at the latest. They advised that in every scenario they constructed, Northern Ireland would not get to net zero GHGs by 2050. They concluded that an 82% reduction in GHGs represents an equivalent effort and fair contribution to the UK net zero target.[6] DAERA is developing a Climate Change Bill that is consistent with this advice.

The CCC did, however, advise that Northern Ireland would achieve net zero CO_2 emissions by 2050 as part of the balanced pathway to UK net zero. As 96% of energy-related emissions are carbon, meeting Northern Ireland's contribution to UK net zero emissions will therefore require energy to be decarbonised.

We propose an overall goal to achieve net zero carbon energy by 2050. This aligns with the advice of the CCC and is consistent with wider climate change action within Northern Ireland. It also aligns with ambitions across the UK and more widely in the Republic of Ireland and EU.

Responses to the Call for Evidence demonstrated significant support for the proposed timeline of net zero carbon emissions from energy by 2050. However, some respondents suggested alternative targets, including achieving net-zero carbon energy ranging from 2030 to 2045.

4 Discussion Document on a Climate Change Bill | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)
5 The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf (theccc.org.uk)
6 Letter: Lord Deben, Climate Change Committee to Edwin Poots MLA - Climate Change Committee (theccc.org.uk)

As identified through the ongoing evidence gathering process, achieving net-zero carbon energy by 2050 will require substantial investment and significant changes to how people live their lives. In their scenario analysis, the CCC found it unlikely that the UK could reach net zero GHG emissions substantially before 2050 and maintained their recommendation to maintain 2050 at the latest as an appropriate goal. **Reaching net zero carbon energy emissions by no later than 2050 in Northern Ireland is a hugely ambitious challenge.**

We will, ensure that the Energy Strategy is a 'live document' that remains flexible to adapt to any new climate emissions targets and/or potential opportunities to decarbonise the energy sector more quickly. There may also be potential to take action more quickly and set targets within specific sectors, and the focus on potential options in this regard are addressed in the body of this consultation.

Q1: Do you agree with the overall goal of achieving net zero carbon energy no later than 2050?

1.3 Strategic Context

The close connections between energy, climate, economic, skills and other policy areas were highlighted in responses to the Energy Strategy Call for Evidence. In addition to DAERA's work on climate change, we note the following important strategies and frameworks that are currently under development and that will complement the new Energy Strategy:

- Programme for Government, The Executive Office (TEO)
- Investment Strategy for Northern Ireland, Strategic Investment Board (SIB)
- Economic Vision, DfE
- Skills Strategy, DfE
- Green Growth Strategy, DAERA
- Environment Strategy, DAERA
- Clean Air Strategy, DAERA
- Housing Supply Strategy, Department for Communities (DfC)
- Fuel Poverty Strategy, DfC

The Government Stakeholders Group established to support the development of the Energy Strategy is providing a forum for information sharing across Departments to support a joined-up approach in the development of these strategies.

A consultation on a new draft Programme for Government (PfG) outcomes framework was published in January 2021.[7] The Energy Strategy will deliver against a number of the outcomes in this, particularly "We live and work sustainably – protecting the environment" and "Our economy is globally competitive, regionally balanced and carbon-neutral."

Since the Call for Evidence in December last year, we have seen the publication of new targets, policies and strategies beyond Northern Ireland that will impact many of the policy areas identified in this consultation. New international obligations have also been put in place as a result of the UK's departure from the EU.

7 Consultation on the Programme for Government draft Outcomes Framework | Northern Ireland Executive

United Kingdom

The UK Government recently published the Energy White Paper: Powering our Net Zero Future[8], which outlines the wider UK approach to decarbonising energy. Whilst energy policy is largely devolved to Northern Ireland, some relevant areas remain reserved/accepted matters. In addition, UK obligations under the Withdrawal Act, the Protocol and the Trade and The Cooperation Agreement will need considered.

Many of the energy policy issues considered in the White Paper are shared with Northern Ireland, and we sit within the wider UK context in contributing to the legislative requirement for net zero emissions. In this regard, we already have and will continue to engage with UK Government to ensure that opportunities arising from the White Paper are available to Northern Ireland.

There are also additional UK strategies and policies in specific areas, such as transport or offshore wind, which impact on Northern Ireland. Where this is the case, these are referred to in the respective sections later in this document.

Republic of Ireland

The Irish Government published its Climate Action Plan in 2019.[9] The plan outlines how the Republic of Ireland will support the ambition emerging within the European Union to achieve a net zero target by 2050 and commits to evaluate in detail the changes required to adopt such a goal in Ireland. We continue to liaise with our counterparts in the Republic of Ireland on relevant energy-related policy matters.

European Union

As part of its commitment to the Paris Agreement, the EU published its Energy Union Strategy in 2015 to give EU consumers secure, sustainable, competitive and affordable energy.[10] It notes that this requires a fundamental transformation of Europe's energy system and put in place a new energy rulebook – the Clean Energy Package (CEP).[11] The CEP consists of eight legislative acts that, when ratified by the Council and European Parliament between May 2018 and May 2019, were to be transposed into national law by EU countries over a 1-2 year period.

The Governance Regulation within the CEP requires member states to produce National Energy and Climate Plans (NECPs) for the period from 2021 to 2030 to demonstrate how they will meet the EU's energy and climate targets to 2030.[12] These outline how EU countries intend to address energy efficiency, renewables, GHG emissions reductions, interconnections and research and innovation.

The other seven CEP acts relate to specific areas of energy policy across electricity, energy efficiency, energy performance of buildings and renewables that will be covered later in this consultation.

8 Energy White Paper (publishing.service.gov.uk)
9 c97cdecddf8c49ab976e773d4e11e515.pdf (assets.gov.ie)
10 Energy union | Energy (europa.eu)
11 Clean energy for all Europeans package | Energy (europa.eu)
12 National energy and climate plans (NECPs) | Energy (europa.eu)

Northern Ireland in a post 'Brexit' context

The United Kingdom voted to leave the EU in 2016 and officially left on 31 January 2020. During a period of negotiations, the UK and EU made commitments to a series of International Treaties, establishing the new arrangements under which the UK, and in some instances the UK in respect of NI, would operate with the EU. The new relationship is determined under a series of agreements, legislative acts and declarations. Of particular note are:

- EU (Withdrawal) Act 2018
- The Withdrawal Agreement (EU (Withdrawal) Act 2020)
- The Northern Ireland / Ireland Protocol ('the Protocol') of the Withdrawal Agreement
- The Trade and Cooperation Agreement (the TCA) – EU (Future Relationship) Act 2020.

During negotiations of the Withdrawal Agreement, it was recognised that, among other policy areas, Northern Ireland shared a unique energy relationship with the Republic of Ireland due to the Single Electricity Market (SEM). The Protocol on Ireland and Northern Ireland details provisions for the SEM and other key North-South cooperation issues.[13]

The Protocol commits the UK, in respect of Northern Ireland, to implementing and continuing to meet legal obligations relating to the SEM in respect of:

- The Electricity Directive;
- The Electricity Regulation;
- The Regulation on Wholesale Energy Market Integrity and Transparency (REMIT);
- The Risk Preparedness Regulation;
- The Regulations regarding the Agency for the Cooperation of Energy Regulators;
- The Industrial Emissions Directive; and,
- The Greenhouse Gas Emissions Directive.

Throughout the Transposition Period (the time between publication of the Withdrawal Agreement and the 31 December 2020), the Department has worked with UK Government and the European Commission to develop appropriate policy, and where relevant legislative, positions in relation to the obligations caught under the Protocol. This work is ongoing, and further development will be considered alongside the wider development of policy proposed as part of this strategy.

Further to the Protocol obligations, the UK's future relationship with the EU is set out the Trade and Cooperation Agreement (TCA)[14]. The agreement consists of three pillars:

- A free trade agreement covering the economic and social partnership, including energy
- A framework for cooperation between law enforcement and judicial authorities
- An overarching governance arrangement.

In addition to meeting the obligations of the Protocol, Northern Ireland will have to contribute to the UK requirements outlined in the TCA, including but not limited to energy requirements such as:

13 Protocol on Ireland and Northern Ireland | European Commission (europa.eu)
14 The EU-UK Trade and Cooperation Agreement | European Commission (europa.eu)

- Obligations for both the electricity and gas markets;
- Trade arrangements for electricity and gas interconnectors;
- Co-operation, risk preparedness and security of supply commitments;
- Safe and sustainable energy commitments, such as the obligations within the UK's National Energy and Climate Plan; and
- Co-operation in the developments of off shore renewables.

There is a considerable amount of work ongoing, UK wide, to examine and consider the implementation of the TCA. We will continue to work on the development of appropriate policy to meet the obligations of the TCA alongside and as part of the wider development of this strategy.

Chapter 2: Strategic Framework

2.1 Vision

The vision we want to achieve through the new Energy Strategy is:

"Net zero carbon and affordable energy"

We intend for all future energy policies to be aligned to delivering this vision.

Net zero carbon energy is our overarching strategic driver to 2050. This is consistent with the UK legislation and advice from the Climate Change Committee, who are the statutory advisors to the UK Government and devolved administrations.

Net Zero Carbon Energy

Net zero carbon energy means that we will remove almost all carbon dioxide (CO_2) emissions from energy-related sectors. Some CO_2 will still be produced but can be offset by planting trees or capturing carbon and storing it or using it.

Action is needed now and into the future to continue to reduce emissions (referred to as "decarbonisation" resulting from our energy system). The Energy Strategy will provide a long-term roadmap for energy decarbonisation and will be supported by short to medium-term policies focused on contributing to this longer-term goal. There are also significant economic opportunities from meeting net zero carbon energy, and we will put in place policies to take advantage of these.

Affordable energy is a key objective throughout the transition to a net zero carbon energy. The CCC advises that the cost savings from replacing fossil fuels with cleaner and more efficient clean technologies will entirely cancel out the investment costs of meeting net zero GHG emissions by 2050. Many of the additional upfront investment costs needed to realise longer-term savings will be in energy and therefore we will ensure a focus on affordability for all consumers – domestic and business – during this transition to zero carbon energy.

Q2. Do you agree with the proposed vision of "net zero carbon and affordable energy" for the Energy Strategy?

2.2 Principles

We have identified five principles that will underpin the Energy Strategy:

Placing you at the heart of our energy future: We will make energy simple for people and develop policies that enable and protect consumers through the energy transition. Affordability and fairness will be key considerations in all our policy decisions. (*See Chapter 4*)

Grow a green economy: We will provide economic opportunities, create new jobs and grow a low carbon skills base through innovation and focusing on our competitive strengths. (*see Chapter 5*)

Do more with less: We will set clear targets, standards and regulations that drive improvements in energy efficiency. Consumers will be supported to invest in buildings and make changes that reduce their energy use. (*see Chapter 6*)

Replace fossil fuels with indigenous renewables: We will phase out fossil fuels by growing our indigenous renewable base and using this to decarbonise power, heat and transport. *(see Chapter 7*)

Create a flexible and integrated energy system: We will create a flexible, smart and digitised energy system that integrates renewables across heat,power and transport, creates value for consumers and enhances security of supply. (*see Chapter 8*)

This options consultation is structured around these five principles.

Q3. Do the five principles identified provide clear direction around the approach that we want to take with the Energy Strategy?

2.3 Delivering the Strategy

The Energy Strategy will set the direction upon which future energy policies will be based. In delivering these, we have identified six priorities to be progressed:

1. **Security of supply:** ensuring that future policies result in a secure and resilient energy system;

2. **Costs:** measuring the whole system costs and benefits of energy policy decisions to ensure cost-effective decisions are made;

3. **Intelligence:** developing a comprehensive energy intelligence work programme of technology pilots, research, modelling, data and statistics;

4. **Legislation:** making the necessary changes to legislation to provide the legal framework to deliver the priorities within the Energy Strategy;

5. **Regulation:** reviewing energy regulation to promote consumer interests whilst delivering on the objectives of the Energy Strategy; and

6. **Governance:** delivering a coordinated ad joined-up approach top energy decarbonisation across all levels of governement.

Chapter 9 of this document will expand on these delivery priorities.

Q4. Are there any key delivery priorities for the Energy Strategy not captured? If so, please outline what you believe should be included.

2.4 Monitoring Progress

Informed by the responses to this consultation, we intend for the new Energy Strategy to be published by the end of 2021. This will be a "live" document that is monitored through annual reports and have the flexibility to be updated at regular intervals based on changing circumstances and developments.

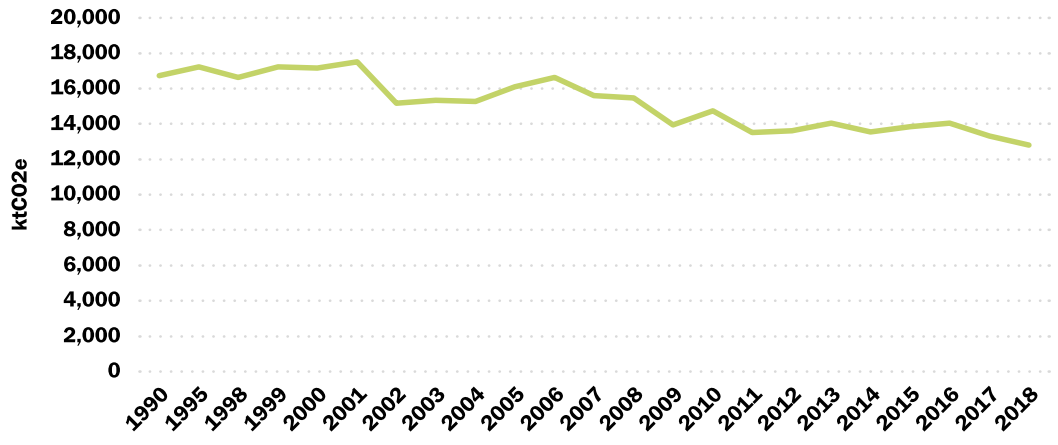
Within each of the five principles, we will set specific targets and objectives in the Energy Strategy that we will report on. In addition, we also intend to monitor a range of strategic outcome indicators which can track progress in achieving the two aspects of our overall vision. These indicators will continue to be refined and developed over the coming months in advance of the Energy Strategy.

Net zero carbon energy

We will monitor energy-related carbon emissions, which are a subset of overall GHG emissions, using the annual statistics publish by the Northern Ireland Statistics and Research Agency (NISRA).[15] Energy-related carbon emissions account for 93% of total carbon emissions, and have fallen by 23% from 1990 to 2018. There are six distinct sectors:

- **Transport** is the largest emitter at 36% of total energy-related carbon emissions; it is also the only sector where carbon emissions have increased (by 30%) from 1990;
- **Energy supply** is the second highest emitting sector, contributing 24% of energy-related carbon emissions; the move away from coal power stations to gas and renewables has helped to reduce emissions by 45% from 1990;
- **Residential** and **business** carbon emissions account for 21% and 16% of energy-related emissions. Whilst both sectors have shown reductions since 1990 (of 24% and 33% respectively), most of this progress was made in the early to mid-1990s, with carbon emissions in the 2000s and 2010s relatively flat; and
- **Industrial process** and **public** sector carbon emissions are very small sectors (both accounting for around 1% of energy-related carbon emissions) and have shown significant reductions (of 59% and 69% respectively) since 1990.

Figure 1: Energy-related Carbon Emissions, 1990-2018



Source: DAERA Green House Gas Inventory

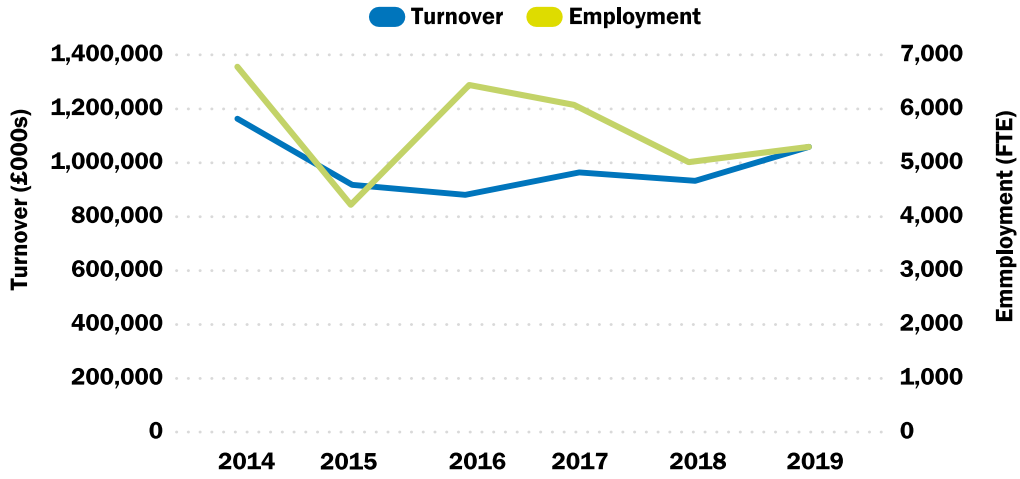
15 NI Greenhouse Gas Statistics 1990-2018 - Report (web version)_0.pdf (daera-ni.gov.uk)

In addition, we propose to monitor the size of the Low Carbon and Renewable Energy Economy (LCREE) to ensure that the economic opportunities of net zero carbon energy are maximised.

This sector is defined[16] by the Office for National Statistics (ONS) on a consistent basis across the UK, with statistics produced annually.[17] We will track both jobs and turnover to capture a range of potential economic benefits. As part of our data development agenda going forward, we will continue to review the survey together with the other stakeholders in relation to coverage and content, in addition to identifying and participating in any other data development opportunities emerging on a UK-wide basis.

The LCREE made a significant economic contribution to Northern Ireland in 2018, at 5,300 full time equivalent jobs and almost £1.1bn in business turnover. We will seek to grow this important sector through the energy policies that result from the Energy Strategy.

Figure 2: Size of the Low Carbon & Renewable Energy Economy



Source: ONS Low Carbon & Renewable Energy Economy Survey

Affordable energy

We will monitor the affordability of energy for both domestic and non-domestic consumers. Affordability is a factor of energy costs relative to household income (for domestic consumers) and turnover (for non-domestic consumers). Within this, cost competitiveness is a key issue for businesses that sell in external markets.

Energy costs are determined by the energy we use and the prices we pay, both of which will be directly impacted by the Energy Strategy. Household income and business turnover are determined by a range of factors mostly outside the remit of the Energy Strategy.

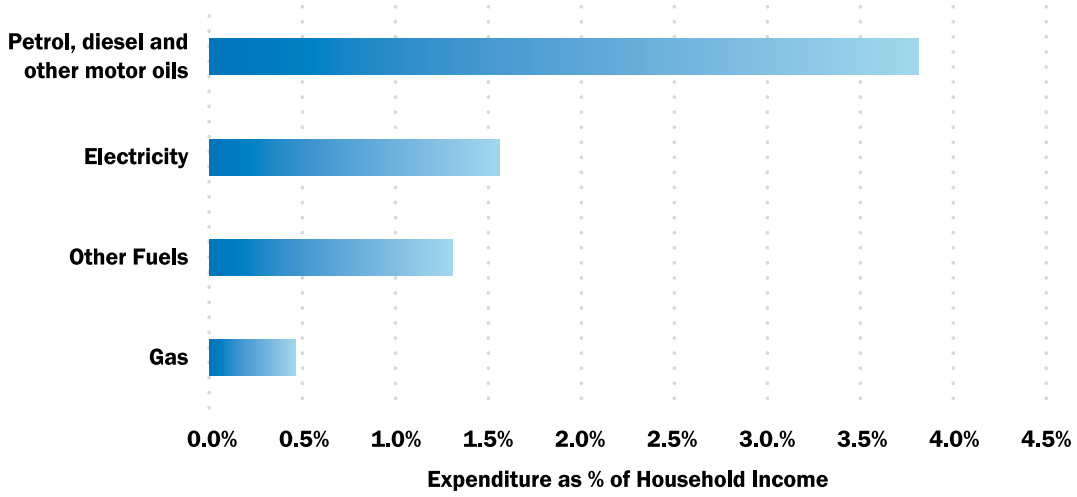
Information on household expenditure is published annually by ONS.[18] Households in Northern Ireland paid an average of £57 per week on energy-related items over the period 2016/17 to 2018/19. Within this:

16 Includes energy efficient products & lighting, low emission vehicles & infrastructure, bioenergy, nuclear power, offshore & onshore wind, solar, energy monitoring systems and renewable combined heat & power.
17 Low carbon and renewable energy economy, UK - Office for National Statistics (ons.gov.uk)
18 Family spending workbook 3: expenditure by region - Office for National Statistics (ons.gov.uk)

- **Petrol, diesel and motor oils** cost the average household £30 per week, or 53% of energy-related expenditure;
- **Electricity** costs were the second largest household item at £12 per week on average (22% of energy-related spending); and
- **Other fuels** (£10 per week) and **gas** (£4 per week) made up the remainder. These figures will reflect the fact that more houses using heating oil (including in other fuels) than gas in Northern Ireland, as well as the respective prices of each.

Using information on Gross Disposable Household Income produced by ONS,[19] suggests that households in Northern Ireland spent around 7% of disposable income on energy-related expenditure. Further development of the methodology and potential data sources to measure affordability will form part of our data development programme resulting from the Energy Strategy.

Figure 3: Household expenditure on energy as % of disposable income, 2016/17 to 2018/19



Source: DfE calculations based on ONS Living Costs and Food Survey and ONS Regional Gross Disposable Household Income

In addition, we would propose to track fuel poverty levels to ensure a focus on affordability for the most vulnerable households.

In Northern Ireland, a household is defined as being in fuel poverty if, in order to maintain a satisfactory level of heating (21°C in the main living room and 18°C in other occupied rooms), it is required to spend in excess of 10% of its household income on all fuel use.[20] Information on fuel poverty is taken from the House Condition Survey carried out by the Northern Ireland Housing Executive.[21] Whilst there are a number of years between each survey, additional estimates are modelled on an annual basis using information on energy prices, energy use and income.

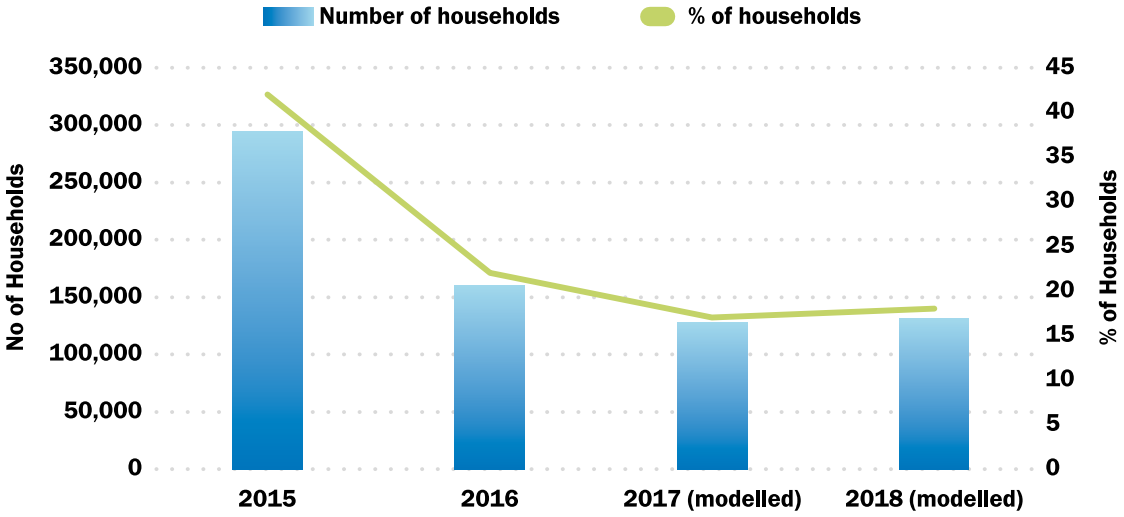
19 Regional gross disposable household income: all NUTS level regions - Office for National Statistics

20 Other definitions of fuel poverty are used across the UK. For example, in England, a household is considered to be fuel poor if they have required fuel costs that are above average, and were they to spend that amount, they would be left with a residual income below the official poverty line. In 2019, Scotland passed a new Fuel Poverty Act which set statutory targets for reducing fuel poverty and also introduced a new definition which aligns fuel poverty more closely with relative income poverty.

21 The Housing Executive - House Condition Survey (nihe.gov.uk)

Northern Ireland has seen a significant reduction in fuel poverty levels, with an estimated 134,000 households coming out of fuel poverty between 2011 and 2016, with the rate falling from 44% to 22%. This reduction is due to a combination of lower energy use, lower fuel prices and higher income. Modelled results for 2017 and 2018 suggest this has fallen further to 18% of households.

Figure 4: Estimates of Fuel Poverty



Source: NI Housing Executive House Conditions Survey

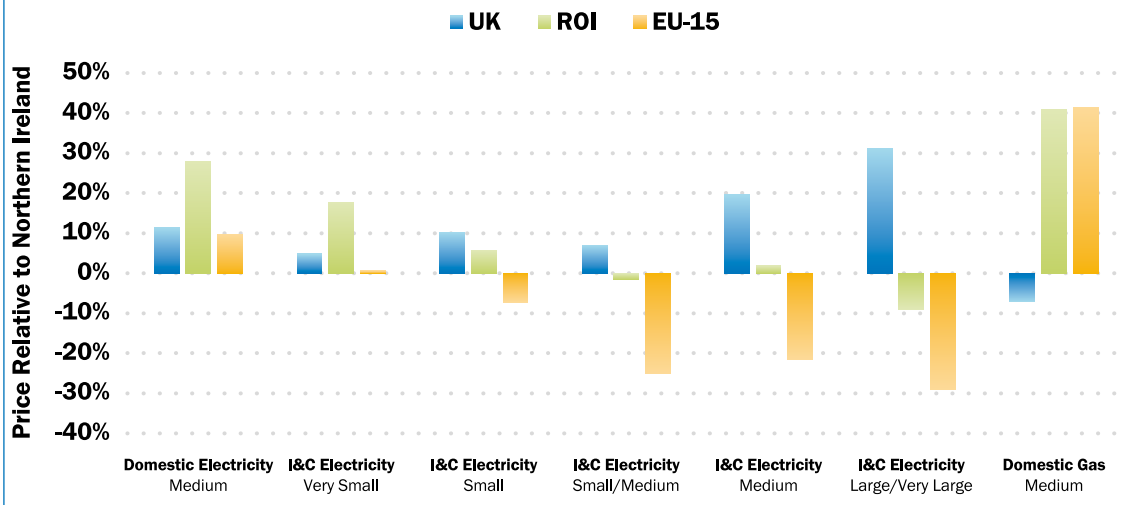
For non-domestic consumers, information on energy purchases and turnover is gathered through the NISRA Annual Business Inquiry.[22] At present, this information is not published and therefore results are not available. For non-domestic consumers, information on energy purchases by energy type and value has been gathered for a number of years through the NISRA Annual Business Inquiry survey. At present, this energy purchase information is not fully validated and therefore not published. Given the potential of this data, developing it fully will be one of the priorities for our data development agenda. Statisticians within NISRA are currently exploring the potential of this data for use in monitoring the Energy Strategy.

In addition to the above sources, data on relative electricity (for domestic and non-domestic consumers) and gas prices (for domestic consumers) are available from the Utility Regulator on a six monthly basis.[23] Whilst prices are not the same as affordability, they are one of the factors that determine this and are a key issue that we want to track in delivering the Energy Strategy.

The latest information shows that Northern Ireland has the most competitive electricity prices for domestic and very small industrial & commercial (I&C) consumers across Europe. I&C prices for larger size bands are generally higher than the EU average, broadly similar to the Republic Ireland, and lower than the UK overall. The large/very large I&C consumer group is where Northern Ireland has higher prices relative to the EU and the Republic of Ireland, although prices are lower than the UK average. For domestic gas customers, Northern Ireland has very competitive prices against the Republic of Ireland and the EU.

22 Annual Business Inquiry | Northern Ireland Statistics and Research Agency (nisra.gov.uk)
23 Latest quarterly transparency report on NI's retail energy market published | Utility Regulator (uregni.gov.uk)

Figure 5: Relative Electricity & Gas Prices, Jul-Dec 2019



Source: Utility Regulator Quarterly Transparency Reports

Q5. Do our proposed indicators adequately allow us to measure success at achieving the proposed Energy Strategy outcome? If not, please advise on what alternative metrics should be used.

a) Carbon emissions from energy-related sectors
b) Jobs and turnover in the low carbon and renewable energy economy
c) Domestic energy costs relative to household income
d) Business energy purchases relative to turnover
e) Households in fuel poverty
f) Relative electricity & gas prices

Chapter 3: Scenarios to Net Zero Carbon Energy

3.1 Introduction

No-one can predict the future of Northern Ireland's energy system out to 2050. There are a wide range of approaches that could be taken over the next three decades to deliver a net zero carbon energy mix.

Our focus in this consultation is on 'low/no regret' options in the short to medium-term that will further decarbonise our energy system, whilst ensuring that we retain the flexibility to respond to the development of new and emerging technologies that could play a significant role in the longer-term.

In this chapter, we present a range of illustrative scenarios to demonstrate how different energy systems could look in the future. To do this, we have developed a range of potential scenarios using a new publicly-available and open-source Energy Transition Model built specifically for Northern Ireland.[24]

None of these scenarios are an expected outcome of the Energy Strategy, and we have not developed these scenarios in order to choose a preference. The scenarios outlined here have been informed by the Call for Evidence and visualise what different energy systems of the future might look like. **They are not forecasts of the future, nor do they represent any statement of policy intent.** They can provide indications of the scale and type of actions required to achieve certain goals, such as decarbonisation.

We have made two key decisions in developing these scenarios:

1. **They align with net zero carbon energy emissions by 2050.** We have not run high, medium and low scenarios looking at achieving net zero by different dates; with the exception of the 'business-as-usual' scenario, all scenarios aim to meet net zero carbon energy by 2050; and

2. **They represent broadly realistic pathways for the future.** Whilst some scenario modelling may seek to test extreme approaches to the future to push the boundaries of different decisions, we have constrained the scenarios to focus on those we consider will be most relevant for Northern Ireland. This means there is overlap across the scenarios.

The remainder of this chapter will provide a high-level overview of the scenarios. More detail on the Energy Transition Model and each of the scenarios can be found in the accompanying Scenario Report.

24 https://pro.energytransitionmodel.com/

Throughout each of the scenarios there are seven energy categories which cover the entirety of energy use across the system. These are:

- **Oil:** Oil and derivatives including transport fuels;
- **Coal:** Coal and derivatives;
- **Electricity:** Renewable and fossil fuel generated electricity;
- **Network gas:** Natural gas and green gas;
- **Hydrogen:** Locally produced and imported hydrogen;
- **Biofuels:** Solid (wood, biomass) and liquid (Hydrogenated Vegetable Oil (HVO) and in transport); and
- **Other:** district heating and solar thermal.

3.2 Scenario 1: Business as Usual

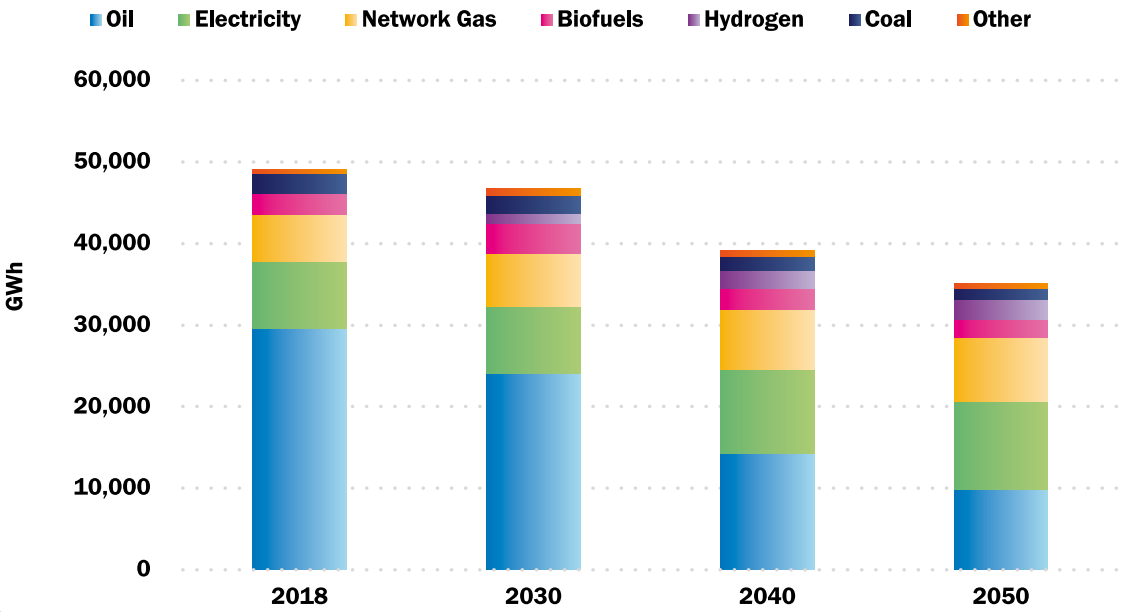
A business as usual (BAU) scenario for Northern Ireland examines the potential impact of maintaining the current range of energy policies and programmes, with the exception of any new policies already announced. Relevant UK-wide policy such as Road to Zero (low emission vehicles) is assumed to be adopted in Northern Ireland as required, although no additional measures are in place to speed up deployment.

Key assumptions are:

- Gradual move from oil to gas for home heating.
- Electricity demand increases due to more electric vehicles (EVs).
- Renewable share of electricity (RES-E) minimum 40% out to 2050 maintained.
- Lower final energy demand through:
  - Continuation of existing energy efficiency measures;
  - Increase in public transport usage, walking, wheeling and cycling; and
  - Some reduction in energy consumption due to increased awareness and behavioural change amongst the population.

Under a business as usual scenario, final energy demand reduces by 29 %. Coal demand has nearly halved, whilst electricity demand increases by 31% due to the uptake of EVs. Demand for gas has increased with additional connections on the existing network displacing use of oil for home heating. Oil (in the form of petrol/diesel) is largely phased out of transport, accounting for 28% of final demand in 2050 compared to 60% in 2018. Hydrogen has become part of the energy mix (7% of demand) due to its role in transport.

Figure 6: BAU - Final Annual Energy Demand by Fuel



Scenario 2: High Electrification

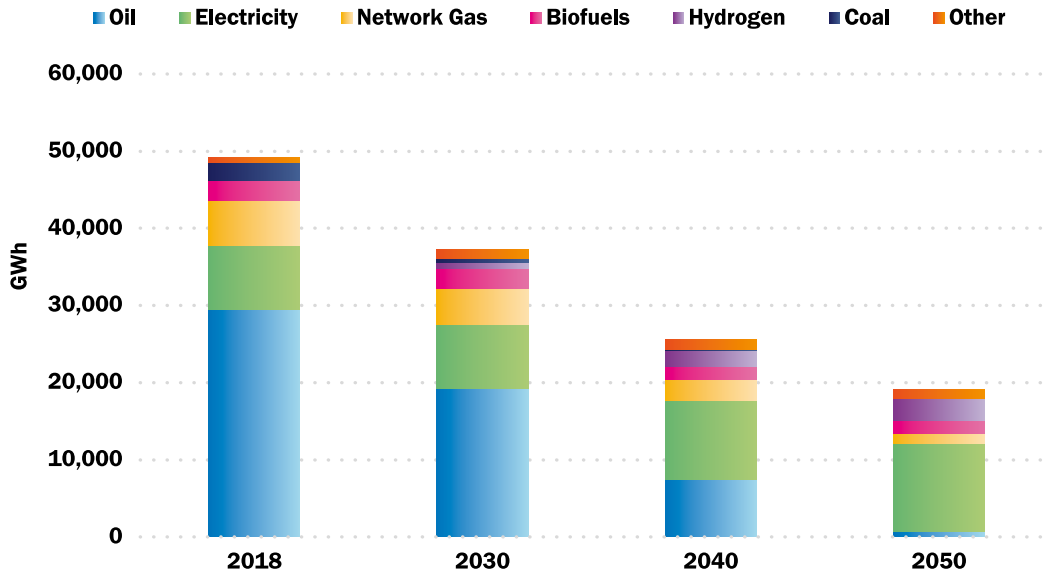
This scenario builds on the existing success of the renewable electricity sector, with high levels of electrification to take advantage of a substantially larger renewable electricity base. Increased capacity is met through a combination of solar photovoltaic (PV), offshore wind and marine technology and an expansion of onshore wind aligned with improved demand-side management and flexibility measures.

Heat pumps provide the majority of heat supplied in the domestic and services sector, and very high levels of energy efficiency are adopted. The existing gas network is not expanded and plays a small role to supplement heat pumps through decarbonised gas, including locally-produced biogas and hydrogen. A combination of a ban on new petrol and diesel cars and a charging infrastructure roll-out programme via public charging and new home standards drive a significant uptake in electric vehicles.

Key assumptions are:

- Home heating, transport and industry largely electrified
- Electricity demand is highest in this scenario
- RES-E target 70% in 2030 achieved, 100% in 2050
- Lowest final energy demand through:
  - Substantial increase in energy efficiency measures early in the pathway to 2050 due to requirements for heat pumps;
  - Reduction in industry energy demand through efficiency measures
  - Increase in public transport usage, walking, wheeling and cycling; and
  - Some reduction in energy consumption due to increased awareness and behavioural change amongst the population.

Figure 7: High Electrification - Final Annual Energy Demand by Fuel



With high levels of electrification and energy efficiency, overall energy demand falls by 61%. Electricity is the largest energy source across heat, power and transport, accounting for 60% of total demand. Hydrogen plays a key role in transport and industry, whilst biofuels (in the form of biogas) is an important energy source. Oil and gas continue to play a very small role due to the 'hard to electrify' areas.

3.3 Scenario 3: High Gasification

With a greater focus on gas, overall demand for electricity is lower meaning RES-E targets are higher due to the need for less additional generation capacity. This scenario has a target of 80% renewable electricity by 2030 and 100% by 2050. There is a large emphasis on off-shore wind mainly used for hydrogen production. Gas is imported for flexible electricity generation alongside the large renewables base. The gas network is fully decarbonised with a mix of hydrogen and biogas and is expanded to reach a larger percentage of the population. As demand for hydrogen and biogas is high, only some of which can be met locally due to the amount needed, there is considerable reliance on imports.

