Northern Ireland Executive

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ENERGY STRATEGY CONSULTATION

SUMMARY OF RESPONSES TO THE OPTIONS CONSULTATION

DECEMBER 2021

Contents

Introduction

Development of the Energy Strategy

The development of a new Energy Strategy is a major work programme being led by the Department for the Economy (DfE) on behalf of the Northern Ireland (NI) Executive. Collaboration, both inside and outside of government, has been at the heart of the development of the new Energy Strategy.

As the Energy Strategy is an Executive-wide strategy, all departments with an energy policy role have been closely involved to date. There has been significant collaboration and engagement across government, industry, domestic and business consumers.

Key milestones in the development of the Strategy include:

- A **Call for Evidence** was carried out from December 2019 to March 2020 to seek input from a wide range of stakeholders on potential policy options. This Call for Evidence received 161 responses, with over half of these coming from stakeholders outside the energy industry. A **Consultation Summary report** was published in June 2020;
- An **Energy Strategy e-Bulletin** was launched in June 2020. The e-Bulletin provides updates on strategy development and energy policy matters, with regular inputs from other departments and stakeholders. The e-Bulletin has been published 15 times on a roughly monthly basis, and now reaches a list of 789 stakeholders;
- Five **working groups** were convened across the areas of Consumers, Energy Efficiency, Heat, Power and Transport to provide further analysis and evidence on potential policy options, with the Transport theme led by the Department for Infrastructure. These groups included representatives from other government departments, as well as the Utility Regulator (Northern Ireland Authority for Utility Regulation), Consumer Council, Invest NI, Strategic Investment Board, NI Housing Executive, Translink, local government and energy sector representatives;
- A **Government Stakeholders Group,** involving representatives from the Executive Office, Department of Agriculture, Environment and Rural Affairs (DAERA), Department of Finance (DoF), Department for Communities, Department for Infrastructure, Department of Education and Department of Health to provide coordination and oversight for the development of the Energy Strategy. The group has met nine times, most recently in September 2021;
- An **Expert Panel** was established to provide international insight and challenge from across the UK and Republic of Ireland (RoI);
- The first **energy systems model** for NI was developed to provide a publicly available and open source tool to run illustrative scenarios, alongside a programme of research and analysis; and
- The **public consultation on policy options** was published in March 2021, providing stakeholders with the opportunity to inform policy development by providing feedback across a total of 79 questions.

Purpose of this Report

This report sets out summary findings for each of the 79 consultation questions. It does not list all comments received.

Departmental staff have endeavoured to summarise the responses without judgement or interpretation. In preparing this report, we[1] have identified common themes and issues raised in response to each question; considering those in support, as well as those that disagreed. It does not aim to cover the entire breadth of the consultation responses.

The feedback from the consultation will be used to inform the Action Plan, which will be published later this year.

It should be noted that the views expressed in this report are representative of the responses received, and are not necessarily shared by the Department.

What Next?

This consultation summary report is being published alongside the new Energy Strategy, which has already been approved by the NI Executive. The Strategy is intended to be a "living document" that is regularly monitored and reviewed. Also being published alongside this report and the Energy Strategy are an Energy Evidence Programme and a statistical methodology report. The Energy Strategy and all supporting documents are available at: https://www.economy-ni.gov.uk/energy-strategy-the-path-to-net-zero-energy.

Following the publication of the Energy Strategy, DfE will publish an Action Plan. This will be an Executive-wide plan, which will set out the next steps needed to deliver on the ambitions of the Energy Strategy together with the proposed timelines. The plan will be informed by the results of the policy options consultation and will initially cover a period from its date of publication to March 2023. This Action Plan will then be monitored and updated on an annual basis.

1 Unless specifically noted, the use of the terms "Department" and "we" in the context of the content of this report should be taken to refer to the Department for Economy and its staff.

Consultation Respondents

Overview of Consultation Responses

In total, 283 responses were received to the Policy Options Consultation. Responses were received in the following formats:

- **Citizen Space:** respondents were able to respond using this NICS-wide online consultation tool, but were able to choose which of the 79 questions they answered;
- **Email Responses:** respondents were able to respond via email. Responses received via this method were both structured (making direct reference to consultation questions) and unstructured (a general response without specific reference to consultation questions). Where responses were structured and did not need any interpretation, they were manually added to Citizen Space. However, the Department was not able to include all of the email responses received in this manner in the statistics presented within this report, particularly where the responses were unstructured. All responses received were included in the qualitative analysis within this report; and
- **Postal Responses:** similar to email responses, we received a small number of consultation responses in hard copy via the post. These responses were also a mix of structured and unstructured, and were processed in the same manner as email responses. All responses received were included in the qualitative analysis within this report.

Of these, 253 responses were hosted on Citizen Space, with around one-third of these manually uploaded by Departmental staff as they were received via other methods (e-mail or post). The remaining 30 responses out of the 283 could not be uploaded to Citizen Space as they were made without specific reference to the consultation questions.

These 283 responses represent over four times the 70 respondents who participated in the Strategic Energy Framework public consultation in 2010, and almost twice as many as the 161 responses received to the Call for Evidence in 2019/2020, reflecting the wider societal interest in this area along with the communications and engagement campaign.

Analysis of Consultation Responses

The Department has considered the demographics related to the 253 Citizen Space responses to determine how well we engaged different sectors and communities, and to identify any particular trends that might have occurred.

A profile of respondents to the consultation highlights that 55% of the responses came directly from consumers, both domestic and business (Figure 1), with representation from across NI (Figure 2). While the majority of respondents reside in urban areas, there was good representation from those that live in rural and semi-urban areas (Figure 3).

Figure 1: Consultation Respondents by Type

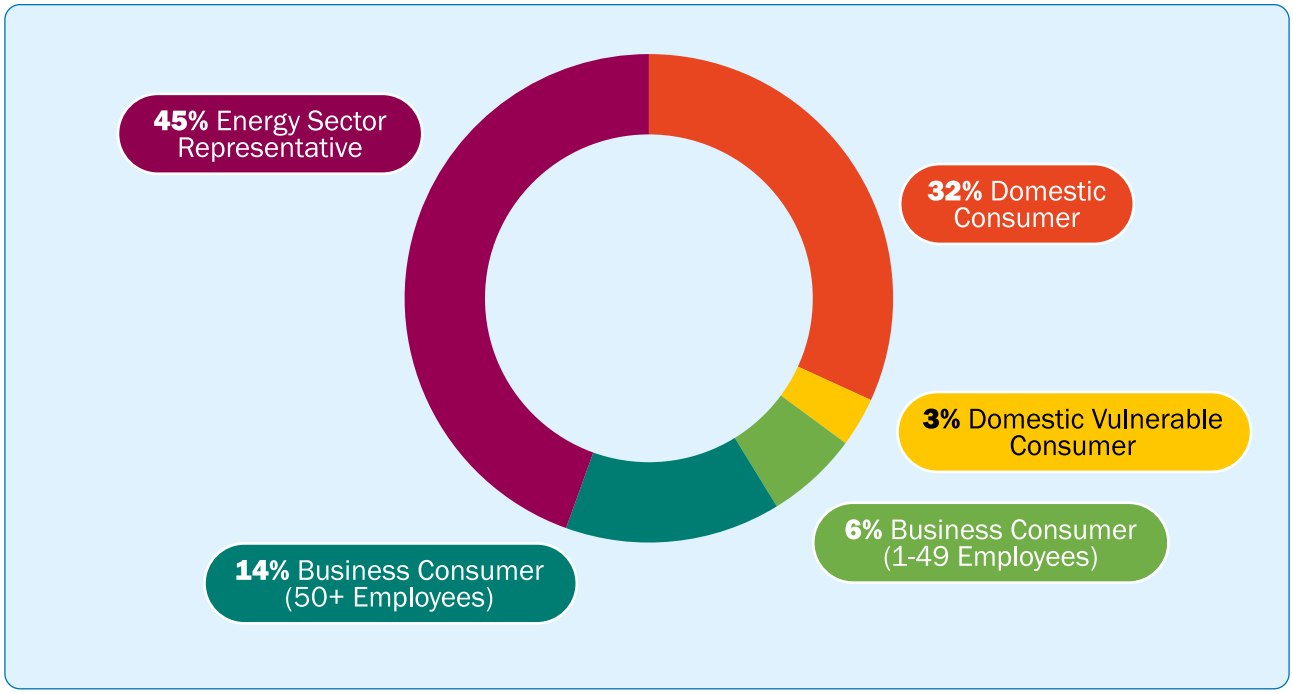


Figure 2: Where Consultation Respondents Live or Work

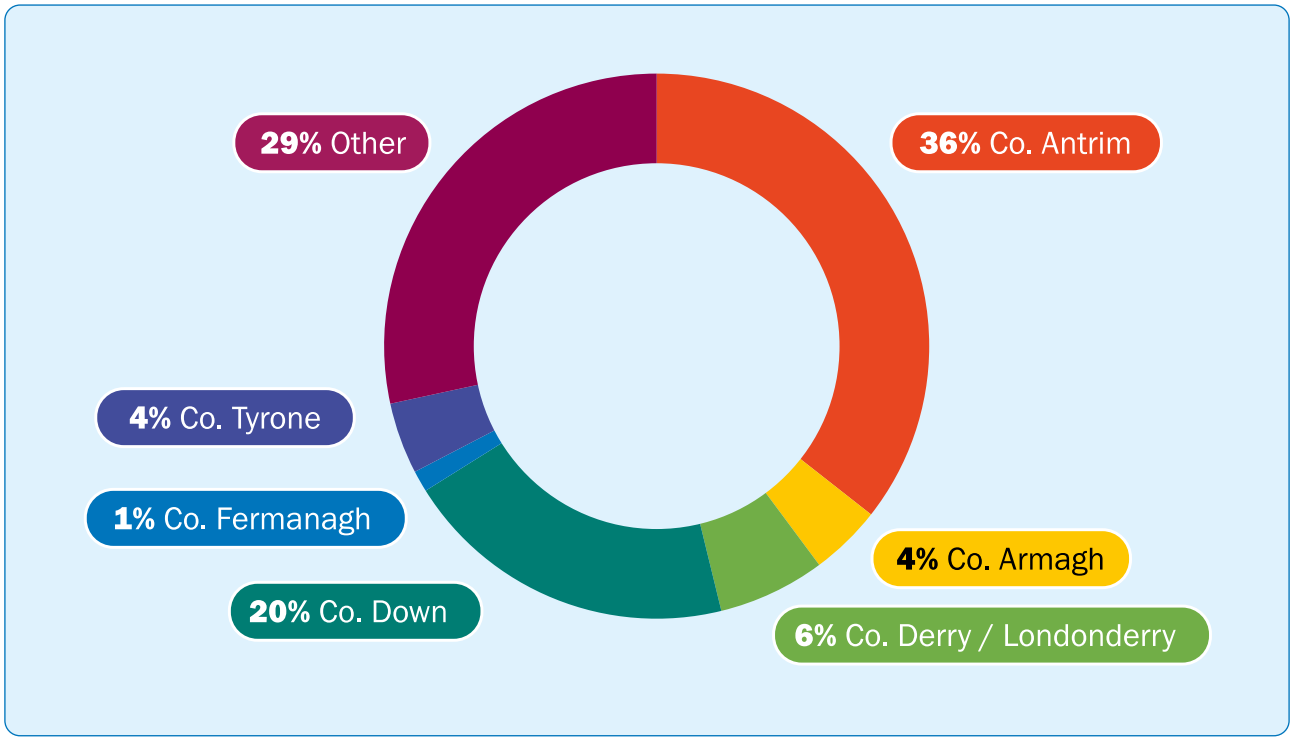
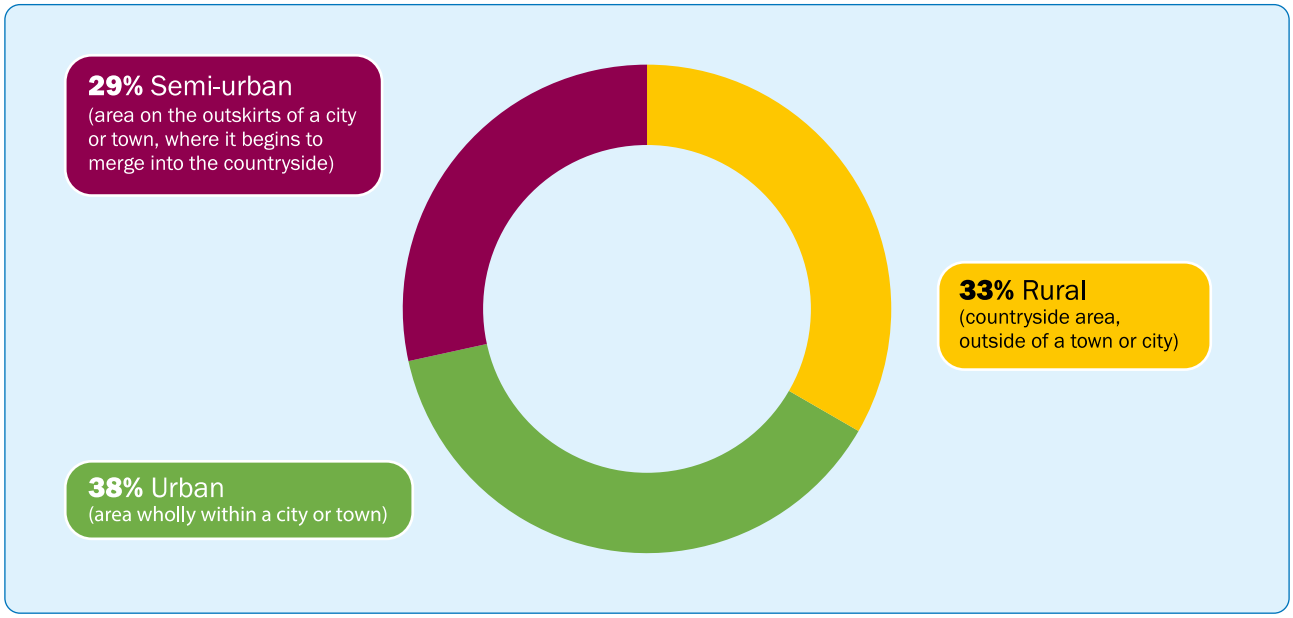
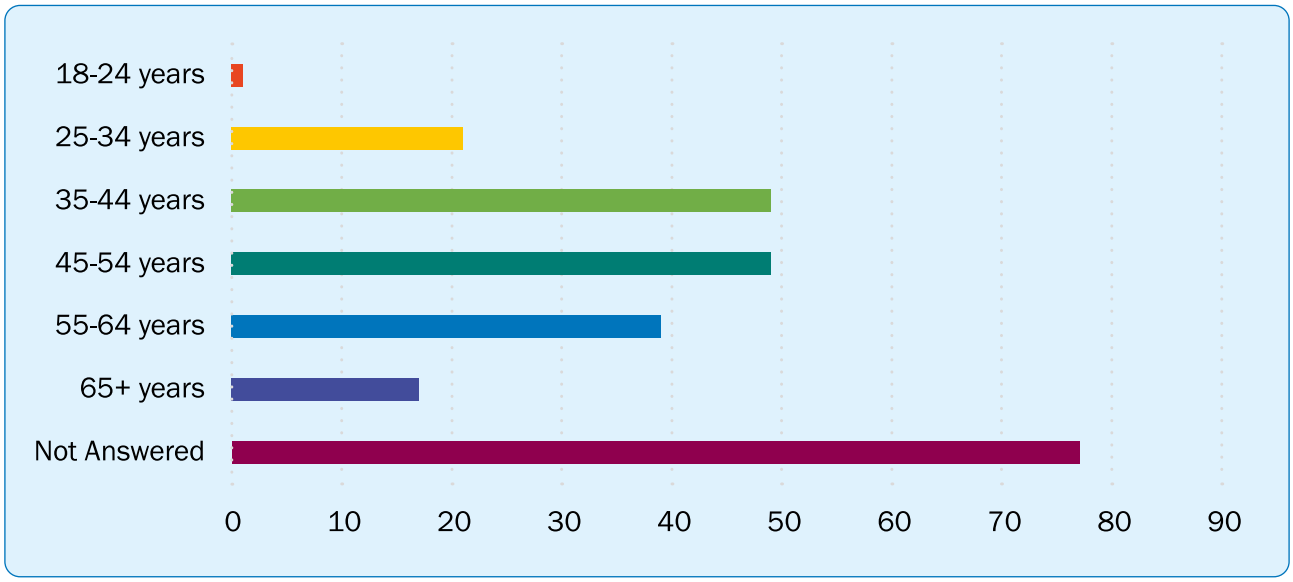


Figure 3: Area Where Consultation Respondents Live or Work



The majority of respondents who provided information on their gender identified as male (50%), whereas those identifying as female or other made up 12% and 4% of responses, respectively. However, 33% of respondents chose not to respond to this question, which may relate to the fact that a number of companies and organisations provided collective responses. Figure 4 shows the age profile of respondents.

Figure 4: Age Profile of Respondents



Methodology

Consultation on Policy Options: Methodology and Promotion

Following a substantial collaborative work programme led by DfE across the NI Executive and involving the energy industry and wider stakeholders, a comprehensive Energy Strategy public consultation on policy options was launched on 31 March 2021.

The public consultation was hosted on the Citizen Space platform as it provided robust data security and a suite of analysis tools. However, in recognition of the fact that not all sections of society have access to or the ability to complete surveys online, it was made clear that the consultation could be responded to via e-mail or via post if necessary. Printed copies were made available and distributed on request to anyone who asked, in line with environmental considerations.

The launch of the Options Consultation, which ran from 31st March until the 2nd July, was accompanied by a substantial communications and engagement campaign. This included:

- A '**consumer friendly' version** aimed at consumers that was also distributed by consumer representatives;
- A comprehensive social media campaign was carried out across Twitter and LinkedIn, reaching over 15,000 people;
- An **animation** providing clear and easily understood messaging about the consultation was produced and widely shared on social media;
- Promotion to the 789 stakeholders on the e-bulletin mailing list;
- Five consultation events which attracted 263 attendees and facilitated in-depth discussions on key energy policy issues;
- Eight focus groups directly involving domestic consumers were held alongside an online survey of businesses to capture their views; and
- Participation by officials and senior officials in many external presentations, forums and meetings with external stakeholders.

As noted previously, the purpose of this report is to summarise the 283 responses for each of the 79 questions put forward in the Policy Options Consultation. The majority (253) of responses were hosted on Citizen Space, with around one-third of these manually uploaded by Departmental staff as they were received via other methods (e-mail or post).

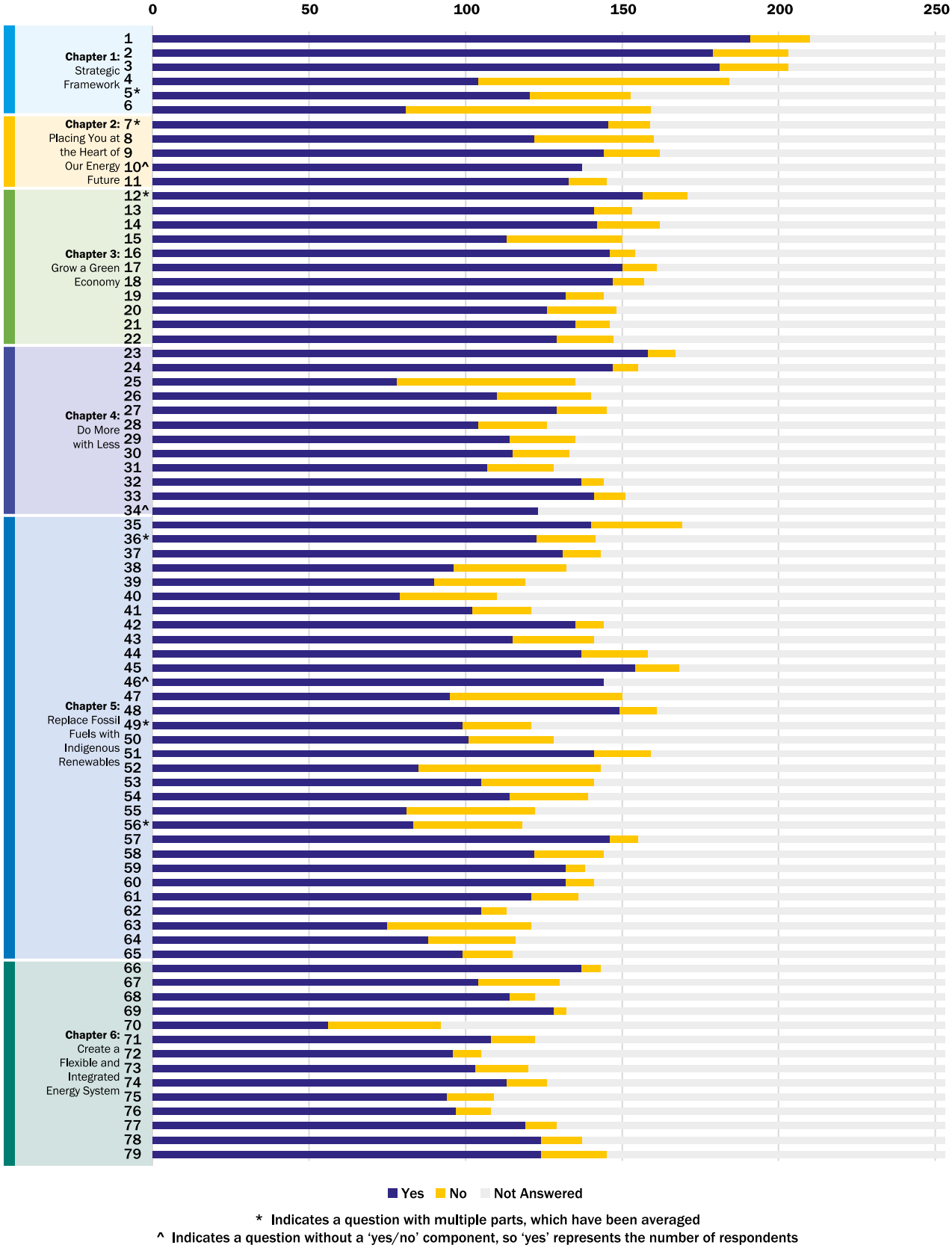
The remaining 30 responses out of the 283 could not be uploaded to Citizen Space as they were made without specific reference to the consultation questions. It would have required significant interpretation to transpose comments received to relevant questions, with a high risk of inferring meaning or intention, thus reducing the quality of the data received.

However, it is important to emphasise that all consultation responses received were considered and are reflected in the qualitative analysis within this report. In compiling the comments and views for each of the 79 questions, departmental staff examined these responses in the same manner as they did the 253 responses on Citizen Space and any feedback from these is incorporated within the summary text.

Only Citizen Space responses were numerically analysed, as these had clear "yes" or "no" type answers to almost all of the 79 consultation questions. Given the number of questions asked, respondents were able to respond only to those questions where they had a preference or view. Some of the 253 respondents on Citizen Space therefore chose not to answer all of these closed questions. Where this occurred, those that did not respond (out of the 253 possible) are not reflected in the statistical analysis of each question. For example, if 200 out of 253 respondents answered a question and 186 supported the proposal put forward, the percentage support is calculated as 93% (or =186/200x100). Table 1 outlines the number of responses received for each question.

In some cases, we have used quotations directly from responses in order to provide further context to the narrative. However, the use of a quotation does not indicate that the view of that respondent has greater significance than others; nor should they be interpreted as being representative of a particular subset of respondents.

Table 1. Breakdown of Number of Responses to the Policy Options Consultation by Question



* Indicates a question with multiple parts, which have been averaged

^ Indicates a question without a 'yes/no' component, so 'yes' represents the number of respondents

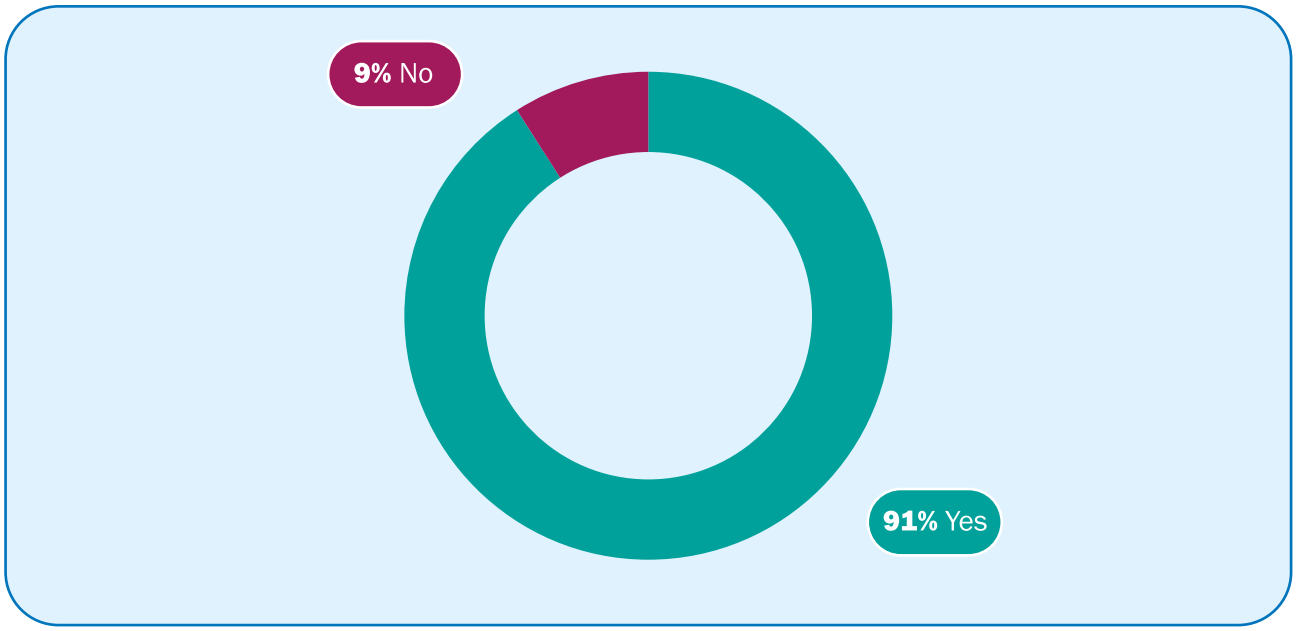
Glossary of Commonly Used Terms

AD	Anaerobic Digestion
BEIS	Department for Business, Energy and Industrial Strategy
Bio CNG	Compressed Biomethane
CCC	Climate Change Committee
CCUS	Carbon Capture, Utilisation and Storage
CfD	Contracts for Difference
CHP	Combined Heat and Power
CNG	Compressed Natural Gas
CO_2	Carbon dioxide
DAERA	Department of Agriculture, Environment & Rural Affairs
DfE	Department for the Economy
DoF	Department of Finance
DS3	Delivering a Secure Sustainable Electricity System
EPC	Energy Performance Certificate
EU	European Union
EV	Electric Vehicle
HVO	Hydrotreated Vegetable Oil
LNG	Liquified Natural Gas
NI	Northern Ireland
Ofgem	Office of Gas & Electricity Markets
OSS	One Stop Shop
p/kWh	Pence per Kilowatt Hour
PV	Photo Voltaic
RES-E	Electricity from Renewable Sources of Energy
RHI	Renewable Heat Incentive
RoI	Republic of Ireland
SEAI	Sustainable Energy Authority of Ireland
SEM	Single Electricity Market
UK	United Kingdom

CHAPTER 1:

Strategic Framework - Response Summary

Q1: DO YOU AGREE WITH THE OVERALL GOAL OF ACHIEVING NET ZERO CARBON ENERGY NO LATER THAN 2050?