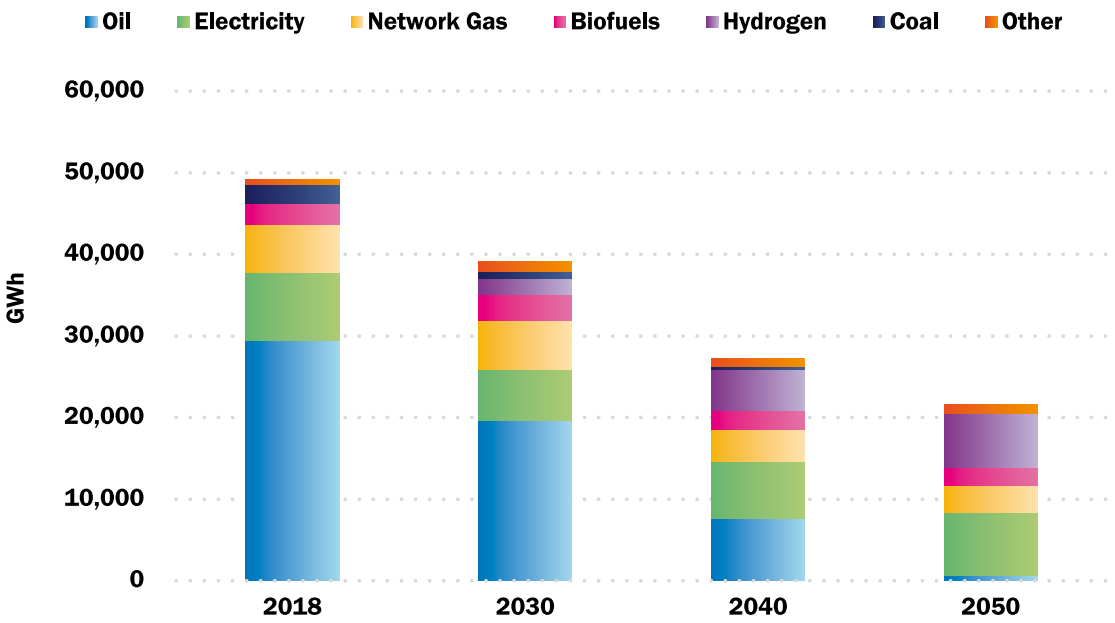
Energy efficiency improvements are supported consistently and the energy performance of buildings improves, however these measures are less ambitious than in the high electrification scenario, as thermal comfort can be provided without the high levels of energy efficiency required by heat pumps. The car and van fleet is powered by a mix of hydrogen and electrification with larger vehicles use mostly hydrogen. This is supported by significant investment in refuelling infrastructure.

Key assumptions are:

- Continued connections to existing gas network, with substantial amount of hydrogen and biogas injected by 2050.
- Off gas grid properties are heated using heat pumps and biofuels.
- Road vehicles decarbonised with a high % of electric cars and vans coupled with a high % of hydrogen-powered buses and HGVs.

- RES-E target 80% in 2030 achieved, 100% in 2050
- Lower final energy demand through:
  - Substantial increase in energy efficiency measures across domestic and non-domestic sectors;
  - Increase in public transport usage, walking, wheeling and cycling; and
  - Some reduction in energy consumption due to increased awareness and behavioural change amongst the population.

Figure 8: High Gasification - Final Annual Energy Demand by Fuel



With high levels of gasification and energy efficiency, energy demand falls by 56%. Gas (including network gas and hydrogen) is the largest energy source across heat and transport, accounting for 46% of total demand. Electricity is the largest energy source, contributing 36% of demand due to its uses in power, for EVs and some heat pumps. Biofuels (in the form of biomass and transport fuel) are important at 10% to meet energy demand. Coal is no longer in use and oil only accounts for 3% of final energy demand for transport.

3.4 Scenario 4: Diverse

This scenario takes into account the considerable regional differences in Northern Ireland and includes higher levels of local involvement as well as local responses to the low carbon transition. Heat and transport have quite different solutions depending on location and geography, and for power may imply a more decentralised system. There is an intermediate target of 80% renewable electricity by 2030. The power sector is fully decarbonised by 2050, through local ambition and public sector leadership this comprises a wide range of small, medium and large-scale renewable generation as local opportunities are maximised.

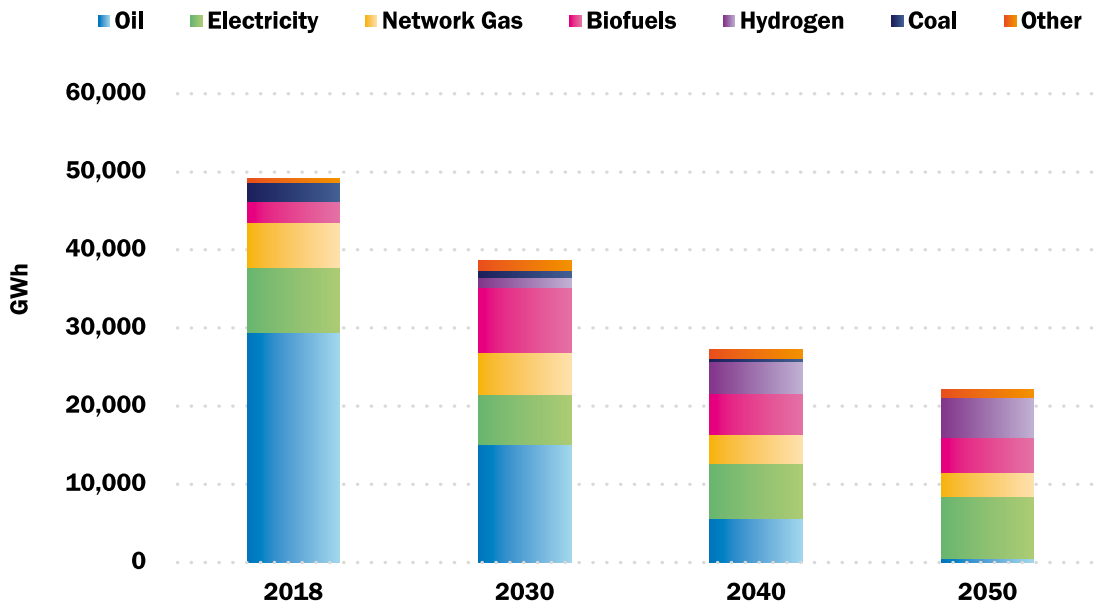
Investment in public transport, active travel and increased flexibility in working arrangements combined with place based solutions that are tailored to the locality and which involve the local people can address connectivity needs, particularly in rural areas, meaning that transport demand is significantly lower. Hydrogen is used for the 'hard-to-electrify' transport sector and heating within domestic sectors.

Energy efficiency improvements are supported consistently and the energy performance of buildings improves through the introduction of increasingly high standards for new builds as well as a comprehensive retrofit programme. There are higher numbers of off-grid energy solutions, particularly for heat. These include a significant focus on heat pumps and use of biofuels such as Hydrogenated Vegetable Oil (HVO) fuel in earlier stages of transition. The existing gas network is decarbonised, including through the use of locally-produced biogas and hydrogen.

Key assumptions are:

- Diverse mix of heating solutions.
- Heating oil displaced mainly through biofuel in early stages of transition before other technologies become more prevalent.
- Introduction of district heating.
- Electric and hydrogen powered cars, vans, HGV and public transport fleet.
- RES-E target 80% in 2030 achieved, 100% in 2050
- Lower final energy demand through:
  - Substantial increase in energy efficiency measures across domestic and non-domestic sectors;
  - Increase in public transport usage, walking, wheeling and cycling; and
  - Larger reduction in energy consumption due to heightened awareness amongst the population from a more decentralised approach.

Figure 9: Diverse - Final Annual Energy Demand by Fuel



With a diverse mix of technologies and greater decentralisation alongside energy efficiency measures, energy demand is 55% lower by 2050 compared to 2018. Electricity is the single largest energy source (36% of total) due to its use across transport and heating. Biofuels plays an important role for heat, accounting for 20% of total energy demand, due to the use of biogas into the gas network and biofuels as a replacement for heating oil. Hydrogen contributes 23% across heat and transport, whilst coal is no longer in use and oil only accounts for 2% of final energy demand for transport.

Comparing the Scenarios

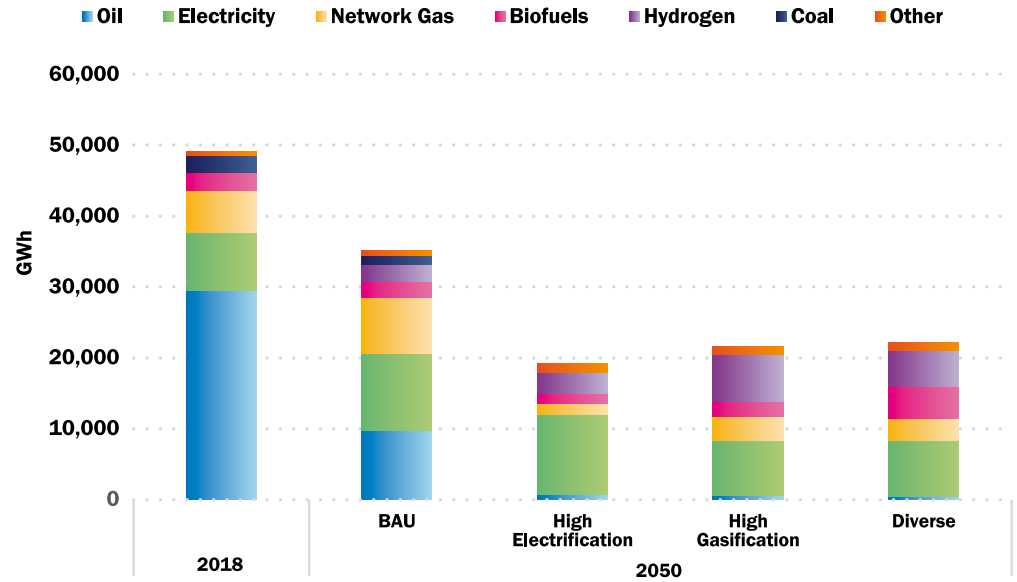
The scenarios presented this chapter are purely illustrative and are not expected outcomes of the Energy Strategy.

By visualising what a range of potential scenarios could be, it demonstrates that under any combination of policy decisions, **the energy system in 2050 will be radically different to how it is today.** Even under the BAU scenario which does not have additional policies over and above those already announced, oil is no longer the dominant energy source and energy demand is lower.

The additional three scenarios go much further than this, reducing energy demand further and leaving oil with less than 5% across all scenarios. Key differences include:

- The **high electrification** scenario has the lowest final demand of all scenarios due to higher energy efficiency required for heat pumps and relies mostly on electricity with 60% of final demand.
- The **high gasification** scenario has the highest proportion of gas demand (network gas and hydrogen) with 46% of final demand, compared to the high electrification (22%) and diverse scenarios (37%).
- The **diverse** scenario has a broader energy mix with 2050 energy demand being quite balanced, albeit higher overall than the other two.

Figure 10: Final Annual Energy Demand by Fuel by Scenarios in 2050

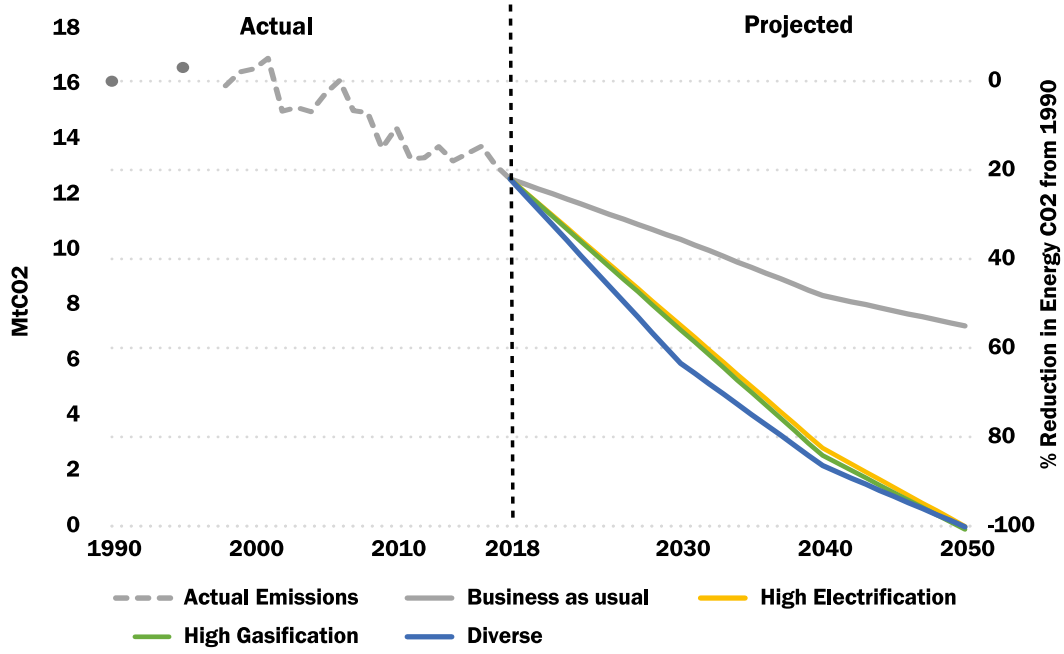


In the BAU scenario, **Northern Ireland falls significantly short of meeting net zero carbon energy without new policies being introduced.** Carbon emissions will decrease based on a minimum 40% renewable electricity share of a larger electricity sector through EVs replacing petrol and diesel cars, but 45% of 1990 emissions still remain by 2050.

The other three scenarios, by comparison, all achieve net zero carbon energy - a reduction of 100% of CO2 emissions from 1990.

Whilst high electrification and high gasification scenarios have very similar pathways to reducing emissions, the diverse scenario achieves a steeper reduction in emissions earlier in the journey to 2050. This is a result of increased use of biofuels in home heating to displace heating oil as an interim solution. The cost effectiveness of such a move would depend on the relative prices of biofuels.

Figure 11: Comparison of Emissions Profiles Across Scenarios and Time



We have not sought to model the potential costs of any of these scenarios, none of which are expected outcomes from the Energy Strategy. Our approach to measuring and monitoring costs is set out later as part of our delivering priorities and will be focused on actual policies we are proposing as part of the pathway put forward in the new Energy Strategy.

Table 1 – Comparison of Scenarios Across Selected Metrics in 2050

Criteria	BAU	Electric	Gas	Diverse
Final energy demand (TWh)	35.1	19.1	21.5	22.1
Final energy demand change from 2018	-29%	-61%	-56%	-55%
Renewable energy share	27.5%	93.6%	95.9%	96.0%
Renewable electricity share	40%	100%	100%	100%
Energy Imports (net)	83.8%	14.4%	21.7%	17.6%
Hydrogen demand (TWh)	2.4	2.8	6.7	5.1
CO_2 emissions relative to 1990	-55.0%	-100%	-100%	-100%
Paris Agreement Compatible (1.5°C)	No	Yes	Yes	Yes

Q6. Do you think there are significantly different illustrative scenarios which should be developed? If so, please provide further information.

Chapter 4: Placing You at the Heart of our Energy Future

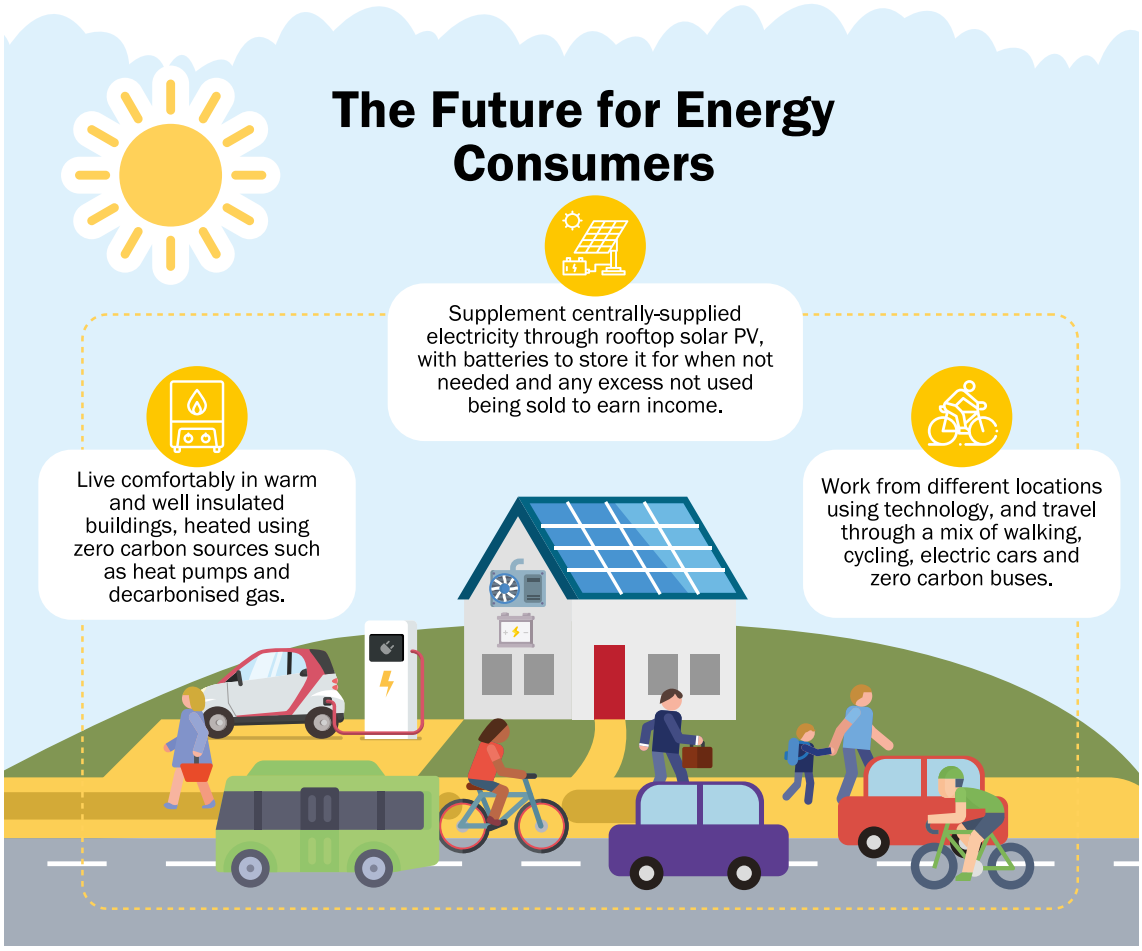
Key proposals we are consulting on include:

- **Establishing a new "one stop shop" for information, technical advice and relevant support for all energy consumers.**
- **Shaping energy policies to enable and protect consumers during the transition to decarbonise energy.**
- **Ensuring affordability and fairness in meeting the investment costs of net zero energy carbon emissions.**

4.1 Introduction

The energy world of the future will be very different than today. Domestic consumers and businesses will be able to benefit from changes to the way we work, live, travel and interact with the energy system. This is referred to as the "energy transition".

The Energy Strategy will be focused on delivering an energy transition that benefits all consumers. To ensure this happens, **we are placing <u>you</u> at the heart of our energy future.**



At the outset of the Call for Evidence, we ensured that "consumers" was a dedicated work theme. We set up a Consumer Working Group to bring together key consumer representatives to identify and consider any possible opportunities and barriers from potential new energy policies, as well as driving forward new consumer-focused policies. We have also engaged with business consumers through the Northern Ireland Chamber of Commerce and Industry, the Confederation of British Industry and the Major Energy Users Council.

We now want to engage directly with energy consumers to better understand the opportunities and challenges of the energy transition. This will help shape policies that fit consumers' lives – at home, work and in leisure time.

We are planning to engage directly with consumers during the consultation period through our partners in The Consumer Council.

Throughout the remainder of this consultation, we will examine relevant consumer issues for the policy approaches being considered. Key policy options considered within this consultation which could either require consumers to make energy decisions or will provide opportunities include:

- New employment and training opportunities for people in growing existing sectors and developing new sectors within the green economy (Chapter 5);
- Upgrading buildings by investing in energy efficiency and encouraging people to change how they heat their homes and travel (Chapter 6);
- Ensuring ongoing public support for new renewable electricity infrastructure needed to meet a 70% renewable electricity target by 2030 (Chapter 7);
- Moving away from current heating fuels and installing new technologies in order to decarbonise heating (Chapter 7);
- Changing the types of vehicles people use to travel and the means by which they fuel these (Chapter 7)
- Enabling consumers and communities to generate, use, sell and share energy, with access to energy market revenue streams (Chapter 8); and
- Installing new smart technologies in buildings and using the data they collet to provide further opportunities for consumers (Chapter 8).

We start by outlining key cross-cutting objectives and considerations for consumers to ensure the best outcomes for them from the energy transition. We have three key objectives:

1. We will **enable and protect consumers** to fully participate in and benefit from the energy transition;
2. We will **make things simple** for all energy users by adopting a "one stop shop" approach for information, advice and support, and by using simple, clear language in all our communications; and
3. **Consumer affordability and fairness** will be primary considerations when assessing costs and investment needed to meet net zero carbon energy.

4.2 Enable and Protect Consumers

We want an energy transition that will "enable and protect" our consumers, keeping them at the heart of our decision making. This means focusing on enabling all consumers who want to participate in the future energy system and providing adequate protections to all, but particularly those who may be unable to. These two considerations will be central to all energy policies that result from the Energy Strategy.

Respondents to the Call for Evidence strongly supported the concept of "enabling and protecting" our consumers on the journey to net zero carbon energy emissions by 2050. The different energy needs of consumers was recognised, with a tailored approach needing to be adopted for each population group.

To ensure this, we have reviewed and will continue to review future energy policy options from the perspective of four distinct consumer populations:

- **Domestic consumers with vulnerable characteristics** (e.g. low income, pensionable age, living with chronic ailment or disability and in rural areas)
- All **other domestic consumers**
- **Small businesses** (up to 50 employees)
- **Larger businesses** (over 50 employees)

Different energy consumers will require a range of tailored measures to decide what meets their particular needs.

The latest available figures estimate that almost 160,000 households were in fuel poverty in Northern Ireland; this figure will now be different than in 2016 due to changes in energy prices amongst other factors.[25] These consumers are likely to require measures to **protect** them, as will businesses in highly competitive markets or where COVID-19 has had a significant impact. On the other hand, domestic and non-domestic consumers who have adequate resources will likely benefit from measures to **enable** them to take advantage of opportunities.

We believe there are five key things we can do to enable and protect consumers:

- **Making available information & advice** in an easily accessible manner by relevant experts that are trusted by consumers to give them confidence in new products and services they are not familiar with;
- **Offering wrap-around Proactive support** to hand-hold certain consumer groups from decision-making through implementation and follow-up support to ensure the best outcomes for them;
- **Providing financial support measures** to bring about behavioural changes and support those who are unable to make these;
- **Driving behavioural change** through measures such as introducing minimum standards or requiring fossil fuels to be phased out; and
- **Reviewing statutory protections** such as regulatory frameworks, codes of practice and consumer redress processes to promote trust and fairness.

25 House Condition Survey Main Report 2016 (nihe.gov.uk)

We propose to build our future energy policies around these five "enable and protect" measures. This will inform the development of tailored approaches might be required for each our consumer populations.

Q7: Do you agree with the four consumer population groups we have identified? Please advise on key considerations within each.

a) Domestic vulnerable consumers
b) Other domestic consumers
c) Small businesses
d) Larger businesses

Q8: Do you agree with the five measures identified to "enable and protect" consumers? If not, please outline what else should be included?

a) Making available information and advice
b) Offering proactive "wrap-around" support
c) Providing financial support measures
d) Driving change
e) Reviewing statutory protections

4.3 Make Energy Simple for Consumers

We are all energy consumers.

In our work, home and leisure environments we regularly have decisions to make around energy: What type of energy do I need? How much energy do I use? How much energy can I save? What energy source is best for my wallet, health and environment? What supplier and tariff should I choose for my energy needs? What is the most cost efficient way to meet my needs? What support is available to me? Who can I trust to advise me and deliver energy measures that are in my interest?

The energy transition will bring about new opportunities for consumers as we move away from fossil fuels. **We want to make sure that all consumers have access to adequate, tailored and easy to understand information and support that makes this transition as simple as possible.**

Key barriers that consumers could face include facing too many choices, not facing enough clear and trusted information about why change is needed and the benefits of this, lack of knowledge, trust or understanding of new technologies, limited financing options and uncertainty around data use and privacy.[26]

A range of bodies across Northern Ireland currently provide energy related information, advice and support to consumers. Almost half (46%) of consumers indicate that clear and independent information and advice would make them more likely to consider energy efficiency measures or renewable energy for their households, thus contributing to the success of the Energy Strategy.[27]

26 https://cdn.eurelectric.org/media/4236/eurelectric-accenture-seeking-shared-success-h-22C4F04C.pdf
27 https://www.consumercouncil.org.uk/sites/default/files/2021-01/Response_to_the_Department_for_the_Economy_Energy_Strategy_Call_for_Evidence.pdf

Call for Evidence respondents showed overwhelming support for a "one stop shop" approach as the best mechanism to deliver clear and easy to understand information, advice and support for energy consumers.

Within the responses, there were a considerable number of references to other bodies across the UK and ROI, such as the Sustainable Energy Authority of Ireland (SEAI),[28] Energy Action Scotland[29] and Carbon Trust.[30]

The SEAI, in particular, was widely quoted as an example of good practice that could inform a future approach in Northern Ireland. We have carried out further research on the remit and functions of this body to inform our approach. This work highlights the substantial impact that the organisation has had in driving forward sustainable energy with consumers and the recent substantial increases in budget it has received to support the delivery of the Republic of Ireland's Climate Action Plan. [31]

Goals of Sustainable Energy Authority Ireland (SEAI)

Empowered citizens and communities at the centre of the sustainable energy transition.

Increased awareness and confidence in sustainable energy technologies, practices and behaviours.

Increased impact from grant programmes.

Step change in public sector, industry and SME sustainable energy activity.

Enhanced decision-making through expert and authoritative analysis.

Enhanced value derived from energy research and innovation.

We propose to develop a "one stop shop" organisation that will be the key contact point for energy consumers in the future. This Northern Ireland-wide body will be the main interface for consumers on energy-related matters, working collaboratively with and complementing existing bodies.

We believe there are a number of routes that could be followed in developing this "one stop shop" for domestic consumers and businesses:

- A **virtual 'one stop shop'** could be created to work with the existing providers of energy information, advice and support and act as a single point of contact for consumers, similar to www.nibusinessinfo.co.uk;
- We could **fund an external delivery organisation** to provide these services on behalf of government to consumers;
- The **remit of an existing organisation could be expanded** to take on the functions of a "one stop shop" for consumers; or
- We could **create a sustainable energy organisation** as an Arm's Length Body (ALB) of the Department for the Economy.

28 https://www.seai.ie
29 Energy Action Scotland | National Body (eas.org.uk)
30 Home | Carbon Trust
31 Cornwall Insight (2021) Review of the Sustainable Energy Authority Ireland, Forthcoming.

The final scope and timeline of this "one stop shop" will be tailored to reflect the policies established as a result of the Energy Strategy. A new organisation with a substantial remit would significantly change the energy support landscape and, depending on the route followed, require legislative change. This would take time and, as such, we would intend to take a phased approach to establishing and expanding the remit of such an organisation. There may need to be interim arrangements for the delivery of new programmes until such an organisation was in place and this would form part of further consultation on specific policy proposals in due course.

The role and remit of the "one stop shop" would likely develop over time, with the long-term ambition being an organisation that provides a wide range of services including information, advice, "wrap-around" support, financial assistance, education, behavioural change campaigns, research and monitoring of the energy transition. It would report to and advise central government and work alongside the energy sector and local government to develop and implement local energy solutions.

Q9: Do you agree with the proposed scope of the "one stop shop"? Please advise on any different activities you think should be included.

Q10: Which approach do you think should be taken to create this organisation? Please outline your rationale.

4.4 Ensure Affordability and Fairness

Respondents to the Call for Evidence highlighted that it was vital to understand the investment costs of the transition for consumers and the sector more broadly. Ensuring these costs will be fairly spread was a key consideration, and seen as critical to the success of the Energy Strategy.

The CCC advises that investments to meet net zero GHG emissions generate substantial fuel savings as cleaner, more efficient technologies replace fossil fuels and in time, these savings cancel out the investment costs entirely. **This is good for consumers.**

HM Treasury Net Zero Review

The Interim Report, published in December 2020, found that the costs of the transition to net zero are uncertain and depend on the policy choices.

The amount of investment required to reach net zero and the impacts on operating costs are difficult to estimate.

They are affected by a range of factors all of which are subject to significant uncertainty.

Whilst the end goal of net zero GHG emissions delivers significant fuel savings for consumers, the journey there will require substantial upfront and ongoing investment. The CCC recognises that fairness in the transition is essential for its success; we therefore need to distribute the costs and benefits fairly across the different consumer populations and between consumers and the energy industry.

HM Treasury is carrying out a review into funding the transition to a net zero economy, and will consider how the transition to net zero will be funded and assess options for where the costs will fall.[32] The Department for Business, Energy and Industrial Strategy (BEIS) has also committed to publishing a call for evidence by April 2021 to begin a strategic dialogue between government, consumers and industry on affordability and fairness. We are engaged in this work to identify the potential implications for Northern Ireland.

The CCC recognises that the impacts of net zero can be more concentrated in some regions of the UK. Its analysis[33] for Northern Ireland suggests that:

- Investment needs to begin now in order for Northern Ireland to make its contribution to the UK meeting net zero emissions by 2050;
- Additional capital investment ramps up to £1-1.5 billion each year from 2026 onwards, with total additional capital investment of £34 billion by 2050;
- Most of this investment is in transport (£11 billion), electricity supply (£10 billion) and residential and non-residential buildings (£8 billion); and
- The operational cost savings from these investments deliver net savings for Northern Ireland from 2040 onwards.

If Northern Ireland were to seek to fund the investment for net zero carbon energy on its own, it would have a significant impact on the affordability of energy for local consumers and taxpayers.

We believe that the investment costs of meeting net zero carbon energy should be shared across the UK. This means Northern Ireland making its fair contribution to the UK commitment to net zero GHG emissions, and in return, the UK ensuring that appropriate funding is available so that local consumers and business are not disproportionately impacted relative to elsewhere in the UK.

The nature and area of investment will determine what options are open to meet these costs; purchasing electric vehicles will clearly rely on different funding mechanisms than upgrading electricity networks. There are three broad avenues open to fund investments:

- **Energy consumers** pay for the energy they use and costs that are socialised across the energy system in regulated industries;
- **Taxpayers** fund a number of energy-related support schemes; and
- The **private sector** makes energy investments based on commercial decisions where markets exists and returns can be made.

The investments required for net zero carbon energy emissions will need to be shared across consumers, taxpayers and the private sector. In doing so, we need to make sure that energy remains affordable for consumers, the energy efficiency of vulnerable households in particular is improved and new investments provide value for money for taxpayers and makes commercial sense for the private sector.

32 HM Treasury's review into funding the transition to a net zero greenhouse gas economy: terms of reference - GOV.UK (www.gov.uk)
33 https://www.theccc.org.uk/wp-content/uploads/2021/02/The-Sixth-Carbon-Budget-Dataset.xlsx

Where consumers will need to contribute to the investment costs, **the principle of fairness must be adopted throughout.** This means that special provisions, protection measures and financial support may be needed for some groups of consumers, particularly those with vulnerable characteristics. Similarly, where new support policies are being introduced, we must make sure these are fair and do not discriminate against certain groups of consumers that are unable to access them.

In meeting these costs, we must ensure that sufficient protections, financial assistance and incentives are in place for consumers. This is again very relevant for those consumers with more vulnerable circumstances. Schemes such as the Warm Homes Discount have been introduced elsewhere across the UK to put such protections in place for domestic consumers. Businesses seeking to compete in challenging and competitive markets will also be a key consideration, particularly as we seek to support a green economic recovery.

Warm Homes Discount

The Warm Homes Discount Scheme offers £140 off consumers' electricity (or gas in some instances) bill.

This is available for consumers either on low incomes or receive the Guaranteed Credit element of Pension Credit.

We are carrying out a review of financial assistance aimed at protecting consumers elsewhere across the UK and the Republic of Ireland. This covers both domestic and non-domestic consumers, and will identify where such schemes exist, the mechanisms they use and the consumer groups targeted.

In reviewing types of assistance needed to protect consumers, we recognise that fuel poverty does not exist in isolation from wider vulnerability and health issues affecting citizens. It will therefore be important to maximise the synergies between existing social, health care and energy support and protection frameworks to make the most of our resources and deliver the best outcomes possible for citizens.

Q11: Do you believe that additional financial assistance to protect certain groups of consumers should be introduced? If so, please identify what consumers should be targeted and what support would be needed.

PLACING YOU AT THE HEART OF OUR ENERGY FUTURE CONSULTATION QUESTIONS

Enable and Protect Consumers

Q7: Do you agree with the four consumer population groups we have identified? Please advise on key considerations within each.

a) Domestic vulnerable consumers
b) Other domestic consumers
c) Small businesses
d) Larger businesses

Q8: Do you agree with the five measures identified to "enable and protect" consumers? If not, please outline what else should be included?

a) Making available information and advice
b) Offering proactive "wrap-around" support
c) Providing financial support measures
d) Driving behavioural change
e) Reviewing statutory protections

Make Energy Simple for Consumers

Q9: Do you agree with the proposed scope of the "one stop shop"? Please advise on any different activities you think should be included.

Q10: Which approach do you think should be taken to create this organisation? Please outline your rationale.

Ensure Affordability and Fairness

Q11: Do you believe that additional financial assistance to protect certain groups of consumers should be introduced? If so, please identify what consumers should be targeted and what support would be needed.

Chapter 5: Grow a Green Economy

Key options we are consulting on include:

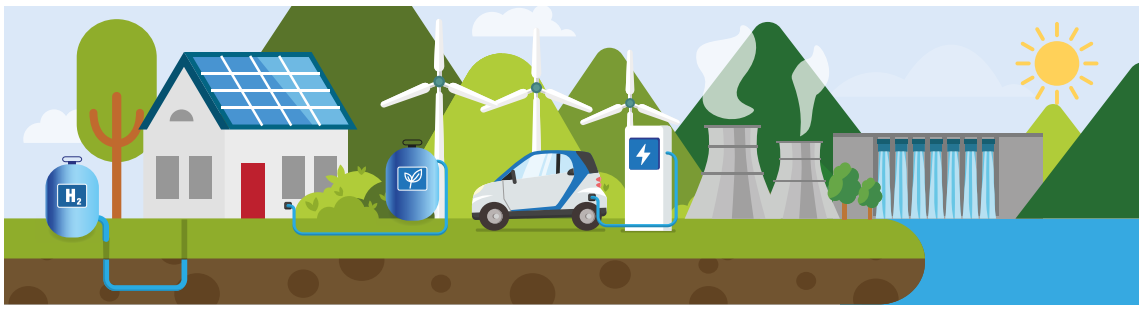
- **Maximising the economic impact of clean energy policies focused on the hydrogen economy, energy efficiency and renewable energy.**
- **Supporting the growth of the hydrogen economy by focusing on hydrogen production, demand and supply chain opportunities.**
- **A pilot green innovation challenge fund to support demonstrator projects that can stimulate growth in the green economy.**
- **Establishing an energy skills forum to shape skills development for a low carbon workforce.**

5.1 Introduction

The Coronavirus pandemic has had a significant impact on our economy. It is estimated that Northern Ireland's economic output will fall by 11% in 2020 and forecast suggests that than just over one-third of this lost output will be recovered in 2021. As a result, the Department for the Economy (DfE) published an Economic Recovery Action Plan focusing on priorities over the next 12-18 months necessary to rebuild our economy.[34] Four key objectives were identified in this:

- Supporting a highly skilled and agile workforce;
- Stimulating research, development and innovation;
- Promoting investment, trade and exports; and
- Building a greener economy.

Around £20million of investment in the green economy is outlined in the recovery plan. **The clean energy sector will be a key driver of the green economy** and, in doing so, also contribute to the other three objectives in the economic recovery plan.



Clean Energy Sector

Includes **low carbon energy networks** and Low Carbon and Renewable Energy Economy sectors:
Energy efficiency (products, lighting, monitoring systems)
Renewable electricity (onshore & offshore wind, solar PV, hydro)
Renewable heat (heat pumps, geothermal, solar, thermal)
Bioenergy & alternative fuels (hydrogen, biogas, liquid biofuels)
Low emission vehicles (hybrid vehicles, electric vehicles, fuel cells)
Other (carbon capture, nuclear power & low carbon services)

34 Economic recovery action plan - Rebuilding a stronger economy (economy-ni.gov.uk)

Alongside the Energy Strategy, DfE is also working on a new long-term Economic Vision and a new Skills Strategy. These three work areas will complement one another in putting forward a comprehensive and cohesive approach to the future growth of the green economy in Northern Ireland.

The proposals outlined in this consultation focus on the role of the clean energy sector and the opportunities that the Energy Strategy can deliver for growing a green economy. The clean energy sector has a number of characteristics which provide unique opportunities in growing the green economy:

- It will lead to **sustainable economic development** that is compatible with and directly contributes to net zero carbon emissions;
- It operates across the manufacturing, utilities, construction and services industries, thus **driving growth throughout our economy;**
- It aligns with global efforts to achieve net zero emissions and therefore presents substantial **export and investment opportunities;**
- It will require the development of new cutting-edge energy technologies, thus **stimulating investment in green innovation;**
- It is **regionally-balanced,** with much of our renewable resources in rural areas whilst most buildings and consumers are in urban areas; and
- It offers the chance for **inclusive growth,** requiring skills at all levels and in many different specialisms to ensure the benefits are shared across society.

The Energy Strategy will be an important part of growing a green economy and contributing to our wider economic vision. We have identified three key objectives within this principle to deliver on this:

1. We will **maximise the economic impact of energy policies** to ensure that we create jobs, attract investment and grow export markets;
2. We will **invest in green innovation** that not only develops new energy technologies for net zero but also drives innovation in local business; and
3. We will **develop a low carbon skills workforce** by planning and developing education and training for the clean energy sector.

5.2 Maximise the Economic Impact of Energy Policies

The Energy Strategy will outline a roadmap and vision towards net zero carbon energy emissions by 2050, with many supporting policies and programmes put in place to deliver on this. We aim to ensure that these policies and programmes not only achieve net zero carbon and affordable energy, but also deliver substantial benefits for the Northern Ireland economy and, in particular, the clean energy sector.

Respondents to the Call for Evidence agreed, highlighting economic opportunities across the clean energy sector, particularly the creation of green jobs across renewables, energy efficiency and the construction sectors. They also referred to the potential for inward investment across Northern Ireland, large scale investment in green energy and the emergence of new services and new business models.

Our clean energy sector makes a significant contribution to the local economy.[35] However, it remains smaller than other economies such as Scotland. This suggests that there is real scope to grow our green economy much further, and doing do will require a dedicated focus on maximising the economic impacts of the policies we put in place to deliver on the Energy Strategy.

Research shows the substantial economic opportunities elsewhere. Achieving net zero emissions is forecast to create 710,000 long-term jobs in the UK and 38,000 long-term jobs in the Republic of Ireland, with most of these in the clean energy sector.[36]

We will take forward research to quantify the economic impacts of potential energy policies in Northern Ireland. This will inform our prioritisation of investment opportunities to target those that deliver the most economic benefits, alongside complementary policies needed to maximise these benefits.

As a small, open and competitive economy we need to focus on key sectors and emerging technologies where we can be global leaders. We have identified four priority areas that not only contribute to net zero carbon energy emissions but will also stimulate the local green economy:

- Improving **energy efficiency** in our building stock;
- Investing in **renewable energy** across power, heat and transport;
- Being at the forefront of the growth of the **hydrogen economy**; and
- Adopting the principles of the **circular economy.**

Invest NI will have a key role in supporting the growth of the green economy. Energy is a key sector and Invest NI maintain a supply chain directory which lists companies in the energy and water supply chains with excellent capability across a range of energy technologies that are well positioned to take advantage of future opportunities.[37] A range of support is available to assist businesses to develop new products and services, access the emerging supply chain networks, and compete successfully in external markets.