WHAT DID RESPONDENTS SAY?

In total, 210 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we proposed an overall goal to achieve net zero by 2050. This aligns with the advice of the UK Climate Change Committee (CCC) in regards to NI, as well as with the wider ambitions across the UK, the RoI and the EU.

There was overwhelming support for the overall goal of achieving net zero energy emissions no later than 2050, which received 91% support from respondents.

We welcome the offers of support from respondents to achieve this vision, including from some partners and institutions that we are already working with. Encouragingly, a number of respondents also outlined their own endeavours to contribute to carbon reduction.

The largest number of comments came from the energy sector. Their emphasis was on the need for swift action to decarbonise energy and requests for earlier power sector decarbonisation targets. It was noted that early action on energy decarbonisation would capture business and investment opportunities. Specifically, there was also:

- A request for prompt publication of the energy strategy; and
- References to the specific technologies that would play a role in this transition.

Energy sector representatives also paid particular attention to the approach to the strategy. This included:

- The importance of targets, including interim targets and sectoral carbon budgets;
- Regular reviews and updates on the strategy, including the need to adapt to change; and
- Accurate measurement and monitoring of targets and progress.

Regarding business consumers, approximately half also focused on the urgency of the climate challenge. For some, early action would ensure that progress would not slip further behind other regions, while others recommended setting an earlier date for economy-wide decarbonisation. Business consumers also mentioned the opportunity to benefit from the investment opportunities of the transition, to make NI *'a great destination for green business and a hub for zero-carbon innovation.'* Others mentioned decarbonised energy to support post-pandemic recovery, and the need for a clear plan and targets to support this journey. Other points raised by business were to strengthen environmental or sustainable aspects within the vision as well as a Just Transition.

The second most cited issue by business was collaboration. This included:

- The importance of integration across sectors and government (including UK and RoI);
- Need for a whole system approach;
- Fully enabling the role of local Councils; and
- Continued citizen engagement and communication as a crucial aspect of the energy transition.

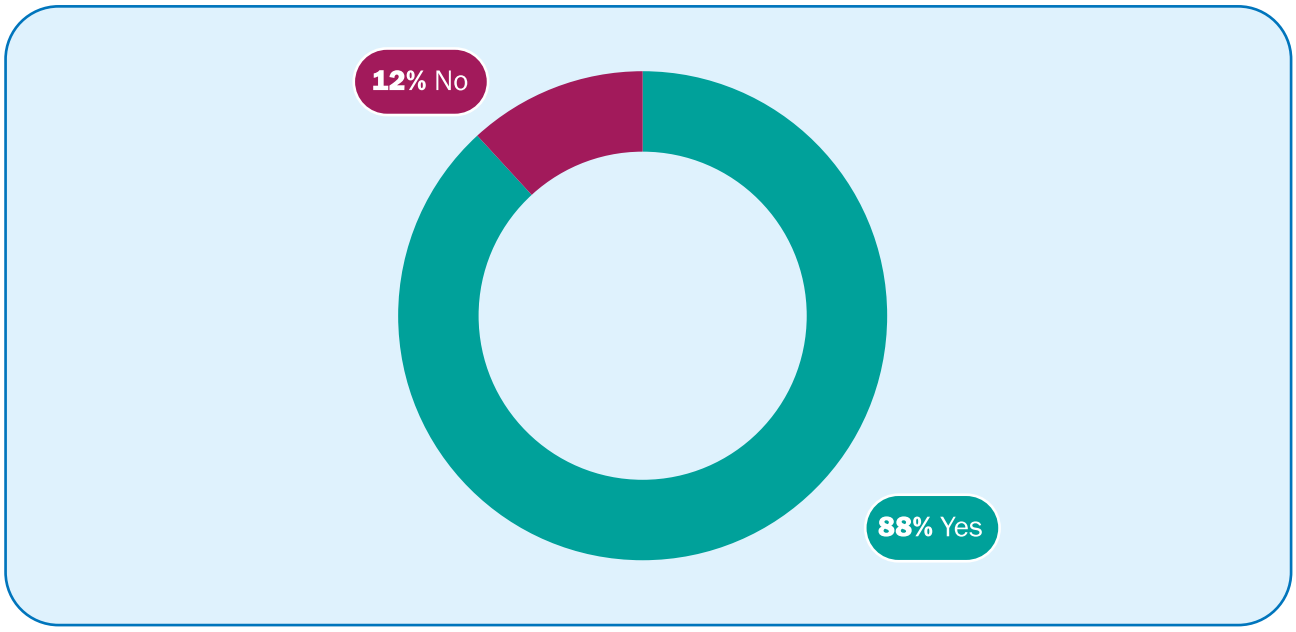
Approximately half of domestic consumers referred to the importance of responding to the challenge of climate change. Many recommended early or swift action, while others noted that delivering this vision would require a robust and comprehensive plan. A large number of domestic consumers want to understand the cost of the transition with some criticism that the cost impact was not clear, while others noted the costs of the impact of climate change on the most vulnerable. Others took a more global view, referring to the importance of a Just Transition and the need for supply chains that are ethical and sustainable. The importance of continued communication with consumers was highlighted. Of the small number of vulnerable consumers who added detail, there was a focus on the need for public and political buy-in.

Common themes across all types of respondents were:

- Need for swift action to respond to the challenge of climate change and benefit from clean energy opportunities;
- To bring the public with us and engaging consumers, including clear communication of the cost impacts;
- The importance of collaboration across sectors and government; and
- The need for a wider decarbonisation framework in NI.

Of those who disagreed with the vision, the vast majority of these – 15 of 19 "no" responses in all – were drawn from the "Domestic consumer" group, but overall this group was 79% in agreement. Few comments were received but did include a reference to the need for costing of the strategy.

Q2: DO YOU AGREE WITH THE PROPOSED VISION OF "NET ZERO CARBON AND AFFORDABLE ENERGY" FOR THE ENERGY STRATEGY?



WHAT DID RESPONDENTS SAY?

In total, 203 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our vision to achieve "net zero carbon and affordable energy." The need for energy to be affordable is a key objective of the energy transition.

There was very strong overall support for the vision of Net Zero Carbon and Affordable Energy, with 88% of all respondents saying they agreed with this, and strong support from all demographic groups. Of those who disagreed with the vision, the majority came from the domestic consumers category; however, even within this category there was strong overall support, with 61 of 75 respondents expressing approval.

Most respondents across all categories who agreed with the vision did not provide any comments. Of those who agreed with the vision and provided further detail, key points are below.

Energy sector responses regarding 'net zero carbon' focused on:

- The importance of early and / or rapid action, including the comment that 'Early action delivers approximately half the emissions of a delayed action pathway';
- Requests for earlier and specific targets for decarbonisation of the power sector; and
- The need for decarbonisation to be incorporated into the Utility Regulator's core remit.

Regarding 'affordability' the energy sector focused on:

- The importance not only of affordability but the broader concept of a Just or Fair Transition;
- The balance of affordability versus the urgency of climate action;
- Some specific pathways to support affordability, including ensuring UK funding, prioritising energy efficiency and benefitting from the lower costs of renewables, although others noted that low carbon technologies could be more expensive;
- Noting that currently we have little control over certain aspects of energy affordability; and
- The distributional impacts of costs, including tax policies for the future, particularly those that fall on the electricity sector.

One comment was that affordable 'has not been clearly defined and brings a level of subjectivity to the proposed vision'. Similarly there was reference to affordable as a 'vague description'. There was also a suggestion to include 'reliable' in the vision. Other recommendations included that the vision be backed up by either climate legislation or specific climate targets.

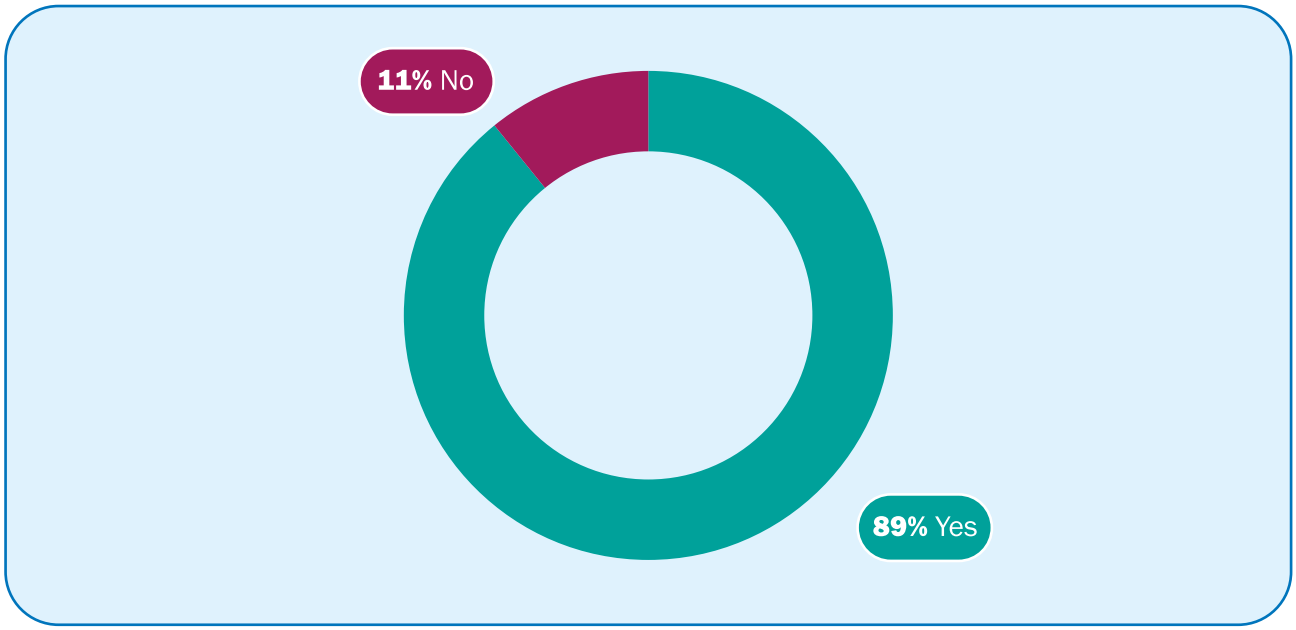
Business responses included recommendations on swift action on climate and a suggestion to include 'sustainability' within the vision. They also noted the importance of a Just Transition, and referred to affordability with regards to impacts on their own competitiveness. Similar to energy sector responses, there was a recommendation to have a broader climate framework and legislation in place to support the strategy. One interesting point referred to ensuring that the low-carbon products that we use are themselves produced in a low-carbon manner.

While few consumers added detail, consumer bodies who provided commentary welcomed the vision but suggested a focus on energy efficiency measures, and recognised the ongoing need to focus on the fuel poor. These respondents welcomed the centrality of affordability and noted the importance of fairness, sustainability and a Just Transition. Further points included the need to consider the cost impact of new policies, interventions and technologies at all levels to ensure they do not result in an unfair financial burden. Some other points referred to the future use of carbon capture and in general recommended a coordinated approach to the protection of habitats.

The small number of uncategorised respondents referred to a range of issues similar to the above. The most cited was the need for a Just Transition, including consideration of impacts on rural areas. There were also references to energy efficiency as a core aspect of affordability, and a note that while the vision was supported, it would be difficult to deliver.

A small number of business consumers and energy sector representatives disagreed with the vision. Most recommended that environmental sustainability and energy security be included within the vision.