35 Low carbon and renewable energy economy, UK - Office for National Statistics (ons.gov.uk)
36 GEF_ClimateJobs-brochure-main-1.pdf
37 Energy Supply Chain Company Database | Invest Northern Ireland (investni.com)

Advanced Manufacturing and Engineering Sector Overview

Grown almost **three times faster than the rest of the UK** in recent years, accounting for 11% of employment and 15% of output.

Home to a range of **indigenous and international companies** engaged in R&D through new product development to manufacturing.

The growth of the clean energy sector is closely linked to the advanced manufacturing, materials and engineering (AMME) sector – one of the priority sectors for the Northern Ireland economy.

Our skills, research base and track record in areas such as plastics & polymers, composites design & manufacturing, precision manufacturing, power generation, specialist joinery & fit-out and construction solutions & products ideally position us to benefit from the supply chain opportunities that will become available.

We have agreed with Matrix - the Northern Ireland Science and Industry Panel – that they will provide detailed analysis of local AMME sectoral strengths and opportunities. This work will take place in 2021 and will help to inform the focus of focus policies aimed at maximising these opportunities.

Q12: Do you agree with the four identified priority clean energy sectors:

a. Energy efficiency
b. Renewable energy
c. Hydrogen economy
d. Circular economy

Please advise on any additional areas that you believe should be prioritised and your reasons for this.

Energy efficiency

Energy efficiency will be a key part of the clean energy sector and the wider green economy. The illustrative scenarios in *Chapter 3* highlights future energy systems are likely to involve significant reductions in energy consumption. This has to be achieved alongside a growing economy and therefore improving the energy efficiency of industry and businesses is vital. "Doing more with less" has been identified a key principle for the Energy Strategy (see *Chapter 6*).

Investing in energy efficiency will not only contribute to decarbonising energy but also provide a stimulus to economic growth. Energy efficiency helps to reduce energy bills and thus improve the competitiveness of businesses.

BEIS has recently published a UK Industrial Decarbonisation Strategy aimed at reducing emissions in the highest emitting industrial sectors.[38] Energy efficiency is a key part of this and substantial funding is available through the UK Industrial Energy Transformation Fund for energy efficiency projects. DfE works with UK Government on the design, oversight and promotion of the scheme in Northern Ireland. Companies in energy intensive sectors can also benefit from compensation for the indirect costs of funding support for renewable electricity that might otherwise impact on their competitiveness.[39]

Industrial Energy Transformation Fund (IETF)

The IETF is a £290 million fund open to England, Wales and Northern Ireland designed to help businesses with high energy use to cut their energy bills and carbon emissions through investing in energy efficiency and low carbon technologies. It operates alongside the **Scottish IETF.**

Invest NI provides a range of energy and resource efficiency to deliver cost savings for local companies and help them become more competitive. *Chapter 6* includes proposals for additional energy efficiency support aimed at businesses which would expand on the current support available and therefore help to deliver even greater energy cost savings for businesses.

Invest NI Support for Energy and Resource Efficiency

Consultancy Support: Fully funded technical audits and feasibility studies.
Industrial Symbiosis: Turning the unwanted materials of one business into a resource for another.
Resource Efficiency Capital Grant: Grants up to £40k towards purchasing resource efficient equipment.

In addition to these benefits, investment in retrofitting buildings to improve energy efficiency will provide a substantial stimulus to jobs in the construction and buildings sectors, as well as the wider economy. These jobs require a range of skills and can provide opportunities for people through apprenticeships and technical qualifications, as well as a route to employment for the unemployed.

Evidence from Scotland suggests that every £1m invested on energy efficiency leads to 1,200 full time equivalent jobs,[40] whilst the Green Homes Grant scheme introduced in England was expected to support over 100,000 new jobs.[41] The European Commission identified that an ambitious energy efficiency target for 2030 could lead to a 4% increase in GDP, a 2% increase in employment and fall in unemployment by up to 3 million people. **Energy efficiency is therefore a win-win for decarbonisation and economic growth.**

38 Industrial Decarbonisation Strategy (publishing.service.gov.uk)
39 Energy Intensive Industries (EIIs): compensation for the indirect costs of funding the Renewables Obligation (Northern Ireland only) (publishing.service.gov.uk)
40 Energy Efficient Scotland: route map - gov.scot (www.gov.scot)
41 A Plan for Jobs 2020 - GOV.UK (www.gov.uk)

Chapter 6 of this consultation puts forward ambitious policy proposals that would lead to substantial investments in energy efficiency of our buildings and therefore act as a stimulus to the green economy. These include:

- Minimum standards for buildings to incentivise new investment;
- A new domestic retrofit scheme aimed at homeowners and private landlords;
- Additional energy efficiency support for businesses; and
- A £370million fund to invest in central government buildings.

Ensuring the industry has the skills and capabilities to deliver on a significant ramp-up in energy efficiency investment will be key to ensuring these benefits are delivered and *Chapter 6* outlines detailed proposals on this.

Q13: Do you agree with the economic growth opportunities identified within energy efficiency? What supporting policies do you believe are needed to take advantage of these?

Renewable energy

Renewable energy will be central to the decarbonisation policies in a new Energy Strategy and one of our proposed principles is to "replace fossil fuels with indigenous renewables". This reflects our ambition to ensure that the future growth in renewable energy not only reduces emissions, but also provides economic opportunities for local businesses as part of the green economy.

Global jobs in the renewable energy sector are expected to almost triple by 2030[42] and every GW of renewable electricity installed in Scotland is estimated to create 1,500 jobs.[43] Wind energy is estimated to support over 500 jobs in Northern Ireland[44] and this can grow as renewable electricity expands and a range of renewables play a greater role in decarbonising heat and transport. Geothermal offers potential as a source of low carbon energy and jobs.

Renewables Sector Overview

Over 150 companies with the capability to provide **innovative products and services** for energy and water supply chains.

Region of excellence in **onshore wind and bioenergy** with a range of innovative companies across anaerobic digestion, biomass, energy from waste and associated feedstock supply.

Expertise in the production of **green hydrogen** from curtailed wind power, manufacture of **hydrogen buses** and intelligence systems for **energy storage.**

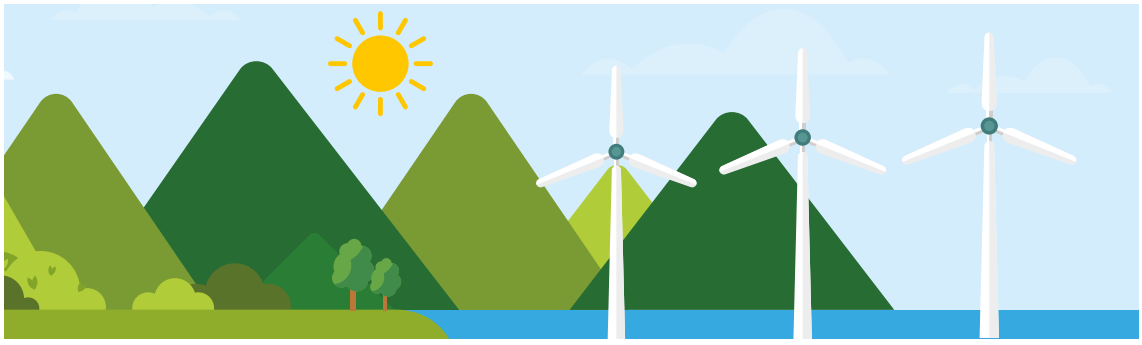
42 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Sep/IRENA_RE_Jobs_2020.pdf
43 PowerPoint Presentation (scottishrenewables.com)
44 NI Renewables Industry Group (2019) Onshore Wind: Economic Benefits in Northern Ireland (website under construction)

In *Chapters 7 and 8* of this consultation, **we put forward a range of potential policy options that would lead to substantial investment in renewable energy infrastructure in Northern Ireland and drive the growth of the green economy.** These include:

- Bringing forward significant investment in renewable electricity to meet a new target of 70% of consumption from renewable sources by 2030;
- Attracting inward investment to Northern Ireland through extending Contracts for Difference and bringing forward offshore and marine renewables;
- Investment in conventional power plants and supporting grid infrastructure to ensure the electricity network supports net zero carbon energy emissions;
- Support for micro-generation such as solar PV that will lead to new investments and supporting economic activity;
- Trials and wider deployment of low carbon technologies in heat and transport to develop and grow new sectors and industries; and
- Opportunities for agriculture and rural economies through the production of biogas and energy from waste.

There are substantial AMME supply chain opportunities in Northern Ireland through the development of offshore wind.

In addition to bringing forward offshore wind as part of the future energy mix, Northern Ireland's strategic location and world-class engineering background means we are ideally positioned to take advantage of offshore wind opportunities in Great Britain and the Republic of Ireland.



Case Study: Bespoke Wind Terminal at Belfast Harbour

Northern Ireland's has a unique offering in competing for offshore wind projects through the presence of the UK's first bespoke offshore wind terminal at Belfast Harbour. This £53 million development across 50 acres offers a bespoke facility for the installation and pre-assembly of over 100 wind turbines.

The UK Government has committed to 40GW of offshore wind by 2030,[45] with the Round 4 leasing round for seabed rights, seeking to secure between 7 and 8.5 GW of offshore wind in English and Welsh waters.[46] The Irish Government has set a target of 5GW of offshore wind by 2030 on its Eastern and Southern coasts and a longer-term ambition of 30GW of floating offshore wind in the Atlantic.[47]

DfE and Invest NI are engaged with the UK and Irish Governments around their offshore wind programmes to identify potential opportunities for Northern Ireland and we also participate in The Crown Estate's offshore wind programme.[48]

Q14: Do you agree with the economic growth opportunities identified within renewable energy? What supporting policies do you believe are needed to take advantage of these?

Hydrogen economy

Hydrogen is the most abundant element in the universe and is found in water. It is an energy intensive gas that can operate across all mediums of heat, transport and power, while only emitting water and oxygen at its point of use. The CCC believes that, with the right government policies, hydrogen can make a significant contribution to meeting decarbonising energy.[49]

Many respondents to the Call for Evidence supported this view, referring to the potential future role of hydrogen in transport for heavy goods vehicles, the gas network, industrial process emissions, power generation and power network management.

Due to the flexibility associated with hydrogen and its many potential uses, governments across the world are investing heavily in hydrogen. The EU has launched a hydrogen roadmap with an ambition to install at least 40GW of renewable hydrogen electrolysers by 2030.[50] The UK Government has committed to generating 5GW of low carbon hydrogen production by 2030[51] and hydrogen forms an important part of the recently published Industrial Decarbonisation Strategy.[52] Scotland also published a hydrogen policy statement focused on the development of low-cost hydrogen capability.[53]

Types of Hydrogen

Grey hydrogen is produced from natural gas through steam methane reformation.

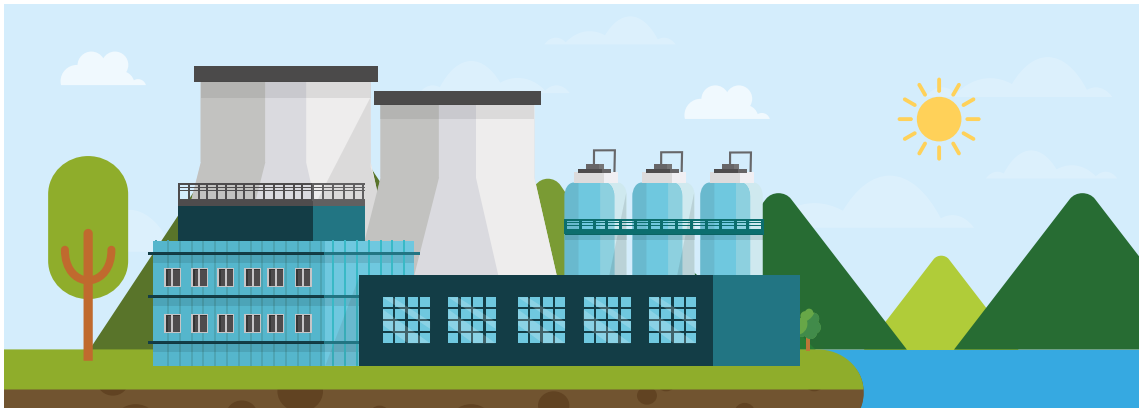
Blue hydrogen is produced using fossil fuels but the carbon is captured and stored or reused.

Green hydrogen is produced through electrolysis powered from a renewable source.

45 New plans to make UK world leader in green energy - GOV.UK (www.gov.uk)
46 Offshore Wind Leasing Round 4 | The Crown Estate
47 gov.ie - Programme for Government: Our Shared Future (www.gov.ie)
48 Offshore wind: a sustainable future | The Crown Estate
49 Hydrogen-in-a-low carbon-economy.pdf (theccc.org.uk)
50 EUR-Lex - 52020DC0301 - EN - EUR-Lex (europa.eu)
51 Energy White Paper (publishing.service.gov.uk)
52 Industrial Decarbonisation Strategy (publishing.service.gov.uk)
53 Scottish Government Hydrogen Policy Statement (www.gov.scot)

Hydrogen is viewed not only as a key route to decarbonisation, but also as a significant driver of the green economy. The European Commission believes that hydrogen can drive the EU's green recovery,[54] whilst hydrogen was a key part of the Prime Minister's Ten Point Plan for a Green Industrial Revolution.[55] It is estimated that hydrogen solutions could unlock up to an estimated 75,000 jobs in the UK by 2035.[56] **Northern Ireland is uniquely positioned to become a leader in the hydrogen economy and secure these benefits locally.**

There is already momentum in Northern Ireland in the hydrogen economy. As part of our green economic recovery funding, DfE provided £5million support to NI Water to procure an innovative new hydrogen electrolyser at its Waste Water Treatment Works[57] - the first such project of its kind across the UK.



NI Water Case Study

DfE provided £5million funding to NI Water to undertake an innovative oxygen and hydrogen demonstrator project. This will deploy a state-of-the-art 1MW electrolyser at a major Waste Water Treatment Works (WWTW).

Water is fed into the electrolyser which produces oxygen and hydrogen. The oxygen can be used to increase capacity at WWTWs, thus reducing the need for investment that would otherwise be needed. The hydrogen produced can be used to meet future energy demands across transport, heat or power.

Translink is introducing three new hydrogen buses into its fleet[58] and is procuring a new hydrogen fuelling station for these[59] and an anticipated 20 further hydrogen buses under a new contract.[60] The GenComm project[61] is led by Belfast Met and received funding from both the EU and UK Governments to trial hydrogen production via electrolysis for hydrogen buses. We are also engaged with a range of complementary potential projects that can build on this momentum and contribute to the growth of an indigenous hydrogen economy in Northern Ireland.

54 Hydrogen to drive the EU's green recovery | European Commission (europa.eu)
55 PM outlines his Ten Point Plan for a Green Industrial Revolution for 250,000 jobs - GOV.UK (www.gov.uk)
56 6-EIA-report.pdf (hydrogentaskforce.co.uk)
57 Hydrogen'ius'!! - News - Climate Change - Northern Ireland Water (niwater.com)
58 A New Era for Public Transport (translink.co.uk)
59 UNITED KINGDOM-Belfast: Supply of Hydrogen Refueling Station Ref: P-1485 - UK Construction Online (ukconstructionmedia.co.uk)
60 Mallon announces £66million programme for 145 zero and low emission buses in effort to deliver Green Recovery | Department for Infrastructure (infrastructure-ni.gov.uk)
61 GenComm, Wrightbus, Energia green hydrogen project

We recognise the substantial opportunities within the hydrogen economy in Northern Ireland and also the need to act now if we are to take advantage of them. We have identified three key areas to progress in parallel:

- **Hydrogen production:** Northern Ireland's success to date, along with ambitious future plans (see *Chapter 7*), presents a unique opportunity to use renewable electricity that is unable to be accommodated on the electricity grid[62] for hydrogen production through electrolysis. This hydrogen can be used locally or exported. Research highlights that large wind farms may be suitable for on-site electrolysis, whilst grid-connected electrolysers would have access to a highly decarbonised electricity system through the SEM and could provide system services (see *Chapter 8*).[63] There is also potential for a large-scale centralised hydrogen production in the future.

Potential for Centralised Large-Scale Hydrogen Production

NUI Galway suggests that an area to the north east of Belfast would be an ideal location due to:

Access to large volumes of electricity through the nearby high voltage electricity grid and interconnection with Scotland.

Proximity to substantial demand including the natural gas grid via the pipeline from Scotland, nearby power stations and buses/heavy goods vehicles on the M1 corridor.

Suitability of Belfast Port for offshore wind generation and export of hydrogen and its derivatives.

- **Hydrogen demand:** We intend to develop potential applications for hydrogen in our energy system across transport, heating, power generation, industrial processes, biomass and carbon capture, utilisation and storage. *Chapter 7 and 8* expand on proposed policies in areas where hydrogen could play a key role in decarbonisation. As with any early-stage technology, hydrogen is more expensive that its fossil fuel equivalents; government policies and public funding will therefore play a key role in the development of the hydrogen economy to bring down costs to the point where it can be commercially viable. It is important we do this in a way which does not place the undue emphasis or burden on energy consumers.
- **Hydrogen supply chain:** Northern Ireland has a world-class manufacturing and engineering base that we want to position to take advantage of the global export opportunities as hydrogen grows rapidly over the coming years. Our initial momentum has already led to economic opportunities for local hydrogen bus production and we aim to further develop opportunities across the supply chain. This includes other areas of transport and the manufacture of electrolysers, which are one of the key constraints in hydrogen production at these early-stages. There are also supply chain opportunities in the manufacture of pressure vessels – used to store compressed hydrogen – and advanced components such as fuel cells, robotics, cryogenics and gas network injection systems. Skills and training will be key enablers of these opportunities and are considered later in this chapter.

62 2020-Qtrly-Wind-Dispatch-Down-Report.pdf (soni.ltd.uk) shows that 15% of wind was dispatched down in 2020.
63 https://www.nweurope.eu/media/13399/hydrogen-exploring-opportunities-in-the-northern-ireland-energy-transition-november-2020.pdf

We will put in place the appropriate policies to take advantage of the opportunities within the hydrogen economy. Through the decarbonisation policies being developed in a new Energy Strategy, we will seek to ensure commercial routes for hydrogen markets are developed and supported by government funding where needed. We will work closely with the industry to identify potential projects and, as part of our broader work on low carbon skills, engage with education and training providers to provide the necessary skills.

We will also work across the UK to ensure Northern Ireland benefits from policies put in place to grow the hydrogen economy at a national level. BEIS is intending to develop a hydrogen production fund that will be open to Northern Ireland and we are represented on the UK Hydrogen Advisory Council which shapes the development of hydrogen policy across the UK. [64]

Q15: Do you agree with the opportunities for production, demand and manufacturing within the hydrogen economy? What supporting policies do you believe are needed to take advantage of these?

Circular economy

The circular economy seeks to break the 'take-make-use-waste' system in place and transform how we manage resources, how we make and use products and what we do with them afterwards. It aims to reduce the material footprint, waste and carbon emissions of Northern Ireland by focusing attention on the opportunities to increase circularity within construction/built environment, tourism, bio-economy and advanced manufacturing sectors and the key materials of food, textiles, electricals and packaging (incorporating plastics, paper/cardboard and glass).

Collaborative Circular Economy Network (CCEN)

The network brings together five councils, four manufacturing businesses and a social enterprise. It covers more than 1,000 people employed in recycling glass, plastic, paper and food waste.

The network supports collaboration around maximising recycling services as part of the circular economy and provides a platform for manufacturers to export recyclable products.

The circular economy will drive significant innovation and research to develop new business models and technologies. Renewable energy is central to this, not only to generate and use clean energy but also to ensure that the materials used in manufacturing renewable technologies and batteries do not damage the environment and can be repurposed.

This approach will reduce our reliance on imports, shortening supply chains and providing local economic opportunities. Local economic opportunities will arise in sectors such as agri-food, industrial biotechnology and advanced manufacturing.

64 Hydrogen Advisory Council - GOV.UK (www.gov.uk)

We intend to develop a Circular Economy Strategic Framework to set a clear vision for how Northern Ireland can transition towards a circular economy. This will take a collaborative approach between central government, local councils, the private sector and third sector.

We believe that transitioning towards a circular economy can make a significant contribution to developing a sustainable economy. We propose to focus a new strategic framework around three principles:

- **Principle 1:** Design out waste and pollution to reduce GHG emissions across the value chain.
- **Principle 2:** Keep products and materials in use to retain the embodied energy in products and materials.
- **Principle 3:** Regenerate natural systems to build natural capital and sequester carbon in soil and products.

Q16: Do you agree with underpinning principles identified within the circular economy? What supporting policies do you believe are needed to take advantage of the potential economic opportunities?

5.3 Invest in Green Innovation

Innovation is one of the key drivers of an economy and the transition to decarbonised energy will require significant investment in innovation in new and emerging low carbon technologies. **We intend for Northern Ireland to be at the forefront of innovation in areas of niche strengths and competitive advantages where we can be a market-leader.**

We have identified two key priorities within this objective:

- We will seek to ensure sufficient **funding for green innovation** is available for the private sector and regulated industries; and
- We will work with our **energy research base** to ensure it supports our priority areas, drive commercialisation and facilitate knowledge transfer.

Funding innovation

Investment in innovation typically requires government involvement at the early stages; due to the high levels of risk and uncertainty involved which make it difficult to attract private investment. There will be substantial funding available to Northern Ireland as part of the development of UK-wide innovation programmes.

The UK Energy White Paper includes a strong commitment to innovation, and outlined a £1 billion Net Zero Innovation Portfolio aims to accelerate the commercialisation of innovative low-carbon technologies, systems and processes in power, buildings and industry to set the UK on the path to net zero and create world-leading industries and new jobs. Many of the funds within this portfolio are and will be accessible to Northern Ireland and DfE has been working with the UK Government to ensure we are linked into their development and delivery.

Table 2: Potential UK Funding Opportunities for Clean Energy Innovation

Opportunity	Lead	Status	Est. Funding
Automotive Transformation Fund	UK Government	Established	£500m-£1bn
Carbon Capture Usage and Storage Fund	BEIS	In development	£1bn
Direct Air Capture and Other Greenhouse Gas Removal Technologies	BEIS	Established	£100m
Horizon Europe	European Commission	In development	€100bn
Hydrogen Production Fund	BEIS	In development	£240m
Industrial Energy Transformation Fund	BEIS	Established	£315m
Innovate UK EDGE	Innovate UK	Established	-
Proof of Concept techstart NI	Invest NI	Established	£4.5m
UK Research & Innovation (UKRI)	BEIS	Established	£8bn

DfE and Invest NI have established a working group including BEIS, QUB and Ulster University aimed at assisting companies to develop competitive proposals for these wider UK funding opportunities.

On top of these opportunities, **we believe that additional tailored support for green innovation is needed in Northern Ireland.** Phase 2 of the £850 million funding for City Deals presents an opportunity to develop collaborative clean energy projects with local councils bringing together key stakeholders to develop feasible proposals that align with decarbonised energy.

We propose to introduce a pilot Green Innovation Challenge Fund during 2021 to support early-stage green innovation. This would be a competitive fund and support innovate projects that align with the priorities outlined in this options consultation and could deliver long-term economic benefits.

Regulated industries in electricity and gas could play a role in supporting a green economic recovery. Ofgem has recently put in place new arrangements to allow local electricity network companies to come forward with new opportunities for green investment and speed up delivery on projects that could help drive economic recovery or build greener infrastructure[65] as part of a Green Recovery Scheme with Great Britain's energy networks.[66]

Ofgem Network Innovation

Network Innovation Stimulus includes two annual network innovation competitions for electricity and gas companies.

Low Carbon Networks Fund allows up to £500m of funding to support innovative projects.

There is also scope to consider how energy regulation can support innovation in regulated industries. This will need to take into account the Utility Regulator's current legislative remit and any potential future changes to this (see *Chapter 9*). Ofgem has introduced two schemes aimed at supporting innovation to trial new technology, operating and commercial arrangements. These are aimed at helping network companies understand what they need to do to provide security of supply at value for money as we move to a low carbon economy.

We propose to work with the Utility Regulator to assess how regulation can facilitate a green economic recovery and green innovation.

Q17: Do you agree that we should develop a green innovation challenge fund? If so, what scale and type of innovative projects should this support?

Q18: Do you believe that we should work with the Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation? If so, how can this be done in a way which protects consumers from the higher risks associated with innovation projects?

Research base

With the scale of new technologies and innovation that will be required to meet net zero, the world-class clean energy research base we have in Northern Ireland has an important role to play in growing a green economy.

65 Energy networks set to power up the Green Recovery | Ofgem
66 Open letter on the Energy Network Association (ENA) Green Recovery Scheme (ofgem.gov.uk)

Table 3: Clean Energy Research Centres

Research Centre	Description
Bryden Centre	The Bryden Centre is €9.4m cross-border renewable energy research centre led by Queens University Belfast (QUB). It focuses on marine renewable energy and bioenergy generation.
Centre for Advanced Sustainable Energy (CASE)	CASE is a £10m centre for industry-led sustainable energy research that bridges the gap between industry research needs and academic research offerings. Its research clusters are focused on bio-energy, energy systems and marine renewables.
Centre for Sustainable Technologies (CST)	Based in Ulster University, CST combines energy modelling, laboratory and real-life research methods at its Terrace Street living laboratory to research energy efficiency, renewable energy, energy storage and energy system coupling.
Hydrogen Safety Engineering and Research Centre (HySAFER)	HySAFER at Ulster University carries out fundamental and industry-driven research, consultancy, knowledge and technology transfer in safety science and engineering, primarily hydrogen and fuel cell technologies.

Funding for City Deals is supporting the development of two new innovation centres – the Advanced Manufacturing Innovation Centre[67] (Belfast City Council) and I4C[68] (Mid & East Antrim Council) – that also play an important role as part of the research base in the future. There are also a number of highly innovative projects such as Gencomm[69], Girona[70] and Artemis[71] that are expanding our research capabilities.

We believe that our clean energy research base can make a significant contribution to decarbonising energy and growing the green economy. In order to maximise the contribution and impact of this, we propose to take forward:

- **Research mapping:** Building on our existing relationships with researchers, we would intend to carry out a mapping exercise to identify key research areas that can support the delivery of a new Energy Strategy. This would provide an important evidence base that ensure the full range of capabilities and specialisms in Northern Ireland are known.
- **Research funding:** Where research, trials and demonstration projects are needed to help inform energy policy decisions, we would seek to provide funding opportunities to local research centres with relevant specialisms.
- **Business linkages:** We would aim to bring together local businesses that have either challenges or opportunities related to clean energy with our research base to ensure knowledge transfer, develop linkages and potentially partner for bids for innovation funding available within the UK and beyond.

67 Advanced Manufacturing Innovation Centre - Belfast Region City Deal: Innovation (brcd-innovation.co.uk)
68 Belfast Region City Deal | Mid and East Antrim Borough Council
69 GENCOMM: GENerating energy secure COMMunities | Interreg NWE (nweurope.eu)
70 Home - Girona (gironaenergy.com)
71 Ulster plays role in Belfast Maritime Consortium helping to build zero emissions ferries - Ulster University

- **UK opportunity scanning:** As we work with UK Government on new innovative energy policies and projects, we would seek to identify where our local research base has specialisms and make connections to ensure that potential opportunities are realised to benefit Northern Ireland.

Q19: Do you agree with a focus on research mapping, research funding, business linkages and UK opportunity scanning to maximise the impact of the local research base with clean energy specialisms? Please identify specific opportunities in the local research base that could be progressed.

5.4 Develop a Low Carbon Skilled Workforce

Skills are a key enabler of economic growth. We want to not only build new skills for the clean energy sector as part of a low carbon workforce, but also use our existing skills as a competitive advantage for new and emerging energy technologies.

The transition to a net zero energy system will create job opportunities across a range of sectors. It has been estimated that 400,000 people may need to be recruited into the energy sector across the UK to meet net zero by 2050, with 13,700 of these in Northern Ireland.[72] This demand for skills is in addition to the need to re-skill and re-train existing workers in sectors currently based around fossil fuels.

Figure 12: Profile of Net Zero Workforce

Source: Building the Net Zero Energy Workforce, National Grid, January 2020

72 download (nationalgrid.com)

Respondents to the Call for Evidence identified skills needed for a low carbon workforce. These include energy assessors, carbon management specialists, smart meter installers, resilience planners, green finance experts, low carbon transport officers and regional expertise on low carbon spatial planning and development. The need for technological skills in areas such as digitalisation, analytics, power engineering, storage, artificial intelligence and environmental sciences was also highlighted.

We will take forward research to forecast the likely skills required for the clean energy sector as a result of new energy policies. This work will be considered alongside research to quantify the economic implications of energy policies and will also seek to identify potential routes to address these needs.

Education and training

We must start now to develop the skills needed for the clean energy sector. Key areas of focus in the short-term are anticipated to be:

- The **building, construction and energy installation** sectors will need trained people to deliver a significant ramp-up in activity to meet ambitious proposals on retrofit and building upgrades proposed in *Chapter 6*;
- Skilled workers for our **electricity system and network operators** to carry out work needed to upgrade the grid as deliver network investments needed to meet a 70% renewable electricity target proposed in *Chapter 7*; and
- Supporting the early-stage growth of the **hydrogen economy** by re-skilling our existing engineering workforce and developing specialisms in hydrogen technology, applications and safety.

These sectors will require a wide range of skills and qualification levels. Alongside building the green economy, developing a highly-skilled and agile workforce is also a key objective of the DfE Economic Recovery Action Plan. Actions within this plan provide opportunities to meet the skills needs of the clean energy sector in the short-term. The plan sets out proposals including:

- Make apprenticeships available to more people;
- Work with sectors to create new apprenticeship pathways; and
- Launch a Flexible Skills Fund.

In addition to the new skills initiatives, DfE has a wide range of existing programme including youth training provision from entry level, Assured Skills Academies, Skills Focus and InnovateUS. These programmes provide opportunities to address some of the immediate skills needs of the clean energy sector from entry-level traineeships through to apprenticeships, graduate programmes and reskilling opportunities for existing workers seeking a new career path.

Further Education (FE) colleges, private training organisations and professional bodies will have an important role in providing work-based training and delivering technical qualifications. Higher-level, including Higher Level Apprenticeships, courses through Higher Education (HE) will also have an important role in supporting medium to longer-term advanced specialisms needed. Critical to success will be working with industry in partnership to shape and help design the skills and training we need to deliver; this is a journey we have already begun with our Sectoral Partnerships for apprenticeships across key sectors including construction, engineering and manufacturing.

We will seek to utilise the comprehensive range of available training and education routes to provide the short-term skills needed by the clean energy sector.
Apprenticeships deliver work-based training and qualifications to employees at level 2 (equivalent to 5 GCSEs) and level 3 (A-levels) alongside a range of higher level apprenticeships (HLAs).73 They usually take two years to complete one level.

Relevant Apprenticeships

Apprenticeships available at Level 2 and Level 3 include: construction; engineering; electrical power engineering; plumbing; and sustainable resource management.

HLAs include courses such as: building services; construction; civil engineering; energy, environment and sustainability; advanced manufacturing; electrical and electronic engineering; and mechanical engineering.

Sectoral partnerships exist to review and develop the content of all youth traineeship and apprenticeship frameworks to ensure that all those involved in training are industry ready.[74] Relevant partnerships in advanced manufacturing and engineering, the built environment, civil engineering, motor vehicles and transport and logistics already exist.

Sectoral Partnerships have been established across a wide range of sectors to review and develop the content of apprenticeships in Northern Ireland and ensure that apprenticeships meet the current and future changing needs of industry in Northern Ireland. The existing partnerships will consider the need for training in green skills as part of their work to identify new and review existing apprenticeship frameworks to reflect the increasing demand for greener technologies across all sectors within the economy.

A range of relevant courses at Level 3 are currently provided across the FE colleges. These cover energy efficiency measures, retrofit assessment and heat pump installations as well as Honours and Foundation degrees and Higher Level Apprenticeships in Building Services and Renewable Energy. Our universities also provide a diverse range of undergraduate and postgraduate courses covering renewable energy engineering, energy storage, energy policy, markets and engineering and hydrogen safety technologies.[75]

73 Apprenticeships | nidirect
74 Sectoral Partnerships | Department for the Economy (economy-ni.gov.uk)
75 Courses at Ulster University - Ulster University, Energy, Environment and Sustainability (FD) D444 | Courses | Queen's University Belfast (qub.ac.uk)

We will also seek to develop training and education routes that aim to meet the needs of the clean energy sector over the medium to longer-term.

DfE has been engaging with Belfast City Council and Mid & East Antrim Council who are developing proposals for new low carbon and hydrogen training academies that would support the needs of new and existing sectors to complement current education providers.

DfE is also developing a new Skills Strategy which includes a proposal for the establishment of a National Skills Council; this will be considered as part of the public consultation. The Council will comprise a central oversight body to coordinate skills policy across NI, as well as regional skills hubs which would operate at a local level. These bodies would include central and local government, businesses – particularly from priority sectors – employee representatives, leaders of the education sector (from higher, further and secondary education) and individuals with expert knowledge on the emerging demands of the skills system.

We propose to establish an Energy Skills Forum to identify the skills needs and training priorities for the clean energy sector. This would bring together key stakeholders from central and local government, industry bodies and major employers to help shape current and future skills priorities for the clean energy sector. It would work closely with any new central skills oversight body ("National Skills Council") established under the Skills Strategy.

The forum would cover a wide range of relevant clean energy sectors, including energy efficiency, heat, renewables, hydrogen, transport technologies and advanced manufacturing. It would focus on identifying clear pathways to develop skills for priority energy sectors of the future and seek to ensure that appropriate routes are available for existing workers and new entrants.

Q20: Do you believe that utilising and tailoring existing education and training routes can meet the short-term skills needs of the clean energy sector? How can activities within these routes be shaped to meet the needs of the sector?

Q21: Do you agree with the proposal to establish an Energy Skills Forum to shape the future skills needs of clean energy sector? If so, what do you believe the role, remit and membership of such a group should be?

Just transition

In addition to the economic opportunities that will arise from the transition to decarbonising energy, it will ultimately lead to a move away from industries associated with fossil fuels.

A 'just transition' means that the move to a low carbon economy is fair and inclusive, leaving no one behind. This includes ensuring that energy remains affordable for consumers, particularly those who are vulnerable and we explore this further in *Chapter 4*.

Support for Just Transition

The **EU** has a Just Transition Mechanism to diversify economies that are heavily reliant on fossil fuels; these include a €40bn just transition fund, a dedicated InvestEU scheme and a new European Investment Bank loan facility.

The **Republic of Ireland** has recently secured €28m from this fund for 47 projects in the Midlands.

Scotland has set up a Just Transition Commission to advise Ministers on how to maximise opportunities that build on Scotland's strengths but mitigate against risks that could arise around regional cohesion, equalities, poverty and a sustainable and inclusive labour market.

In the context of the green economy, it is particularly relevant for economies that are heavily reliant on fossil fuels and, without significant changes, many carbon-intensive industries could see a high proportion of jobs lost or transformed.[76] This will have a disproportionate focus on lower skilled jobs with generally lower wages and fewer opportunities for career progression.[77]

Northern Ireland does not have large indigenous fossil-fuel industries similar to those economies which have put in place targeted support for the just transition. Nonetheless, the transition to decarbonised energy will still bring about significant changes for many sectors and our largest emitters.

The extent to which these changes could require policy intervention will depend on the specific decisions made – which will be informed by this consultation – as well as the responsiveness of markets and industries. Business that are involved in fossil fuels – such as power plants, natural gas suppliers, coal and oil distributors and petrol and diesel vehicles retailers – are likely to see new market opportunities in renewables, hydrogen, carbon capture, decarbonised gas, dried wood, biofuels or low emission vehicles.

Our energy sector has already shown itself capable of responding to these changes. With the phasing out of coal-fired power generation by 2023, Kilroot has announced its conversion to gas-fired generation[78] and its proposals for an Energy Park including a solar farm, battery storage, hydrogen facility and EV charging.[79]

Adapting to these changes will require workers to develop new skills and learn new technologies. Measures focused on re-skilling and re-training our existing workforce into a low carbon workforce are therefore essential to ensuring a just transition and this is already part of our proposed focus for education and training routes in the previous section.

Q22: Do you believe that there is a need for specific measures aimed at ensuring a just transition in Northern Ireland? If so, please advise on what the focus of these should be in addition to the education and training routes already proposed for a low carbon workforce.

76 Going_Green-_Preparing_the_UK_workforce_to_the_transition_to_a_net_zero_economy.June.2020.pdf (nesta.org.uk)
77 Planning a Just Transition for NI Jan 21.pdf (nerinstitute.net)
78 Kilroot to become gas-fired power station - BBC News
79 Kilroot Energy Park | Renewable Energy Power Generation

GROW A GREEN ECONOMY CONSULTATION QUESTIONS

Maximise the Economic Impact of Energy Policies

Q12: Do you agree with the four identified priority clean energy sectors:

a) Energy efficiency
b) Renewable energy
c) Hydrogen economy
d) Circular economy

Please advise on any additional areas that you believe should be prioritised and your reasons for this.

Q13: Do you agree with the economic growth opportunities identified within energy efficiency? What supporting policies do you believe are needed to take advantage of these?

Q14: Do you agree with the economic growth opportunities identified within renewable energy? What supporting policies do you believe are needed to take advantage of these?

Q15: Do you agree with the economic growth opportunities identified for hydrogen production, demand and manufacturing within the hydrogen economy? What supporting policies do you believe are needed to take advantage of these?

Q16: Do you agree with underpinning principles identified within the circular economy? What supporting policies do you believe are needed to take advantage of the potential economic opportunities?

Invest in Green Innovation

Q17: Do you agree that we should develop a green innovation challenge fund? If so, what scale and type of innovative projects should this support?

Q18: Do you believe that we should work with the Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation? If so, how can this be done in a way which protects consumers from the higher risks associated with innovation projects?

Q19: Do you agree with a focus on research mapping, research funding, business linkages and UK opportunity scanning to maximise the impact of the local research base with clean energy specialisms? Please identify specific opportunities in the local research base that could be progressed.

Develop a Low Carbon Skilled Workforce

Q20: Do you believe that utilising and tailoring existing education and training routes can meet the short term skills needs of the clean energy sector? How can activities within these routes be shaped to meet the needs of the sector?

Q21: Do you agree with the proposal to establish an Energy Skills Forum to shape the future skills needs of clean energy sector? If so, what do you believe the role, remit and membership of such a group should be? If not, what alternative routes are there to provide this role?

Q22: Do you believe that there is a need for specific measures aimed at ensuring a just transition in Northern Ireland? If so, please advise on what the focus of these should be in addition to the education and training routes already proposed for a low carbon workforce.