Q3: DO THE FIVE PRINCIPLES IDENTIFIED PROVIDE CLEAR DIRECTION AROUND THE APPROACH WE WANT TO TAKE WITH THE ENERGY STRATEGY?



WHAT DID RESPONDENTS SAY?

In total, 203 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we proposed five principles to develop and deliver the strategy and asked whether these provided clarity to our approach. The principles were Placing You at the Heart of Our Energy Future, Grow a Green Economy, Do More with Less, Replace Fossil Fuels with Indigenous Renewables, and Create a Flexible and Integrated Energy System.

The significant majority (89%) of respondents were in support of the principles, agreeing that they provided clear direction. As with the previous two questions, this support carried through all respondent types. Approximately 86% of those who responded provided no further feedback beyond yes or no answers.

Of those who did not agree, only a small number provided any further information. Most were recommendations to include sustainability and biodiversity within the principles. Of the remainder, there was one recommendation to focus more on adaptability and flexibility as a principle. A relatively high percentage of those who disagreed live in rural areas (>50%) when compared with overall responses.

Of those who agreed, some indicated potential improvements in specific principles, while others provided general comments.

General comments

Eight respondents said that coordination is crucial to delivering the strategy. Most of these comments came from the energy sector and large businesses, and referred to responsibilities being spread across different government departments and the need for joined up approaches.

Recommendations to include a new principle of sustainability, or to include sustainability within existing principles, cited the importance of environmental protection (including the potential for environmental damage through low-carbon nuclear energy) and biodiversity, for both land-based and marine environments. A specific phrase used was the need to consider the 'nature and climate emergency' rather than just the climate emergency. Other comments were in regards to the challenge of delivering the strategy, and how to address and allocate the costs.

Specific comments

Placing you at the heart of our energy future

Respondents noted that a Just Transition should consider fuel poverty and affordability. There was recognition of the importance of engaging with consumers, but also a query about the extent to which all consumers can be expected to play an active role in delivering the energy transition. Specifically, the role of suppliers was mentioned in communication and how energy efficiency measures will make a vital contribution to this principle.

Grow a green economy

There were critiques of the assumptions implicit in this principle, particularly growth that may not be sustainable given the finite nature of earth's resources. Opportunities were mentioned more frequently in this principle, including the ability to export products with green credentials, the need for 'good' green jobs and a competitive zero carbon manufacturing base.

Do more with less

This principle was referenced as being crucial to all aspects of delivering the strategy and each principle. Comments included recommendations that it be considered a 'first fuel' and to focus on the wider benefits of healthy homes. It was also commented that this may be misread as a need to 'make do with less'.

Replace fossil fuels with indigenous renewables

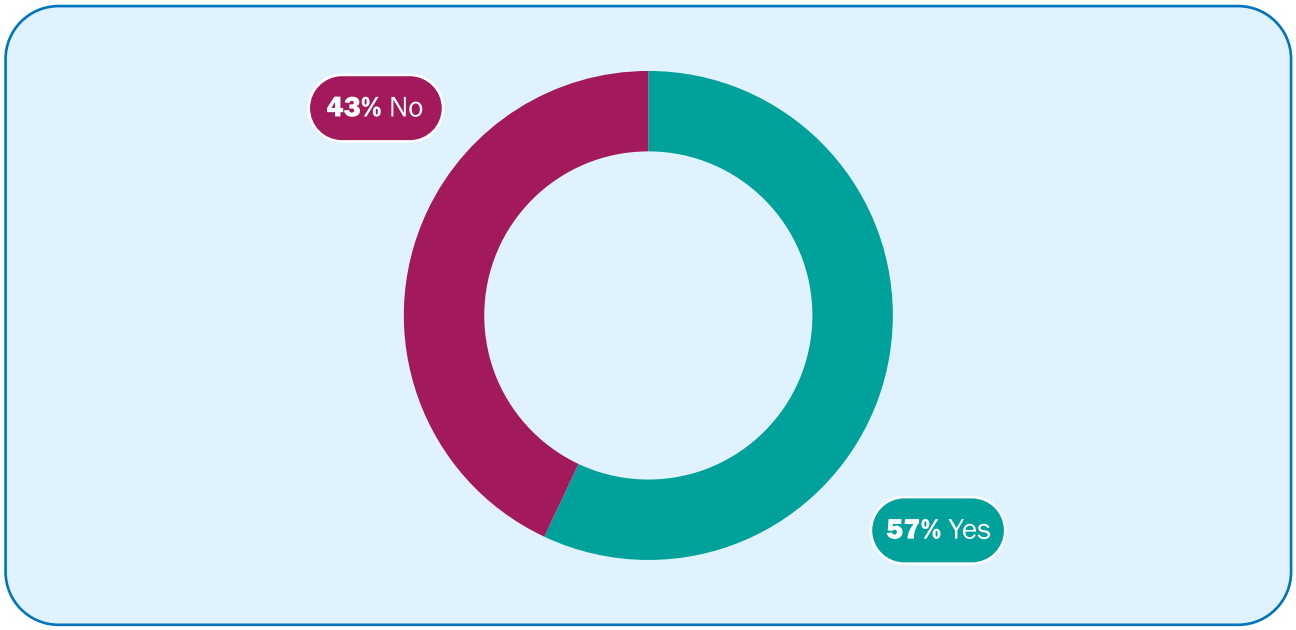
The word 'indigenous' created some difficulty. Some respondents believed it could limit opportunities for using certain renewable fuels or our ability to import renewable fuels and electricity. One respondent suggested that this principle could not be achieved affordably.

Create a flexible and integrated energy system

Key points here referred to the need for policy integration alongside system integration, as well as recommendations to focus more on citizen and community opportunities to engage and ensure local benefits. There were also recommendations to refer more specifically to a secure and resilient energy supply.

Q4: ARE THERE ANY KEY DELIVERY PRIORITIES FOR THE ENERGY STRATEGY NOT CAPTURED?

IF "YES", PLEASE OUTLINE BELOW WHAT YOU BELIEVE SHOULD BE INCLUDED.



WHAT DID RESPONDENTS SAY?

In total, 184 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we outlined our six delivery priorities to be progressed in delivering the Energy Strategy and asked if there were any others that had not been captured or included. The six priorities listed in the consultation were as follows:

1. **Security of Supply**: ensuring future policies result in a secure and resilient energy system
2. **Costs**: measuring costs and benefits to ensure cost-effective decisions are made
3. **Intelligence**: a comprehensive energy intelligence work programme
4. **Legislation**: providing the legal framework by making necessary changes to legislation
5. **Regulation**: reviewing regulation to promote consumer interests
6. **Governance**: a co-ordinated, joined-up governmental approach to energy decarbonisation

Overall, the six key delivery priorities identified within the policy options consultation document received overwhelming support. However, over half (56.5%) of respondents suggested additional delivery priorities.

Domestic consumers commonly expressed concerns about the availability of grants and loans, the need to address the issue of building insulation, and concerns around costs. Other comments included that:

- Urgent action is needed and NI is catching up compared to other areas;
- Biodiversity, education and the Just Transition were suggested as missing key delivery priorities;
- DfE will need to work collaboratively and effectively with other government departments to address climate change; and
- Costs should include the entire life cycle, including the supply chain, to ensure that sustainability is considered fairly.

Business consumers reiterated the importance of security of supply, with a mention toward rural areas or businesses that create jobs in these areas, and the need at early design stages to future proof the grid against future climate change risks – i.e. flood risks, higher summer temperatures, increases in frequency of storms.

This theme of risk was also mentioned by those suggesting a new delivery priority around environmental protection, biodiversity conservation, and climate resilience. This was seen to tie closely to planning and governance, and requiring planning around energy generation to be well informed, organised and implemented in a way that adequately safeguards NI's biodiversity. It was felt that whilst security of supply had been identified as a risk within the policy options paper, there were also significant risks around inaction from the Energy Sector to protect infrastructure from the effects of climate change.

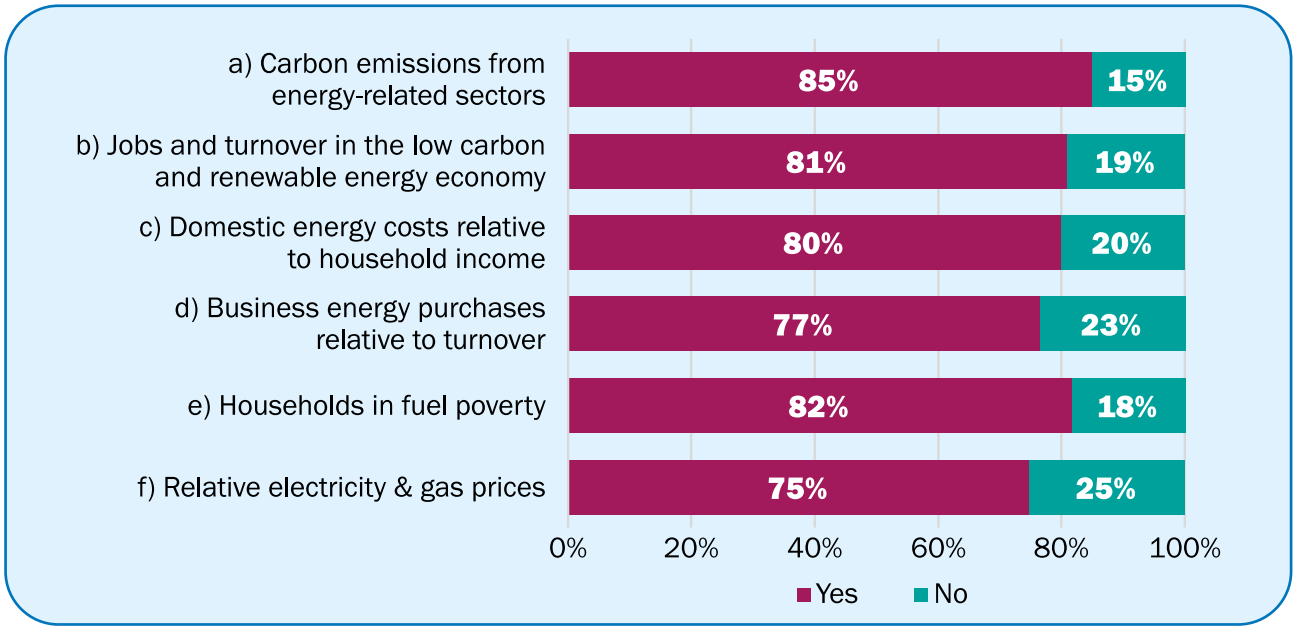
Several responses also emphasised the role of cost and the need to stay competitive. Many respondents pointed out that falls in the numbers of people in fuel poverty may have been influenced by recent lower fossil fuel prices, something that may change as the economic impact of the Covid-19 pandemic becomes clear. In this vein, finance was suggested as another key delivery priority as the ability of the public and private sector to adequately fund the investment required will be critical to the success of the Energy Strategy.

Amongst energy sector respondents, over two thirds felt that additional delivery priorities were needed. Suggestions included:

- Provision of education to drive behavioural change and ensure the public understands that energy is a complex subject;
- Educational focus is critical to provide the skilled workers required by the Energy Strategy;
- Community owned energy projects and how communities can participate and own some of the energy system as "prosumers" rather than merely consumers;
- Need for carbon accounting, a mechanism to prioritise the adoption of zero carbon technology and maximise adoption of carbon negative technology;
- Need for EV Charging, including the development of ultra-rapid EV charging hub infrastructure across NI;
- Green economic recovery from the Covid-19 pandemic to unlock private investment in low-carbon infrastructure and create new jobs; and
- Requirement to embrace the principles of sustainability, ensuring that local resources are not exploited or the wider environment is not detrimentally affected by any of the actions the Energy Strategy might contain.

Q5: DO OUR PROPOSED INDICATORS ADEQUATELY ALLOW US TO MEASURE SUCCESS AT ACHIEVING THE PROPOSED ENERGY STRATEGY OUTCOME?

IF NOT, WHAT ALTERNATIVE METRICS COULD BE USED?



WHAT DID RESPONDENTS SAY?

For this question, between 149 and 155 responses for the metrics were received in Citizen Space.

The policy options consultation document set out six energy indicators to monitor success of energy strategy outcomes and asked stakeholders if they agree with the indicator or suggested an alternative metric.

All the indicators proposed received strong support, with carbon emissions from energy-related sectors receiving the most support (85%).

The two largest groups that responded to each part of Question 5 include domestic consumers (43%) and energy sector representatives (39%). Representation was much lower across the three remaining group's i.e. vulnerable domestic consumers (3%), businesses with 1-49 employees (5%) and businesses with over 50 employees (8%). Domestic consumers responses had the highest approval (yes) rating (67-74%) for each of the indicators proposed. Whereas the lowest approval rating (26-31%) was present in business (50+) responses across all proposed indicators, the most common comments from this group included the need for an energy efficiency metric to measure reductions in fuel consumption and a security of supply metric.