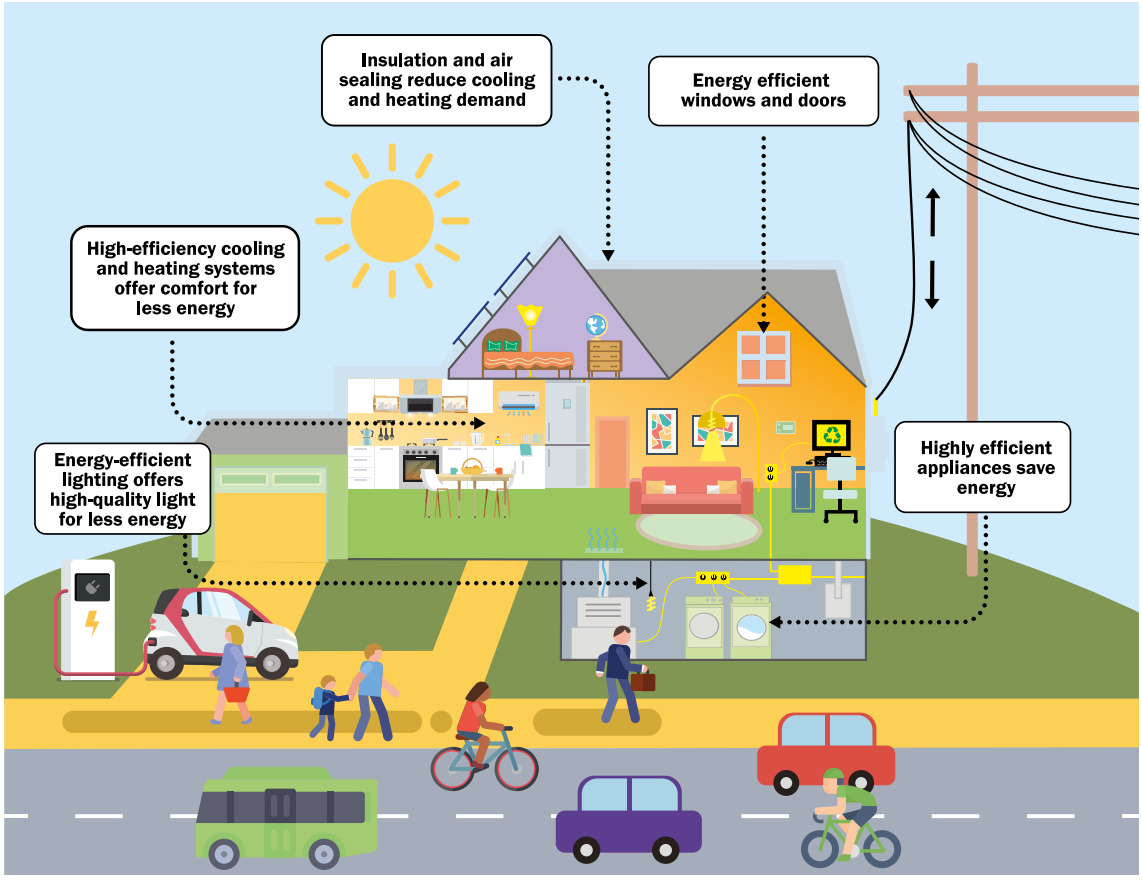
Chapter 6: Do More With Less

Key options we are consulting include:

- **Introducing an energy savings target, minimum energy efficiency standards for buildings and uplifted building regulations.**
- **Comprehensive additional energy efficiency support for domestic and non-domestic consumers.**
- **A range of approaches to build consumer trust and confidence in energy efficiency work carried out by the industry.**
- **Measures aimed at supporting consumers to change how they use energy and travel.**

6.1 Introduction

Meeting net zero carbon energy is not just about using zero-carbon energy sources. As our illustrative scenarios show, reducing the overall amount of energy we consume will play a significant role in reducing emissions. It will also reduce the investment needed in zero-carbon energy technologies as less energy is needed.



A key principle of a new Energy Strategy has to be about doing more with less. To do this, we must continue to serve the energy needs of a growing economy and population whilst being more efficient with our energy use. This can partly be achieved through smart and energy efficient appliances and technologies. It can also be achieved through 'behind the grid' solutions such as minimising efficiency losses and ensuring fuels are used for the most efficient applications.

But this principle is not about technologies and networks, it is about consumers and how government can support you to do more with less.

It is commonly mentioned that the unit of energy we don't use is both the cheapest and cleanest unit of energy there is. This statement is the reason why doing more with less is so important for consumers. It will help to reduce consumer bills, lift people out of fuel poverty, improve comfort levels where we live and work and better maintain our health. And it will do all this whilst helping to achieve net zero carbon emissions from energy, and improving our security of supply.

We want to enable consumers to make the necessary investments and behavioural changes to reduce energy demand, whilst protecting those who may be unable to do so. We have three key objectives:

1. We will **set clear direction for energy efficiency** to ensure that the necessary targets, standards and regulations are in place;
2. We will **support consumers to invest in buildings** through a range of measures tailored to individual needs and circumstances; and
3. We will seek to **help consumers change behaviours towards energy use** through a range of approaches that benefit individuals and society.

6.2 Set Clear Direction for Energy Efficiency

The investments and changes necessary to deliver significant improvements in energy efficiency will not happen without government intervention. This all starts with clear direction to stakeholders – government, industry, consumers – about what our intentions are and what we need from them.

We have considered a range of options to provide this direction. These include: establishing an energy savings target; introducing minimum energy efficiency standards; improving building regulations; and using the rating system to promote energy efficiency.

Energy savings target

Targets play an important role in signalling government intentions and driving decisions that will lead to objectives being achieved. Whilst Northern Ireland did contribute to the delivery of the UK's overall target in the EU Energy Efficiency Directive, there is currently no dedicated energy efficiency target for Northern Ireland. **This needs to change.**

Respondents to the Call for Evidence were strongly in favour of some form of energy efficiency target for Northern Ireland. There was, however, no clear consensus on what metric should be used as a target. Various suggestions included total energy consumption, energy savings achieved from supporting policies and carbon emission reductions from buildings. The very existence of a target, rather than the definition of the metric used, was seen as more important by some.

We propose to set an energy savings target for Northern Ireland. This target would act as a strategic driver for, and be an aggregate measure of, the energy savings achieved from all policies and schemes that impact on energy use.

An energy savings target would ensure that energy savings could be attributed to energy efficiency activity, rather than to wider factors that impact total energy consumption. Further, measuring 'energy savings achieved' rather than 'energy consumption reduced' ensures that the target would not dis-incentivise economic activity. The target would facilitate assessments of energy savings by sector and help to identify the effectiveness of policies in reducing energy demand. It would be built into all energy efficiency policies and schemes across all sectors, and we would intend to report on progress against this target on an annual basis.

Whilst data development work is needed to provide a baseline, this approach would provide consistency with methods undertaken in other regions of the UK, for example the Energy Company Obligation in Great Britain, as well as the approach taken by the European Union to monitor energy efficiency performance.

Q23: Do you agree that an energy savings target should be set for Northern Ireland?

Minimum energy efficiency standards

Minimum Energy Efficiency Standards (MEES) are legally enforceable standards that government places on domestic and non-domestic buildings to drive compliance and improvement in energy performance.

Energy Performance Certificates

An EPC tells consumers how energy efficient a building is from a rating of A (very efficient) to G (inefficient).

EPCs let consumers know what it could cost to heat and light a property, as well as potential steps to improve the rating.

They are required on all new builds and when an existing property is being sold or rented.

Energy Performance Certificates (EPCs) are the main method used in the UK to measure whether the standards are being met. Minimum EPC standards have, for example, been set in Scotland[80] and other parts of the UK[81] as a way to deliver such standards, whilst the Republic of Ireland has set standards for major home renovations based on the Building Energy Ratings (BER) measure.

80 The Energy Efficiency (Private Rented Property) (Scotland) Regulations 2019: draft guidance - gov.scot (www.gov.scot)
81 https://www.gov.uk/government/publications/clean-growth-strategy/clean-growth-strategy-executive-summary#tracking-

A significant number of Call for Evidence responses proposed that EPCs should be used to set MEES for both domestic and non-domestic buildings. Clearly the successful delivery of MEES policy depends on a reliable assessment of the energy performance of building stock across different tenure types. Less than 50% of housing has an Energy Efficiency Rating (EER) band C or above.[82]

We propose to set minimum energy efficiency standards for buildings in Northern Ireland. Standards could be set for different tenure types (e.g. private rented; domestic home-owners; social housing; non-domestic building owners). Monitoring and enforcement measures will be needed, complemented by additional support tailored to the individual needs of each sector.

It is estimated that the cost of upgrading the 390,000 eligible domestic dwellings in Northern Ireland to band C is around £2.4bn, or £6,200 per household. Increasing the 586,000 eligible households to a higher band B is estimated to be £9.2bn, or £15,600 per household.[83] In setting standards, careful consideration will therefore be given to both the costs and benefits for domestic and non-domestic consumers.

We believe that setting standards will benefit consumers. The uplifts to bands C and B (referenced above) are estimated to deliver energy savings of £500 - 700 per household per year. Standards will be important for vulnerable domestic consumers to help to address fuel poverty, improve thermal comfort and lead to better health outcomes. They will also help to reduce energy consumption and energy bills for businesses, thus improving competitiveness. The cost implications for the work required to meet standards means that support will be needed.

Some respondents to the Call for Evidence suggested that the Standard Assessment Procedure (SAP), the methodology that underpins domestic EPCs, should be reviewed to ensure its robustness. EPCs are used effectively in other devolved administrations and utilising them in their current form offers opportunities for comparisons to and measurement against other UK policies. The EPC database also provides a rich source of information that can be utilised to inform energy efficiency policy. Rather than delay the introduction of MEES by seeking to develop an alternate measure, we will continue to engage with other parts of the UK as part of any future reviews of SAP methodology.

Q24: Do you agree that Minimum Energy Efficiency Standards should be set to drive improvements in energy efficiency? If so, what buildings should be the early priorities for introducing minimum standards?

Building regulations

Building regulations set minimum standards for building work with respect to energy efficiency and carbon performance for any relevant work. They do not apply for existing buildings where no building work is planned or being carried out and are therefore just one part of the overall landscape in providing direction on improving our energy efficiency.

our-progress

82 Research into the future of energy efficiency policy in Northern Ireland (economy-ni.gov.uk)

83 Cost of carbon savings in Northern Ireland's housing stock (nihe.gov.uk)

The Department of Finance (DoF) has policy and legislation responsibility for Building regulations. District councils are responsible for enforcement of the regulations, which is normally carried out through their building control departments.

Our local building regulations are currently less onerous with regard to energy performance than those in Great Britain and the Republic of Ireland. In addition, other jurisdictions are further uplifting their regulations with a view to their commitments to net zero emissions.

England[84] and Wales[85] have consulted on introducing the Future Homes Part L Standard in 2025. The Republic of Ireland introduced an uplift in standards in 2019 to address Nearly Zero Energy Building (NZEB) performance requirements, [86] and Scotland is expected to implement what could be the highest standards in the UK later this year.[87] An EU-wide uplift in energy performance of buildings is also being carried out.[88]

Future Homes Standard

From 2025, homes built to the Future Homes Standard in England will be built with low carbon heating (primarily expected to be heat pumps) instead of fossil fuel heating, with high levels of energy efficiency that mean no further retrofit work will be needed to enable them to become zero-carbon.

We recognise that the current standards for new buildings in Northern Ireland need to be uplifted.

The need to update Northern Ireland's building regulations and ensure stricter enforcement emerged from the Call for Evidence, with over 50% of all responses referring to this as a vital issue in raising energy efficiency standards in buildings. Respondents noted the importance of updated building regulations, particularly for new builds, stricter enforcement through Building Control, and closer alignment with the planning system to ensure that energy efficiency is at the forefront of design. Specific reference was made to the need to catch up with building regulations elsewhere across the UK as a minimum.

DoF is proposing an ambitious five phase approach to uplifting building regulations. This will take into account the Future Homes and Future Buildings standards that emerge in England. DOF aims to consult on the details of this approach later in 2021.

The five phases are anticipated to be:

- **Phase 1 is an interim uplift during 2021/22.** This will seek to increase standards through higher targets and new minimum insulation values that will lead to improved building fabric and an increased use of on-site renewables, with a view to implementation as quickly as possible.

84 Future Homes Standards consultation (publishing.service.gov.uk)
85 Building regulations Part L review | GOV.WALES
86 gov.ie - New Energy Efficiency Standards for New Dwellings (www.gov.ie)
87 Scottish Building Regulations review of energy standards: call for evidence - gov.scot (www.gov.scot)
88 Energy performance of buildings directive | Energy (europa.eu)

- **Phase 2 is a discussion document to inform longer term uplifts.** This is expected to issue shortly after the phase 1 consultation and will seek to gather evidence to identify and help remove constraints to higher standards in the long term.
- **Phase 3 is an uplift in 2022/23 that would take into account uplifts planned in other regions for 2021/22.** These changes are likely to incentivise heat-pump led solutions and ensure buildings are future-proofed in relation to low-carbon heating.
- **Phase 4 is an uplift in 2026/27 that would take into account the 'Future Homes and Future Buildings' standards and similar developments in other regions.** It is anticipated that England will introduce standards in 2025 to ensure that new buildings are low-carbon ready and explicitly support low-carbon heating solutions. It is unlikely that mains gas or oil connections will be viable for new buildings under those standards.
- **Phase 5 is a further review in 2029/30.** This will review the position and consider issues that have not been addressed in previous phases.

The 'Future Homes and Future Buildings' standards and the position adopted by other devolved administrations and the Republic of Ireland are natural starting places for setting higher standards here. However, we also need to make sure that these are tailored to reflect different characteristics here and that future pathways to increasing standards align with the direction set in the Energy Strategy to optimise delivery on carbon reduction.

Under the Building Regulations (Northern Ireland) Order 1979 (as amended) the standards set can only be those which "can reasonably be expected to be attained". Key considerations in uplifting regulations therefore include assessing the ability of the industry to deliver, along with the investment needed in the electricity network to accommodate heat pumps and export of electricity from self-generation. The alignment of fuel pricing with carbon impacts is also an issue that must be addressed if we are to avoid low-carbon heating systems being both more costly to install and to operate than higher carbon options. We will consider these issues as part of related policy options proposed elsewhere in this consultation.

Uplifted regulations are good for society. They should deliver more energy efficient buildings, reduce the need for future investment and support the decarbonisation of energy. However, we also need to be aware of the potential cost impacts of higher standards on those carrying out building work, how increased costs might be passed through to new homeowners and tenants, and what protections might be needed.

Q25: Do you agree with the general scale and proposed pace of change outlined in the five phase plan for building regulations? If not, please outline what achievable timescale or programme should be implemented and your rationale for this.

Rating system

The taxation system could potentially be shaped to provide direction on the need to invest in energy efficiency through a range of mechanisms, including lower rates bills, discounted VAT rates and/or reductions in Stamp Duty, Inheritance Tax or Capital Gains Tax linked through to energy efficiency of buildings. Developments may occur in these areas across the UK, and we would intend to monitor them.

At present, rates are the main devolved tax raising power that could be used to promote energy efficiency. The domestic rates bill is determined by the rateable valuation of a property and the domestic rate of each council area. Such an approach could introduce EPC ratings as a factor in determining the overall rates bill, which would incentivise investments, increase demand (and therefore prices) for buildings that are more energy efficient and widen the reach of EPCs.

Important protections would, however, be needed. Lower income households would have less resources to make investments that would lower their rates bill and such a move could lead to a regressive tax. Any change such as this would therefore need to be accompanied by appropriate support particularly aimed at the vulnerable to make these investments.

Q26. Do you think that we should seek to explore how the rates system can be used to encourage energy efficiency? If so, please outline key issues that would need to be considered.

6.3 Support Consumers to Invest in Buildings

The vast majority of the building stock in 2050 already exists today. The CCC advises that significant retrofitting of buildings to improve energy efficiency and reduce energy demand is needed.[89] DfE research[90] suggests:

- A dramatic change in policy extent and funding levels is required for Northern Ireland to put building energy performance in line with the UK's net zero carbon emissions commitment.
- Domestic dwellings in Northern Ireland currently use more energy than anywhere else in the UK or the Republic of Ireland.
- A peak of 50,000 homes might need to be retrofitted annually, around three times the level at the moment.
- Deeper levels of retrofit per building are required, with modelling indicating annual energy saving 14 times higher than at present.

A step change in retrofitting buildings is therefore needed in Northern Ireland.

Standards and regulations are an important driver of improvements in energy efficiency, but they will only succeed if accompanied by measures aimed at supporting consumers to invest. Measures currently available are:

- **Domestic:** The NI Sustainable Energy Programme (NISEP),[91] Affordable Warmth and Boiler Replacement Schemes.[92] All are primarily focused on supporting low income and/or vulnerable domestic consumers. DfE previously consulted on introducing a new Energywise scheme, but it was not progressed.[93]

89 https://www.theccc.org.uk/publication/reducing-uk-emissions-2019-progress-report-to-parliament/
90 https://www.economy-ni.gov.uk/sites/default/files/publications/economy/Research-Future-Energy-Efficiency-Policy-Northern-Ireland.pdf
91 NISEP List of Schemes 2020-2021.pdf (uregni.gov.uk)
92 The Housing Executive - Boiler Replacement Scheme (nihe.gov.uk)
93 Microsoft Word - EnergyWise Consultation May 2016 - BRANDED VERSION FOR ISSUE (economy-ni.gov.uk)

- **Businesses:** Invest NI has recently introduced a temporary Energy Efficiency Grant as part of the COVID-19 response.[94] Wider support is also available for technical consultancy and resource efficiency grants.[95] Some support for businesses is available through NISEP.

Energywise

Energywise would have replaced NISEP and provided support for households not eligible for the Affordable Warmth Scheme.

It sought to provide a "one stop shop" approach to consumers for the majority of government energy efficiency support and advice.

Despite the good work that these schemes carry out, annual spend per capita on energy efficiency schemes is around 250% higher in Scotland and about 50% higher in Wales.[96] The recent Green Homes Grant scheme introduced in England was not made available to other parts of the UK.[97]

We will need to significantly increase our funding for energy efficiency support and ensure the support landscape is appropriately structured to deliver the investments needed for net zero carbon energy.

Respondents to the Call for Evidence indicated support for a broad range of financial measures that are straight-forward and desirable to encourage and incentivise consumers to invest in energy efficiency. Generally, feedback highlighted a need for incentives to be tailored and flexible, while covering all building tenure types including owner-occupiers and the private rented sector. The need for incentives for investment in non-domestic buildings was also highlighted.

We believe that the key principles underpinning the future energy efficiency support landscape for consumers are:

- **Deliver a step change in the scale and level of funding** aimed at meeting net zero carbon energy emissions from buildings;
- **Offer tailored and comprehensive support** for both domestic and non-domestic consumers;
- **Incentivise investment in energy efficiency for all consumers** whilst ensuring a focus on the most vulnerable in society; and
- **Follow a "consumer-centric" approach** that follows the customer journey from start to finish and ensures quality assurance at each stage.

Meeting these principles for consumers will require the energy efficiency support landscape to substantially change in Northern Ireland.

94 Invest NI announces Energy Efficiency Grant as latest COVID-19 support scheme | Invest Northern Ireland
95 Reduce waste and save energy | Invest Northern Ireland (investni.com)
96 https://www.economy-ni.gov.uk/sites/default/files/publications/economy/Research-Future-Energy-Efficiency-Policy-Northern-Ireland.pdf
97 Apply for a Green Homes Grant - GOV.UK (www.gov.uk)

We will consider potential options for domestic and non-domestic consumers in turn. However, support for these groups should ultimately sit alongside one another within the "one stop shop" approach outlined in *Chapter 4*. This is essential to ensure that support for consumers is straightforward and simple to access.

Domestic consumers

Domestic consumers want to have a comfortable temperature in their homes at the lowest possible cost. Any support for energy efficiency needs to allow them to achieve both these goals. Household income will be a key determinant of whether domestic consumers are able to make investments in energy efficiency, as well as whether they own the home they live in.

The types of support offered to domestic consumers therefore needs to reflect these factors. Respondents to the Call for Evidence suggested that the availability of private finance for owner-occupiers will be an integral element of driving sufficient demand for energy efficiency measures. However, for low income and fuel poor households, public support will have a larger role to play.

The Energy Company Obligation (ECO) is the main support scheme for energy efficiency in Great Britain.[98] The Green Homes Grant scheme was also introduced in England in response to COVID-19.[99]

Northern Ireland does not have an equivalent Energy Efficiency Obligation scheme and provides support to the same target groups though the NISEP and Affordable Warmth. Whilst an obligation scheme could be a suitable alternative to these, it would still require additional funding mechanisms to target all consumer groups.

Energy Company Obligation (Great Britain)

The ECO is funded by an obligation on medium and large electricity and gas suppliers.

The suppliers work with installers to introduce energy efficiency measures into homes.

It is typically aimed at low income, fuel poor and vulnerable households.

We therefore do not at this time propose to introduce a similar obligation scheme in Northern Ireland. However, in developing future finance options, we will consider what role both suppliers and distributors might have in helping to drive progress in energy efficiency.

We propose to introduce a new domestic retrofit scheme offering tailored support to all households. This would provide support to all domestic consumers, including vulnerable / fuel poor households, owner-occupiers and the private rented sector. The details of this scheme, including consideration of the scope of grant and/or loan funding, will be consulted upon separately.

98 Energy Company Obligation (ECO) | Ofgem
99 Green Homes Grant: make energy improvements to your home - GOV.UK (www.gov.uk)

We intend to take a phased two-stage approach to introducing this support:

- **By spring 2022,** DfE will put in place a pilot domestic retrofit scheme to provide support to a wide range of domestic consumers.
- **Following this initial pilot period**, the proposed "one stop shop" body will take ownership of the new domestic retrofit scheme.

It is envisaged that this new scheme would replace the NISEP, and we will work with the Utility Regulator to ensure continuity of support. We will also work across government to identify what further changes to the energy efficiency support landscape are needed to deliver a cohesive "one stop shop" approach for consumers.

We propose that two funding routes would be used for this new scheme. It would be partly funded through the energy efficiency element of existing Public Service Obligation (PSO) that is paid by all electricity consumers and currently used for NISEP.[100] **We intend to review the level of this obligation, the scope of the consumer base across which it is shared and whether it should be extended beyond electricity.** We would also supplement this with additional public expenditure funding sources, therefore increasing the overall scale of support available for energy efficiency.

At present, 80% of the funding for NISEP from the PSO is ring-fenced for "priority" vulnerable domestic consumers. **We propose that 100% of the PSO element of funding for the new scheme is ring-fenced for vulnerable and fuel poor households,** with additional funding being used to provide support to all domestic consumers. Focusing the PSO on vulnerable and fuel poor households ensures that a minimum guaranteed level of support is available and targeted on those who will benefit most from the positive health outcomes that warmer and more comfortable homes deliver, thus reducing demands on the health service.

Alongside new government support, there is an opportunity to explore private funding models. Bank-led products such as green mortgages or low-interest loans for energy efficiency investments could be delivered through a market-led approach and intervene at key points when homeowners are buying, re-mortgaging or improving their properties.

It would, however, be important to ensure appropriate protections are in place for consumers if green private finance solutions are to be developed. Such products could come with increased risk of debt for homeowners and landlords, particularly those who have issues in managing personal finances and an appropriate regulatory framework would need to be in place.

Q27: Do you agree that we should introduce a pilot domestic retrofit scheme by spring 2022, followed by a substantive scheme as part of a "one stop shop" approach? Please advise on changes you believe should be made to the level and scope of the PSO for energy efficiency.

100 The energy efficiency element of the PSO is paid by all electricity consumers and is worth approximately £8m. The average annual impact on electricity bills is £3.59 for domestic consumers, £18.89 for combined residential/business consumers, £18.95 for SMEs using less than 70kVA, £366.14 for SMEs using more than 70kVA and £7846.68 for large energy users.

Q28: Do you agree that we should ring-fence the PSO funding for vulnerable consumers including the fuel poor? Please advise on changes you believe should be made to the level and scope of the PSO for energy efficiency.

Q29: Do you believe that green private finance solutions have a role to play in supporting domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Non-domestic consumers

Non-domestic consumers include private sector businesses and public sector organisations. Their motivations will be based on rational investment decisions taking into account the upfront and ongoing costs set against potential benefits and the resulting payback period. The buildings of non-domestic consumers account for 13% of total emissions, therefore ensuring appropriate support is available for such consumers is vital for meeting net zero carbon energy emissions.[101]

We do not propose to expand a new domestic retrofit scheme to include businesses. We believe the needs and motivations of non-domestic consumers are different than domestic consumers, and a dedicated focus is needed.

This is similar to the approach taken in the Republic of Ireland, where separate schemes aimed at domestic and non-domestic consumers sit within a single "one stop shop" body.

EXEED Certified Grant (SEAI)

The EXEED grant scheme is designed for organisations planning a major energy investment project.

Support is provided for both the design and capital investment stages of a project.

Companies of all sizes are eligible, with higher grants available for SMEs.

We propose to introduce a new non-domestic energy efficiency scheme offering tailored support to businesses. The details of this scheme, including consideration of the scope of grant and/or loan funding, will be considered separately.

We intend to take a phased two-stage approach to introducing this support:

- **In the short term**, Invest NI will deliver a pilot energy efficiency scheme to provide support to businesses.
- **Following this initial pilot period**, the proposed "one stop shop" body will take ownership of energy efficiency support for non-domestic consumers.

As with domestic consumers, there may be an opportunity to explore green finance solutions such as low-interest loans for energy efficiency investments to complement the support available from government.

101 NI Greenhouse Gas Statistics 1990-2018 - Report (web version)_0.pdf (daera-ni.gov.uk)

Central government will also need to invest in its buildings and decommission inefficient assets that are not economical to upgrade. An Energy Management Programme for Central Government is already in place, and is currently delivered by an Energy Management Unit funded by DfE and SIB.[102] It targets 30% energy savings by 2030 and covers not only the administrative estate, but also hospitals, prisons, schools, libraries, courts and Further Education colleges.

Energy Management Programme

The first in a number of new energy contracts has been secured to deliver significant cost savings and in time supply 100% renewable energy to government buildings.

An Energy Reporting Management System collecting data from over 3,000 public buildings has been developed and is updated annually.

Energy meters are being replaced across the government estate and behavioural change campaigns to be undertaken.

Realising energy efficiencies by central government will require upfront investment in the government estate and behavioural change. England introduced a £1bn public sector decarbonisation scheme as part of its COVID-19 recovery package which provides grants for public sector bodies to fund energy efficiency measures.[103]

We have committed to developing an 'invest to save' fund for central government to take forward projects that will reduce energy consumption, save taxpayers money and reduce the environmental impact of the government estate. This is an estimated £370m additional investment in the central government estate by 2030 to deliver the 30% energy reduction target by 2030.

There are also wider decarbonisation opportunities for central government. The Energy Management Programme is currently focused on reducing energy consumption and improving energy efficiency. However, as recent energy supply contracts have shown, government can also be a driver of renewable technologies. **We propose to widen the scope of the 'invest to save' fund to include opportunities that deploy renewable technologies across central government.**

Q30: Do you agree that Invest NI should deliver a pilot energy efficiency support scheme for businesses, to be followed by a substantive scheme delivered through the proposed "one stop shop" organisation. If so, what type of support do you believe is most appropriate for different groups of business consumers?

Q31: Do you believe that green private finance solutions have a role to play in supporting non-domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

102 Energy Management Strategy and Action Plan to 2030 - Strategic Investment Board (sibni.org)
103 Public Sector Decarbonisation Scheme: closed to applications - GOV.UK (www.gov.uk)

Consumer trust and confidence

Consumers will need to invest significant amounts in their buildings and they need to be able to trust and have confidence in the work being undertaken by the energy services for retrofit sector. This work must be of a high standard, lasting the expected lifetime and delivering the benefits anticipated. **Neither consumers, nor taxpayers, can afford to pay for work that does not meet these criteria.**

Ensuring that people doing work for consumers are appropriately skilled will be vital to building this trust and confidence. Apart from professions where qualifications are required, such as gas engineers, electricians, or civil engineers, the self-employed nature of the energy services for retrofit sector has often led to a lack of formal qualifications.

Installation of deep retrofit solutions is also driving the development of new job roles within the construction sector, such as project design, management, implementation and a range of tradespeople installing, which requires specific skills in these areas.

We intend to progress a range of measures aimed at ensuring consumers have confidence and trust in work being done to their buildings. This will help to enable consumers them to make the necessary investments whilst protecting them from receiving a service that does not meet their expectations.

Respondents to the Call for Evidence noted that enhanced standards and monitoring of work will be required to deliver net zero targets across the built environment. It was also suggested that an accreditation body could be used to guarantee installations. We intend to progress three measures:

- **Development of skills and capability.** This would involve government working with key partners in education institutions, professional bodies and the industry to identify and address skills requirements. It would involve clear direction from government on the forecasted pipeline of work to facilitate industry investment in upskilling and could include delivery of pilot schemes and training to augment existing skills.

- **Enhance quality assurance and standards.** This would require individuals and organisations who provide energy services for retrofit through government-backed schemes to adhere to minimum standards, such as those set by the British Standards Institute (BSI). It would provide assurance that measures being installed in buildings are of a sufficient quality to effectively deliver the benefits intended and aligns with the approach taken in Great Britain.

- **Use an accreditation body to provide guarantees.** This would endorse an accreditation body to assess whether companies meet requirements covering technical competence, customer service and trading practices. For example, one approach taken in Great Britain is through the use of TrustMark, which has a network of registered tradespeople who are inspected and endorsed by a trade association or inspection body.

This would result in a comprehensive approach of upskilling the industry, enhancing standards and providing significant quality assurance in terms of both the installers and the work being undertaken by them.

Q32: Do you agree that we should seek to develop skills and capability, enhance quality assurance and standards and use an accreditation body to provide guarantees on work undertaken by the energy services for retrofit sector? If so, how can we help to prepare the sector for these changes?

6.4 Help Consumers to Change How They Use Energy

The potential measures we are proposing will support changes to consumers energy use through enforcing (via standards and regulations) and incentivising (via financial support) consumers along this journey. There are also a range of complementary decisions that consumers can take to reduce the energy they use.

There are two complementary pathways to help consumers to "do more with less":

- **Buildings and heating:** Consumers' day-to-day approach to using energy whilst occupying a building and attitudes towards improvements of building performance, such as the adoption of low-carbon heating or a decision to invest in retrofit measures; and
- **Private vehicles:** Peoples' decisions regarding what journeys they take, the distance they travel and their attitudes to using private vehicles rather than walking, cycling or using public transport.

We have already outlined our proposal to create a "one stop shop" body that will provide a range of information and advice to consumers alongside behavioural change campaigns. **We believe that targeting consumer behaviours around "doing more with less" could be an initial focal point for this work.**

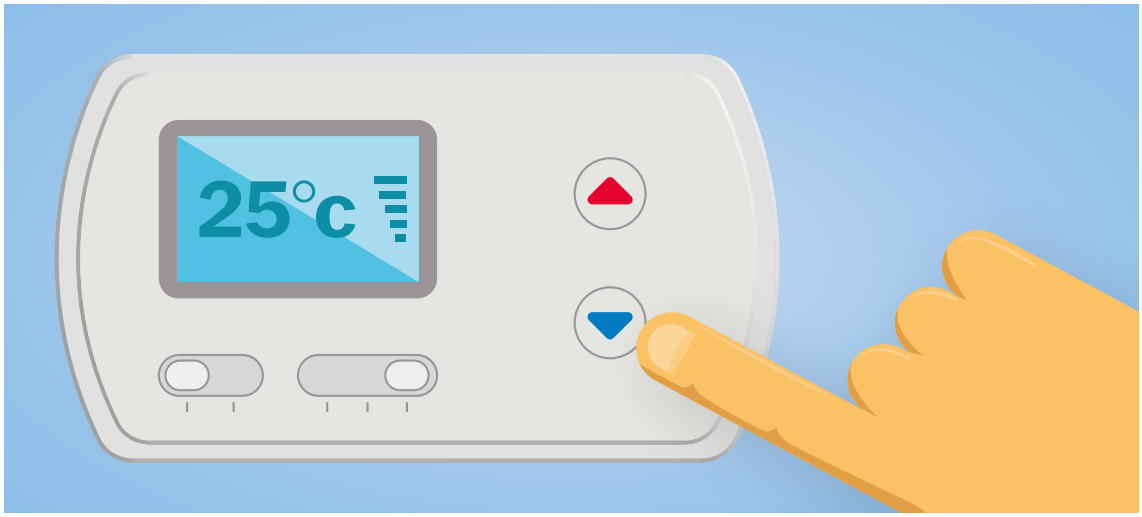
Buildings and heating

Significant progress has already been made in reducing the electricity we use within our buildings. Energy efficient labelling means consumers can make informed decisions around the appliances they purchase. Electronic appliances have become more energy efficient, with features such as low power and automatic standby modes being common. Low cost measures such as LED lightbulbs are widely available and, in the absence of smart meters, home energy monitors can be purchased relatively cheaply to inform consumers of the energy they use.

Whilst there are still opportunities to support consumers to reduce energy use on these measures, **there is much greater need to help consumers heat their buildings more efficiently.**

UK government guidance has recommended indoor temperatures of between 18°C and 21°C depending on the use of the room.[104] Many consumers will, however, choose to have very different temperatures in their homes. This may be due to a range of factors: some may be historically used to warmer or colder rooms; some may lack the knowledge or understanding of how to achieve steady constant temperatures from their heating system; some may have inefficient buildings which lose heat quickly and thus run heating for longer periods; and some may limit their heating due to worries over being able to meet increased energy bills.

104 Minimum temperature threshold for homes in winter (publishing.service.gov.uk)



Consumer Tips

Being aware of the temperature in each room and how this changes depending on heating programmes.

Setting heating timers to achieve steadier temperatures and using Thermostatic Radiator Valves to tailor levels for each room.

Installing technology such as smart thermostats which automatically operate heating systems to achieve a set temperature.

Taking **simple steps** such as closing doors and windows or draft proofing to retain temperatures in rooms.

Whatever the reasons behind these, **there are simple changes consumers can make** to ensure they have a comfortable temperature whilst also reducing energy bills. For example, turning thermostats down by 1°C has the potential to save 13% of space heating energy per household per year.[105]

Developing awareness of relatively basic steps to improve energy efficiency can then act as a basis to encourage more significant changes relating to upgrading buildings and changing to low carbon heating systems.

Building this awareness will help to build acceptance of future changes and increase demand for low carbon and energy efficiency products from consumers.

We intend to make information, awareness and behavioural change a key part of future energy efficiency support. This would be delivered through the proposed "one stop shop" approach for consumers.

105 Thermal Management Materials (publishing.service.gov.uk)

Informing and educating consumers as part of any programme of energy efficiency support in order to encourage early adoption could include:

- Targeting policies to address specific barriers for different groups of consumers;
- Increasing awareness, promoting energy efficiency and influencing individual decision-making by ensuring that consumers are fully informed of their energy use and how their actions can impact on energy consumption and cost; and
- Promoting to consumers the value and longer term benefits of, for example, investing in low carbon heating, by lowering up-front and running costs.

Q33: Do you agree that information, awareness and behavioural change should be a key strand of future energy efficiency support? If so, what are the key behaviours that should be targeted?

Travel and transport

Significant investments have been made in walking, cycling and public transport infrastructure in Northern Ireland to try to reduce the amount of miles that people travel in private vehicles. Whilst one-quarter of journeys are taken by walking, cycling or public transport, most journeys continue to be made by car.[106] There has been little to no shift towards active or sustainable transport since the Travel Survey for Northern Ireland was first carried out twenty years ago.

We need to take steps to help consumers to reduce travel and move towards active travel and public transport.

Over the past year, the measures taken to reduce the spread of COVID-19 have resulted in significant impacts for travel and transport. Measures may still have an effect for some time to come but, as we look out to a timeframe extending to 2050, it is clear that there are underlying issues to address in order to reduce the miles that people travel in private vehicles.

Respondents to the Call for Evidence supported a 'travel hierarchy' approach of modal shift to reduce unnecessary travel, increase active travel and use of public transport and switch to low/zero emission vehicles. Under this approach, reducing the miles that people travel in private vehicles is the starting point for decarbonising transport.

Reducing Private Vehicle use

The Glider bus rapid transit system has been introduced to link East and West Belfast, with plans to extend to North and South Belfast.

Park and Ride projects allow citizens to use the public transport network as an alternative to commuting.

Greenways and protected cycleways allow people to take up active travel such as walking and cycling.

Pop-up cycle lanes and extended pedestrian zones have increased space for cycling and walking.

106 Travel Survey for Northern Ireland Headline Report 2016-2018 (infrastructure-ni.gov.uk)

This will mean taking a different approach to infrastructure provision. Rather than developing infrastructure that follows travel trends, **we have to take a more proactive and interventionist approach to shaping choices if we are to deliver behavioural changes at pace.** This could mean government taking a greater role in deciding what modes of transport are needed and then creating these opportunities for people.

We believe there are a number of complementary steps that could be taken to reduce private vehicle miles and support people to move to different forms of travel:

- We can seek to **reduce vehicle numbers and journeys** by maintaining the flexible working arrangements brought about by COVID-19; promoting home working; using digital platforms to access public, shared and private transport services to facilitate car sharing; and potentially supplement with further measures such as parking charges, less parking availability and congestion charges.
- We can **create an environment** in which it is easy for people to travel using public transport, walking or cycling. This builds on recent highlighted projects and can involve reallocating road space to develop relevant infrastructure, simplifying fares and ticketing, and introducing pedestrian zones.
- We can try to **change the distance people need to travel** by carefully planning and creating connected spaces that ensure the places we want to live, work, socialise and shop are located close to one another – a 15 minute neighbourhood – and are well served through hubs that link walking, cycling and transport infrastructure.
- We can **use new technologies** to change travel habits. This could include innovate solutions such as mobility as a service, e-bikes/e-scooters and shared transport services that are facilitated by electronic systems and provide flexibility in real-time to passengers demands for pick-up and drop-off.
- We can **deliver communications** to people to provide them with the necessary information to make changes alongside raising awareness of the benefits of different travel methods for their finances, health and wellbeing.

Mobility as a Service (MaaS)

This integrates various modes of transport along with information and payment functions into a single mobility service.

It is a one-stop online interface which puts users at the centre of a journey planner, payment portal and booking system for end-to-end journeys spanning multiple modes of transport.

The MaaS model could help to reduce car ownership and congestion, and help transport authorities plan more efficient and affordable routes.

It is recognised there is no “one size fits all” approach that will support all types of individual’s circumstances and needs and tailored approaches – particularly distinguishing between urban and rural areas – will be needed. The involvement of local councils will be key via planning policy, community planning and the need for localised and place-based solutions. Where technology plays a part in the solutions available, consideration is needed for those that do not have access to suitable digital infrastructure and/or are unable to use these services.

Q34: What measures do you think can have the most impact on changing behaviours to change how we travel and reduce our reliance on private vehicles? Please explain your rationale.

DO MORE WITH LESS CONSULTATION QUESTIONS

Set Clear Direction for Energy Efficiency

Q23: Do you agree that an energy savings target should be set for Northern Ireland?

Q24: Do you agree that Minimum Energy Efficiency Standards should be set to drive improvements in energy efficiency? If so, what buildings should be the early priorities for introducing minimum standards?

Q25: Do you agree with the general scale and proposed pace of change outlined in the five phase plan for building regulations? If not, please outline what achievable timescale or programme should be implemented and your rationale for this.

Q26. Do you think that we should seek to explore how the rates system can be used to encourage energy efficiency? If so, please outline key issues that would need to be considered.

Support Consumers to Invest in Buildings

Q27: Do you agree that we should introduce a pilot domestic retrofit scheme by spring 2022, followed by a substantive scheme as part of a "one stop shop" approach? If so, what changes are needed to the wider energy efficiency support landscape to ensure a joined-up approach?

Q28: Do you agree that we should ring-fence the PSO funding for vulnerable consumers including the fuel poor? If so, do you believe the PSO for energy efficiency should be increased to provide additional funding for this group?

Q29: Do you believe that green private finance solutions have a role to play in supporting domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Q30: Do you agree that Invest NI should deliver a pilot energy efficiency support scheme for businesses, to be followed by a substantive scheme delivered through the proposed "one stop shop" organisation. If so, what type of support do you believe is most appropriate for different groups of business consumers?

Q31: Do you believe that green private finance solutions have a role to play in supporting non-domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Q32: Do you agree that we should seek to develop skills and capability, enhance quality assurance and standards, and use an accreditation body to provide guarantees on work undertaken by the energy services for retrofit sector? If so, how can we help to prepare the sector for these changes?

Change Consumer Behaviours

Q33: Do you agree that information, awareness and behavioural change should be a key strand of future energy efficiency support? If so, what are the key behaviours that should be targeted?

Q34: What measures do you think can have the most impact to support people to reduce the miles they travel in private vehicles? Please explain your rationale.

Chapter 7: Replace Fossil Fuels with Indigenous Renewables

Key options we are consulting on include:

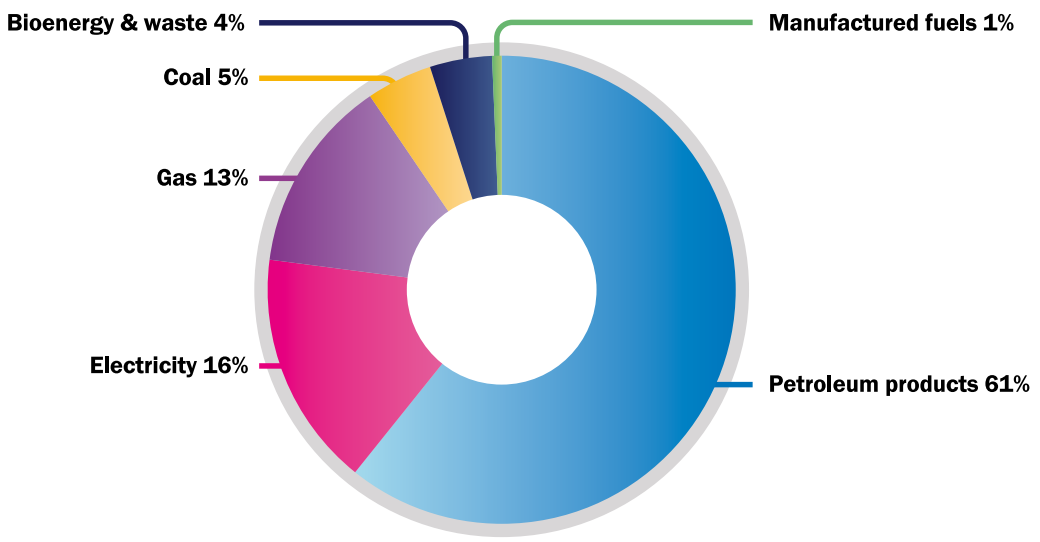
- **A 70% renewable electricity target by 2030 with flexibility to increase this if it proves achievable and cost effective.**
- **Extending 'Contracts for Difference' support to Northern Ireland along with a targeted action plan to bring forward offshore & marine renewables.**
- **A phased approach to removing fossil fuel heating sources.**
- **Adopting parallel on and off-gas grid approaches to decarbonise heating, keeping a range of potential solutions open at this stage.**
- **Providing pilot support for low carbon technologies, alongside trials of heat pumps, decarbonised gas and biofuels.**
- **Developing an Electric Vehicle infrastructure plan, along with demonstrator projects to trial alternative vehicle fuels.**

7.1 Introduction

We are a fossil fuel dominated economy.

Most of the energy we consume comes from petroleum products (petrol, diesel and kerosene oil) and natural gas. Meeting net zero energy emissions means ending our dependency on fossil fuels and replacing them - as far as it is possible to do so - with clean energy sources such as renewable electricity, gas produced from renewable source (biogas) and hydrogen.

Figure 13: Final Energy Consumption by Fuel Source, 2018 (% of total energy)



Source: NISRA

We have identified four key objectives in phasing out fossil fuels:

1. We will **decarbonise power** by building on our renewable electricity success to date with new generation and more diverse technologies;
2. We will **decarbonise heat** by removing fossil fuel heating sources and replacing them with low carbon heating solutions;
3. We will **decarbonise transport** through electric vehicles and alternative vehicles fuels to replace petrol and diesel vehicles; and
4. We will **remove residual emissions** that remain through deploying new technologies and reviewing the position on fossil fuel exploration.

Our focus to date has been on decarbonising power, where 49% of our electricity consumption now comes from renewable sources.[107] This is an outstanding achievement, placing Northern Ireland ahead of all international competitor nations in the recent Competitiveness Scorecard.[108] Power is, however, only responsible for 16% of total energy consumption in Northern Ireland.

This means most of our energy sector is not decarbonised, and **most of the work that we need to do to meet net zero carbon energy is still ahead of us.** This will require not only extending the reach of a power sector that is increasingly focused on renewables into heating and transport, but also complementing this with additional zero carbon energy sources such as biogas and hydrogen.

107 Electricity Consumption and Renewable Generation Statistics | Department for the Economy (economy-ni.gov.uk)
108 Competitiveness-Scorecard-for-NI.pdf (ulster.ac.uk)

The decarbonisation of power to date has not required direct choices by consumers. This will not be the case with heating and transport, where we will need consumers to make important decisions and accept potentially significant changes in how they live and work. **We therefore have to consider the implications of these policy decisions for consumers as they are being made,** alongside any complementary measures necessary to enable and protect people through this transition.

7.2 Decarbonise Power

The starting point for achieving net zero carbon energy has to be the further decarbonisation of our power sector.

Northern Ireland has world-leading renewable assets, particularly wind, an established track record of success and significant interest from developers and investors. This is a recipe for success for the future decarbonisation of power.

We will put in place the appropriate policy environment to bring forward renewable electricity projects and ensure the necessary investments and decisions are made in order to decarbonise the power sector.

We believe there are four key aspects to this:

- Following on from the previous 40% targets set by the NI Executive, a new **renewable electricity target** for 2030;
- A mechanism for **supporting low carbon electricity generation** that provides price certainty for investors;
- Diversifying the renewables base, with a particular focus on **offshore and marine renewables**; and
- Ensuring **public support for renewables** to help projects proceed through the planning system.

Renewable electricity target

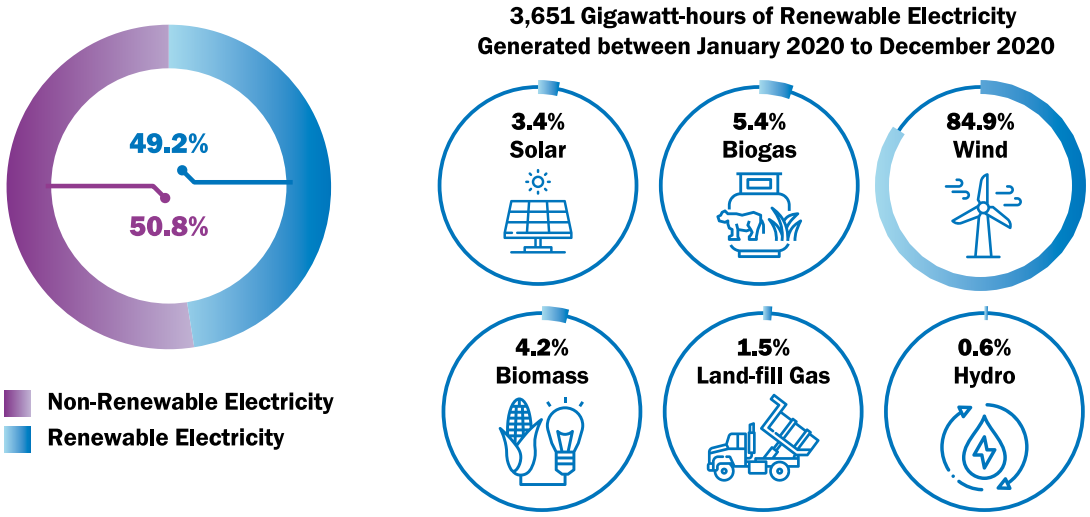
Previous renewable electricity (RES-E) targets have played a vital role in setting clear direction to all stakeholders to facilitate the investment and decisions needed.

Moving away from coal generation to gas-fired and renewables has already reduced power sector emissions by 45% since 1990, and we have surpassed our 2020 target of 40% renewable electricity consumption. Despite this progress, the carbon intensity of Northern Ireland's power sector still remained 70% higher than the wider UK in 2017.[109]

Responses to the Call for Evidence were supportive of a new ambitious renewable electricity target by 2030. The Power Working Group has assessed evidence on a range of options suggested through the Call for Evidence, from no new target to a highly ambitious target of 95-100% renewable electricity by 2030. Moving away from renewable consumption as a target towards carbon intensity was also suggested.

109 Sources: DAERA and BEIS data taken from Energy Strategy Call for Evidence

Figure 14: Renewable Electricity Consumption, September 2020



Source: NISRA Electricity Consumption and Renewable Generation

We intend to maintain our focus on a target based on electricity consumption from renewable sources at this time, as it is a well-established and defined measure that has previously delivered success, although we will also monitor carbon emissions from the power sector as part of our overall strategic reporting.

We do not believe that any target below 70% would bring about the necessary changes to electricity generation necessary to remain on course for net zero carbon emissions, whilst we do not believe that a target above 80% is feasible in this timeframe in a cost-effective manner for consumers.

We propose to set a renewable electricity target of 70% by 2030. We will retain the flexibility to increase this target to 80% should it prove achievable and cost effective. We will also consider the methodology used to measure this.

70% by 2030

Additional renewable capacity of between 980 MW and 1,400 MW – an increase of 58% to 83% on the 1,685 MW of existing capacity.

Achievable based on the 2,067 MW (including 486MW of storage) of capacity in the investment pipeline.

Network development costs of between £230m and £480m will be spread amongst the consumer base and developers depending on generation mix and policies in place.

A 70% renewable electricity target is ambitious and will bring forward significant investments that will further decarbonise our power sector.

Given the scale of investment needed in both the electricity grid and renewable assets, we must ensure that meeting this target is achieved in the most cost effective way for consumers.

An 80% target could require up to an additional 2,750 MW of capacity, a 163% increase on the current figure, with associated network development costs in the range of £470m to £650m. These figures do not reflect any potential further costs such as renewable electricity support or system support service charges.

There remain a number of uncertainties with regards to both the future demand for electricity (depending on the extent of electrification of heating and transport) and the potential mix of technologies that would meet this demand. We propose the following criteria for making any future decisions to uplift the target beyond 70% by 2030:

- Renewable developers in Northern Ireland are **able to deliver projects in a cost-effective** manner relative to Great Britain and the Republic of Ireland;
- **Offshore renewable generation could be delivered** in a timeframe that would allow for operational generation by 2030;
- Adequate **technologies are in place** to effectively reduce the impacts of curtailment caused by intermittent weather conditions;
- There is **greater clarity on the technologies, markets and consumer behaviours** that will determine the scale of electrification of heating and transport and the requirements for hydrogen production; and
- The costs of delivering the necessary infrastructure and price stability to developers does **not disproportionately impact on consumer bills**.

Through regular monitoring of the Energy Strategy policies and targets we will assess progress against these criteria.

Q35: Do you agree with setting a 70% renewable electricity target by 2030, whilst retaining the flexibility to increase this to 80%?

Q36: Do you agree with the criteria outlined in order to consider any future increases in the renewable electricity target?

a) Projects can be delivered in a cost-effective manner.
b) Offshore wind can be delivered by 2030.
c) Storage technologies can minimise system curtailment of renewables.
d) Greater clarity on electricity demand for heating and transport.
e) Consumers bills are not disproportionately impacted.

If not, what alternative criteria might be used?

Bringing forward investment

The Executive's 40% renewable electricity target was underpinned by the Northern Ireland Renewables Obligation (NIRO) which was introduced in 2005 and closed in 2017 to new generation.

At the time the NIRO was introduced, and throughout much of its lifetime, renewable technologies were not well established and the cost of generating power via renewables sources was substantially higher than for fossil fuel generation. The support provided across the UK and the Republic of Ireland therefore provided financial incentives aimed at overcoming these differences in cost and encouraging investment in emerging and higher risk technologies.

Our previous success at bringing forward renewables generation means that this form of financial support for developers is no longer needed for established technologies.

The direct commissioning costs of onshore wind, offshore wind and large-scale solar electricity generation projects are now lower than for gas powered Combined Cycle Gas Turbine (CCGT) projects. It is cheaper to invest in large-scale renewable generation than fossil fuel plants, and this gap will increase in the coming decades.[110] **Renewable electricity can not only be the cleanest, but also the cheapest option in deploying new generation capacity.** The overall costs of renewables for consumers will be dependent on wider system costs.

Renewable generation is, however, mainly intermittent. It is largely dependent on the wind and the sun which cannot be guaranteed to be able for dispatch by the system operator in the same manner as fossil fuels. For developers, this means they do not have the future revenue certainty that is needed to take forward substantial multi-million pound investments.

The majority (67%) of responses to the power questions in the Call for Evidence suggest that some form of incentive is required to encourage investment in low carbon generation.

Great Britain has introduced Contracts for Difference (CfD)[111] for generation above 5MW, and the Republic of Ireland has a Renewable Electricity Support Scheme (RESS) to bring forward investment.[112]

These mechanisms are aimed at providing guaranteed prices to renewable generators whilst protecting consumers. If the price they receive in the market is above an agreed price through a competitive auction, they pay the difference back to consumers. If it is below the agreed price, then consumers make up the difference.

Contracts for Difference (CfDs)

Provides developers with protection from volatile wholesale price.

Protects consumers from paying increased support costs when electricity prices are high.

Developers are paid a rate for the electricity they produce based on the difference between an agreed 'strike price' and the price they receive for electricity in the wholesale market.

Three auction rounds have been held to date, with the fourth in 2021.

We believe that a similar mechanism is needed in Northern Ireland to attract the investment necessary to deliver on a 70% renewable electricity target.

We propose to explore with BEIS the possibility of extending the Contracts for Difference scheme to Northern Ireland. Our aim would be to try and design a scheme that supports generation in Northern Ireland and protects local consumers from being exposed to wider costs across the UK.

110 Electricity Generation Costs 2020 (publishing.service.gov.uk)
111 Contracts for Difference - GOV.UK (www.gov.uk)
112 gov.ie - Renewable Electricity Support Scheme (RESS) (www.gov.ie)

We will investigate with BEIS and launch a separate consultation if we are able to develop suitable proposals. Northern Ireland previously consulted on joining Contracts for Difference and it was recognised there were a number of issues that would need to be resolved; these issues will form the basis of our discussions with BEIS. **Should the right outcome not be secured for Northern Ireland, we will develop alternative options to bring forward renewable generation.**

In addition to this support mechanism, subsidy-free projects and corporate Power Purchase Agreements (PPAs) - a contract under which a business agrees to purchase electricity directly from a renewable generator - will be expected to play a role. Wider measures aimed at ensuring a supportive policy environment for renewables projects will be important for these. In this regard, **there may be merit in reviewing the connection charging policy** to ensure the correct balance between the competitiveness of renewables projects and the impact on consumer bills. Any changes would need to be carefully considered and based on robust analysis.

Q37: Do you agree that we should explore with BEIS the possibility of extending the Contracts for Difference scheme to Northern Ireland? If so, what terms would be needed to ensure generation in the region whilst protecting consumers?

Offshore and marine renewables

In order to take advantage of Northern Ireland's world-leading wind resource, the majority of our renewable electricity capacity comes from onshore wind.[113] Our renewable electricity pipeline demonstrates some changes in renewable generation and storage technologies, but onshore wind still largely dominates.[114] Diversifying the technology mix is important from both a grid capacity and security of supply perspective, and the system operates best with a diverse range of technologies.[115]

Respondents to the Call for Evidence focused particularly on the need for offshore renewable energy generation in Northern Ireland to follow the successes in deployment and cost reduction seen elsewhere in the UK, as well as the increases in activity to facilitate offshore wind in the Republic of Ireland. The need for support in the form of ring-fenced incentives, R&D funding and test site development was also highlighted for emerging technologies.

We intend to ensure our policy framework will attract investment into established technologies such as onshore and offshore wind and solar energy, as well as facilitating newer and alternative technologies. Offshore and other marine renewables, in particular, will be a key focus.

We intend to develop a targeted action plan to bring forward offshore and marine renewables in Northern Ireland. This will focus on four key issues: grid development; consents/planning; regulatory change and financial support. We will work together across the NI Executive and with partners including the UK Government and The Crown Estate to address any barriers.

113 https://www.economy-ni.gov.uk/articles/electricity-consumption-and-renewable-generation-statistics#skip-link
114 Renewable electricity pipeline for Northern Ireland | Department for the Economy (economy-ni.gov.uk)
115 Future of renewables in Northern Ireland | Department for the Economy (economy-ni.gov.uk)

Floating platform offshore wind is likely to represent the best long term option for Northern Ireland due to the geology of our seabed. However, fixed platform offshore wind could also play a key role in our generation mix.

We propose a two-stage approach as follows:

- **In the 2020s** we will put in place the appropriate policy environment to progress a fixed platform offshore wind project and/or a demonstrator floating platform project. We will also seek to bring forward innovative pilot projects to test new and emerging marine technologies.
- **In the 2030s and 2040s** we will pursue opportunities around floating platform offshore wind as a key offshore generation source for Northern Ireland, alongside other offshore technologies that have become more established.

Offshore Wind Technologies

Fixed platform offshore wind is fixed on the seabed and therefore only suitable for shallower depths.

This technology is mature and could provide a cost-effective solution to decarbonising the power sector.

Floating platform offshore wind requires less invasive tethering to the seabed and can be located much further out from the shore.

This technology can access greater wind speeds and therefore higher load factors but is more costly and not yet commercially viable.

Q38: Do you believe it is possible that an offshore wind project in Northern Ireland could be operational before 2030? If so, please outline what targeted actions could be taken to deliver this.

Q39: Do you believe that a fixed platform offshore wind project should be targeted to be part of the renewable generation mix? If so, how would you propose some of the challenges associated could be overcome?

Q40: Do you believe that floating platform offshore wind offers the best long-term opportunities for offshore wind in Northern Ireland's waters? If so, what additional steps could be taken to encourage these projects?

Q41: Do you believe that other marine renewables can play a key role in our renewable generation mix? If so, please identify what technologies offer the greatest potential and what steps can be taken to support these.

Public support for renewables

Around four in five people across the UK are concerned about climate change and are in favour of renewable energy.[116] Over 70% of people would like faster action to develop clean energy,[117] and local consumers highlight that the initiative they would most like to see from their supplier is protection of the environment.[118] The Energy Strategy will therefore help to deliver on this key issue for the public.

Meeting a minimum target of 70% renewable electricity by 2030 will require significant volumes of new renewable generation. **Although we are seeking to diversify the technology mix, a significant proportion of new renewable generation is likely to be onshore wind.**

In bringing forward new investments, it is important that they are acceptable in the local environment. When the preferences of developers and the public differ, these opinions are likely to first come into focus through the local planning system.

Planning System Developments

A Planning Engagement Partnership will enhance the quality and depth of community engagement in the planning process at both the regional and local planning levels, which could make planning applications move more efficiently through the planning process.

The Ministerial Advisory Panel on Infrastructure has recommended that an Infrastructure Commission is established, with a remit that includes delivering net zero targets.

Planning was a key issue raised in the Call for Evidence as a barrier that could impact on Northern Ireland meeting its renewables targets and therefore our contribution to net zero emissions.

For major planning applications, the applicant is required to consult with the local community. Entering into positive and constructive engagement, taking on board the comments and any issues or concerns from the local community and indicating how these have been addressed or sought to be mitigated will assist the planning process.

Developers recognise this and many are engaging with local communities. **Early and practical engagement remains an important part of ensuring projects retain the support of local communities.** But this is unlikely to be sufficient in itself.

We propose that a strategic approach is taken to planning the locations of renewables projects and associated grid infrastructure. This will ensure that renewable generation is developed in the most appropriate areas of the power network. It will involve close collaboration between central and local government, grid operators and renewables developers.

116 BEIS Public Attitudes Tracker Wave 35 (publishing.service.gov.uk)
117 71% of UK citizens say renewables need more government support (smart-energy.com)
118 Domestic Consumer Insight Tracker 2018 Summary Final.pdf (uregni.gov.uk)

As a starting point, **we intend to ensure that local government has a stake in addressing climate change** in order to ensure their buy-in to the objectives that renewables projects are delivering for Northern Ireland.

We believe that the approach taken by NIE Networks to **cluster generating stations to share network infrastructure** provides a good basis for strategically locating renewables projects, and we are aware that SONI has recently consulted on four different potential approaches to locating future renewable generation.[119]

Scotland National Planning Framework

Sets out a long-term vision for spatial development and investment across Scotland over 20-30 years. Climate change is the overriding priority for the upcoming fourth spatial strategy.

Prioritises the types and locations of developments that will help meet emission reduction targets.

Objectives are to reduce the need to travel, make buildings more energy efficient and facilitate decarbonised heating and electricity generation and distribution.

A final potential measure would be to put in place requirements to **ensure the financial benefits of renewables projects are shared with local communities.** This could align with the proposed approach in relation to community energy explored further in Chapter 8 and help to enable local communities. It may, however, also increase developer costs and thus require higher levels of support from the wider consumer base.

Q42: Do you agree that a strategic approach to planning the location of renewable projects should be taken? If so, please outline practical steps that could be taken to deliver this.

Q43: Do you believe that there should be a requirement for renewable developers to share some of the financial benefits of developments with local communities? If so, what share do you think would be reasonable? If not, please provide your rationale.

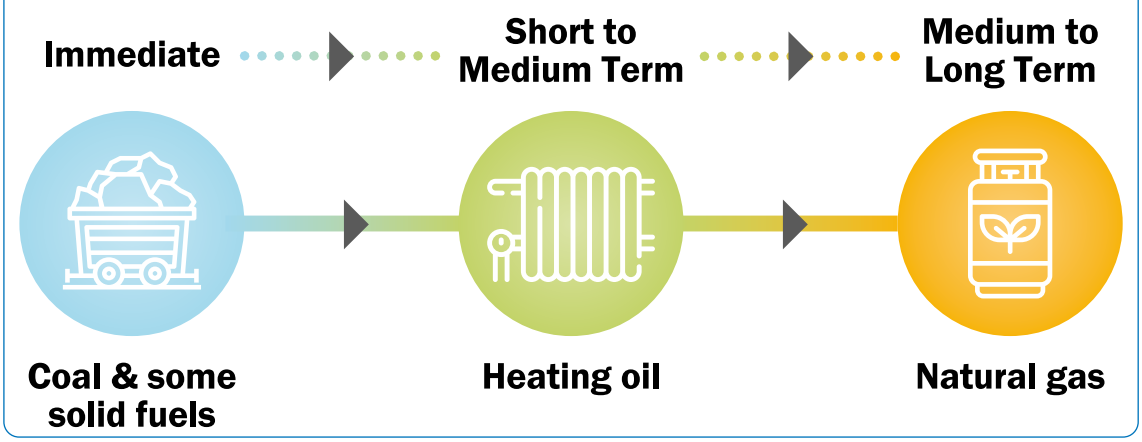
119 Industry Consultation: Shaping Our Electricity Future - SONI Consultation Portal

7.3 Decarbonise Heat

Decarbonising heat is the biggest challenge in meeting net zero carbon energy emissions. Heat accounts for 50% of our energy consumption and is almost entirely met through fossil fuels, mainly oil (54% of total heat consumption) and natural gas (27%).[120] This is a key difference with Great Britain and much of Europe where natural gas is the main heat source. Whilst the technologies available to Northern Ireland are similar to elsewhere, the solution to decarbonising heat will not be the same. This provides both challenges and opportunities to us.

Our overall objective has to be to remove all, or almost all, fossil fuel heating sources in Northern Ireland by 2050. Whilst fossil fuels all release emissions, some are worse than others[121] and we intend to focus on removing the highest emitting sources first. Measures to replace all fossil fuels from heating will, however, need to be progressed in parallel.

Figure 15: Priorities to Phase Out Fossil Fuel Heating



Key questions in phasing out fossil fuels include: What do consumers replace them with? What is the cost and efficiency of alternatives for consumers? What is the level of disruption and adaptation facing consumers? These questions are paramount in our thinking as we set future policy for heat decarbonisation.

There are a number of potential solutions available, including:

- **Heat pumps** convert energy in the ground, air or water into heat, and use electricity to move heat from cold spaces into warmer spaces in buildings. They can be used on their own or in, the case of a hybrid heat pump, in combination with a secondary boiler.
- **Zero carbon gas** replaces natural gas in the gas network and can be produced using hydrogen or biogas (converted into biomethane).
- **Liquid biofuels** are an alternative to heating oil (mainly kerosene for domestic heating) and are produced using biomaterials such as food waste.

Each of these solutions are at different stages in terms of technology readiness, availability and commercial viability. This has a key influence on the timing of phasing out fossil fuels and the role of government intervention in doing so.

120 NISRA, Total sub-national final energy consumption, 2018
121 Environment - U.S. Energy Information Administration (EIA) - U.S. Energy Information Administration (EIA)

There will not be a "one size fits all" solution for decarbonising heat in Northern Ireland. We therefore do not intend to remove potential low and zero carbon solutions from consideration at this stage.

We propose that trials of heat pumps, decarbonised gas and biofuels should take place. These trials will shape how these solutions can be used locally, providing valuable information on the technical and economic viability of each technology for consumers.

In deploying these potential solutions, **there is likely to be parallel on-gas grid and off-gas grid approaches.** Cost effectiveness is a key consideration in aligning technologies with each of these separate approaches, as is the impact on consumers. Within these approaches, we will have to consider the scope consumers may desire to shape their own solutions, as well as the role of regulations and incentives in driving the necessary changes.

The role of interim solutions is also a key consideration. There may be opportunities to support consumers to use lower carbon heating solutions than at present, before then taking a further step to a zero carbon source in the longer-term.

We believe that interim solutions can only play a role in decarbonising heat where any substantial investments being made by consumers are compatible with net zero in the longer-term. This means potentially targeting interventions at trigger points (e.g. replacing a boiler; upgrading a building) to ensure that consumers are not then required to make further substantial investments to reach net zero carbon.

To enable consumers to make future changes we will need to provide education on the reasons for changes being made including information and awareness campaigns. Clear advice from a trusted source on heat technology options available, including costs, will be important, as will incentives for behavioural changes and technology decisions. The "one stop shop" body proposed earlier in this consultation would have a key role to play in this.

Important protections for consumers will also be needed. Regulatory and/or statutory provisions in relation to heat options that are currently not regulated will be needed. Protocols will be needed for consumers who cannot or choose not to move away from existing carbon-intensive heating sources. As vulnerable consumers will be a focus for information and assistance, it will be important to work closely with the NI Housing Executive and Housing Associations to deliver the best outcomes for tenants.

We intend to carry out a study of regulatory and consumer issues that determine consumer choices around decisions relating to heat. This will look at optimal solutions for individuals and key consumer groups, the behavioural changes necessary, the role of government policy to deliver this and potential key new areas of consumer protection needed.

Q44: Do you agree with taking separate approaches to on-gas grid and off-gas grid consumers? If not, what approach should be taken?

Q45: Do you agree that we should not rule out potential low and zero carbon heat solutions at this stage? If not, please outline your rationale.

Q46: What low and zero carbon heat solutions do you believe we should prioritise for trials? Please identify where such trials should be focused and what key issues should be tested within each.

Heat pumps

The electrification of heat through heat pumps could make a major contribution to the decarbonisation of heating.

Heat pumps can take advantage of the significant renewable electricity resource already available and which will increase going forward. Renewable electricity technologies are well established and heat pumps are also relatively mature. They are a key technology in the CCC recommendations for the sixth carbon budget[122] and the Republic of Ireland has targeted installing 600,000 heat pumps by 2030, including 400,000 in existing buildings.

Support for Heat Pumps

Great Britain is introducing a Clean Heat Grant from 1 April 2022 for a two year pilot period. This will provide flat rate grants targeted at households and small non-domestic buildings to install heat pumps.

The Republic of Ireland's Support Scheme for Renewable Heat offers grants for air source, ground source and water source heat pumps.

Respondents to the Call for Evidence generally recognised the potential for heat pumps and supported a strong policy focus on them. Some recommended considering different approaches for heat pump installation in areas on and off the gas grid, and others highlighted the higher emission reductions from switching to heat pumps rather than natural gas. Curtailed wind (i.e. wind that is unable to be used on the electricity grid for technical reasons) was identified as an opportunity for optimal heat pump use, similar to hydrogen production.

Heat pumps will play a role in the decarbonisation of heat, and we do not see any viable pathway to reach net zero carbon which does not use this technology. If England's Future Home Standard forms the basis for uplifting building regulations in Northern Ireland, as referenced earlier in this consultation, it could effectively mandate the deployment of low carbon heating such as heat pumps in new builds.

The specific role of heat pumps may be different depending on whether properties are on or off the gas grid:

- **Off-grid:** Heat pumps could directly replace fossil fuel heating oil and/or solid fuels as a primary heating source if installed alongside energy efficiency measures. There may also be an opportunity to utilise biofuels or biomass as a secondary heating source alongside heat pumps if needed.
- **On-grid:** Heat pumps could either operate with a decarbonised gas network (through a hybrid heat pump) or in place of it alongside significant energy efficiency measures.

122 Sixth Carbon Budget - Climate Change Committee (theccc.org.uk)

Whilst heat pumps as a technology are well established, the specific applications of them to our circumstances and buildings are not. **Further work to gather evidence of heat pumps is needed before making any long-term commitment to this technology.** This includes understanding how heat pumps operate across a range of heating scenarios for consumers in Northern Ireland and the extent to which deep retrofit of buildings may be needed to enable heat pumps to operate efficiently. Trials of low and zero carbon heating solutions proposed earlier will help to inform this, but we believe additional steps are needed to build initial momentum of heat pumps amongst local consumers.

We propose that Northern Ireland seeks to develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers. We intend to consult separately on this.

Due to the lower rate of heat output from a heat pump, a much higher level of thermal efficiency in a building is needed. Heat pumps will require substantial retrofit of existing buildings, and some Call for Evidence respondents highlighted that routes for heat electrification in new builds could be different from existing homes. **We will ensure that new energy efficiency support (*see Chapter 6*) aimed at consumers is aligned with any policy focus for heat pumps.**

Call for Evidence respondents also noted the impact of heat pumps on consumers, particularly with regards to encouraging people to make the necessary changes and retrofit their buildings, and that any new technology would require support, advice and trust-building. **We would see the proposed "one stop shop" body (*see Chapter 5*) as being vital in enabling and supporting consumers with heat pump technology which they will not be familiar with.**

Q47: Do you believe that the role of heat pumps should be different depending on whether consumers are on or off the gas grid? Please outline what you think the specific roles should be.

Q48: Do you agree that Northern Ireland should develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers? If so, please identify key issues that need to be considered in designing and delivering such a scheme.

Gas network

Natural gas has been available in the Greater Belfast area since 1996, and the network has been expanded in stages. Currently, there are approximately 280,000 connections[123] and, by 2022, approximately 550,000 properties will be able to connect to the grid.[124] Carbon emissions from the domestic heating sector have been slowly decreasing, primarily as a result of the increasing uptake of natural gas.[125]

Respondents to the Call for Evidence noted that Northern Ireland homes and businesses are much less reliant on gas than in other parts of the UK. They broadly indicated support for the facilitation of zero carbon gas injection into the gas grid.

123 2020.11.27 Q3 2020 QTR FINAL.pdf (uregni.gov.uk)
124 https://www.uregni.gov.uk/sites/uregni/files/media-files/2016-09-15_GD17_Final_Determination_-_final_1.pdf
125 NI annual housing stock statistics 2020 - 808,000 homes in 2020

We have already outlined that we believe that natural gas does not have a long-term role in net zero carbon energy emissions for heating. However, this does not mean that the gas network cannot have an important role to play.

Northern Ireland has a modern polyethylene gas distribution network which is expected to be able to accommodate zero carbon gas without requiring extensive upgrades. The Scotland Northern Ireland Pipeline (SNIP), which currently supplies natural gas from Great Britain, is also expected to be able to accommodate the transmission of renewable gases without extensive upgrades. Technical studies are ongoing to test what further upgrades may be needed to accommodate hydrogen.

We import our gas via the SNIP, and can therefore benefit from the decarbonisation of gas in Great Britain. These gas networks have outlined their roadmap to decarbonise gas by 2050, and the UK government is introducing a Green Gas Levy in autumn 2021 on licensed gas suppliers in Great Britain to fund the growth of biomethane injection into the gas network.[126]

There are also a number of major trials ongoing in Great Britain investigating the feasibility of large scale hydrogen production and distribution in the gas grid, which suggest that it is possible to produce blue hydrogen at scale with distribution via the modern pipeline network that we have in Northern Ireland.[127] [128]

Gas Goes Green

The Energy Networks Association has outlined a Pathway to Net Zero in Great Britain which results in a fully decarbonised gas network by 2050. Key steps to 2030 are:

Preparing for transition through strategic, technical and policy planning for zero carbon gas.
Facilitating connections of Anaerobic Digestion biomethane plants to the gas grid

Expanding supply through scale-up of biomethane and the first hydrogen projects integrated (anchored by industry and transport).

We therefore believe that our modern gas network can have a role to play in meeting net zero carbon energy emissions.

In addition to importing decarbonised gas from Great Britain, there is an opportunity for Northern Ireland to produce its own zero carbon gas for injection into the network and thus be more proactive in its approach to decarbonising gas. There are two key potential sources of decarbonised gas in Northern Ireland:

- **Biomethane** produced from Anaerobic Digestion (AD) is a mature technology and is used in the gas network in Europe.[129] Northern Ireland already has an estimated 76 AD plants in operation,[130] mainly aimed at electricity generation due to the support available through the NIRO.

126 GB Green Gas Levy
127 H21 Leeds City Gate report
128 Hynet: Hydrogen and CCS
129 Biogas and Biomethane in Europe: Lessons from Denmark, Germany and Italy | IFRI
130 NNFCC biogas site list

- The focus of **hydrogen** production over the coming years is likely to be on transport and industry as the most economically viable routes. However, with an established hydrogen production base in Northern Ireland, it could subsequently be used in the gas network alongside biomethane.

Regardless of where it is produced, zero carbon gas will need to be introduced into the gas network in Northern Ireland. **We believe that biomethane injection should be the initial focus,** with hydrogen more likely to play a role in the medium-term as the technologies and market solutions are further developed.

We intend to continue to work with the Utility Regulator and the energy industry to address any regulatory, technical and legislative issues in facilitating biomethane injection into the gas network.

Respondents to the Call for Evidence broadly supported using our agriculture sector to contribute to decarbonising gas through biogas production, which can then be upgraded into biomethane for injection to the gas grid. The Committee on Climate Change (CCC) considers the production of biomethane from waste as a low-regret option and recommend continued government support.[131]

Specifically, respondents noted that subsidies are likely to be needed to make biomethane production commercially viable, at least in the initial period. The UK government has announced plans to introduce a Green Gas Support Scheme for biomethane production from AD in Great Britain for injection into the gas grid.[132]

Green Gas Support Scheme

The proposed support will begin in Great Britain in 2021/22 and is expected to run until 2025/26. It will provide a tariff for biomethane production and will be funded from a Green Gas Levy.

In the longer term, BEIS propose to consider extending support to other sources of green gas such as hydrogen or advanced gasification.

The availability and sustainability of agricultural waste also needs to be factored into considerations around the future role of biomethane production. Northern Ireland's large agriculture base provides a significant opportunity to produce biomethane locally, and it is estimated that potential biogas production from AD feedstocks in the Republic of Ireland could account for over 25% of total natural gas supply.[133] There are potential environmental impacts of generating biogas at this scale to take into account if the correct protections are not put in place.

We propose to undertake a review of the costs and benefits of biogas and biomethane. This work would seek to identify the potential scale of local biogas production, the commercial viability of this, the need for additional support and wider environmental and sustainability measures that would also be needed.

131 Biomass in a low-carbon economy - Climate Change Committee (theccc.org.uk)
132 GB Green Gas Support Scheme
133 SEAI - biogas in Ireland

Gathering this type of information, alongside trials of decarbonised gas and network studies, will help to inform a new policy position on the future of the gas network.

A range of views were presented through the Call for Evidence, with some believing that the gas network should be expanded, whilst others believed that this would not be compatible with decarbonisation and would lock consumers into carbon emitting heating technologies.

Reach of the Gas Network

It is estimated that around 65% of properties will have access to the gas network by 2023.

Actual connections are lower, with the latest figures suggesting that 26% of properties were connected in 2016/17. This is an increase of 2pp from the previous year.

The current policy approach is to facilitate new gas connections where it is economic and efficient to do so in order to reduce our reliance on oil for heating and processing.

This is likely to continue to lead to a gradual and ongoing increase in customers connected to the gas network. Further expansion of the network beyond current plans for localised network extensions is likely to be uneconomic without a change in government policy.

We believe it is too soon to make any changes to the current policy position with regards to the future of the gas network. Any decisions which would seek to either restrict or expand access to the gas network must be based on a robust evidence base accompanied by the findings of trials of decarbonised gas.

We propose that the Gas Network Operators in Northern Ireland provide a credible pathway to Net Zero by 2050. This will allow us to consider the plan alongside related policy measures around the electrification of heating, alternative renewable fuels, energy efficiency and carbon capture, use and storage.

Q49: Do you agree that legislative and regulatory steps should be taken to facilitate biomethane injection into the gas network?

Q50: Do you believe that support should be provided to encourage biomethane production for injection into the gas network? If not, please outline what alternative approach should be taken to decarbonising the gas network.

Q51: Do you agree that the local Gas Network Operators should provide a plan to decarbonise gas out to 2050? If so, what key issues must be considered within it?

Oil and oil boilers

Fossil fuel heating oils have no long-term future in our energy mix.

In order to ensure this, bans have been proposed or implemented elsewhere on the future use of oil boilers. The UK Clean Growth Strategy proposes a ban on oil (and other fossil fuel) boilers in new homes from 2025,[134] whilst in Europe, bans on oil boilers extend to existing homes as well as new homes.

134 Clean Growth Strategy (publishing.service.gov.uk)

Northern Ireland is much more reliant on home heating oil than both the UK and mainland Europe, meaning similar bans would be much more disruptive. The Republic of Ireland, which also has a high dependence on home heating oil,[135] proposed a ban on oil boilers in new homes from 2022 and gas boilers from 2025 in its Climate Action Plan. A review is also being undertaken to establish when the replacement of oil and gas boilers in existing dwellings could commence.[136]

A range of opinions were provided in the Call for Evidence responses on the approach that Northern Ireland should take to oil as a heating source. These ranged from implementing a ban on all new oil boilers in any type of home, to restricting oil boiler replacement in areas that have access to the gas network, to continuing their use and replacing fossil fuel oil with a mix of biofuels and bio oils.