Key themes raised across the indicators (Please note that the figures included in brackets relate to the count of comments, unless otherwise specified):

- **Carbon emissions -** 8 respondents noted that the metric should include carbon emissions from all sectors not just energy related sectors.
- **Low Carbon Renewable Energy Economy -** comments included that job creation figures are difficult to measure in the early stages, number of jobs does not directly correlate with environmental improvement and wages should be included to illustrate high value jobs. The metric should highlight the skills development (4) and further education courses/apprenticeships created (3).
- **Domestic energy costs relative to household income -** it was mentioned that household income is irrelevant to energy costs whether green or not (2); energy consumption (2) and energy efficiency adopted (3) should be considered as well as the amount of energy generated from low carbon resources.
- **Business energy purchases relative to turnover -** respondents (3) noted that energy costs in relation to turnover may provide the wrong focus, as there are a range of variants and complexities. An alternative suggestion included benchmarking (3) against other jurisdictions to ensure NI remains competitive for Foreign Direct Investment.
- **Households in fuel poverty -** respondents (3) noted that alleviating fuel poverty as a metric alone does not assist with decarbonisation. Public health benefit should also be considered (4). It was raised that fuel poverty is difficult to define due to the various definitions and measurements, an alternative suggestion included region-specific heat maps.
- **Relative electricity and gas prices -** respondents noted that many factors influence the price of electricity and gas, and that it is not solely affected by the successful adoption of an alternative fuel sources. It was noted that there is currently a disparity between the pricing methodology of electricity and gas to the customer (3). Relative costs (p/kWh) for all energy sources should be included.

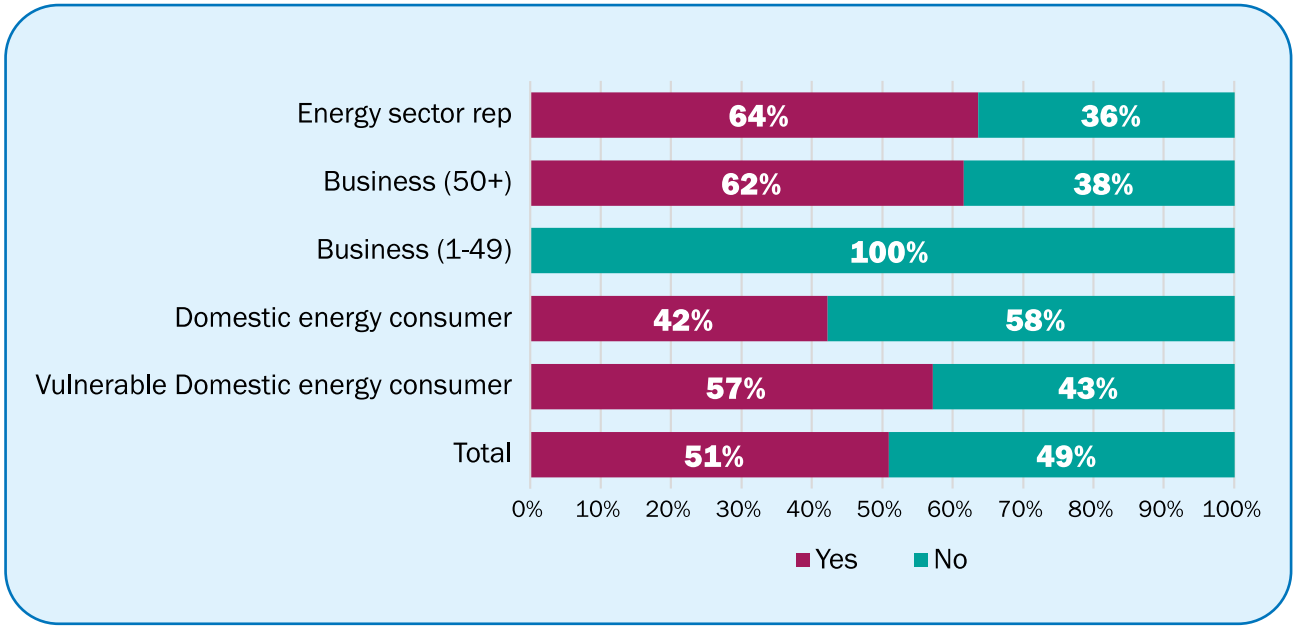
Across all comments relating to alternative metrics, consistent messages emerged including:

- **Energy efficiency (28) -** monitoring energy efficiency measures was mentioned in 15 comments, with the overwhelming support (85%) coming from the non-domestic respondents. It was stated that metrics should be considered to monitor the carbon of the NI building stock (6), retrofitted buildings (6) and energy standards for new builds (1).
- **Renewable energy use (20) -** some additional suggestions included measures for the diversity of the fuel supply (3), renewable energy used in NI (6), uptake in low carbon solutions (2) and the number of renewable energy generators (1). Also mentioned was that an indicator is required to gauge community energy growth (8).
- **Transport (12) -** this included monitoring the electrification of transport and that EV uptake and infrastructure should be monitored (8).

- **Energy consumption (11) -** strong support in relation to this suggested indicator, some responses highlighted that an additional metric is required to measure changes in energy consumption.
- **Security of supply (10) -** energy security was raised by multiple respondents, highlighting the fundamental role it plays in the energy strategy. Interruptions or shortages in supply need to be monitored given the changes in methods of energy generation.
- **Environmental impact (9) -** suggestion to measure the impact on the local environment.
- **Costs (8) -** a number of comments mentioned the need to monitor costs, both for government/local authority (2) and costs to the consumer (6).

Q6: DO YOU THINK THERE ARE SIGNIFICANTLY DIFFERENT ILLUSTRATIVE SCENARIOS WHICH SHOULD BE DEVELOPED?

IF SO, PLEASE PROVIDE FURTHER INFORMATION.



WHAT DID RESPONDENTS SAY?

In total, 159 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document set out three different future energy decarbonisation scenarios and asked stakeholders if there are significantly different illustrative scenarios that should be developed.

Of the total responses to Question 6 just over half (51%) of respondents thought that there were significantly different illustrative scenarios which should be developed. Energy sector representatives (64%) and businesses with over 50 employees (62%) had the highest proportion of responses which felt that alternative scenarios should be developed.

Key themes raised to be considered in scenarios are set out below. Please note that the figures included in brackets relate to the count of comments, unless otherwise specified.

Those who stated "Yes" to alternative scenarios being developed:

- **Future Energy Scenarios (26)** – strong support of a direction of travel towards the Diverse scenario orientation (9) and also High Electrification (7). However, comments indicated the need to acknowledge assumptions in other scenarios, such as International Energy Agency (IEA) Net Zero pathway (4). In addition, responses indicated needed to consider the level in the reduction of energy demand in the future (3) and incorporating behavioural change (3).

- **Alternative power generation (17)** – to ensure the decarbonisation of power generation a number of alternative sources were suggested including, offshore wind (4); nuclear (4); micro-grids (4); hydro/tidal (3); geothermal (1) and waste (1). Non-domestic consumers made up over three-quarters (77%) of responses associated with theme.
- **Hydrogen (14)** – a mixture of responses to this theme, positive in terms of future opportunities including exporting (5); however, some caution in its uses and efficiency in production (3) and a need for departmental direction (2). Positive comments on the role of green hydrogen (4).
- **Efficiency (11)** – strong encouragement to address energy efficiency (10) early in the transition and also system efficiency (1). Domestic respondents made this comment as well (23%).
- **Costs (10)** – respondents stated there was a need to examine the costs (10), including infrastructure and to the consumer, associated with scenarios. Only non-domestic respondents made this comment.
- **Biofuels (7)** – there was a mixture of comments in regard to biofuels, (4) negative or cautionary towards the extended use and (3) positive towards the role that biofuels could play in the decarbonisation of the energy system.
- **Renewable Electricity Share (5)** – four comments indicated support for a RES-E target of 80% by 2030, three of which suggested an aim of fully decarbonised power system by 2035. One comment in support of 70% RES-E by 2030.
- **Geothermal (4)** – respondents suggested that geothermal should be considered more widely as a renewable heating source (4).

Those who stated “No” to alternative scenarios being developed:

- **Future Energy Scenarios (21)** – strong support of a direction of travel towards the Diverse scenario orientation (9). High Electrification (3) and High gasification (1) were equally referenced positivity. In addition, responses indicated needed to consider the level in the reduction of energy demand in the future (3) and incorporating behavioural change (5).
- **Energy Efficiency (9)** – all respondents highlighted that the reduction in energy consumption is a priority and should be at the foremost of all scenarios (9). While no further scenario was suggested, it was noted that illustrating the reduction in total energy demand caused by energy efficiency alone would be useful. This response was mostly received from non-domestic respondents (78%).
- **Biofuels (8)** – as with those who felt a need for alternative scenarios there was a mix of responses to biofuels. More than half being positive (5), while indicating a need for the distinction between liquid biofuels, biogas and locally produced fuel to be made clear. Other respondents expressed cautionary or negative views towards the use of biofuels (3) stating that currently liquid biofuels are primarily not indigenous and would have an environmental consequence globally. Another response raised concerns regarding the production of biofuels and the negative impact on the local environment if not solely sourced from waste.
- **Transport (4)** – it was suggested that a clearer transport strategy should be developed with focus on public transport and cycling as alternatives.

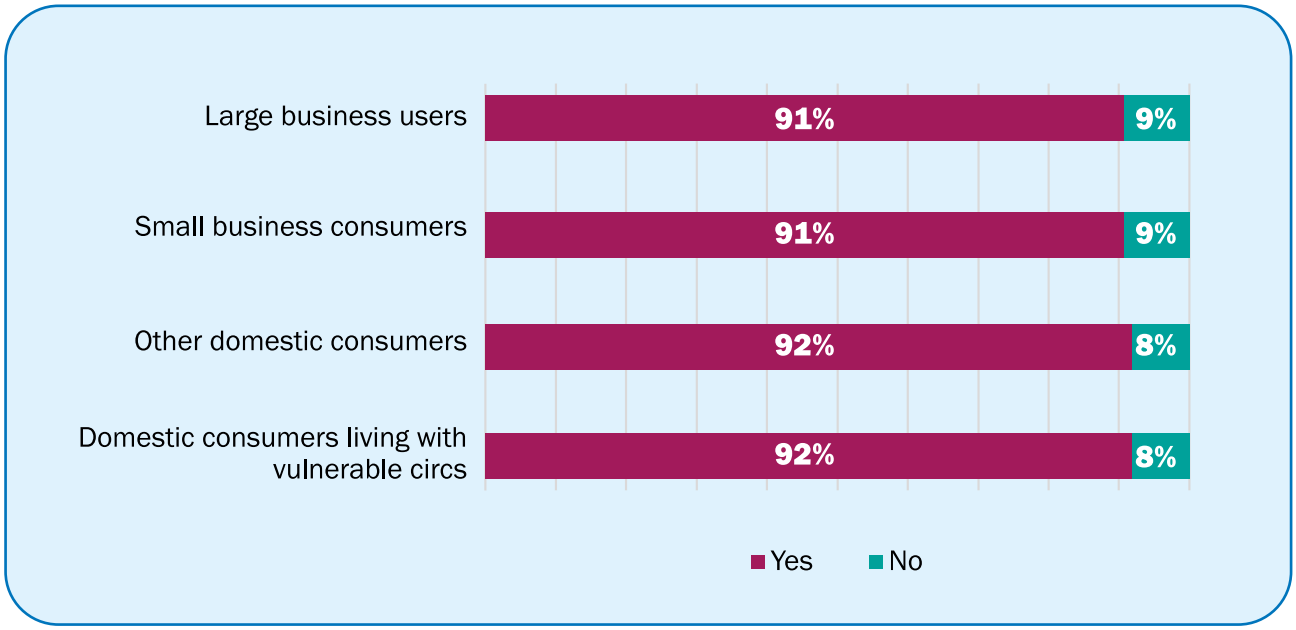
CHAPTER 2:

Placing You at the Heart of Our Energy Future – Response Summary

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



WHAT DID RESPONDENTS SAY?

For this question set on consumer population groups, between 158 and 160 responses were received in Citizen Space.

Within the policy options consultation document, we stated our intention to develop an energy transition that would 'enable and protect' consumers. We identified four consumer population groups asking for any key considerations pertaining to each.

The responses indicate that there is overwhelming support for these population groups, with an average of 91% of respondents in support across the four categories identified.