Respondents noted that home heating oil costs are a factor in fuel poverty levels. It was also pointed out that the high reliance on heating oil represents an opportunity to leap-frog to very low carbon heat sources and a challenge given the scale of change required to both heating sources and energy efficiency levels in buildings.

Policy action must be taken to move households and businesses away from fossil fuel heating oils. Whilst information, advice and support will play a key role in bringing about this change, it is likely that restrictions on oil boilers and/or fossil fuel heating oils will be needed.

Consumers on the gas grid already have access to viable alternatives to fossil fuel heating oils through heat pumps and/or connecting to the gas network, and therefore removing fossil fuel heating oils from these properties is a low/no regret option. We propose two potential approaches for on-grid consumers:

- Oil boilers could still be allowed, but **the sale of fossil fuel heating oil could be phased out.** This would retain greater consumer choice and keep a range of options open including decarbonised gas, heat pumps and biofuels.
- Alternatively, the sale and installation of **oil boilers could be banned for properties on the gas grid**, which removes any low carbon biofuel options and leaves consumers with two main options – heat pumps and gas.

Separate interventions will be needed to drive behavioural change away from fossil fuel heating sources for off-gas grid properties.

Any restrictions on oil boilers will be challenging for off-grid consumers who do not have the same options as those on the gas grid. We propose two broad approaches to phasing out fossil fuel heating oils for off-grid consumers:

- Oil boilers could be allowed for properties off the gas grid, but **the sale of fossil fuel heating oil could be phased out.** This would keep a range of options open including heat pumps, biofuels and biomass.
- Alternatively, **oil boilers could be banned for all properties**, which stops not only the burning of fossil fuel heating oil but also liquid biofuels. This is consistent with the position in Great Britain and the Republic of Ireland, and places a significant emphasis on heat pumps for off-grid properties.

135 https://www.seai.ie/publications/Energy-in-Ireland-2020.pdf
136 https://static.rasset.ie/documents/news/2019/06/climate-action-plan.pdf

Under either approach, **heat pumps are likely to be a key solution to decarbonising off-gas grid heating.** However, we also recognise that there may be some applications or circumstances where heat pumps alone might not either be suitable or the most cost-effective route.

We therefore want to fully explore the role that biofuels and biomass could play on the pathway to net zero carbon energy emissions.

As biofuels can operate with existing oil boilers and use existing distribution networks, they present an opportunity to reduce emissions with minimal disruption and investment needed by consumers.

There are, however, key uncertainties around the availability of biofuels and particularly the cost of these compared with kerosene oil and other renewable technologies that are compatible with net zero carbon energy emissions. **Work is needed to provide an evidence base on the potential role of biofuels.**

Biofuels

Biofuels provide an option for homeowners to keep existing oil boilers, while burning a renewable substitute for fossil fuel heating oil.

Hydrogenated Vegetable Oils (HVO) are renewable, biodegradable fuels currently in use in some countries as a home heating oil, and a diesel substitute in transportation.

HVO can be used in a blend with heating oil with some amends to conventional boilers.

We propose that the Oil Industry in Northern Ireland provide a credible pathway to Net Zero by 2050 involving biofuels. This work must provide robust and comprehensive information on current and future costs and supply.

There could also be a potential role for sustainable biomass as a replacement for fossil fuel heating oils. Biomass could potentially meet 5-10% of the UK's energy demand by 2050,[137] and up to 30% of the Republic of Ireland's heat in the future.[138]

Support is currently in place to promote biomass use for heating in both Great Britain[139] (ending in March 2022) and the Republic of Ireland.[140] The forthcoming Clean Heat Grant[141] in Great Britain includes support for biomass in limited circumstances.

137 Biomass-in-a-low-carbon-economy-CCC-2018.pdf (theccc.org.uk)
138 Sustainable Biomass Fuels in Ireland | Bioenergy | SEAI
139 Domestic Renewable Heat Incentive (RHI) | Ofgem
140 SSRH-Scheme-Details-.pdf (seai.ie)
141 Future support for low carbon heat: consultation (publishing.service.gov.uk)

Biomass

Biomass refers to all organic material, such as wood, energy crops and organic waste. It is a renewable, carbon neutral form of energy as the carbon dioxide absorbed from the atmosphere during growth is released back into the environment when burnt.

It can be used at a small scale for domestic boilers to produce heat, or in larger scale Combined Heat and Power (CHP) units to produce both heat and electricity.

Despite its potential applications, biomass does require large areas of agricultural land or natural ecosystems required to be given over for the production of biomass crops. Furthermore, while biomass can be seen as carbon neutral, burning it releases greenhouse gas (GHG).

If wood pellets are used, it takes many years for a tree to absorb the equivalent amount of carbon released when burned for fuel. Whilst the CCC does see potential uses for biomass from well-managed and sustainable sources, it recommends the current uses of biomass be phased out going forward.

Future use of biomass is likely to be focused on off-grid consumers where heat pumps alone are not a viable option, and accompanied by regulation on both the boilers and biomass sources used to ensure sustainability.

Q52: Do you believe that on-gas grid consumers should have the option to retain oil boilers for use with biofuels? If not, what is a viable timeline for introducing a ban on oil boilers for on-grid consumers?

Q53: Do you believe that off-gas grid consumers should have the option to retain oil boilers for use with biofuels? If not, what is a viable timeline for introducing a ban on oil boilers for off-grid consumers?

Q54: Do you agree that the local Oil Industry should provide a plan on how biofuels could play a role in decarbonising heat out to 2050? If so, what key issues must be considered within it?

Q55: Do you believe that support should be introduced to promote the uptake of biomass for off-grid consumers? If so, please advise on what support is needed and where it should be focused.

Coal and solid fuels

Regardless of whether consumers are on-gas grid or off-gas grid, action is needed now on coal and solid fuels.

Burning solid fuels is the most polluting form of heating and causes air pollution leading to adverse effects on health.[142] A recent DAERA Clean Air Discussion Document on Clean Air considers the negative role of solid fuels on air quality.[143]

142 https://www.eia.gov/tools/faqs/faq.php?id=73&t=11
143 20.21.066 Draft Clean Air Strategy for NI - Public Discussion Doc Final V6.PDF (daera-ni.gov.uk)

Restrictions on Solid Fuels

The UK government banned the sale of bagged coal and wet wood in England from February 2021.

The Welsh government's recent Clean Air Bill proposes a ban on solid fuels for heating.

The Republic of Ireland banned the burning and sale of 'smoky' coal in Dublin in 1990 and has extended this to other towns. It is now consulting on a new Solid Fuels Regulation for Ireland.

In 2019, 1.7 million tonnes of coal were imported into Northern Ireland, with 73% for domestic or industrial use and 27% for the generation of electricity.[144] Whilst only 3% of households use solid fuels as their primary source of heating, 72% use them as a secondary source.[145] This means any changes to the availability of solid fuels have the potential to impact on many consumers in some form.

Respondents to the Call for Evidence were strongly supportive of the early elimination of solid and fossil fuels for heating purposes. However, it was noted that the replacements for these heating sources would need to be easily and competitively available, especially for those who rely on it as their primary heating source.

Any ban on the sale of coal and wet wood would eliminate the most polluting source of home heating, allowing business and consumers time to switch to other fuels. However, if consumers simply switched to other solid fuels still allowed, the impact on emissions would be minimal, and therefore further additional steps would have to be taken in the future in order for us to meet net zero carbon energy.

If Northern Ireland were to introduce a ban, there could be opportunity to go further than elsewhere in the UK and Republic of Ireland and ban the sale of all solid fuels with the exception of kiln dried wood for household use.

This would expand upon legislation in Great Britain by including peat and peat products (briquettes) and solid fuels manufactured from coal. The only solid fuels permitted would be kiln dried wood (for domestic wood stoves) and renewable biomass (such as wood chips or pellets). This would effectively decarbonise solid fuels, while still allowing householders to burn dried wood in small quantities for secondary heating or aesthetic purposes. There would be a greater impact on consumers who use solid fuels and on solid fuel-related industries.

Q56: Do you believe that the sale of coal and wet wood should be banned in Northern Ireland? If so, do you believe this should be extended to include other solid fuels with the exception of kiln dried wood?

144 Northern Ireland Annual Coal Inquiry (nisra.gov.uk)
145 NISRA: Continuous Household Survey (Heat) 2016/17

7.4 Decarbonise Transport

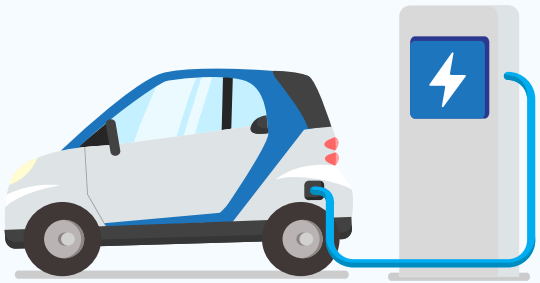
Transport is responsible for 33% of energy consumption, with the large majority (87%) being road transport using petrol or diesel fuels followed by fuels used for agriculture (12%). This has been the only energy-related sector where emissions have increased since 1990, demonstrating the scale of challenge.

Whilst behavioural change away from private vehicles will help to reduce emissions from transport, decarbonising transport will ultimately require consumers to move away from fossil fuel vehicles to Ultra Low Emission Vehicles (ULEVs).

Unlike heat and power, transport policy is not fully devolved; many of the overarching strategies and interventions are set at a UK level. **The UK Government has announced that it will bring forward the ban on the sale of new petrol and diesel cars from 2040 to 2030**, with the sale of some hybrid cars allowed until 2035.[146] This target forms part of wider plans to tackle greenhouse gas emissions that will apply in Northern Ireland.

The Road to Zero strategy[147] outlines the current UK approach to decarbonising transport. This was published in 2018 before the ban on the sale of petrol and diesel vehicles was moved forward. The UK Government is developing a new Transport Decarbonisation Plan,[148] expected to be published in spring 2021. This will also contain policies and measures that extend to Northern Ireland and which will contribute to local action that will help achieve the Northern Ireland specific emissions targets to be set out in the forthcoming Climate Change legislation.

We intend to develop a Northern Ireland strategy showing how we will continue to tackle emissions targets within the transport sector once the UK Transport Decarbonisation Plan has been published. This will build on the UK-wide approach being taken and outline a Northern Ireland specific response to transport decarbonisation that also takes account of all-island considerations.



Such a strategy could provide opportunity to outline our approach to decarbonising transport and may include consideration of:

- **Electric vehicles:** charting a pathway to vehicle electrification through addressing financial and non-financial barriers to the uptake of Electric Vehicles (EVs) in Northern Ireland, taking into account the wider UK policy, legislative and funding environment.
- **Alternative fuel vehicles:** assessing the role of alternative fuels and enablers such as support for refuelling infrastructure and producing fuels, introducing new and retrofitted vehicles, and advising on skills needs and developing fleet replacement switching tools for operators.

146 Government takes historic step towards net-zero with end of sale of new petrol and diesel cars by 2030 - GOV.UK (www.gov.uk)
147 The Road to Zero (publishing.service.gov.uk)
148 Creating the transport decarbonisation plan - GOV.UK (www.gov.uk)

The implications of decarbonising transport for consumers is significant. It will require extensive communication to change perceptions and raise awareness of the benefits of new transport solutions. Measures to overcome additional costs of electric and alternative fuel vehicles will be important. Regulations and consumer protections for new Zero Emission Vehicles markets may also be needed.

Q57: Do you agree that we should develop a Northern Ireland specific strategy that sets an overarching, long-term plan for cleaner, greener transport and shows how we will meet net zero emissions within the transport sector? If so, what Northern Ireland specific issues need to be factored into this in order to accelerate the uptake of Zero Emissions Vehicles?

Electrifying transport

There is general consensus that the most likely technology currently available to replace petrol and diesel cars and vans by this date is plug-in Electric Vehicles (EVs), consistent with the views expressed by respondents to the Call for Evidence. The CCC's balanced pathway to net zero involves substantial take-up in EVs.[149]

There are currently around 4,200 low emission vehicles registered in Northern Ireland and, whilst the number of EVs registered year-on-year has been increasing, the uptake has been slower than in the rest of the UK and Ireland.[150] The cost of initial purchase and the lack of a second hand market mean that EVs remain a relatively expensive option for consumers.[151] Grants and incentives are available across the UK including up to £3,000 for a new electric car up to £8,000 for an electric van, up to £7,500 for an electric taxi and £1,500 for a motorbike.

Vehicle supply has been a constraint, and charge-point infrastructure to support widespread adoption of EVs will be a necessity. In contrast to petrol and diesel vehicles, EVs offer consumers the ability to charge their vehicles at home. This is not only more convenient but is also estimated to be cheaper once pricing for public network charging is introduced. **Home charging is therefore expected to be the main route used by domestic consumers.**

Energy Saving Trust Cost Estimates for EV Charging

£568 | Charging the battery at home for 10,000 miles per year
£1,298 | Charging the battery at a public paid charge point
£787 | Charging 70% of the time at home and 30% at a public charge point
£1,415 | Annual fuel cost for a petrol Nissan Micra

Home EV charging also provides a range of opportunities for domestic consumers. If coupled with micro-generation systems such as solar PV, consumers can use and store their own electricity rather than purchasing it from suppliers. If time-of-use tariffs are introduced, consumers could pay less for charging EV at off-peak times, and smart EV charge-points could shift the time of day when an EV charges in response to signals such as lower tariffs or higher levels of renewables.

149 The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf (theccc.org.uk)
150 https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01
151 Attitudes towards electric vehicles in Northern Ireland 2019 2020 (infrastructure-ni.gov.uk)

It is important that consumers are aware of these benefits, and **we believe that a Northern Ireland EV communication campaign would be important** alongside other measures aimed at increasing EV update. This would help to educate the public on the benefits of EVs and target some of the reasons discouraging uptake. It could build on the Go Ultra Low initiative which seeks to provide facts and information to consumers to inform their decision about switching to EVs.[152]

Consumers will need a wider charge-point infrastructure beyond their home to overcome range anxiety around EVs. This will include charge-points at workplaces, public on-street and strategic locations around Northern Ireland. Ultimately, EV owners want to be assured that vehicles can be charged quickly and accessibly through an extensive network that offers a positive consumer experience comparable to the current petrol and diesel refuelling system.

We believe that the EV charging network will need to be expanded to support increased EV uptake**.** The current e-Car public network is almost a decade old, and a replacement programme is being taken forward to upgrade the existing network.

e-Car Project

Delivered by a public-private consortium between 2011 and 2014.

Now owned and operated by the Electricity Supply Board (ESB).

Consists of 320 fast charge points and 17 rapid charge points across Northern Ireland.

In addition to the public network, the market is open to commercial operators. The recent removal by the Utility Regulator of the Maximum Retail Price[153] for ULEVs provides a market route for commercial operators to develop EV charge-points.

The private sector will have a key role to play in developing EV infrastructure, and we will aim to ensure that further barriers to the commercial viability of EV infrastructure projects are removed.

We propose to develop an EV Charging Infrastructure Plan, in partnership with key stakeholders from government, public, private and third sectors to develop the charging network in Northern Ireland.

An EV Charging Infrastructure Plan would support the upgrade and expansion of the network, looking not only at the forecast need for EV charge-points, but also how the infrastructure will be managed and what standards there should be. It is envisaged that a range of stakeholders would be responsible for progressing delivery of the initiatives and direction established in the Energy Strategy.

It will be important for electricity network operators to be involved in this work given the implications of further EV uptake on the electricity grid, and the role of future investment in the electricity network to facilitate EV infrastructure and ensure projects are commercially viable.

152 Home - GUL (goultralow.com)
153 Maximum Resale Price as it applies to Ultra Low Emission Vehicles (ULEV's) decision | Utility Regulator (uregni.gov.uk)

Consumer involvement will be important to ensure proposals meet public needs. We will need to ensure consumers have equal opportunities to access charging infrastructure, particularly those who are less likely to have access to off-street home charging and the range of enabling opportunities this can bring. Appropriate tariff structure for EV charging will need to be in place, particularly the fair allocation of costs to ensure non-EV users are not paying for those who do.

Q58: Do you agree that an EV communication campaign should be run in Northern Ireland? If so, what key messages would be most impactful for consumers as part of this?

Q59: Do you agree that the private sector and local government have a key role to play in developing EV infrastructure? If so, what barriers can government address to ensure that such projects are commercially viable?

Q60: Do you agree that we should develop an EV Charging Infrastructure Plan in collaboration with public and private partners? If so, what should the key priorities of the plan be?

Alternative vehicle fuels

Whilst electrification will play a key role in decarbonising transport, it is widely accepted that EVs will not provide a single solution for the phasing out of diesel and petrol engines. **Alternative fuels**[154] **will therefore have an important role to play in decarbonising transport.**

It is, likely to be another 10-15 years before development of Battery Electric Vehicle (BEV) and Hydrogen Fuel Cell Vehicle (HFCV) technologies and associated infrastructure are ready to replace diesel long-haul Heavy Goods Vehicles (HGVs).

Examples of Alternative Fuels

Battery electrification for the car and light goods vehicle markets

Hydrogen fuel cell technology which can be used in the bus and other heavy goods vehicle sectors.

Biomethane-supplied **Compressed Natural Gas (CNG)** and **Liquid Natural Gas (LNG).**

Synthetic fuels produced using hydrogen and/or carbon such as Dimethyl Ether (DME) and Hydrogenated Vegetable Oil (HVO).

We cannot wait this long to decarbonise transport and we believe interim solutions such as Compressed Natural Gas (CNG), Liquid Natural Gas (LNG) and synthetic fuels could play a role in the transition to fully zero carbon transport. Where these fuels can make productive use of carbon from heat, power and transport that would otherwise be emitted into the atmosphere, it provides additional benefits to the decarbonisation of energy.

154 The Alternative Fuels Infrastructure Regulations 2017 (legislation.gov.uk)

The Renewable Transport Fuel Obligation (RTFO) is the main support mechanism to stimulate investment in alternative fuels across the UK.[155] **We recognise that there may be potential opportunities to develop alternative fuels that would not be realised if relying solely on the transport sector.**

We propose that demonstrator projects of alternative vehicle fuels are trialled in Northern Ireland. This would stimulate early-stage activity, test technologies and assess the commercial viability of alternative fuels.

We believe that the public sector can be a key driver for piloting, demonstrating and growing alternative fuels. Public sector contracts are already leading to innovative zero carbon projects in buses (Translink) and water (NI Water), and there are potential opportunities to further test alternative fuels within other services such as rail, sewerage and refuse collection.

Zero Emission Buses

Translink are trialling three new Hydrogen Fuel Cell Buses that emit only water and will be powered 100% by renewable energy.

The Department for Infrastructure is also funding a further 100 zero emission buses (80 battery and 20 hydrogen) and 45 low emission buses as part of a new contract.

Collaborative research that brings together industry, government and academia also has an important role to play in demonstrating alternative fuels. The Genncomm[156] project helped to facilitate the hydrogen buses purchased by Translink, and the Artemis Ferry[157] project is taking advantage of our strategic location and harbour facilities to test zero emission ferries for the maritime sector.

There will also be private sector opportunities within industry, agriculture and road freight to trial alternative fuels, particularly synthetic fuels with existing vehicles.

Q61: Do you agree that public sector contracts can be a key driver for developing technologies and markets for alternative fuel vehicles? If so, what specific opportunities are there that could be progressed?

Q62: Do you agree that collaborative research will be important to demonstrate alternative fuels? If so, what are the best routes to identify and progress potential projects?

Q63: Do you believe that fuels such as Compressed Natural Gas, Liquid Natural Gas and/or synthetic fuels can play a role as an interim measure to decarbonising transport? If so, how can government help to encourage the private sector to trial and use these fuels?

155 Renewable Transport Fuel Obligation - GOV.UK (www.gov.uk)
156 GENCOMM: GENerating energy secure COMMunities | Interreg NWE (nweurope.eu)
157 Belfast consortium to develop zero-emissions ferry - BBC News

7.5 Remove Residual Emissions

Even with significant measures to decarbonise power, heat and transport, there will still be residual emissions which are more challenging or expensive to address. Our scenarios demonstrate that even with substantial decarbonisation policies, 1-2% of emissions still remain. This is why the UK commitment is for *net* zero emissions, which acknowledges the need to capture or offset some remaining emissions.

Carbon Capture, Utilisation and Storage (CCUS) technologies which remove greenhouse gases from the atmosphere will be essential to meeting net zero, and the UK Government seeks to become a global leader in this field.[158] It has committed to investing £1bn up to 2025 to facilitate the deployment of CCUS in two industrial clusters, and a further two clusters by 2030.[159] There is also a clear roadmap setting out the government's approach to CCUS.[160] **We will seek to ensure the opportunities for CCUS in Northern Ireland are well defined.**

Whilst seeking to reduce energy emissions in Northern Ireland, **we are reviewing whether or not it is economically, environmentally or socially appropriate to continue to license fossil fuel petroleum exploration and development onshore**. Doing so not only has the potential to produce fossil fuels that we are seeking to phase out through the Energy Strategy, but also potentially export fossil fuels and therefore emissions elsewhere.

Carbon capture, use and storage

The capture, use and storage of carbon will be an essential step towards mitigating climate change.

Whilst natural sequestration such as planting forests and trees can play a role in dealing with remaining carbon emissions, large-scale CCUS technology deployment will be needed at national and international levels. Existing technologies are typically linked to industrial processes although new technologies such Bioenergy (BECCS) and Direct Air Capture (DACCS) are viewed as having significant potential in the future.

Emerging CCUS Technologies

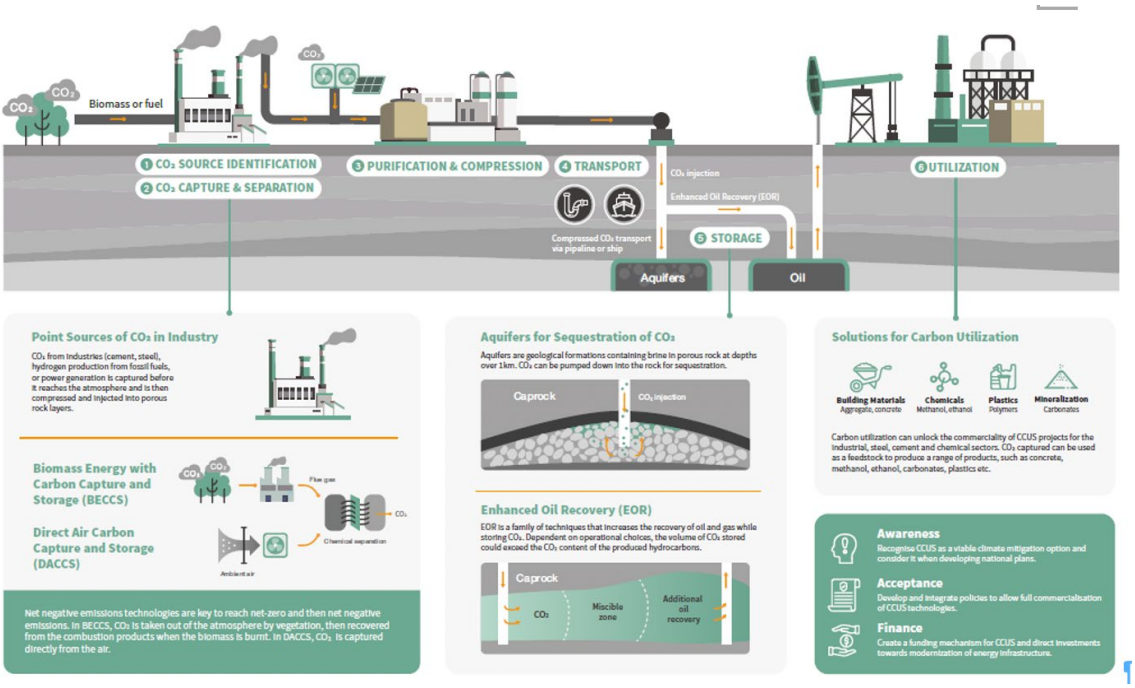
Bioenergy CCS (BECCS) takes CO_2 out of the atmosphere by vegetation which is recovered through combustion when the biomass is burnt. **Direct Air Capture (DACCS)** captures CO_2 directly from the air.

In both cases, the captured CO_2 is compressed and injected into rocks at least one kilometre underground.

158 The UK Carbon Capture Usage and Storage deployment pathway: an action plan (publishing.service.gov.uk)
159 Energy White Paper (publishing.service.gov.uk)
160 UK carbon capture, usage and storage - GOV.UK (www.gov.uk)

CCUS technologies are costly and both BECCS and DACCS are some away from commercial readiness. The United Nations estimate that the quantity of CO_2 to be captured is far greater than any potential market for this and the investments will not be fully paid back, meaning this should be viewed as a societal cost of avoiding climate change.[161] BEIS are seeking to develop CCUS business models[162] with a view to deploying CCUS during the 2030s subject to the costs coming down.[163]

Figure 16: Overview of CCUS



Source: United Nations Economic Commission for Europe, CCUS Technology Brief

The CCC highlights that CCUS technologies are best deployed in certain areas of the country where there are significant industrial clusters, near CO_2 storage sites or in close proximity to sources of biomass.[164] Northern Ireland does not have major clusters comparable with those in Great Britain and mapping of potential CO_2 storage sites did not identify any in offshore areas around our coast. The CCC therefore believes that Northern Ireland is not an ideal place to locate these CCUS technologies. **We do not intend to develop a policy regime to store carbon at sites onshore in Northern Ireland.**

This does not mean that CCUS does not have a role to play. Call for Evidence respondents emphasised using natural means of carbon capture, such as afforestation and peatland restoration, alongside exploring geological storage. Some proposed that Northern Ireland should proactively explore opportunities for deployment, while others were supportive yet noted the high costs and risks compared with other decarbonisation solutions.

161 CCUS brochure_EN_final.pdf (unece.org)
162 Carbon Capture, Usage and Storage: an update on business models (publishing.service.gov.uk)
163 The UK Carbon Capture Usage and Storage deployment pathway: an action plan (publishing.service.gov.uk)
164 Letter: Lord Deben, Climate Change Committee to Edwin Poots MLA - Climate Change Committee (theccc.org.uk)

We believe that there may be future opportunities for CCUS technologies in Northern Ireland for capturing, utilising and transporting carbon.

Given the early stage of the technologies involved, the timescales before CCUS is expected to commercially viable and the limited offshore storage options for Northern Ireland, **we intend to engage in and learn from CCUS developments across the rest of the UK to identify any potential role for Northern Ireland.**

HyNet North West

HyNet is based on the production of hydrogen from natural gas. It includes the development of a new hydrogen pipeline and the creation of the UK's first carbon capture and storage infrastructure.

The project seeks to tackle industrial and domestic heat emissions, demonstrating industrial cluster decarbonisation and CCUS in action.

We are already involved in the industrial decarbonisation programme being delivered by BEIS and will seek to engage with the HyNet North West industrial cluster in England which offers the nearest potential CO_2 storage site in development and can also bring important learning about its potential applications alongside hydrogen.

Q64: Do you believe that CCUS can play a role in Northern Ireland? If so, what potential applications could be the initial focus for demonstration projects?

Petroleum exploration

A range of moratoria or bans on have been introduced across the rest of the UK and the Republic of Ireland on forms of oil and gas exploration and development. Northern Ireland has had relatively limited onshore petroleum exploration over a number of decades, and there are no current active licenses. 18 exploration wells have been drilled and, although several wells have recorded gas and oil shows, none of these have led to field development. DfE is the legal licensing authority for such exploration based on legislation dating back to 1964.[165]

DfE recently commissioned research into the economic, environmental and societal impacts of petroleum exploration and development.[166] This will provide a similar evidence base to that gathered in Scotland, Wales, England and the Republic of Ireland to inform their policy position on petroleum issues. The purpose of the research is to provide a strong, regionally-specific evidence base to inform the basis of policy options that will be taken to public consultation.

We believe that any future petroleum policy decisions should be taken with as full an understanding of all the issues as possible. This includes taking into account all the positive and negative potential economic, environmental and societal impacts of such exploration and development. It also requires considering the uses of petroleum not only for energy generation, but also where used in construction materials, chemical feedstocks and other products.

Q65: Do you believe that our approach to petroleum licensing should change in line with our commitment to decarbonise energy?

165 Petroleum (Production) Act (Northern Ireland) 1964 (legislation.gov.uk)
166 Specification for research into the economic, societal and environmental impacts of onshore petroleum exploration and production in Northern Ireland | Department for the Economy (economy-ni.gov.uk)

REPLACE FOSSIL FUELS WITH INDIGENOUS RENEWABLES CONSULTATION QUESTIONS

Decarbonise Power

Q35: Do you agree with setting a 70% renewable electricity target by 2030, whilst retaining the flexibility to increase this to 80%?

Q36: Do you agree with the criteria outlined in order to consider any future increases in the renewable electricity target?

a. Projects can be delivered in a cost-effective manner.
b. Offshore wind can be delivered by 2030.
c. Storage technologies can minimise system curtailment of renewables.
d. Greater clarity on electricity demand for heating and transport.
e. Consumers' bills are not disproportionately impacted.

If not, what alternative criteria might be used?

Q37: Do you agree that we should explore with BEIS the possibility of extending the Contracts for Difference scheme to Northern Ireland? If so, what terms would be needed to ensure generation in the region whilst protecting consumers?

Q38: Do you believe it is possible that an offshore wind project in Northern Ireland could be operational before 2030? If so, please outline what targeted actions could be taken to deliver this.

Q39: Do you believe that a fixed platform offshore wind project should be targeted to be part of the renewable generation mix? If so, how would you propose some of the challenges associated could be overcome?

Q40: Do you believe that floating platform offshore wind offers the best long term opportunities for offshore wind in Northern Ireland's waters? If so, what additional steps could be taken to encourage these projects?

Q41: Do you believe that other marine renewables can play a key role in our renewable generation mix? If so, please identify what technologies offer the greatest potential and what steps can be taken to support these.

Q42: Do you agree that a strategic approach to planning the location of renewable projects should be taken? If so, please outline practical steps that could be taken to deliver this.

Q43: Do you believe that there should be a requirement for renewable developers to share some of the financial benefits of developments with local communities? If so, what share do you think would be reasonable? If not, please provide your rationale.

Decarbonise Heat

Q44: Do you agree with taking separate approaches to on-gas grid and off-gas grid consumers? If not, what approach should be taken?

Q45: Do you agree that we should not rule out potential low and zero carbon heat solutions at this stage? If not, please outline your rationale.

Q46: What low and zero carbon heat solutions do you believe we should prioritise for trials? Please identify where such trials should be focused and what key issues should be tested within each.

Q47: Do you believe that the role of heat pumps should be different depending on whether consumers are on or off the gas grid? Please outline what you think the specific roles should be.

Q48: Do you agree that Northern Ireland should develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers? If so, please identify key issues that need to be considered in designing and delivering such a scheme.

Q49: Do you agree that legislative and regulatory steps should be taken to facilitate biomethane injection into the gas network?

Q50: Do you believe that support should be provided to encourage biomethane production for injection into the gas network? If not, please outline what alternative approach should be taken to decarbonising the gas network.

Q51: Do you agree that the local Gas Network Operators should develop and publish a plan to decarbonise gas out to 2050? If so, what key issues must be considered within it?

Q52: Do you believe that on-gas grid consumers should have the option to retain oil boilers for use with biofuels? If not, what is a viable timeline for introducing a ban on oil boilers for on-grid consumers?

Q53: Do you believe that off-gas grid consumers should have the option to retain oil boilers for use with biofuels? If not, what is a viable timeline for introducing a ban on oil boilers for off-grid consumers?

Q54: Do you agree that the local Oil Industry should develop and publish a plan on how biofuels could play a role in decarbonising heat out to 2050? If so, what key issues must be considered within it?

Q55: Do you believe that support should be introduced to promote the uptake of biomass for off-grid consumers? If so, please advise on what support is needed and where it should be focused.

Q56: Do you agree that the sale of coal and wet wood should be banned in Northern Ireland? If so, do you believe this should be extended to include other solid fuels with the exception of kiln dried wood?

Decarbonise Transport

Q57: Do you agree that we should develop a Northern Ireland specific strategy that sets an overarching, long term plan for cleaner, greener transport and shows how we will meet net zero emissions within the transport sector? If so, what Northern Ireland specific issues need to be factored into this in order to accelerate the uptake of Zero Emissions Vehicles?

Q58: Do you agree that an EV communication campaign should be run in Northern Ireland? If so, what key messages would be most impactful for consumers as part of this?

Q59: Do you agree that the private sector and local government have a key role to play in developing EV infrastructure? If so, what barriers can government address to ensure that such projects are commercially viable?

Q60: Do you agree that we should develop an EV Charging Infrastructure Plan in collaboration with public and private partners? If so, what should the key priorities of the plan be?

Q61: Do you agree that public sector contracts can be a key driver for developing technologies and markets for alternative fuel vehicles? If so, what specific opportunities are there that could be progressed?

Q62: Do you agree that collaborative research will be important to demonstrate alternative fuels? If so, what are the best routes to identify and progress potential projects?

Q63: Do you believe that Compressed Natural Gas, Liquid Natural Gas and/or synthetic fuels can play a role as an interim measure to decarbonising transport? If so, how can government help to encourage the private sector to trial and use these fuels?

Remove Residual Emissions

Q64: Do you believe that CCUS can play a role in Northern Ireland? If so, what potential applications could be the initial focus for demonstration projects?

Q65: Do you believe that our approach to petroleum licensing should change in line with our commitment to decarbonise energy?

Chapter 8: Create a Flexible and Integrated Energy System

Key options we are consulting on:

- **Increasing flexibility in our electricity infrastructure supported by markets that deliver the best outcomes for consumers.**
- **A new cost benefit analysis of smart meters to gather and utilise energy data as part of a smart energy system.**
- **Enabling consumers and communities to generate, use, sell and share energy, with access to energy market revenue streams.**
- **Trials of geothermal, waste and biomass heat networks.**

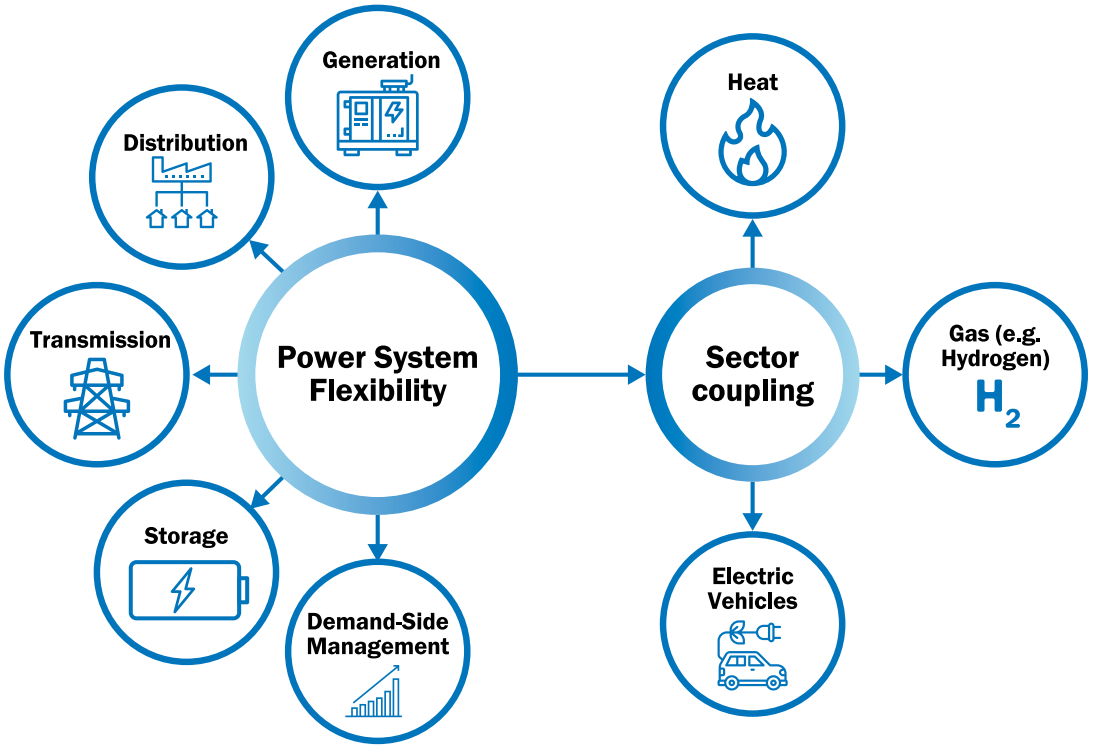
8.1 Introduction

Fossil fuel-based energy systems have relatively limited integration across heat, power and transport. Moving away from fossil fuels to renewables as outlined in *Chapter 7* will change this and create much more integrated energy systems. The power system will play a particularly important role in this and will be expected to integrate further renewables, increase flexibility and also meet greater demands from heat and transport. Our focus in this chapter is therefore predominantly on the future of the power system as part of a flexible and integrated energy system.

The growth of renewables already having a profound impact on our electricity sector, with variable wind and solar technologies across almost 23,800 generators now integrated into a largely centralised power system. Increasing the level of renewables and meeting the additional needs of heating and transport will present significant challenges and opportunities for our system and network operators.

Future investments in the energy system should be focused on increasing flexibility in order to integrate renewable energy in a way that minimises costs for consumers and strengthens energy security of supply.

Figure 17: Power System Flexibility Enablers in the Energy System



Source: IRENA Power System Flexibility for the Energy Transition

To achieve this, we have identified three objectives:

- We will ensure **flexible markets and infrastructure** that are necessary to facilitate an integrated energy system based around our power sector;
- We will **develop a smart and digitised energy system** that uses data and technology to minimise system costs and reduce consumers bills; and
- We will **facilitate decentralisation** that supports demand-side flexibility as a tool to empower consumers and minimise network investment costs.

This approach is in line with the requirements of the Electricity (Recast) Directive 2019.

Northern Ireland has already transposed some aspects of the Directive in meeting the UK's obligations under the Withdrawal Agreement with remaining requirements to be developed in parallel with the Energy Strategy.

2019 Electricity (Recast) Directive

EU Directive 2019/944 on common rules for the internal market for electricity aims to create a competitive, consumer-centred, flexible, fair and transparent electricity market that increases the integration of electricity from renewable sources, free competition and energy security. The Directive lays down rules to ensure that national law doesn't hamper consumer participation, including through demand response, investments in variable and flexible generation, energy storage, deployment of electro-mobility and ensures that electricity prices reflect actual demand and supply.

Measures to achieve a flexible and integrated energy system must be strategically planned and implemented in a joined-up and cohesive manner across the demand and supply sides and spanning multiple sectors. Taking forward individual aspects of this without the necessary technologies, markets and infrastructure in place is unlikely to lead to optimal outcomes for consumers.

We propose that the Electricity Network Operators provide a long-term pathway to creating a flexible and integrated power system. This should identify routes to integrate renewable energy across power, heat and transport at the least cost for consumers whilst ensuring security of supply.

Q66: Do you agree that the Electricity Network and System Operators should provide a pathway to creating a flexible and integrated energy system? If so, please provide evidence to demonstrate what the priorities of such a plan would be?

8.2 Ensure Flexible Markets and Infrastructure

Infrastructure and markets are the platform upon which our power system is built, and they will be key enablers to achieving the Energy Strategy vision in the most cost effective way for consumers. Well-functioning markets and systems, with adequate interconnections, are also seen as the best guarantee of security of supply.

SEM and Grid Investment

The upgraded SEM is the evolution of the wholesale electricity market for Northern Ireland and the Republic of Ireland. It went live in 2018.

Investment in the electricity grid has allowed for integration of up to 65% renewable generation, which the DS3 programme will gradually increase to 75%.

Northern Ireland has a successful track record of delivering new markets and infrastructure.

The new Single Electricity Market (SEM) arrangements have facilitated the trading of low/zero price renewables that now largely drive wholesale prices, thus delivering efficient outcomes for consumers. The Delivering a Secure, Sustainable Electricity System (DS3) programme will be key to further integrating renewable generation onto the grid. Our modern gas network infrastructure was introduced in 1996 and will reach around 550,000 properties by 2022.[167]

We will need to build on these successes to develop flexible markets and infrastructure for the future that increase renewable penetration and meet the future demands of heat, power and transport. Maintaining separate systems that are not integrated and do not have this flexibility are likely to lead to higher than necessary costs for consumers and reduce our security of supply.

Particular areas of focus within this objective are:

- Centralised conventional **flexible electricity generation** that can operate efficiently alongside intermittent renewable generation;
- Developing cost-effective and **flexible network infrastructure**;
- Encouraging **flexible demand and supply**; and
- Ensuring **flexible markets** that provide routes for new generation

Flexible power generation

Meeting net zero carbon energy by 2050 will largely phase out fossil fuel power generation over the next three decades.

Articles 30 and 33 of the Industrial Emissions Directive have already begun this transition, with the phasing out of high emissions combustion plants required by 31 December 2023.[168] This is supported by Article 22(4) of the Electricity Regulation, which requires capacity mechanisms – the means by which SEM generators get long term generation contracts – to limit CO_2 emissions.[169]

Despite this long term direction of travel, conventional power generators continue to play an important role in our energy system operating alongside variable renewable generation to meet our electricity demands and ensure security of supply.

Power Generation

Northern Ireland has just over 2GW capacity of power generation that the system operator can dispatch.

This is mostly concentrated in three centralised power stations: **Ballylumford** (gas); **Coolkeeragh** (gas); and **Kilroot** (coal and oil).

At least three conventional units are required to be on-line at any one time for technical reasons.

With an ambitious renewable electricity target of at least 70% by 2030, conventional power generation will play an increasingly smaller – but still vital – role to meet our electricity demands.

167 https://www.uregni.gov.uk/sites/uregni/files/media-files/2016-09-15_GD17_Final_Determination_-_final_1.pdf
168 The Industrial Emissions Directive - Environment - European Commission (europa.eu)
169 EUR-Lex - 32019R0943 - EN - EUR-Lex (europa.eu)

Conventional power generators are therefore required to maintain system stability and our security of supply.

Northern Ireland's power stations are privately owned and decisions around the development of these are commercial matters. However, **we believe that our power stations can play a role in the transition to net zero carbon energy by supporting an electricity system based around renewable generation and incorporating new low and zero carbon technologies.**

Our large-scale conventional generators were built before renewables were part of the power system and were not intended to act as a responsive and flexible resource around variable renewable generation. This may mean future investments in modern assets that are faster-response and can be on-line but not operating at full capacity. New technologies such as battery storage, hydrogen and carbon capture, use and storage may also play a role, and plans for the future development of Kilroot Energy Park include some of these. [170]

We aim for the Energy Strategy to provide clear direction to the owners of power stations on our ambitions and objectives to allow them to plan medium and long term investments that support a decarbonised power system.

Q67: Do you agree that conventional power generation can play an important role in the pathway to decarbonised energy? If so, what opportunities and barriers exist for such plants?

Flexible network infrastructure

Meeting a renewable electricity target of at least 70% by 2030 will require substantial investments in our electricity grid. We will need to start to plan and deliver new investments that support a flexible electricity system now if we are going to maximise the contribution of our existing renewable assets and accommodate additional renewable capacity going forward.

However, we need to make sure that new investments are made in the smartest and most efficient way that minimise costs whilst creating value for consumers. This may mean our network operators taking different approaches to developing new electricity infrastructure. To inform this, the System Operator for Northern Ireland (SONI) is consulting on four options to locate new clean electricity generation in order to make the grid ready for 2030.[171]

Shaping Our Electricity Future

SONI has identified four approaches to strengthening the electricity grid:

Generation-led: put clean electricity close to where power is used.

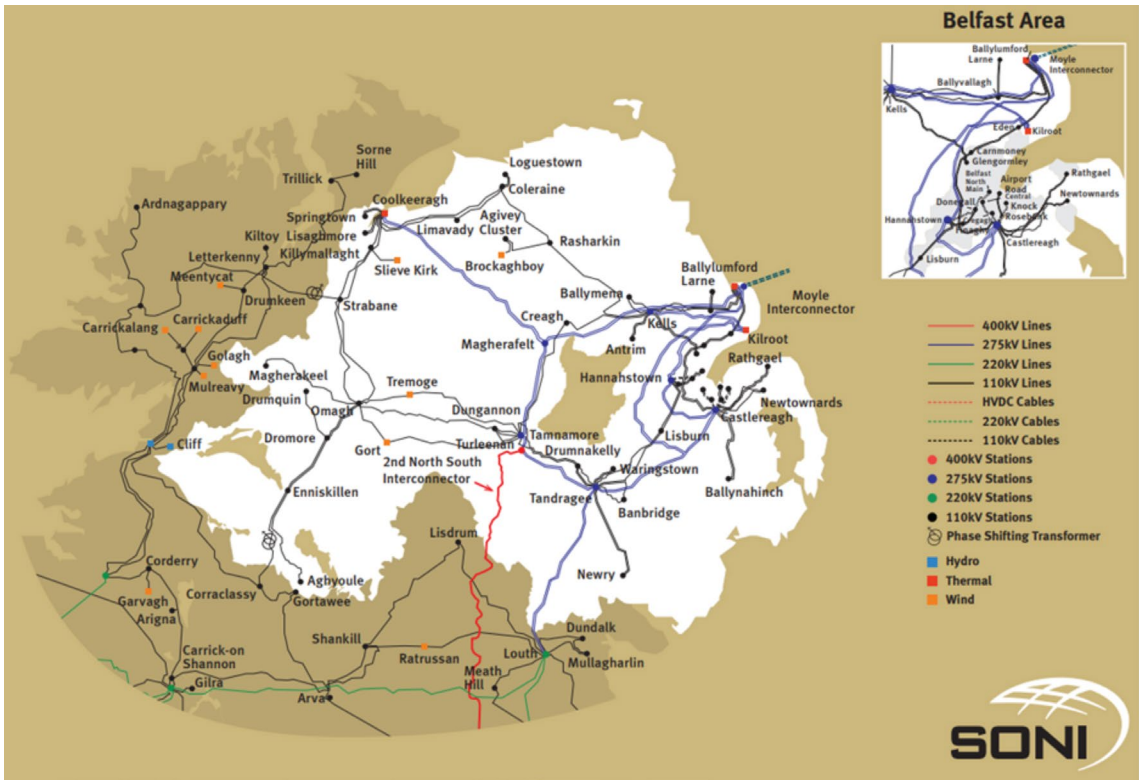
Developer-led: developers decide the location of clean electricity generation.

Technology-led: try new ways to move clean electricity across the country.

Demand-led: put large electricity users close to clean electricity generation.

170 Kilroot Energy Park | Renewable Energy Power Generation
171 Industry Consultation: Shaping our Electricity Future | SONI Consultation Portal

Figure 18: Electricity Transmission Map



Source: SONI

Whilst developing our internal electricity grid will be a vital part of meeting net zero carbon energy emissions, achieving a truly flexible power system will require us to be connected to external grids and markets. This is why interconnectors are so important for our energy future.

Interconnectors create flexibility and efficiency in markets and networks. They allow electricity to be imported and exported based on the price signals created by demand and supply in the markets that are connected, thus minimising costs for consumers. They can facilitate renewables on the system by allowing markets to trade depending on demand and supply in connected markets.

They can also enhance security of supply by allowing network operators to call on generation not just within a single jurisdiction, but on generation available in others as well. The more markets that are connected, the more flexibility that is available.

Respondents to the Call for Evidence consistently referenced the need for the new North South interconnector to act as an additional tie-line which will enable greatly increased efficiency in the SEM. There were also references to improving balancing across the Moyle Interconnector and constraints in Scotland. Generally, interconnectors were seen as playing a role as part of a portfolio of tools to enable better energy balancing.

The North South Interconnector will be vital in delivering on the ambition of a new Energy Strategy.

This interconnector will relieve congestion in the SEM leading to more efficient outcomes for consumers and improving North-South security of supply. It could also deliver additional benefits from being better able to access onward interconnection to Great Britain via the 500MW East West Interconnector (EWIC) and the proposed Greenlink [172]interconnector and to mainland Europe via the Celtic[173] interconnector, reconnecting the SEM to Europe's Internal Energy Market.

As the illustrative scenarios *in Chapter 3* demonstrate, all scenarios lead to higher demands on the electricity grid and substantially more renewables being accommodated. If there is a need for further interconnection with nearby markets in the long-term, and it is important that appropriate market mechanisms are in place to deliver this. Ofgem has established a 'cap and floor' regime to encourage development of interconnectors by providing revenue streams for investors.[174]

Q68: Do you believe that further interconnection will be needed in the future? If so, is a new revenue mechanism needed to bring forward this investment?

Flexible demand and supply

The power system is based around matching supply with demand. As increasing levels of renewables are accommodated onto the grid and electricity demands change with the integration of heating and transport, this will become increasingly difficult to manage without introducing significant flexibility in demand and supply.

The majority of supply currently comes from conventional units that are dispatched by the system operator in response to projected demand and require sufficient time – usually many hours – to ramp up to meet these demands. Alongside conventional generation, Variable Renewable Energy (VRE) such as wind and solar, whose output is less predictable and fluctuates.

Demand is determined almost exclusively by consumers' needs, which usually result in power systems having to meet extreme highs (known as peak load) and lows (known as base load) each day. Both of these loads will vary depending on the time of year due to seasonal weather changes.

Peak Electricity Demand

The highest level of demand each day tends to be between 5pm and 7pm as consumers return from work.

The highest level of demand each year tends to be in January due to weather and lighting conditions. In 2020, the peak demand was on 07 December at 1,559 MW.

Maintaining a power system that has a combination of less flexible and unpredictable supply along with extreme highs and lows in demand over the course of a day, week, month and year is difficult to manage, inefficient for consumers and leads to security of supply challenges.

172 Greenlink Interconnector | energy infrastructure | Ireland and Wales
173 Celtic Interconnector, connecting the electricity grids of Ireland and France
174 Ofgem Cap and Floor Regime

It requires high levels of conventional generation to be available for the peak load even if it is not needed for a proportion of the time. Older units can typically only operate at full capacity and therefore are either "on or off", whereas more modern units can operate at part-capacity, thus leaving greater room on the system for renewable generation.

We believe that having a power system based around flexibility is key to achieving a decarbonised energy system at the lowest cost to consumers whilst maintaining security of supply.

Potential solutions include:

- **Supply-side flexibility:** Flexible generating plants that can be synchronised in short timeframes will be required in response to changing levels of renewables and will make the electricity system more efficient and easier to manage. Technologies such as open-cycle gas turbines (OCGT) can start up in minutes and are therefore more flexible than closed cycle gas turbines (CCGT) or coal and fired power plants.[175]
- **Storage:** Electricity storage systems are primarily used to shift the timing of electricity supply by storing electricity when its value is lowest and discharging it when the value is highest. This helps to balance mismatches between demand and supply and also stores renewable electricity at a frequency that can be more easily accommodated onto the grid. Storage can therefore help to accommodate variable renewables onto the system. Northern Ireland has recently begun to see a number of battery storage projects, with an estimated 184MW of storage potential in the pipeline.[176] Hydrogen also offers an opportunity to use excess electricity and store energy for a range of applications across heat and transport. A regulatory and legislative framework for storage will form part of future policy development on these technologies.
- **Demand-side flexibility:** Demand response involves changing the pattern of consumers electricity demand to better match electricity supply. This not only helps with efficient management of the grid, but also presents opportunities for consumers to play a role either individually or aggregated. This can have the effect of "flattening" our electricity demand and make better use of the generation capacity available to us. NIE Networks has recently launched a flexibility services tender to explore markets with consumers who are willing and able to control how much they generator or consume.[177]

Q69: Do you agree that our power system should be based around flexible solutions to align demand and supply? If so, please advise on what key decisions are needed to achieve this.

Flexible markets

With the pace of change that has and will continue to happen in the energy system, energy markets need to be flexible and adapt to new technologies and generation profiles that come forward.

175 Power system flexibility for the energy transition, Part 1: Overview for policy makers (irena.org)
176 Renewable Electricity Pipeline for Northern ireland (economy-ni.gov.uk)
177 FLEX | Northern Ireland Electricity Networks (nienetworks.co.uk)

The DS3 programme has successfully enabled an increasing amount of renewable energy on the Northern Ireland power system in a safe and secure manner. The level of supply that could be delivered by non-syncronous penetration (SNSP) has increased from 50% [178] in 2014 to its current level of 70%, with a trial of 75% planned during 2021. This figure represents the maximum amount of renewables that the grid can safely use at any one time.

In addition to upgrading our network infrastructure to accommodate higher levels of renewables, the DS3 programme also introduced system services for technologies such as battery storage and industrial demand-side response units that can support greater flexibility.[179]

DS3 System Services

System services are payments and charges paid or levied outside the Single Electricity Market.

Most of these are related to payments for services necessary for the secure operation and restoration of the electricity system.

Other system charges are intended to incentivise the optimum performance of generators connected to ensure efficient use of the power system.

Looking forward, wholesale markets will need to continue to evolve to accommodate further flexibility and support the energy system of the future. There a range of existing and new flexible technologies that are likely to need to be accommodated which will include but not be limited to:

- **Battery storage:** Many respondents to the Call for Evidence highlighted the opportunities for storage in Northern Ireland for both large and small scale battery storage, including co-location of storage with intermittent generation. They highlighted the cost-reductions in battery storage technology, while noting that the market and revenue stacking for storage had not yet been sufficiently developed.
- **Hydrogen:** Hydrogen can be stored physically as a gas or liquid, and can be created through electrolysis by splitting water into hydrogen and oxygen. Call for Evidence respondents referenced hydrogen production as an opportunity to store energy when wind output was high and demand low and thus convert what would be curtailed renewables into productive energy for use in transport or heating. Electrolysers could therefore provide a system service to the electricity network if revenue streams were available.
- **Electric vehicles:** The widespread roll-out of EVs along with smart charging infrastructure can facilitate significant flexibility in the electricity system. In addition to benefitting consumers by facilitating the charging of vehicles during off-peak periods, the power system can access these batteries and use them as system storage as needed. If EVs are providing this service, appropriate market arrangements should be considered alongside other storage services.

178 DS3-Programme-Overview-2014.pdf (eirgridgroup.com)
179 DS3-System-Services-Proven-Technology-Types.pdf (eirgridgroup.com)

- **Local markets:** In an increasingly distributed energy system, the opportunity for local energy markets to match supply and demand may arise. This can reduce the need for large-scale infrastructure, minimise losses and enable flexibility – all of which could reduce customer bills. Local markets could act as platforms where local balancing of supply and demand takes place. Trials of local markets are beginning to emerge,[180] such as peer to peer trading,[181] virtual networks[182] and microgrids,[183] and markets in local flexibility services would need to be developed to manage local network constraints.

Q70: Do you believe that the SEM and DS3 offer sufficient market routes to support the deployment of flexible technologies for generators of all sizes? If not, please provide evidence to demonstrate what additional market routes may be needed.

8.3 Develop a Smart and Digitised Energy System

Consumers are becoming increasingly reliant on digital technologies in their home and work lives. In this increasingly digitalised world, data has become ever more valuable and has helped develop new and better services for consumers in key areas such as banking, shopping, mobile communications, internet and smart home devices. This change has generally not yet happened for most energy consumers.

Enhanced data access and use has the potential to help consumers manage their energy consumption, benefit from cheaper tariffs, and have access to new revenue streams that have been traditionally reserved to energy companies. This will require building smarter energy systems, which are critical to delivering energy transition.

Data will be a key enabler of ensuring that the energy transition benefits consumers. Whilst data is used in our current energy system, this will become increasingly more important and valuable in the future. The role, ownership, organisation and use of underlying energy data will be crucial alongside the increase digitisation of energy systems, grids and consumer behaviour. This will ultimately help to transform the energy sector into a whole energy system.

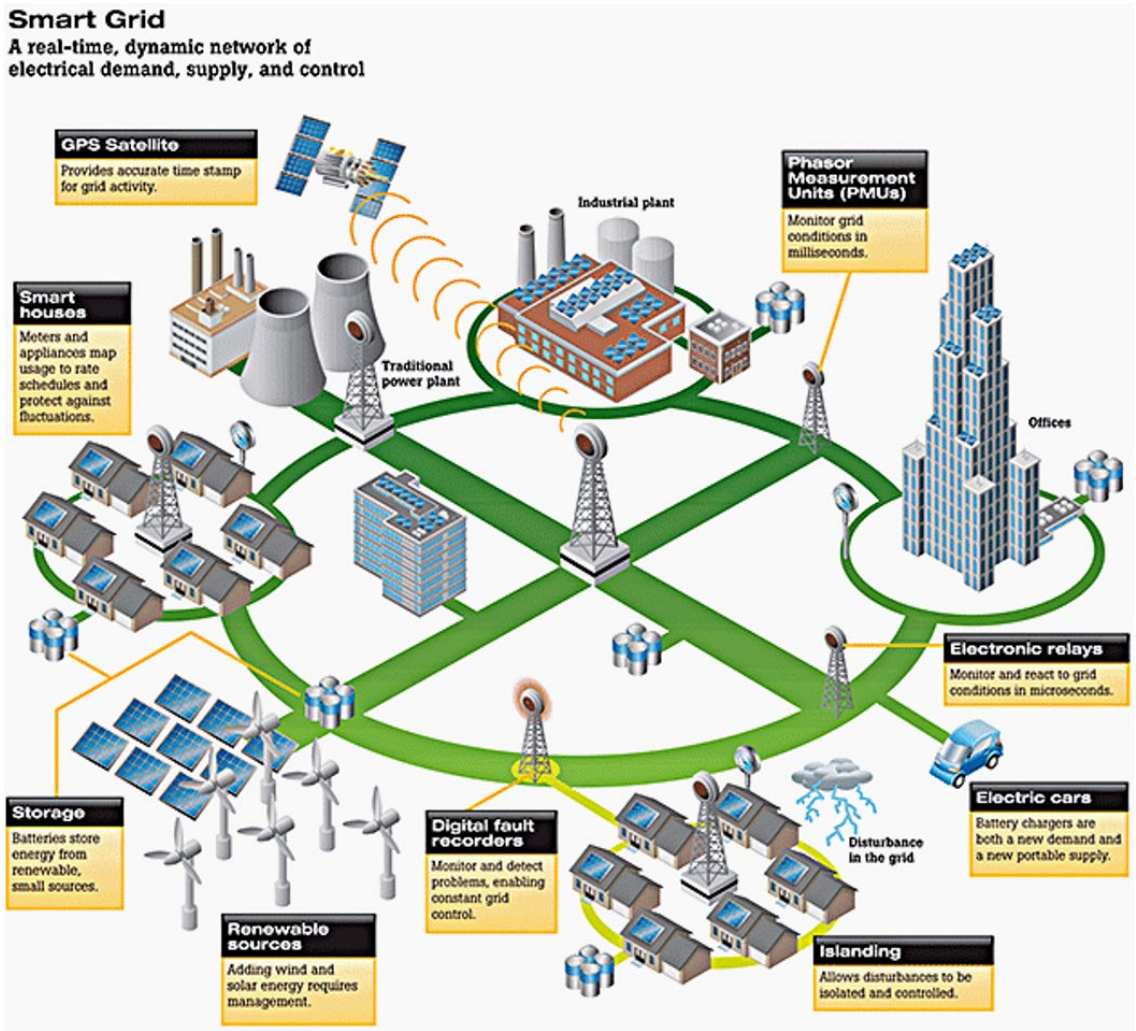
There are two key types of data within a smart and digitised energy system:

- **Consumer data** refer to information that consumers can access such as energy usage, timing, patterns, charging and billing. They can then use this information to change their usage patterns, participate in energy markets and take control of their own consumption, technologies and self-generation.
- **Energy system data** refer to information such as network volumes, time of use optimisation, areas of high and low demand, network constraint points and locations of active renewable generation. These data help operators run the networks more efficiently and better integrate variable renewable generation, thus reducing the network costs passed onto consumers and strengthening security of supply. Such information can also allow consumers to take advantage of new time-of-use tariffs.

180 Cornwall Local Energy Market | Centrica plc
181 UK trials peer-to-peer energy trading | Financial Times (ft.com)
182 Northern Powergrid to create 'virtual' local energy market (edie.net)
183 SSE Networks (Shetland) | Smarter Grid Solutions

We believe that such data have significant potential to benefit consumers but, in order to realise these benefits, we will need to begin to develop a smart grid. We will also need to regulate how consumer data are used and develop a framework that helps to monetise the value that consumer data provides to the energy system.

Figure 19: Example of a Smart Grid



Source: ennomotive

Smart grids are energy networks that can automatically monitor energy flows and adjust to changes in energy supply and demand accordingly. Smart grids can also provide time of use tariffs and real-time information on consumption to consumers and suppliers.

Time of Use Tariffs

Smart meters facilitate new tariffs that set different prices depending on when energy is available more cheaply.

Consumers can reduce their energy bills by using energy at off-peak times.

The UK Government has consulted on introducing smart charging to allow EV owners to take advantage of off-peak tariffs.

There are also significant benefits for the electricity network.[184] Smart grids can better incorporate heat pumps and EVs into the network alongside distributed generation by phasing their operating times to better balance supply and demand.

Replacing traditional meters with smart meters is a key step in allowing consumers to have access to new services, better data and energy markets. Such a roll-out does, however, require significant investment in network infrastructure which is paid for by the consumer base. This decision requires detailed understanding of the potential costs and benefits for consumers, supported by accompanying regulatory and commercial frameworks.

Smart technologies also have a key role to play in the transport sector to make journeys faster, safer, easier, more comfortable and more affordable. Mobility innovation will include new ways to travel, to get access to e-bikes, e-scooters, cars, planes and trains providing the best deals for consumers as well as making our towns, cities and countryside less polluted. Automation, electrification and demand-led transport services promise to decrease private car use, improve safety, reduce emissions and improve user experiences. Digital infrastructure is enabling modes and services to join up in ways previously impossible.

In rolling out these types of technologies to gather and use data, there would be a need for significant awareness of any data changes with consumers, consumer representatives, suppliers and other market players that consumers engage with. Clarity on data ownership and information rights would be important alongside a regulatory framework and consumer protections. New industry protocols would be needed, particularly in relation to vulnerable consumers who are unable to access or utilise such data.

Consumer data

Respondents to the Call for Evidence tended to focus on consumer data from an energy use perspective. There was strong support for an improvement in consumer access to real-time energy data – something which the introduction of smart metering or functionality could improve. There needs to be a balanced approach to how this data can be used, and it was noted that current legislation would need to change to allow the sharing of customer data and the regulation of this by agents or intermediaries working on behalf of consumers. There was very strong support for appropriate protection of consumer data and consumer privacy.

We intend to carry out a review of consumer data to inform the development of a future policy framework that benefits consumers. We will ensure that consumers and consumer representatives are directly involved in this work.

This review will consider a number of issues, including: the availability of energy consumer-related data; what data is most effective for consumers and how they might use it; the role of third party intermediaries or other agents working on behalf of consumers; implications for policies relating to the use of smart technologies by the energy system; investigating new energy data regulation and/or protection frameworks needed for all consumers, including those unable to directly benefit from smart approaches and important lessons learned from elsewhere.

184 Smart_Grid_Vision_and_RoutemapFINAL.pdf (publishing.service.gov.uk)

Q71: Do you agree that a policy framework should be put in place to enhance access to and use of consumer data? If so, please outline key considerations that need to be factored into this framework.

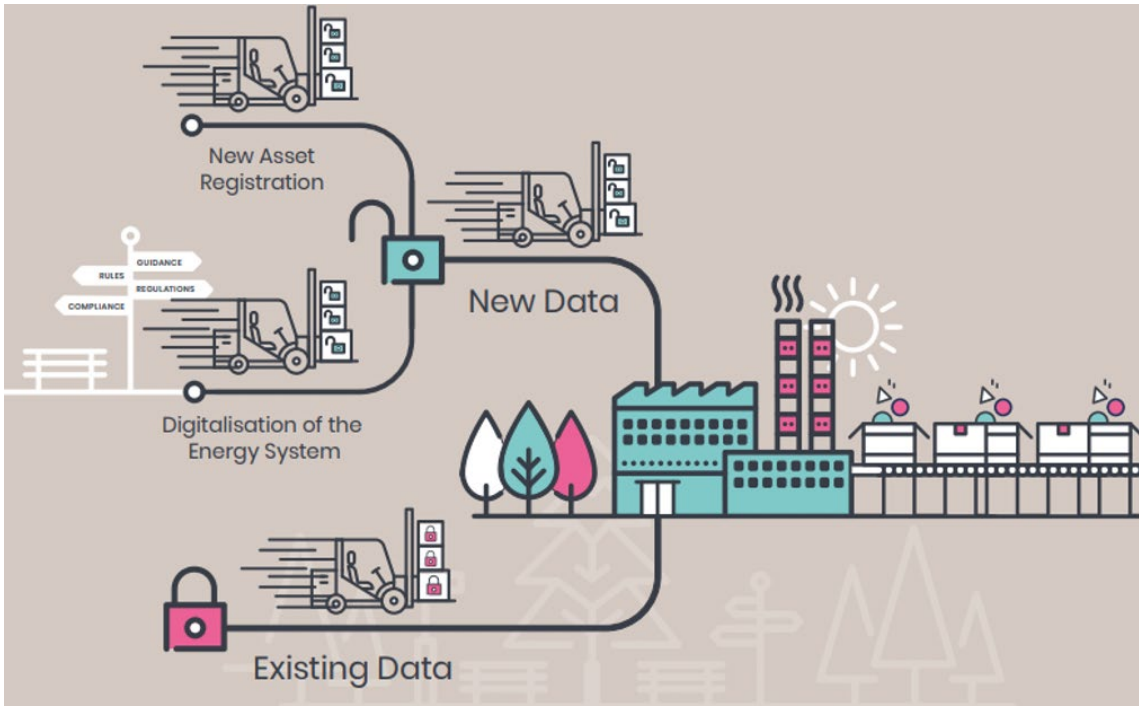
Energy system data

Within the energy system there has been some progress in improving the accessibility of electricity data, including steps by NIE Networks and SONI to make more data available to customers such as the Network Capacity Map,[185] Power Check App,[186] and SmartGrid Dashboard.[187]

Respondents to the Call for Evidence noted that accessing system data could provide opportunities for new markets. However, enabling greater access may involve standardisation of datasets to provide a common language across the sector for data requests and enabling a greater clarity to the customer. It also requires consideration of security requirements and controls.

The BEIS Energy Data Taskforce in Great Britain focused on the need for energy systems data to be at the heart of driving change that will ultimately benefit consumers via a more open energy system data platform. [188] It focused around two key principles – filling in the data gaps through requiring new and better-quality data, and maximising its value by embedding the presumption that data is open.

Figure 20: Digitisation of the Energy System



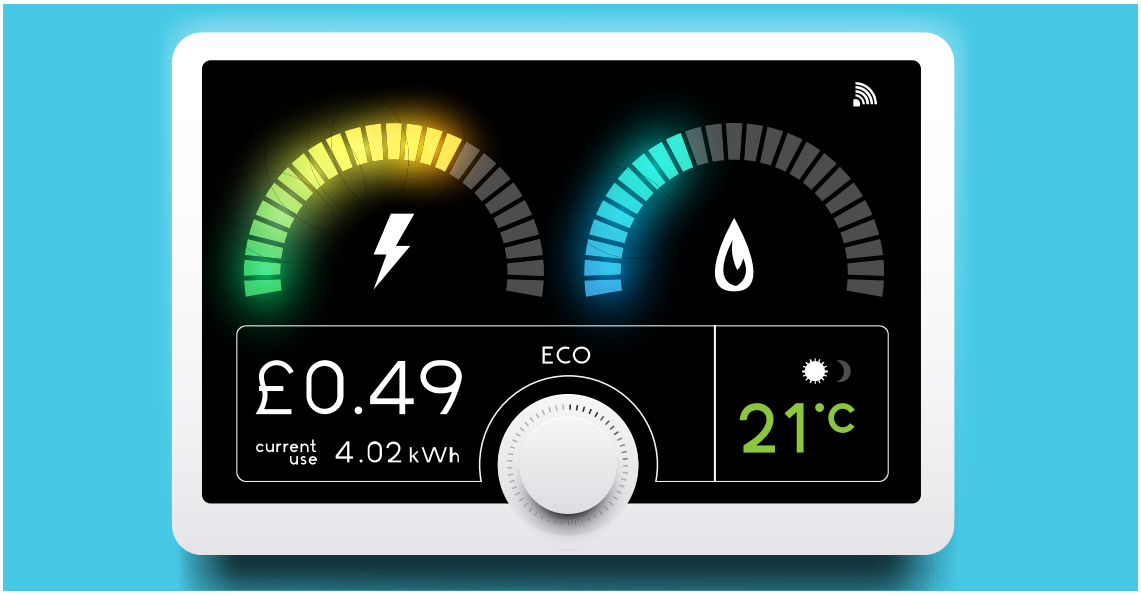
Source: Catapult Energy Data Taskforce

185 Connect a new home, business or property to our network | Northern Ireland Electricity Networks (nienetworks.co.uk)
186 https://powercheck.nienetworks.co.uk/
187 EirGrid Group plc - Smart Grid Dashboard
188 Energy Data Taskforce: A Strategy for a Modern Digitalised Energy System (catapult.org.uk)

Respondents to the Call for Evidence noted that the regulated electricity sector was moving towards digitalisation and were broadly supportive of the key recommendations contained within the report. They did, however, stress that data visibility would need to comply with protection measures such as the new UK General Data Protection Regulation (GDPR).

We intend to assess how the recommendations of the Energy Data Taskforce could be applied in Northern Ireland. Again, we will ensure that consumers and consumer representatives are involved in this work.

Q72: Do you believe that we should take forward the Energy Data Taskforce recommendations in Northern Ireland? If so, please advise on key differences with Great Britain that need to be factored in.



Smart meters

The UK Government has set aside £265m for smart systems and published a plan for how it, together with Ofgem, will work alongside industry to deliver a smarter, more flexible energy system by removing barriers to smart technologies.[189] In order to facilitate smart systems, smart meters are being introduced in Great Britain with 22.2m operating in homes and small businesses in September 2020.[190]

189 Upgrading our energy system: smart systems and flexibility plan - GOV.UK (www.gov.uk)
190 Q3_2020_Smart_Meters_Statistics_Report_FINAL.pdf (publishing.service.gov.uk)

The introduction of electricity smart meters across the EU is a requirement of Article 19(2) of the Electricity (Recast) Directive 2019, subject to an analysis of their costs and benefits. The EU estimates that approximately 123 million smart electricity meters will have been deployed across Europe by the end of 2020,[191] and the Republic of Ireland began rolling out smart meters in 2019.[192] The UK Government estimates that once the smart meter programme reaches a steady state, costs will be £670m per annum with overall net benefits of around £1.2bn per annum.[193] The CCC estimates that the cost of reaching net zero emissions by 2050 could be up to £16bn per annum higher across the UK without a more flexible energy system.[194]

Respondents to the Call for Evidence largely supported the introduction of smart meters. There was support for dissemination of the data captured in a safe and open manner and suggestions that smart meter roll-outs elsewhere, particularly in GB, had not yet provided the benefits that were originally expected. The primary focus was on electricity metering, although some suggested gas metering as well as reference to technologies for measuring oil use. Regulation was suggested as a route to ensure obligatory smart meter installation.

We intend to undertake a Cost Benefit Analysis (CBA) of electricity and gas smart meters as required by the Electricity Directive. In addition to measuring the financial costs and benefits, we propose that this CBA should take into account the broader role of smart meters to facilitate an energy-transition that benefits consumers.

Q73: Do you agree that a Cost Benefit Analysis of smart meters should take into account the broader benefits they can bring to consumers as an enabler of energy data and a smart system? If the CBA for smart meters is not positive, what alternative approaches could be taken to deliver these benefit for consumers?

8.4 Facilitate Decentralisation

Decentralised energy refers to energy that is generated off the main grid and produced close to where it will be used. Whilst it is expected that the majority of electricity supplied to meet the overall needs of Northern Ireland will be large-scale generation, certainly in the earlier stages of the transition to decarbonised energy, decentralisation can have a key role to play in the energy transition and could deliver a range of benefits:

- **Consumers** can be more in control of their energy production and have an active role in creating local resilience;
- **Communities** can have an active stake in the energy transition and work together to ensure it benefits them; and
- **Networks** can operate more efficiently by reducing transmission losses across a large-scale grid and reinforcement investment can be deferred.

191 mj0220176enn.en_.pdf (buildup.eu)
192 Smart Metering - Commission for Regulation of Utilities (cru.ie)
193 Smart Metering Implementation Programme - Cost-Benefit Analysis 2019 (publishing.service.gov.uk)
194 Government sets out plans to drive up smart meter installations - GOV.UK (www.gov.uk)

The extent to which Northern Ireland adopts a decentralised approach will have to take into account costs to strengthen the distribution network and the economies of scale typically associated with large-scale generation.

We intend to undertake a strategic review of the whole system costs and benefits of demand-side generation technologies. This will inform the extent to which Northern Ireland adopts additional decentralisation policies over and above those already required within the Electricity (Recast) Directive 2019.

To date, Northern Ireland's progress on decentralisation has mainly been through the uptake of micro solar PV systems primarily on domestic rooftops. Of the more than 23,700 accredited generators to the NIRO, most of these are micro-generators who generate their own electricity and can largely sell any excess to the grid.

The uptake of micro-generation has shown that there is demand for such an approach amongst consumers. However, simply replacing large-scale generation with micro-generation will not deliver the range of benefits associated with decentralisation; indeed, this could result in higher system costs due to the economies of scale associated with large-scale generation.

A comprehensive range of measures taken forward in parallel are needed to realise the benefits of decentralised energy in a cost effective way. This means accompanying micro-generation with smart technologies that use data and market mechanisms to better align demand and supply as part of a flexible system.

Decentralisation is not just limited to electricity; heat networks also present an opportunity to implement local solutions to consumers demand for energy and introduce low carbon technologies that may otherwise not be viable on an individual consumer basis.

Information and advice will be crucial to consumers to consider implementing a decentralised energy system. The consumers will also need to be part of an ongoing support and engagement programme to ensure the benefits are realised. We believe that the proposed "one stop shop" delivery body would have a key role in addressing these. Regulatory frameworks will be needed to ensure decentralised consumers have the same rights and protections as other consumers, and a clear system of redress in place to build trust and confidence. **We will want to assess approaches and consumer views in other jurisdictions to inform this.**

Active consumers

Decentralisation enables consumers to become active by generating their own energy and/or participating in energy markets.

The Electricity (Recast) Directive 2019 includes a range of relevant articles that can help inform the development of a policy framework for Northern Ireland. Article 15 in the includes dedicated provisions for final consumers to become active consumers without being subject to disproportionate or discriminatory technical requirements, administrative requirements procedures and charges, and to network charges that are not cost-reflective.[195] Articles 4 (free choice of supplier), 5 (market-based supply prices) and 12 (right to switching) are also relevant here.

We intend to develop a policy framework for active consumers. This will draw from the requirements of relevant articles within the Electricity (Recast) Directive 2019 alongside additional evidence gathered including through this consultation.

Micro-generation Support Scheme (Republic of Ireland)

The scheme will support new deployment, deliver a route to market for citizens and communities to generate their own renewable electricity, and receive a fair price when they sell the excess into the grid.

It is open to solar PV, hydro, wind and renewable CHP designed to primarily service the self-consumption needs of the property where it is installed.

Following the closure of the NIRO, consumers seeking to generate their own electricity can benefit from an export tariff paid by Power NI for electricity exported to the grid. This is consistent with Great Britain, where a Smart Export Guarantee has been introduced to guarantee a tariff for electricity exported to the grid for small-scale technologies.[196]

The Republic of Ireland has gone much further, introducing a pilot solar PV scheme in 2018 that provides upfront grants to homeowners for solar PV panels and domestic battery storage.[197] More recently, a consultation has been launched to introduce a Micro-generation Support Scheme.[198] Both schemes in the Republic of Ireland are linked to the energy efficiency of the building.

If a proactive approach to supporting active consumers through micro-generation is taken, this will impact on the allocation of costs for other consumers. As more consumers generate their own electricity and reduce their reliance on the grid, this means there will be fewer consumers with which to distribute the costs of upgrading the network. Future energy costs will become increasingly focused on investments in networks and assets, rather than paying for commodities, and therefore the scale of costs to be socialised is likely to increase whilst the customer base decreases. This is why active consumers must be considered as part of a broader policy approach that involves smart systems and demand-side flexibility in order to use the network more efficiently.

195 EUR-Lex - 32019L0944 - EN - EUR-Lex (europa.eu)
196 About the Smart Export Guarantee (SEG) | Ofgem
197 Microsoft Word - Solar PV Pilot Scheme_Guide 2020 (seai.ie)
198 gov.ie - Public Consultation on a Micro-generation Support Scheme (MSS) in Ireland (www.gov.ie)

We propose that a review of network charging would need to be carried out should the electricity system become more decentralised. This would focus on ensuring that on-grid customers are not paying disproportionately for consumers who are less reliant on the grid but still require access to the network for resilience and to sell energy they generate.

It is important that any measures put in place aimed at active consumers are easily accessible by vulnerable consumers and those who would need additional help to take advantage of it. In the absence of a different allocation of network costs, these consumers would otherwise be most "at risk" of facing disproportionate costs.

There is also a need to look at how the relationship between suppliers and consumers would change in a decentralised energy system with active consumers. New business models for decentralisation will include third party intermediaries potentially as aggregators of generation, support and storage, energy service providers, peer-to-peer trading platforms or operators of micro-grids. **A new regulatory framework may be needed to protect consumers in any new relationships outside of the traditional supplier-consumer model.**

Q74: Do you believe that financial support should be provided for micro-generation to increase the number of active consumers in Northern Ireland? If so, what should this support look like? If not, what are the alternatives?

Q75: Do you agree that network charging would need to change if the electricity system becomes more decentralised? If so, what principles do you believe should be adopted in distributing future network costs across consumers?

Q76: Do you agree that a new regulatory framework is needed to protect consumers who engage in decentralised arrangements? If so, what consumer protection measures should be part of this?

Energy communities

In addition to providing opportunities for individual consumers, decentralisation can also enable communities to work together to shape their own energy system and the energy savings and financial benefits that result from this.

Responses to the Call for Evidence demonstrated strong support for the development of energy communities. They recommended adopting the frameworks and models operated in Scotland and the Republic of Ireland, and identified the need for legal and regulatory reform to facilitate community involvement.