There were a number of common suggestions mentioned by respondents, which included:

- Need to further breakdown the vulnerable consumer category;
- Need to capture those on the margin of fuel poverty / vulnerability;
- Breakdown of rural versus urban for all categories, with some suggesting that the agricultural sector should be its own category;

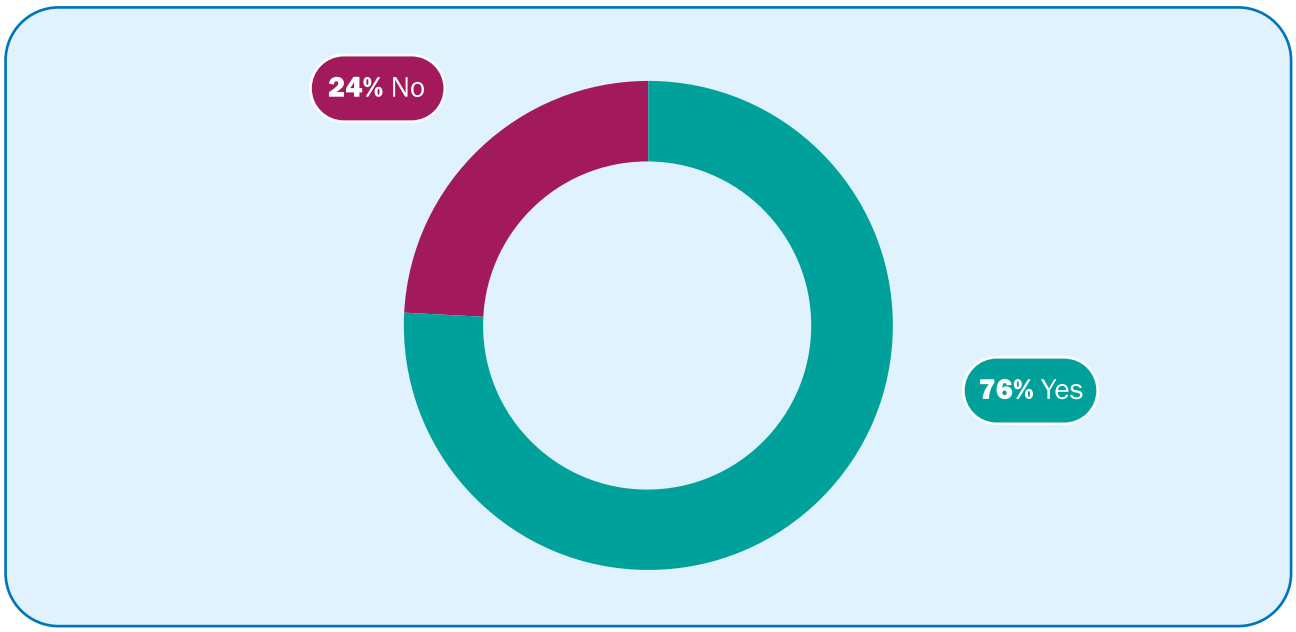
- Use of Energy Networks Association (ENA) categories – these are system service providers, active participant, passive participant, and passive consumer;
- Need for a public sector category;
- Further breakdown of the domestic consumer by housing sectors and differing models of home ownership – including private rental, registered social landlords, social housing, and multiple occupancy homes; and
- Differentiate businesses by levels of energy use, as this often corresponds with headcount and sector.

Other comments made by respondents included:

- Need to consider 'mosaic' consumers, i.e. those that use and produce and maximise that relationship;
- None of the categories properly covers community energy systems, which do not fall neatly into any one of those listed;
- Regarding terminology, it should be noted that everyone is an energy user as opposed to consumers;
- Need to add energy intensive industrial processes, data centres and infrastructure as categories; and
- Need to differentiate between business consumers who have single Meter Point Reference Number (MPRN) sites vs. customers who have multiple MPRNs.

Q8: DO YOU AGREE WITH THE FIVE MEASURES IDENTIFIED TO "ENABLE AND PROTECT" CONSUMERS?

IF NOT, PLEASE OUTLINE WHAT ELSE SHOULD BE INCLUDED?



WHAT DID RESPONDENTS SAY?

In total, 160 out of 253 responses were received to this question in Citizen Space.

Within the policies option consultation, we identified five 'enable and protect' measures that will protect consumers. In summary, these five measures were:

- Making available information and advice to consumers;
- Offering wrap-around proactive support to assist certain consumer groups;
- Providing financial support measures;
- Driving behavioural change; and
- Reviewing statutory protections.

Respondents strongly supported these measures, with 76% in agreement, compared with 24% that did not agree. While there were high levels of support for these measures, some respondents stated that each of them needs careful consideration in terms of its practical implementation.

A number of comments received from respondents were related to other areas of the policy options consultation and are not specifically addressed in this summary. For example, respondents provided feedback regarding specific types of alternative fuels, reference to nuclear energy, home retrofits and building standards. These topics are covered in other questions.

In relation to these enable and protect measures, a number of respondents drew linkages to the proposal for the One Stop Shop (OSS). They noted the need for advice to be provided by suitable experts without a vested interest in any type of technology, and that the OSS needs to be a trusted service that provides sufficiently independent advice. A number of those responding stated that the advice should be suitable and tailored to the customer's circumstances and needs. The need to avoid overwhelming consumers via information overload was a concern for some respondents.

Another common issue raised was in regards to the measure to drive behavioural change. A number of respondents noted that behavioural change was critical to achieving net zero emissions. They also recognised the challenges associated with it as a change of this magnitude only occurs through a significant and prolonged campaign that targets all of society. In doing so, it was highlighted that consumers must genuinely buy into the changes, understanding how day-to-day activities contribute (e.g. not just focus on a one-off change, such as installing a new boiler).

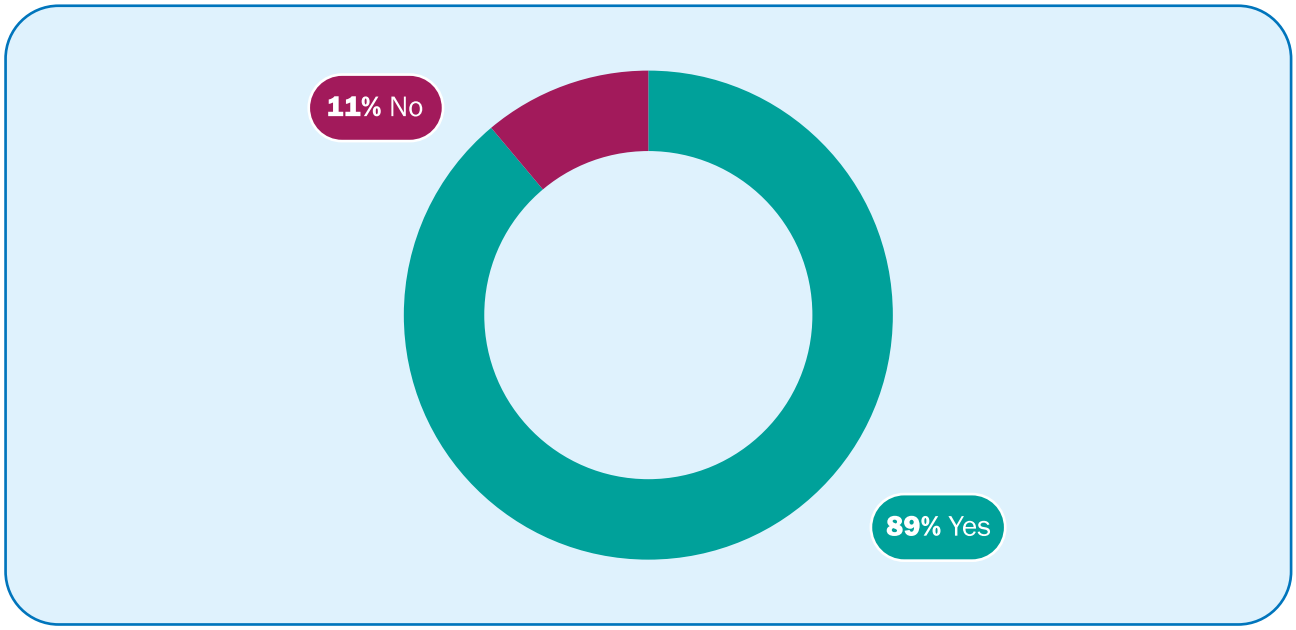
A number of respondents also suggested additional measures for consideration:

- Adding empowering rather than just enabling, possibly as part of the overarching objective, e.g. enable, protect and empower;
- Addressing lack of consumer cost impact data;
- Making best use of new technologies and innovations, and promoting these to consumers once they are recognised as accepted solutions;
- Tackling the digital divide;
- Need to remove subsidies and tax fossil fuels (e.g. polluter pays principal) in order to help fund alternatives;
- Ensuring affordability of energy;
- Adopting Just Transition principles;
- Reviewing network and system costs and charges;
- Fairer balance of costs and revenues between industry and consumers; and
- Tariff reform.

Finally, respondents underscored the importance of financial support schemes, as well as the need to ensure that the burden of costs did not fall on vulnerable or low-income consumers. A number of respondents highlighted that these measures also need to apply to non-domestic consumers. The need to ensure that these measures were not centred solely on Belfast and should benefit all areas of NI was mentioned, with a suggestion to consider local supply options and level playing field requirements.

Q9: DO YOU AGREE WITH THE PROPOSED SCOPE OF THE "ONE STOP SHOP"?

PLEASE OUTLINE BELOW ANY DIFFERENT ACTIVITIES YOU THINK SHOULD BE INCLUDED.



WHAT DID RESPONDENTS SAY?

In total, 162 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to develop a "one stop shop" organisation that will be the key contact point for energy consumers in the future. This NI-wide body will be the main interface for consumers on energy-related matters, working collaboratively with and complementing existing bodies.

There was broad overall support for the proposed scope of a One Stop Shop (OSS), with 89% of respondents who answered this question agreeing with the proposal, compared with 11% indicating they did not agree. Support for the scope of the OSS was consistent across all age groups, and across urban, semi-urban or rural areas.

Domestic consumers supporting the OSS underscored the need for it to include energy efficiency within its remit and one respondent raised the need for more accurate and informed methods for evaluating energy performance in buildings. A number of people stated that the OSS should provide information and advice that is easy to access, with a virtual platform that is consumer friendly and easy to navigate.

Business and energy sector respondents were largely supportive of the OSS core concept. Many recognised the need for the OSS stating it was vital and that a more coordinated approach to the delivery of energy strategy would be useful as there are currently too many bodies responsible. A number of respondents emphasised the need for the OSS to be a trusted source of independent advice in order for stakeholders to make well-informed decisions. Finally, many responses highlighted the need for the OSS to be empowered to implement policy and legislation, and for the organisation to be free from outside influences.

Many business and energy sector respondents underscored the need for stakeholders in NI to shape the remit of the organisation, as well as the need for this to be clearly defined with a transparent terms of reference. Respondents also commented that the OSS should support businesses and should not deter new entrants to the marketplace. Creation of a new energy agency / department was the preferred approach for a small number of respondents.

Amongst those that indicated they did not support the proposed scope of the OSS, the reasons given for this include:

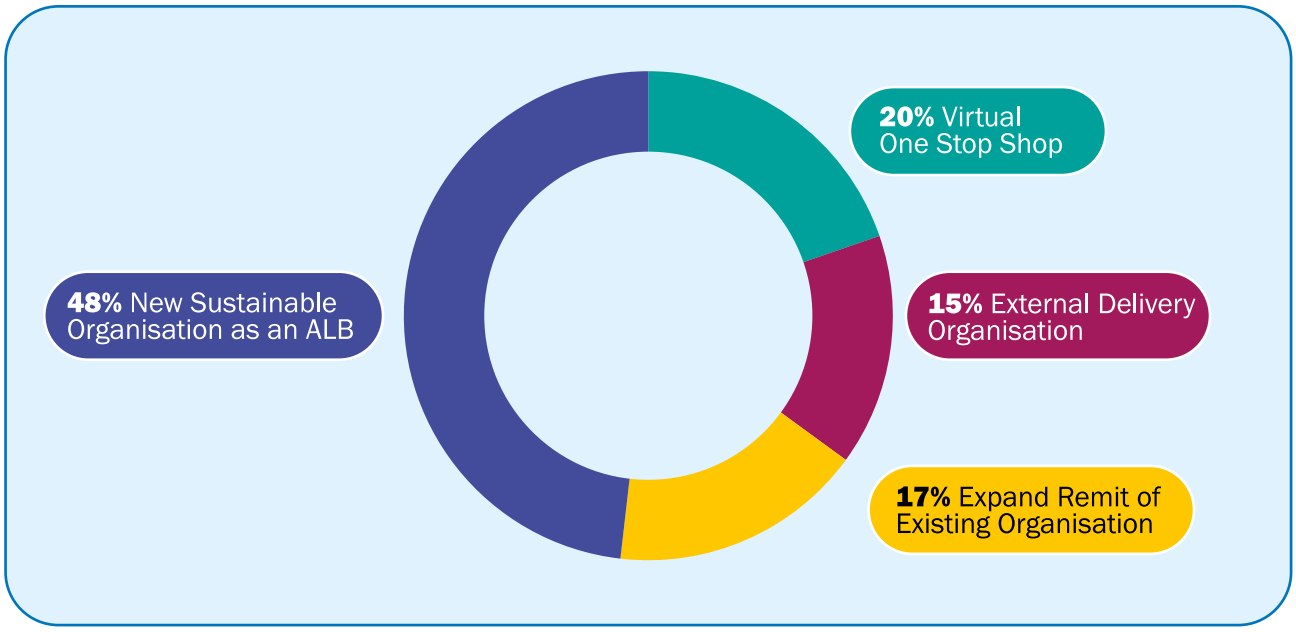
- Scope of OSS should be broadened beyond domestic consumers, and could include domestic energy producers (e.g. micro-generation);
- Money will be spent inappropriately or could be better spent elsewhere;
- Concerns that the OSS will not be innovative and stagnate in the absence of competition;
- Open to abuse by industry;
- Not suitable for those that do not use the internet, or that need specialist support; and
- No need for a transition to net zero carbon emissions as the climate is always changing.

There were numerous suggestions for different activities that could be included within the remit of the OSS. A large number of respondents stressed the importance of the OSS in providing wrap-around energy information, technical advice, and support. Other suggestions include:

- Consumer education and in depth analysis of customer needs (including design services);
- Management and administration of energy efficiency schemes, including grant allocation;
- Scoping and funding of appropriate energy research;
- Membership and liaison with other relevant national and international bodies;
- Provision of advice, as well as the ability to challenge the government;
- Links to certified expertise, e.g. list of accredited suppliers and installers; and
- Holding the government to account on the delivery of the energy transition.

A number of responses recognised the need for the OSS to take a more proactive approach to vulnerable customers. One business respondent suggested the inclusion of a ‘community energy audit service’ that focuses on vulnerable and low-income households with the goal of providing practical advice, as well as implementing energy efficiency and/or fuel poverty interventions.

Q10: WHICH APPROACH DO YOU THINK SHOULD BE TAKEN TO CREATE THE "ONE STOP SHOP" ORGANISATION?



WHAT DID RESPONDENTS SAY?

In total, 137 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document set out four different approaches to creating a 'One Stop Shop' (OSS) and asked stakeholders which option they feel the department should take, including any rationale for this selection. The four options discussed were 1) a virtual 'One Stop Shop', 2) funding an external delivery organisation, 3) expanding the remit of an existing organisation; and 4) creating a sustainable energy organisation as an Arm's Length Body (ALB).

Almost half of respondents (48%) felt that the creation of a new ALB was the best approach to take when creating a OSS; with the other three options all receiving similar levels of support (between 15-20%). Support for a new ALB was consistent across all age groups. Across urban and rural areas, a new ALB was the most supported option; however, semi-urban respondents were almost equally divided in their support for virtual OSS, expanding the remit of an existing organisation and setting up a new ALB.

For those supporting the establishment of a new ALB, the most commonly cited reasons for this support were that it:

- Maintains a strong link to the delivery of policy objectives, acting independently;
- Is able to provide a single point of contact across a range of issues including technical advice, available services, as well as support for the delivery of projects;
- Works collaboratively across government departments, as well as in conjunction with academia, industry and local communities;

- Has the ability to operate flexibly, adjusting rapidly to new technologies and innovation; and
- Offers the greatest overall benefit and is able to provide the support needed to deliver against net zero commitments.

Of those supporting a virtual OSS, it was noted that it was likely to be the cheapest and fastest option for delivery, and that it was likely to be the most widely accessible option. However, a number of those in support of this option also noted that it was insufficient on its own, as some customers are likely to need more support including the option of speaking to advisers. Respondents across all options noted that a virtual only approach was likely to be inappropriate for the elderly, those without reliable internet access and vulnerable consumers.

The main rationale of those expressing support to expand remit of an existing organisation was that existing organisations were already set up and ready to deliver the remit, which would be more cost effective. Respondents mentioned a number of organisations whose remit could be expanded including the Consumer Council NI, Invest NI, NI Energy Advice Service, the Energy Savings Trust, and NI Business Info.

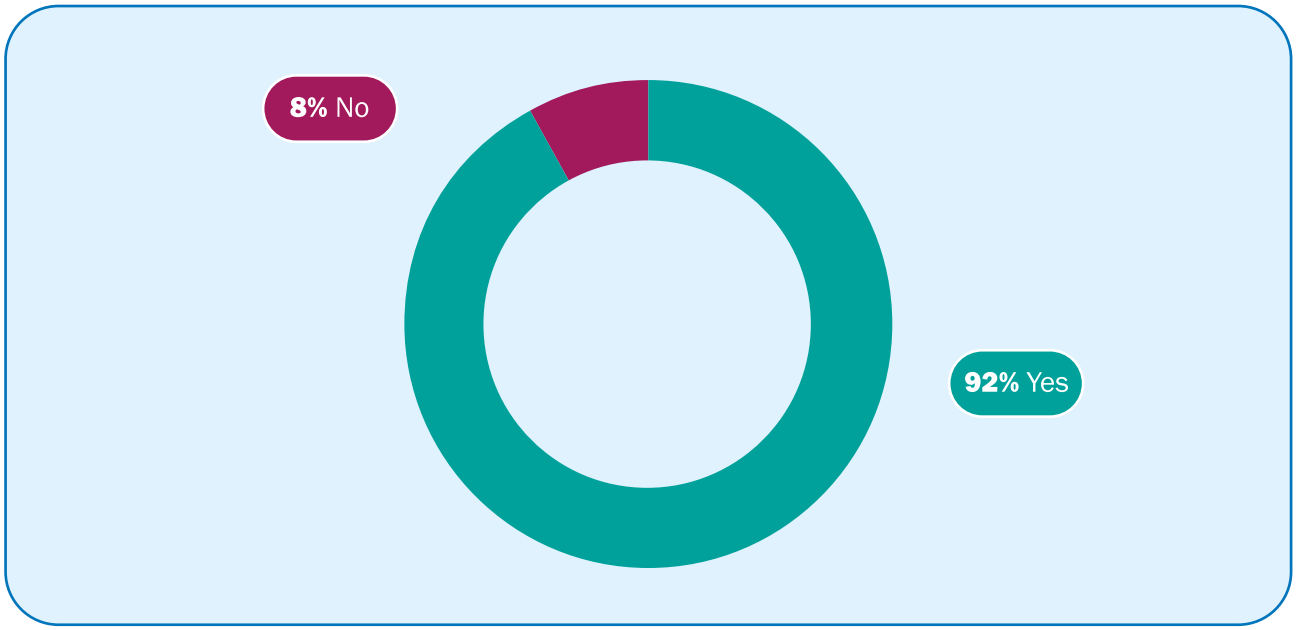
For those supporting the formation of an external delivery organisation, the reason most commonly cited was the need for independence with many expressing scepticism that any body linked to the government would be sufficiently independent. For some respondents, this option was felt to be appropriate if the "scope is wide enough" to ensure that it could address customer queries at the first point of contact, noting that it would need to provide balanced and accurate information for all customers.

Across all four options for establishing an organisation, consistent messages emerged including:

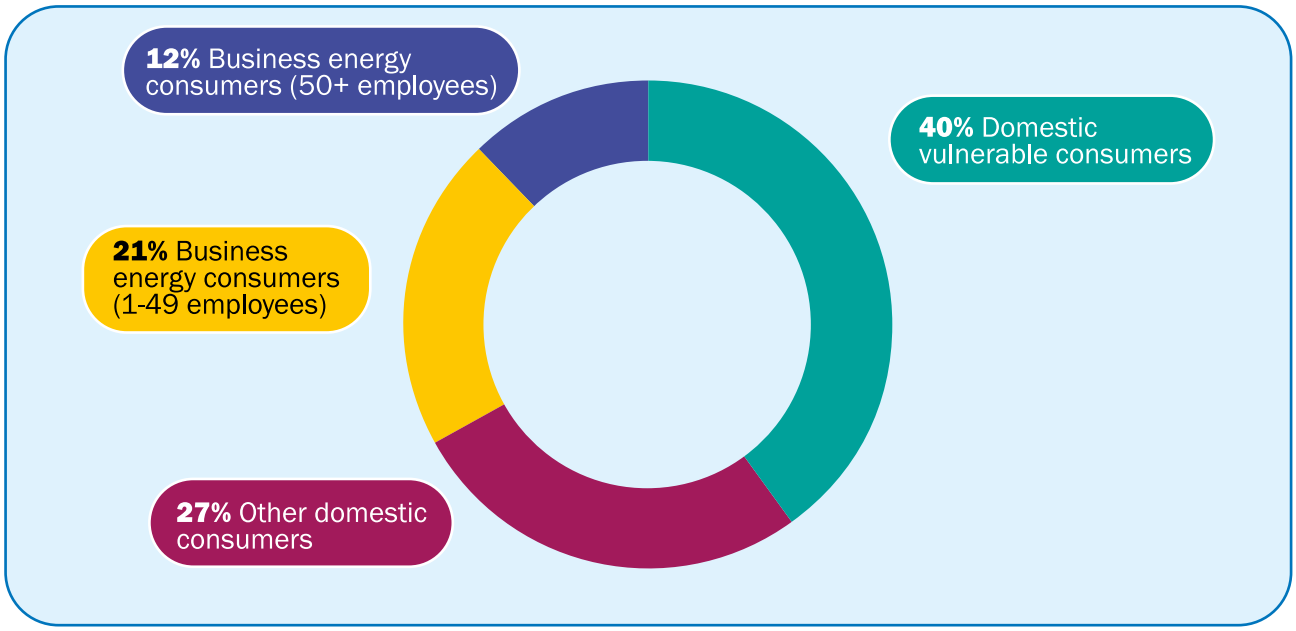
- **Need for Independence:** In order to be a credible and trusted source of information, the organisation must deliver government policy independently;
- **Technology neutral**: The organisation must not have a stake in any one type of technology or approach;
- **Delivery Body:** It must be empowered to deliver against energy policy objectives;
- **Partnership:** Any new organisation must work together with local councils, voluntary and community organisations, and the energy sector across NI;
- **Well Resourced**: It must be sufficiently resourced and able to respond to customers in a timely manner. Any organisation will need to have the appropriate depth of knowledge and expertise to provide the necessary advice and support; and
- **Engagement and Awareness**: Needs to be proactive and raise awareness of the issues related to climate change and energy, making stakeholders aware of the benefits that the energy transition can bring.

A number of respondents highlighted the Sustainable Energy Authority of Ireland (SEAI) and Home Energy Scotland as good examples of what a similar OSS organisation in NI could deliver.

Q11: DO YOU BELIEVE THAT ADDITIONAL FINANCIAL ASSISTANCE TO PROTECT CERTAIN GROUPS OF CONSUMERS SHOULD BE INTRODUCED?



IF "YES", PLEASE IDENTIFY BELOW WHICH CONSUMERS SHOULD BE TARGETED AND TELL US WHAT SUPPORT MIGHT BE NEEDED:



WHAT DID RESPONDENTS SAY?

In total, 145 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to "*Ensuring affordability and fairness in meeting the investment costs of net zero energy carbon emissions.*" We outlined how financial assistance was provided elsewhere (UK/RoI) covering both domestic and non-domestic consumers; and our intention to maximise synergies between existing social, health care and energy support and protection frameworks.

There is substantial support across all consumer categories, with 92% of those who responded agreeing with additional financial assistance to protect certain groups of consumers, and 8% that did not agree. In considering which category of consumer should be targeted for assistance, the majority of respondents (40%) selected domestic consumers living with more vulnerable circumstances. A summary of feedback by consumer type is set out below.

Domestic consumer living with more vulnerable circumstances:

Respondents in this category noted the need for support in the form of information and education, in addition to financial support. It was mentioned that those in vulnerable circumstances could be wary of any option that incurred debt; therefore, grant aid or measures by housing associations were identified as potential options. Another respondent highlighted the need to recognise hidden poverty amongst domestic consumers that are not generally recognised as vulnerable.

Domestic consumers:

A number of respondents noted the need for support across different consumer types, as well as calling for education including carbon literacy. A number of respondents cautioned against increasing costs for those least able to pay, even if these changes would lead to lower costs in the long-term. Other comments included:

- Affordability and the need for grants to be available for certain types of technology (e.g. heat pumps and EVs);
- Need for education and support; and
- Use of discounted tariffs or cash / rebate scheme.

Business consumers:

A number of business respondents mentioned protecting vulnerable consumers. In addition, respondents commented that support schemes would be needed for all types of consumer, and that the ability to apply for a loan or financial support should not be restricted to certain types of consumer. The need for any assistance scheme to be fair, equitable and easily accessible was mentioned, recognising that many of the most vulnerable may need assistance in accessing new technologies. Reference was made to the following:

- Incorporation of FSB fairness principles[2] and / or Just Transition principles;
- Incentivising businesses by introducing regulation (e.g. building regulations) to stimulate change;
- Prioritising the least efficient buildings and high energy users; and
- Need for support mechanisms for consumers that use fuels not associated with an energy supplier (e.g. home heating oil), which are easily accessible to those in crisis.

2 https://www.fsb.org.uk/resources-page/why-policymakers-must-listen-to-small-businesses-to-achieve-net-zero-target.html

Energy sector representatives:

Protecting vulnerable consumers was mentioned by a number of energy sector representatives, although it was also noted that some level of assistance would be needed across all groups in order to incentivise change. A number of respondents discussed the need to develop appropriate options for the different groups, noting that financial assistance may need to be tiered depending on what people can afford. Some respondents were concerned that the energy transition, and associated services, may be more expensive for rural households and widen the imbalance between urban and rural communities. The need to consider vulnerable and at risk households living in hard to improve homes was noted as an area in need of focus.

Respondents recognised that a combination of carrot (incentive) and stick (deterrent) measures might be required and that taxation may be needed (e.g. carbon or climate tax). One respondent noted the effect that climate change may have on vulnerable households, whereby fuel poverty would be experienced in terms of the ability to employ cooling technologies in summer months.