Support for Energy Communities

Whilst community energy in Scotland remains voluntary, it has set targets for 2GW of capacity by 2030 and published good practice principles for developers.

The Republic of Ireland has developed a network of sustainable energy communities through a comprehensive pathway of facilitation, coordination and support.

The Renewable Electricity Support Scheme also provides an enabling framework and financial support for community participation in renewable energy projects.

Article 16 in the Electricity (Recast) Directive 2019 outlines what an enabling regulatory framework for citizen energy communities should ensure.[199]

This provides a baseline of considerations that would need to be reflected in a policy framework for energy communities. However, there are wider aspects to community energy than as defined in the Directive, any these would need to be reflected in any future policies.

We intend to develop a policy framework for community energy. This will meet the requirements of the 2019 Electricity (Recast) Directive, whilst also considering additional policy measures that should be included.

The community energy sector in Northern Ireland is still at the early adoption stage; institutional and policy support is needed if it is to develop further.[200] [201]

The key requirements to drive energy communities include: access to finance; capability training for communities; positive leadership; a clear strategy; clear unambiguous legislation accompanied by easy to understand guidance and a strong regulatory framework; straightforward administration processes; good marketing and communication; incentives; additional training opportunities to prepare construction and allied industries for opportunities through competent suppliers and installers.

Q77: Do you believe that energy communities have a role to play as part of the energy transition? If so, what support is needed to progress these? If not, what are the alternatives?

Heat networks

As part of an overall solution to decarbonising heat in Northern Ireland, there are decentralised solutions built around heat networks (also known as district heating) that could be taken forward at a local level.

Heat Networks

Local heat networks distribute heat in the form of hot water through insulated pipes from a central source to a number of buildings in the local area.

Heat enters each building through a heat exchanger similar in size to a domestic gas boiler, and the central heating and hot water system works the same as a conventional oil or gas system.

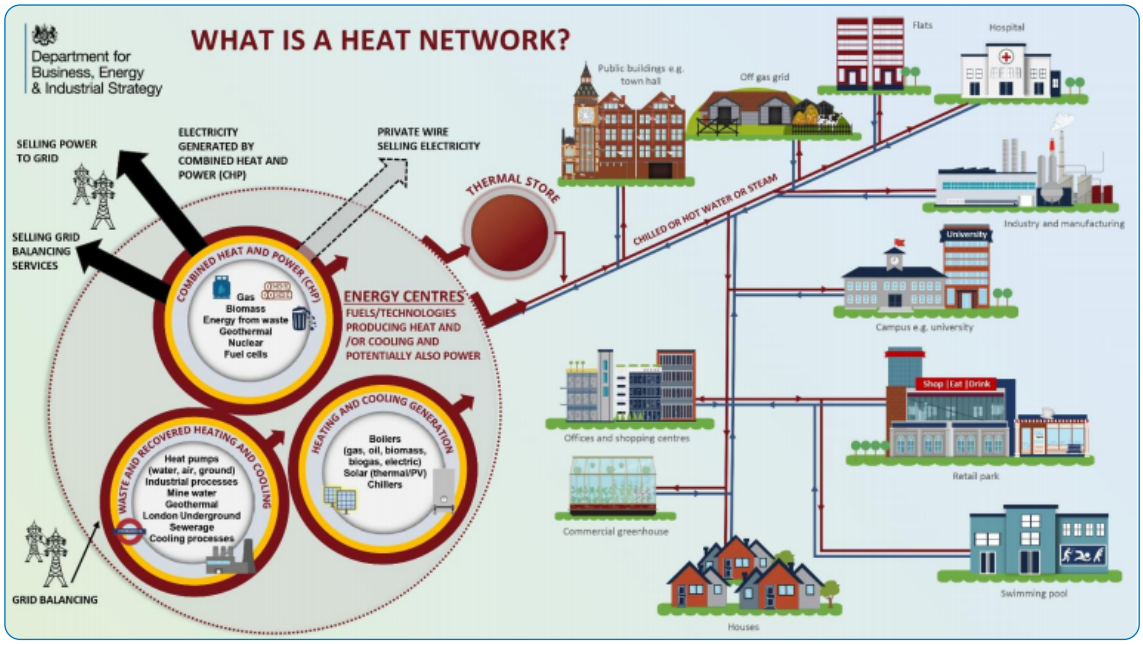
This aligns closely with the recognition in the Call for Evidence that no 'one-size fits all' approach would work for the decarbonisation of heating, and that local solutions would vary across Northern Ireland.

199 EUR-Lex - 32019L0944 - EN - EUR-Lex (europa.eu)
200 https://communityenergyengland.org/files/document/385/1592215769_CommunityEnergy-StateoftheSector2020Report.pdf
201 https://communityenergyengland.org/files/document/388/1591956106_CommunityEnergy2030Vision.pdf

Heat networks could provide an additional route to decarbonise heat using a mature technology that has been proven elsewhere.

Heat networks are common throughout Europe[202] and can be an efficient means of providing heat to areas of high demand density, such as urban centres or business parks, as well as rural areas.

Figure 21: Overview of Heat Network



Source: BEIS

Whilst heat networks have generally been powered by fossil fuels, more modern networks are now switching to a range of low carbon or renewable heat sources, offering the opportunity to supply low or zero carbon energy to a large number of properties where it would not be financially feasible to do so on an individual basis.

Geothermal Energy

A clean, sustainable, naturally occurring source of energy from within the Earth. It can take many forms, hot springs or volcanic vents near the surface or heat stored deep within geological formations.

Hot water can be used in district heating schemes or, if hot enough, in power generation. Iceland has harnessed the geothermal energy from its hot springs to supply the majority of its electricity and hot water needs.

The Geological Survey of Northern Ireland (GSNI) is working on a potential EU funded trial of geothermal heat network projects that would take place between 2021 and 2027. It is also developing a Science Strategy that will set a blueprint to drive the geosciences agenda, including geothermal.

202 https://www.seai.ie/publications/2016_RDD_79._Guide_District_Heating_Irl_-_CODEMA.pdf

Whilst geothermal energy is long established elsewhere, it is still immature in Northern Ireland. Work by shown that there are extensive geological formations which could be a source of such energy.[203]

We believe that the potential of geothermal energy should be explored further, and initial work started on understanding the implications of heat networks more broadly for our legislative and regulatory frameworks.

There could also potentially be a role for promoting biomass as a fuel source for local heat networks, where it is a well-established energy source off the gas grid.

We propose that further trials of local heat networks are carried out. These trials could potentially use geothermal energy, waste heat and/or biomass. Due to the high cost of heat networks for developers to install, government support for such trials would be needed.

These trials could help to assess the consumer impacts of heat networks. If they were expanded in the future, consumers would need information and advice to understand the role and options associated with them. Other important issues would also need to be considered including the costs for consumers, how they might be regulated and what consumer protections might be needed to gain trust and buy-in. This could build on work that has already taken place across the UK.[204]

Q78: Do you agree that the potential of geothermal energy should be further explored, supported by a legislative and regulatory framework? If so, what applications do you believe there are for geothermal energy in Northern Ireland?

Q79: Do you agree that further trials of heat networks should be carried out? If so, what key issues do you think should be tested through these?

203 The Geothermal Potential of Northern Ireland (geothermal-energy.org)
204 heat_networks_final_report.pdf (publishing.service.gov.uk)

CREATE A FLEXIBLE AND INTEGRATED ENERGY SYSTEM CONSULTATION QUESTIONS

Q66: Do you agree that the Electricity Network Operators should produce a pathway to creating a flexible and integrated energy system? If so, please provide evidence to demonstrate what the initial priorities of such a plan be?

Ensure Flexible Markets and Infrastructure

Q67: Do you agree that conventional power generation can play an important role in the pathway to decarbonised energy? If so, what opportunities and barriers exist for such plants?

Q68: Do you believe that further interconnection will be needed in the future? If so, is a new revenue mechanism needed to bring forward this investment?

Q69: Do you agree that our power system should be based around flexible solutions to align demand and supply? If so, please advise on what key decisions are needed to achieve this.

Q70: Do you believe that the SEM and DS3 offer sufficient market routes to support the deployment of flexible technologies for generators of all sizes? If not, please provide evidence to demonstrate what additional market routes may be needed.

Develop a Smart and Digitised Energy System

Q71: Do you agree that a policy framework should be put in place to enhance access to and use of consumer data? If so, please outline key considerations that need to be factored into this framework.

Q72: Do you believe that we should take forward the Energy Data Taskforce recommendations in Northern Ireland? If so, please advise on key differences with Great Britain that need to be factored in.

Q73: Do you agree that a Cost Benefit Analysis of smart meters should take into account the broader benefits they can bring to consumers as an enabler of energy data and a smart system? If the CBA for smart meters is not positive, what alternative approaches can be taken to deliver these benefit for consumers?

Facilitate Decentralisation

Q74: Do you believe that financial support should be provided for micro-generation to increase the number of active consumers in Northern Ireland? If so, what should this support look like? If not, what are the alternatives?

Q75: Do you agree that network charging in a decentralised energy system will need to change? If so, what are the principles that should be adopted in distributing future network costs across consumers?

Q76: Do you agree that a new regulatory framework is needed to protect consumers who engage in decentralised arrangements? If so, what consumer protection measures should be part of this?

Q77: Do you believe that energy communities have a role to play as part of the energy transition? If so, what support is needed to progress these? If not, what are the alternatives?

Q78: Do you agree that the potential of geothermal energy should be further explored, supported by a legislative and regulatory framework? If so, what applications do believe there are for geothermal energy in Northern Ireland?

Q79: Do you agree that further trials of heat networks should be carried out? If so, what key issues do you think should be tested through these?

Chapter 9: Delivering the Strategy

9.1 Introduction

This consultation is focused on informing the policy options that will shape the new Energy Strategy. Whilst the strategy will provide the direction and ambition for the future of energy in Northern Ireland we recognise that it is just as important to deliver on it.

We have therefore not waited for the strategy to be developed to begin to deliver on key energy measures, including:

- Declaring that a new renewable electricity target should be **no lower than 70% by 2030** to provide clear signals of intent to developers;
- Developing proposals for **£20 million of green recovery interventions** as part of the Economic Recovery Action Plan;[205]
- Providing **£5 million of hydrogen funding** to Northern Ireland Water to trial innovative new electrolyser technology;[206]
- Dfl awarding a **£66 million contract for 145 zero and low emission buses**[207] and Translink launching a procurement for a hydrogen refuelling station;[208]
- Working with the UK Government to launch and promote a new **£289 million Industrial Energy Transformation Fund** (IETF);[209]
- Funding the **establishment of an Energy Management Unit** to deliver energy savings across central government;[210] and
- Delivering **vision statements** for renewable electricity,[211] energy efficiency[212] and the hydrogen economy.[213]

We will continue to identify and progress urgent energy issues alongside the development of the Energy Strategy.

Looking ahead, we believe that the proposed "one stop shop" (see *Chapter 4*) will play a key role in driving forward the delivery of the Energy Strategy. In addition to this, we have identified six key delivery priorities which will be essential to progress alongside the energy policies within the Energy Strategy. These are:

1. **Security of supply:** ensuring that future policies result in a secure and resilient energy system;
2. **Costs:** measuring the whole system costs and benefits of energy policy decisions to ensure the most cost-effective decisions are made;
3. **Intelligence:** developing a comprehensive energy intelligence work programme of technology pilots, research, modelling, data and statistics;

205 Economic recovery action plan - Rebuilding a stronger economy (economy-ni.gov.uk)
206 Hydrogen'ius'!! - Northern Ireland Water (niwater.com)
207 Mallon announces £66million programme for 145 zero and low emission buses in effort to deliver Green Recovery | Department for Infrastructure (infrastructure-ni.gov.uk)
208 UNITED KINGDOM-Belfast: Supply of Hydrogen Refueling Station Ref: P-1485 - UK Construction Online (ukconstructionmedia.co.uk)
209 Industrial Energy Transformation Fund (IETF) Phase 1: Spring 2021 - how to apply - GOV.UK (www.gov.uk)
210 Energy Management Strategy and Action Plan to 2030 - Strategic Investment Board (sibni.org)
211 Minister's vision for renewable electricity sector | Department for the Economy (economy-ni.gov.uk)
212 Better energy efficiency will benefit whole society – Dodds | Department for the Economy (economy-ni.gov.uk)
213 Northern Ireland can be a global leader in hydrogen energy – Dodds | Department for the Economy (economy-ni.gov.uk)

4. **Legislation:** making the necessary changes to legislation to provide the legal framework to deliver the priorities within the Energy Strategy
5. **Regulation:** reviewing energy regulation to facilitate decarbonisation whilst protecting consumer interests and delivering on the wider objectives of the Energy Strategy; and
6. **Governance:** delivering a coordinated and joined-up approach to energy decarbonisation across the whole of government, central and local.

This chapter expands on each of these delivery priorities in turn.

9.2 Security of Supply

Having a resilient and secure supply of energy is essential for the functioning of society and the economy. This is the core requirement of any energy system and will be central to our transitioning to a new energy system based around indigenous renewables (see *Chapter 7*). We will also continue to meet our legal obligations under the Risk Preparedness Regulation which sets out a common framework on how to prevent, prepare for and manage electricity crisis. [214]

Moving away from imported fossil fuels can enhance our energy resilience by removing risks associated with the supply of oil, gas and coal from other parts of the world where external events can occur over which Northern Ireland has no control. The integration of more renewables into our power system, along with wider changes to heat and transport, will bring both opportunities and challenges from a security of supply perspective. This is why our energy system needs to become much more flexible and better integrated as outlined in *Chapter* 8, which is aimed at enhancing security of supply through increased flexibility in the energy system.

We intend to regularly monitor and report on security of supply through the transition to decarbonised energy. This will look at all aspects of the energy system and involve continued close and collaborative working with those involved in providing energy to consumers.

We already work closely with those in the electricity, gas, oil and petroleum industries to monitor security of supply and this will continue. Our network will adapt to ensure any new energy generators, distributors and operators that may emerge through the transition to decarbonised energy are captured within a comprehensive approach to monitoring security of supply. We believe it is important that our security of supply position is clearly communicated to provide confidence alongside reporting on our progress against achieving "net zero carbon and affordable energy".

214 EUR-Lex - 32019R0941 - EN - EUR-Lex (europa.eu)

9.3 Costs

Energy costs are one of the biggest issues for consumers. Affordability is therefore part of our overall vision for the Energy Strategy and we considered how we can ensure affordability in meeting the investments costs of net zero carbon energy in *Chapter 5*.

Ensuring an affordable transition to decarbonised energy will require an understanding of the full costs and benefits of energy policy decisions. As our energy systems become more integrated across heat, power and transport, decisions that would previously have been largely contained within one sector will have much wider impacts in the future.

ReCosting Energy Recommendations: From Silos to Whole Systems

Policy, regulation and market design must **accommodate the full system impacts** ensuring that costs or impacts are not passed from one silo to another

Whole system audit is needed of policy, regulation and regulated assets

Levelised cost of energy is too blunt an instrument for system values or costs

All policy and regulation and regulated assets must **consider demand actions and assets equal to supply assets**

Whole system costs capture the **real value of avoided costs**

Chapter 8 explored in more detail how we can use both consumer and energy system data to benefit consumers. Work produced by the chair of the Catapult Energy Data Taskforce and the Energy Strategy Expert Panel on "Recosting Energy" explores how a whole systems approach can maximise the use of our assets and reduce overall costs.[215]

We want to develop how all involved in energy policy, regulation, asset management and market design can measure and monitor the costs and benefits of energy to understand the full range of impacts that policy decisions over the coming years. This covers not only the costs and benefits to the energy system but also to society more broadly.

We intend to adopt and promote a "whole systems approach" to measuring costs and benefits of energy policies. This will ensure evidence on the full range of costs and benefits are understood and used to inform decision-making.

9.4 Intelligence

Evidence and intelligence is at the heart of energy policy development. The approach taken to developing the Energy Strategy has been to focus on evidence, initially through the Call for Evidence and subsequently by gathering additional intelligence through the five working groups and our Expert Panel, commissioning research projects and providing funding for independent academic research.

We have developed an Energy Transition Model for Northern Ireland that is openly available for all to use[216] and has provided the platform for illustrative scenarios outlined in *Chapter 3* and the accompanying scenario report.

215 Whole-System-Costs.pdf (challenging-ideas.com)
216 https://pro.energytransitionmodel.com/

In addition, we have recently published two major research studies on renewable electricity[217] and energy efficiency[218] and, alongside this consultation, we have released a further two research projects that review both the previous Strategic Energy Framework. In addition, we have recently published two major research studies on renewable electricity and energy efficiency with further research ongoing.

We also publish a biennial overview of Energy in Northern Ireland[219], produce regular statistics on Electricity Consumption and Renewable Generation[220] and have released the first Renewable Electricity Pipeline for Northern Ireland.[221]

We intend to develop and publish an energy intelligence work programme. This will put in place a roadmap to gathering and utilising energy information for the purposes of policy development and delivery.

The contents of the intelligence programme will focus on evidence needed to inform potential energy policies outlined in this consultation. We envisage that there will be a number of aspects to this including:

- Real-life **demonstrators and pilots** to gather intelligence on new technologies as proposed in *Chapter 5* and *Chapter 7*;
- Taking forward **research projects** and providing grant funding to academics and researchers that provide insights in key energy policy issues;
- Developing **energy modelling** that expands our understanding of the whole energy system supplemented by detailed micro-modelling of specific energy technologies, markets and systems; and
- Working with the Northern Ireland Statistics and Research Agency (NISRA) to enhance the availability of **data and statistics** to monitor the Energy Strategy (see *Chapter 2*) and track progress on key targets and objectives.

9.5 Legislation

Legislation defines the functions of government and provides the legal basis upon which departments and organisations can exercise these functions. In the context of energy, this is particularly relevant for DfE (and other departments with energy functions), the Utility Regulator, the Consumer Council and regulated energy sectors.

Energy (Northern Ireland) Order 2003

Sets out provisions relating to: regulatory arrangements; objectives of electricity and gas regulation; functions of the Consumer Council; licences; enforcement; electricity from renewable sources and other related issues.

217 Future of Renewables in NI report (economy-ni.gov.uk)
218 Research into the future of energy efficiency policy in Northern Ireland (economy-ni.gov.uk)
219 Energy in Northern Ireland | Department for the Economy (economy-ni.gov.uk)
220 Electricity Consumption and Renewable Generation Statistics | Department for the Economy (economy-ni.gov.uk)
221 Renewable Electricity Pipeline for Northern ireland (economy-ni.gov.uk)

Key energy legislation that shapes the current focus of energy policy and delivery include the Energy (Northern Ireland) Order 2003[222], the Electricity (Northern Ireland) Order 1992[223], the Gas (Northern Ireland) Order 1996[224], the Energy Act (Northern Ireland) 2011[225], the Electricity (Class Exemptions from the Requirement for a License) Order (Northern Ireland) 2013[226] and the Electricity Safety, Quality and Continuity Regulations (Northern Ireland) 2012.[227] EU legislation referenced earlier in *Chapter 1* will also be important.

The implementation of the types of potential policies considered in this consultation document would represent a transformational change in our energy system and would require changes to our legislative framework.

Respondents to the Call for Evidence believed that legislative and regulatory energy frameworks should be aligned and consistent with new energy policies that emerge from the Energy Strategy. They were strongly supportive of reviewing the Energy (Northern Ireland) Order 2003 with regards to sustainability and the requirement to promote the gas industry, whilst also recognising the need to take into account the potential for zero carbon gas solutions in the medium-term.

We intend to review current energy legislation and put in place new legislation as necessary. This will be a major work programme that will provide the legal basis to deliver policies resulting from the Energy Strategy.

9.6 Regulation

The Northern Ireland Authority for Utility Regulation (the "Utility Regulator") is responsible for regulating the electricity, gas, water and sewerage industries in Northern Ireland, protecting the short and long-term interest of consumers. The latest Corporate Plan for 2019-24 is consistent with this mission and outlines a vision to "ensure value and sustainability in energy and water."[228]

The Utility Regulator has played an important role in supporting energy decarbonisation to date. Through price controls, it has approved funding for the electricity network and system operators to accommodate higher levels of renewables onto the grid and facilitated the move of consumers away from oil to lower emitting natural gas. It has responsibility for administering the Northern Ireland Renewables Obligation (NIRO) which delivered most of the renewable generation capacity to exceed the previous 40% renewable electricity target. The Utility Regulator also operates the NISEP which is estimated to have delivered over 5,900 GWh of energy savings, more than 1 million tonnes of carbon savings and £733 million of cost savings for consumers over the period 2010/11 to 2018/19.[229]

222 The Energy (Northern Ireland) Order 2003 (legislation.gov.uk)
223 The Electricity (Northern Ireland) Order 1992 (legislation.gov.uk)
224 The Gas (Northern Ireland) Order 1996 (legislation.gov.uk)
225 Energy Act (Northern Ireland) 2011 (legislation.gov.uk)
226 Electricity (Class Exemptions from the Requirement for a Licence) Order (Northern Ireland) 2013 (legislation.gov.uk)
227 THE ELECTRICITY SAFETY, QUALITY AND CONTINUITY REGULATIONS (NORTHERN IRELAND) 2012 (legislation.gov.uk)
228 Corporate Strategy 2019-24 final for web.pdf (uregni.gov.uk)
229 190815_Review of NISEP Discussion Paper.pdf (uregni.gov.uk)

Respondents to the Call for Evidence were strongly supportive of extending the powers of the Utility Regulator to promote decarbonisation. It was suggested that the statutory duties in the Energy (Northern Ireland) Order 2003 were more prescriptive than Ofgem, which provided it with greater scope to support emissions reductions and environmental matters. Some respondents proposed that greater levels of innovation and flexibility should be allowed within the regulatory framework.

Energy regulation, as with other parts of the energy system, is going through a significant transition to adapt to new energy objectives and the scale of innovation required. As highlighted in *Chapter 5*, Ofgem has introduced new approaches to delivering network innovation and is bringing forward investment projects to support a green economic recovery. In its 2021/22 forward work programme the Utility Regulator has committed to reviewing the adequacy of its legislative remit in the context of emerging industry requirement and change.[230]

New models and approaches of regulation are being tested and adopted. Nesta – the UK innovation agency – is developing a new approach of anticipatory regulation based around six elements: inclusive and collaborative; future-facing, proactive; iterative mindset; outcomes-based and decentralised experimentation.[231] The Council for European Energy Regulators (CEER) new strategy will be focused on empowering consumers for the energy transition and has adopted the principles of affordability, simplicity, protection, inclusiveness, reliability and empowerment.

We intend to work with the Utility Regulator to review the adequacy of its legislative remit in the context of the Energy Strategy. This will form part of our wider legislative work programme and ensure that energy regulation continues to promote consumers interests in delivering on the wider objectives of the Energy Strategy.

Given the widespread changes that the transition to decarbonised energy will bring for people, there is also the potential need to consider regulation and consumer protections in areas such as the environment, data, transport, education, financial services and housing depending on the policies adopted in the future.

9.7 Governance

Achieving the Energy Strategy vision will require a collaborative approach across the NI Executive. The current energy governance landscape in Northern Ireland cuts across many different government departments and organisations.[232]

Respondents to the Call for Evidence believed that, in the past, cross-government working on energy matters had been hindered by the existing division of powers and responsibility. Many recognised that a joined-up approach across government was needed going forward. There were a number of different views on how this could be achieved ranging from improved coordination through to structural departmental change.

230 Draft FWP 2021-22 published.pdf (uregni.gov.uk)
231 Anticipatory regulation | Nesta
232 Energy governance for the Northern Ireland energy transition final published.pdf (exeter.ac.uk)

There is now clear and strong leadership across the NI Executive on climate and energy matters. The Department for Agriculture, Environment and Rural Affairs (DAERA) is developing a Climate Change Bill that will put in place statutory targets.[233] DfE has worked closely with DAERA in developing the new Energy Strategy process as decarbonising energy is one of the main delivery routes to address a large proportion of the required emissions' reductions and also more broadly as part of DAERA's Green Growth Strategy.[234]

Respondents to the Call for Evidence also proposed that all of government needed to work closely together with potentially a greater role for local councils. There was strong support for councils committing to carbon reduction targets and reporting on their contribution to these. Recent developments such as the Belfast Resilience Strategy[235] and the North West Regional Energy Strategy[236] demonstrate the role that councils are already playing in this area. Many respondents also supported councils demonstrating leadership though energy efficiency and renewable deployment on their estates as well as aligning their Local Development Plans with Northern Ireland policy on renewables and associated infrastructure.

The governance structures put in place in the development of the new Energy Strategy have led to a collaborative approach across central and local government to developing policy options that can tackle emissions from energy-related sectors. These structures include:

- The establishment of a Government Stakeholders Group that brings together all central government departments with a role in energy governance alongside a local government representation;
- Involvement of central and local government in the five working groups (consumers, energy efficiency, heat, power and transport) established to support the development of policy options;
- DfI leading on the transport theme for the Energy Strategy; and
- DfE involvement in a range of working groups led by other departments and local government.

The policy issues covered within this consultation document are wide-ranging and represent the collective work of many departments and organisations that have a role within the energy governance landscape in Northern Ireland across both central and local government. It also involves significant input from and working with external organisations and stakeholders. **This options consultation therefore demonstrates collaborative working across government and the wider energy system in action.**

DfE intends to provide leadership across central and local government on the decarbonisation of energy. This will build on the existing structures put in place for the Energy Strategy and ensure a coordinated and joined-up approach in the delivery of future energy policies.

233 Discussion Document on a Northern Ireland Climate Change Bill - Full-length version_0.pdf (daera-ni.gov.uk)
234 Poots chairs first meeting of Green Growth Inter-Ministerial Group | Department of Agriculture, Environment and Rural Affairs (daera-ni.gov.uk)
235 Belfast Resilience Strategy | Your say Belfast (belfastcity.gov.uk)
236 Appendix 2- NW Reg Energy Strategy Exec Summary.pdf (derrycityandstrabanedistrict.com)

Chapter 10: Next Steps

Responses to this consultation must be submitted by 17:00 on 30 June 2021 through the following link:

Energy Strategy Options Consultation

There are a total of 79 questions in the consultation. Please only answer those that are most relevant and important to you.

Through the consultation period we plan to host a series of external events themed around the proposed Energy Strategy principles. We will also be working with The Consumer Council to directly gather the views of energy consumers on potential energy policies that will impact directly on them (see *Chapter 4*).

The views and information provided through the consultation will be used to inform the continued development of energy policies that will feature within **a new Energy Strategy to be published before the end of 2021**.

We intend for the release of the Energy Strategy to include:

- An **Energy Strategy** roadmap based around the strategic framework which will set key targets and objectives for the future of energy in Northern Ireland;
- A **Delivery Plan** which will detail specific and tangible actions under each principle to be taken forward across government; and
- A **Consultation Report** outlining the responses received to this consultation, the views expressed by respondents and our response to these.

We will continue to share relevant information and engage widely with key stakeholders during the consultation period and in the run up to the publication of a new Energy Strategy. If you would like to be added to our mailing list or wish to speak with the team please contact:

energystrategy@economy-ni.gov.uk

Consultation Questions

Q1: Do you agree with the overall goal of achieving net zero carbon energy no later than 2050?

Q2: Do you agree with the proposed vision of "net zero carbon and affordable energy" for the Energy Strategy?

Q3: Do the five principles identified provide clear direction around the approach that we want to take with the Energy Strategy?

Q4: Are there any key delivery priorities for the Energy Strategy not captured? If so, please outline what you believe should be included.

Q5 Do our proposed indicators adequately allow us to measure success at achieving the proposed Energy Strategy outcome? If not, please advise on what alternative metrics should be used.

a. Carbon emissions from energy-related sectors
b. Jobs and turnover in the low carbon and renewable energy economy
c. Domestic energy costs relative to household income
d. Business energy purchases relative to business turnover
e. Households in fuel poverty
f. Relative electricity & gas prices

Q6. Do you think there are significantly different illustrative scenarios which should be developed? If so, please provide further information.

Placing You at the Heart of our Energy Future

Q7: Do you agree with the four consumer population groups we have identified? Please advise on key considerations within each.

a) Domestic vulnerable consumers
b) Other domestic consumers
c) Small businesses
d) Larger businesses

Q8: Do you agree with the five measures identified to "enable and protect" consumers? If not, please outline what else should be included?

a) Making available information and advice
b) Offering proactive "wrap-around" support
c) Providing financial support measures
d) Driving change
e) Reviewing statutory protections

Q9: Do you agree with the proposed scope of the "one stop shop"? Please advise on any different activities you think should be included.

Q10: Which approach do you think should be taken to create this organisation? Please outline your rationale.

Q11: Do you believe that additional financial assistance to protect certain groups of consumers should be introduced? If so, please identify what consumers should be targeted and what support would be needed.

Grow a Green Economy

Q12: Do you agree with the four identified priority clean energy sectors:

a) Energy efficiency
b) Renewable energy
c) Hydrogen economy
d) Circular economy

Please advise on any additional areas that you believe should be prioritised and your reasons for this.

Q13: Do you agree with the economic growth opportunities identified within energy efficiency? What supporting policies do you believe are needed to take advantage of these?

Q14: Do you agree with the economic growth opportunities identified within renewable energy? What supporting policies do you believe are needed to take advantage of these?

Q15: Do you agree with the economic growth opportunities identified for hydrogen production, demand and manufacturing within the hydrogen economy? What supporting policies do you believe are needed to take advantage of these?

Q16: Do you agree with underpinning principles identified within the circular economy? What supporting policies do you believe are needed to take advantage of the potential economic opportunities?

Q17: Do you agree that we should develop a green innovation challenge fund? If so, what scale and type of innovative projects should this support?

Q18: Do you believe that we should work with the Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation? If so, how can this be done in a way which protects consumers from the higher risks associated with innovation projects?

Q19: Do you agree with a focus on research mapping, research funding, business linkages and UK opportunity scanning to maximise the impact of the local research base with clean energy specialisms? Please identify specific opportunities in the local research base that could be progressed.

Q20: Do you believe that utilising and tailoring existing education and training routes can meet the short-term skills needs of the clean energy sector? How can activities within these routes be shaped to meet the needs of the sector?

Q21: Do you agree with the proposal to establish an Energy Skills Forum to shape the future skills needs of clean energy sector? If so, what do you believe the role, remit and membership of such a group should be?

Q22: Do you believe that there is a need for specific measures aimed at ensuring a just transition in Northern Ireland? If so, please advise on what the focus of these should be in addition to the education and training routes already proposed for a low carbon workforce.

Do More With Less

Q23: Do you agree that an energy savings target should be set for Northern Ireland?

Q24: Do you agree that Minimum Energy Efficiency Standards should be set to drive improvements in energy efficiency? If so, what buildings should be the early priorities for introducing minimum standards?

Q25: Do you agree with the general scale and proposed pace of change outlined in DoF's five phase plan for building regulations? If not, please outline what achievable timescale or programme should be implemented and your rationale for this.

Q26: Do you think that we should seek to explore how the rates system can be used to encourage energy efficiency? If so, please outline key issues that would need to be considered.

Q27: Do you agree that we should introduce a pilot domestic retrofit scheme by spring 2022, followed by a substantive scheme as part of a "one stop shop" approach? If so, what changes are needed to the wider energy efficiency support landscape to ensure a joined-up approach?

Q28: Do you agree that we should ring-fence the PSO funding for vulnerable consumers including the fuel poor? Please advise on changes you believe should be made to the level and scope of the PSO for energy efficiency.

Q29: Do you believe that green private finance solutions have a role to play in supporting domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Q30: Do you agree that Invest NI should deliver a pilot energy efficiency support scheme for businesses, to be followed by a substantive scheme delivered through the proposed "one stop shop"organisation? If so, what type of support do you believe is most appropriate for different groups of business consumers?

Q31: Do you believe that green private finance solutions have a role to play in supporting non-domestic consumers to invest in energy efficiency? If so, what specific green finance solutions should be explored?

Q32: Do you agree that we should seek to develop skills and capability, enhance quality assurance and standards, and use an accreditation body to provide guarantees on work undertaken by the energy services for retrofit sector? If so, how can we help to prepare the sector for these changes?

Q33: Do you agree that information, awareness and behavioural change should be a key strand of future energy efficiency support? If so, what are the key behaviours that should be targeted?

Q34: What measures do you think can have the most impact to support people to reduce the miles they travel in private vehicles? Please explain your rationale.

Replace Fossil Fuels With Indigenous Renewables

Q35: Do you agree with setting a 70% renewable electricity target by 2030, whilst retaining the flexibility to increase this to 80%?

Q36: Do you agree with the criteria identified that would allow in order to consider any future increases in the renewable electricity target?

a) Projects can be delivered in a cost-effective manner.
b) Offshore wind can be delivered by 2030.
c) Storage technologies can minimise system curtailment of renewables.
d) Greater clarity on electricity demand for heating and transport.
e) Consumers' bills are not disproportionately impacted.

If not, what alternative criteria might be used?

Q37: Do you agree that we should explore with BEIS the possibility of extending the Contracts for Difference scheme to Northern Ireland? If so, what terms would be needed to ensure generation in the region whilst protecting consumers?

Q38: Do you believe it is possible that an offshore wind project in Northern Ireland could be operational before 2030? If so, please outline what targeted actions could be taken to deliver this.

Q39: Do you believe that a fixed platform offshore wind project should be targeted to be part of the renewable generation mix? If so, how would you propose some of the challenges associated could be overcome?

Q40: Do you believe that floating platform offshore wind offers the best long-term opportunities for offshore wind in Northern Ireland's waters? If so, what additional steps could be taken to encourage these projects?

Q41: Do you believe that other marine renewables can play a key role in our renewable generation mix? If so, please identify what technologies offer the greatest potential and what steps can be taken to support these.

Q42: Do you agree that a strategic approach to planning the location of renewable projects should be taken? If so, please outline practical steps that could be taken to deliver this.

Q43: Do you believe that there should be a requirement for renewable developers to share some of the financial benefits of developments with local communities? If so, what share do you think would be reasonable? If not, please provide your rationale.

Q44: Do you agree with taking separate approaches to on-gas grid and off-gas grid consumers? If not, what approach should be taken?

Q45: Do you agree that we should not rule out potential low and zero carbon heat solutions at this stage? If not, please outline your rationale.

Q46: What low and zero carbon heat solutions do you believe we should prioritise for trials? Please identify where such trials should be focused and what key issues should be tested within each.

Q47: Do you believe that the role of heat pumps will be different depending on whether consumers are on or off the gas grid? Please outline what you think the specific roles should be.

Q48: Do you agree that Northern Ireland should develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers? If so, please identify key issues that need to be considered in designing and delivering such a scheme.

Q49: Do you agree that legislative and regulatory steps should be taken to facilitate biomethane injection into the gas network?

Q50: Do you believe that support should be provided to encourage biomethane production for injection into the gas network? If not, please outline what alternative approach should be taken to decarbonising the gas network.

Q51: Do you agree that the local Gas Network Operators should develop and publish a plan to decarbonise gas out to 2050? If so, what key issues must be considered within it?

Q52: Do you agree that the sale and installation of new oil boilers should not be allowed for consumers on the gas grid? Please outline your rationale and, if you agree, what a viable timeline for introducing this might be?

Q53: Do you believe that off-gas grid consumers should have the option to retain oil boilers for use with biofuels? If not, what is a viable timeline for introducing a ban on the use of all oil boilers?

Q54: Do you agree that the local Oil Industry should develop and publish a plan on how biofuels could play a role in decarbonising heat out to 2050? If so, what key issues must be considered within it?

Q55: Do you believe that support should be introduced to promote the uptake of biomass for off-grid consumers? If so, please advise on what support is needed and where it should be focused.

Q56: Do you agree that the sale of coal and wet wood should be banned in Northern Ireland? If so, do you believe this should be extended to include other solid fuels with the exception of kiln dried wood?

Q57: Do you agree that we should develop a Northern Ireland specific strategy that sets an overarching, long-term plan for cleaner, greener transport and shows how we will meet net zero emissions within the transport sector? If so, what Northern Ireland specific issues need to be factored into this in order to accelerate the uptake of Zero Emissions Vehicles?

Q58: Do you agree that an EV communication campaign should be run in Northern Ireland? If so, what key messages would be most impactful for consumers as part of this?

Q59: Do you agree that the private sector and local government have a key role to play in developing EV infrastructure? If so, what barriers can government address to ensure that such projects are commercially viable?

Q60: Do you agree that we should develop an EV Charging Infrastructure Plan in collaboration with public and private partners? If so, what should the key priorities of the plan be?

Q61: Do you agree that public sector contracts can be a key driver for developing technologies and markets for alternative fuel vehicles? If so, what specific opportunities are there that could be progressed?

Q62: Do you agree that collaborative research will be important to demonstrate alternative fuels? If so, what are the best routes to identify and progress potential projects?

Q63: Do you believe that Compressed Natural Gas, Liquid Natural Gas and/or synthetic fuels can play a role as an interim measure to decarbonising transport? If so, how can government help to encourage the private sector to trial and use these fuels?

Q64: Do you believe that CCUS can play a role in Northern Ireland? If so, what potential applications could be the initial focus for demonstration projects?

Q65: Do you believe that our approach to petroleum licensing should change in line with our commitment to decarbonise energy?

Create a Flexible and Integrated Energy System

Q66: Do you agree that the Electricity Network and System Operators should produce a pathway to creating a flexible and integrated energy system? If so, please provide evidence to demonstrate what the initial priorities of such a plan be?

Q67: Do you agree that conventional power generation can play an important role in the pathway to decarbonised energy? If so, what opportunities and barriers exist for such plants?

Q68: Do you believe that further interconnection will be needed in the future? If so, is a new revenue mechanism needed to bring forward this investment?

Q69: Do you agree that our power system should be based around flexible solutions to align demand and supply? If so, please advise on what key decisions are needed to achieve this.

Q70: Do you believe that the SEM and DS3 offer sufficient market routes to support the deployment of flexible technologies for generators of all sizes? If not, please provide evidence to demonstrate what additional market routes may be needed.

Q71: Do you agree that a policy framework should be put in place to enhance access to and use of consumer data? If so, please outline key considerations that need to be factored into this framework.

Q72: Do you believe that we should take forward the Energy Data Taskforce recommendations in Northern Ireland? If so, please advise on key differences with Great Britain that need to be factored in.

Q73: Do you agree that a Cost Benefit Analysis of smart meters should take into account the broader benefits they can bring to consumers as an enabler of energy data and a smart system? If the CBA for smart meters is not positive, what alternative approaches can be taken to deliver these benefits for consumers?

Q74: Do you believe that financial support should be provided for micro-generation to increase the number of active consumers in Northern Ireland? If so, what should this support look like? If not, what are the alternatives?

Q75: Do you agree that network charging in a decentralised energy system will need to change? If so, what are the principles that should be adopted in distributing future network costs across consumers?

Q76: Do you believe that a new regulatory framework is needed to protect consumers who engage in decentralised arrangements? If so, what consumer protection measures should be part of this?

Q77: Do you believe that energy communities have a role to play as part of the energy transition? If so, what support is needed to progress these? If not, what are the alternatives?

Q78: Do you agree that the potential of geothermal energy should be further explored, supported by a legislative and regulatory framework? If so, what applications do you believe there are for geothermal energy in Northern Ireland?

Q79: Do you agree that further trials of heat networks should be carried out? If so, what key issues do you think should be tested through these?