A number of possible financial support options were proposed:

- Most commonly raised was the 'pay as you save' model;
- Rates rebates and low / no interest loans, particularly for vulnerable consumers;
- Equity release scheme, similar to what is in place in Scotland;
- A billing model called Energiesprong (https://energiesprong.org/) used in the Netherlands; and
- Sustainable Energy Communities scheme run by SEAI.

Across all types of respondents, the need to clearly define and recognise the different categories of vulnerable consumers was raised, as was the need to consider those on low incomes and those vulnerable to fuel poverty. The need for decisions to be made in a fair and transparent way was also stated.

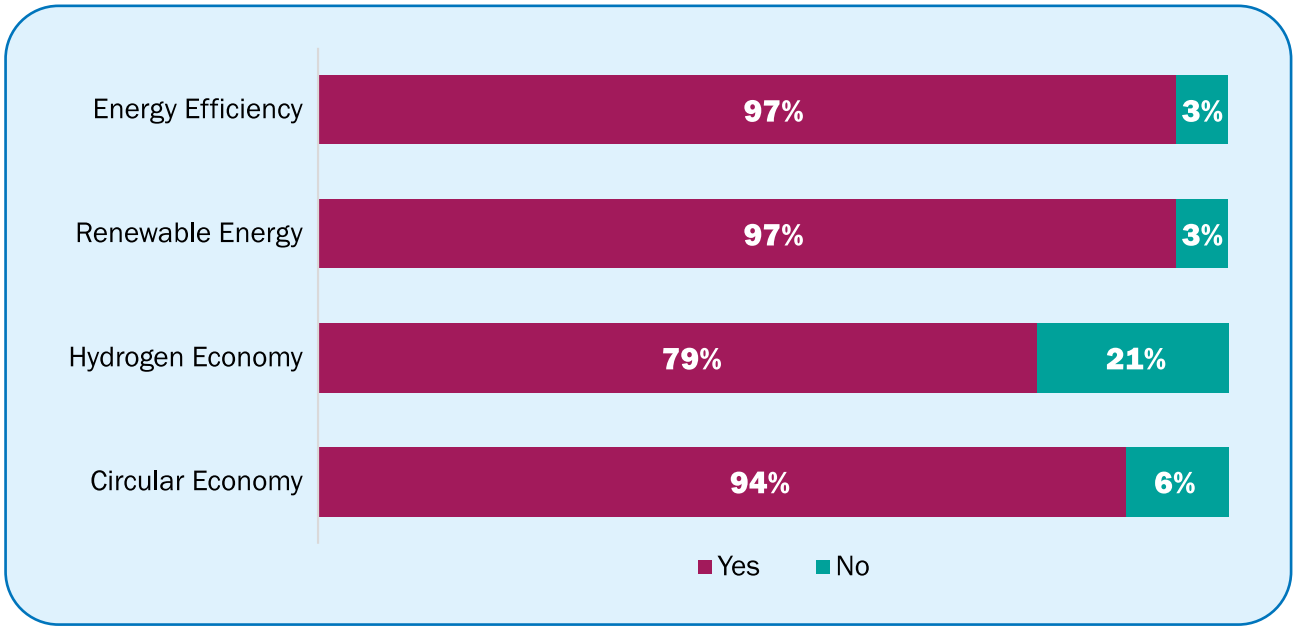
CHAPTER 3:

Grow the Green Economy – Response Summary

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.



WHAT DID RESPONDENTS SAY?

On average, 171 out of 253 stakeholders responded to one or more parts of this question on Citizen Space.

Within the policy options consultation document we stated that as a small, open and competitive economy we need to focus on priority sectors and emerging technologies where we can maximise economic benefits. The priority clean energy sectors identified were energy efficiency, renewable energy, hydrogen economy, and circular economy.

The question provided respondents with an opportunity to identify additional areas they believe should be prioritised, to which 104 respondents provided a response. Some additional priority sectors were proposed by respondents, including Innovation, Digitalisation, Consumer Behaviour/Empowerment, and Clean/Renewable Transport. Community and local energy were mentioned as providing an opportunity to deliver local energy solutions at a local scale.

An overview of the responses for each of the four areas is set out below.

12a Energy Efficiency

Of the 253 possible respondents, 172 replied to the question on Citizen Space. Of these respondents, **97% agreed that energy efficiency should be one of the four priority clean energy sectors to stimulate the green economy**.

Where additional comments were provided in relation to energy efficiency, almost 100% supported its inclusion as a priority clean energy sector. Common themes arising were that:

- Improving the energy efficiency of homes and businesses in NI is a *"no-brainer"*;
- In the short to medium-term, these measures can provide quick wins for saving carbon; and
- Energy efficiency is an easy option for consumers to adopt given its proven and well known effectiveness.

Respondents indicated support for a retrofit strategy and a 'fabric first' approach[3]. They suggested that a large-scale programme, implemented quickly (in the near-term) across all sectors will ensure that homes and properties are ready to adopt new technologies, such as heat pumps. The need for political action to drive forward robust and coordinated delivery was mentioned, both in terms of retrofitting existing buildings and ensuring new builds meet net zero standards.

A small number of respondents expressed reservations as to how energy efficiency will be achieved and it was recommended that NI *"think beyond the simple metrics of EPCs and arbitrary targets"*. In the non-domestic sector, reservations were also identified and there was a call for businesses *"to take energy efficiency seriously and appoint energy managers"***.**

12b Renewable Energy

Of the 253 possible respondents, 171 replied to the question on Citizen Space. Of these respondents, **97% agreed that renewable energy should be one of the four priority clean energy sectors to stimulate the green economy**.

The remaining 3% felt that renewable energy should not be a focus going forward with one respondent citing concerns about the efficiency and the green credentials of renewable technologies.

3 A 'fabric first' approach to building design involves maximising the performance of the components and materials that make up the building fabric itself, before considering the use of mechanical or electrical building services systems (https://www.designingbuildings.co.uk/wiki/Fabric_first).

A number of respondents supporting this priority sector also referenced the need to embrace other technologies in diversifying the electricity generation mix. Comments included:

- Need for storage (of all types) to be integrated with other technologies to become sustainable, perhaps through a model of storage as service;
- Need for a separate storage strategy that recognises and takes account of potential risks;
- Further consideration of Carbon Capture, Utilisation and Storage (CCUS), particularly in conjunction with biogases;
- Consideration of nuclear energy for large scale energy generation due to its ability to meet all future requirements efficiently, cleanly and safely; and
- Use of solar, together with storage, as a proven technology.

There were contradictory views on the scale of renewable energy deployment with some favouring large-scale developments as the best way forward, while others pointed to under-representation of micro-generation. It was noted that NI is "*world leading in RES-E"* and as a result there are unique opportunities to use the electricity system as a test bed for new and emerging technologies, possibly expanded through micro-generation. Meanwhile it was suggested that micro-generation is *"very untapped"* with one political party suggesting that legislation (once introduced) should be put in place that would oblige DfE to introduce a scheme to mandate major electricity providers to establish a minimum price tariff for micro-generated electricity and to purchase a set amount of that electricity by defined dates.

A number of respondents advocated for changes in the planning regime, and introduction of regulatory and tax measures to facilitate further deployment of renewables. Other comments received advocated that more weight should be given to the wider benefits of renewable projects in planning considerations, that there is a need to address speed of determination, and that greater priority should be given to repowering existing sites.

12c Hydrogen Economy

Of the 253 possible respondents, 169 replied to the question on Citizen Space. Of these respondents, **79% agreed that hydrogen should be one of the four priority clean energy sectors to stimulate the green economy.**

Those not in support of hydrogen as a priority sector raised concerns that it is a fuel derived from a hydrocarbon (blue hydrogen but with carbon capture). A number of respondents felt that hydrogen should not be singled out and that it should be called 'Green Gas', as this would expand to cover biomass and biomethane. Other concerns raised were in regards to the safety of hydrogen as a fuel and the emerging nature of the technology involved.

Those in support of this sector made links to the utilisation of constrained wind in order to create green hydrogen and noted that the benefits would be widely felt. In general, respondents supported the development of green or sustainable hydrogen, but expressed concerns regarding blue hydrogen. A number of respondents noted the potential benefits that hydrogen could bring to NI, attracting investment and creating jobs. However, even amongst respondents supporting the hydrogen economy there were some notes of caution with reference to the immature nature of the technology. Respondents noted that while hydrogen may be appropriate for hard to decarbonise sectors (e.g. aviation and transport), it was likely to be a longer-term solution for more general use and that it needed to be shown to be feasible, safe and a cost effective option.

There were mixed views on the level of hydrogen related technology and concerns regarding implementation.

12d Circular Economy

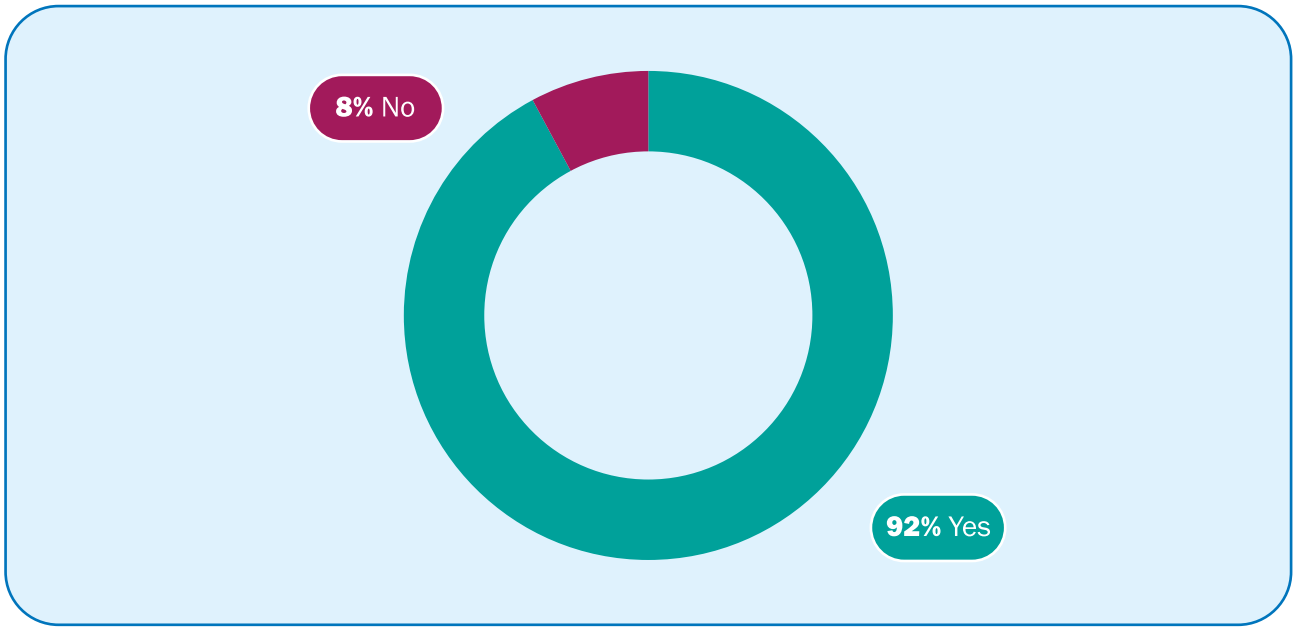
Of the 253 possible respondents, 171 replied to the question on Citizen Space. Of these respondents, **94% agreed that the circular economy should be one of the four priority clean energy sectors to stimulate the green economy.**

The remaining 6% of respondents felt that the circular economy should not be a focus going forward. One respondent provided a reason citing concerns about the level of understanding amongst the public and a reluctance to undergo or accept significant change.

Those supporting the circular economy as a priority sector highlighted the importance of utilising by-products, as well as noting that maximising and prolonging resources achieves greater sustainability. Others referred to waste management and recycling recognising the need to address excessive packaging and the opportunity to turn residual waste into energy. There was one reference to how utilising agricultural residue *"will reduce agri-emmissions and induce a re-balance of nutrients on the land promoting a circular sustainable economy".*

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?



WHAT DID RESPONDENTS SAY?

In total, 153 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, policy proposals were put forward that will lead to substantial investments in the energy efficiency of our buildings and therefore act as a stimulus to the green economy. Consultees were asked if they agreed with the economic growth opportunities identified within energy efficiency and what supporting policies were required.

Of the 153 people that responded to this question, 92% agreed with the proposal, while 8% did not. A number of respondents provided comments on the policies they believed would be needed to take advantage of economic growth opportunities identified within energy efficiency.

A number of respondents recognised the economic benefit of retrofit activities to NI. While it was felt that energy efficiency policies provided significant economic opportunities, the scale of cost was recognised, with 10% calling for greater government support through tax incentives and provision of loans with preferential rates. These respondents referred to the importance of incentivising businesses, with some stating the current support to the commercial sector was not comprehensive enough.

Where comments were provided, 21% of respondents recognised the important role education and training facilities could play in supporting economic growth. It was recognised that the drive for new skills provided an opportunity for universities and training facilities to deliver courses that support new technologies and retrofit solutions resulting from government policy. Reference was made to the importance of this for supply chain organisations, individual contractors and growth opportunities for apprenticeships.

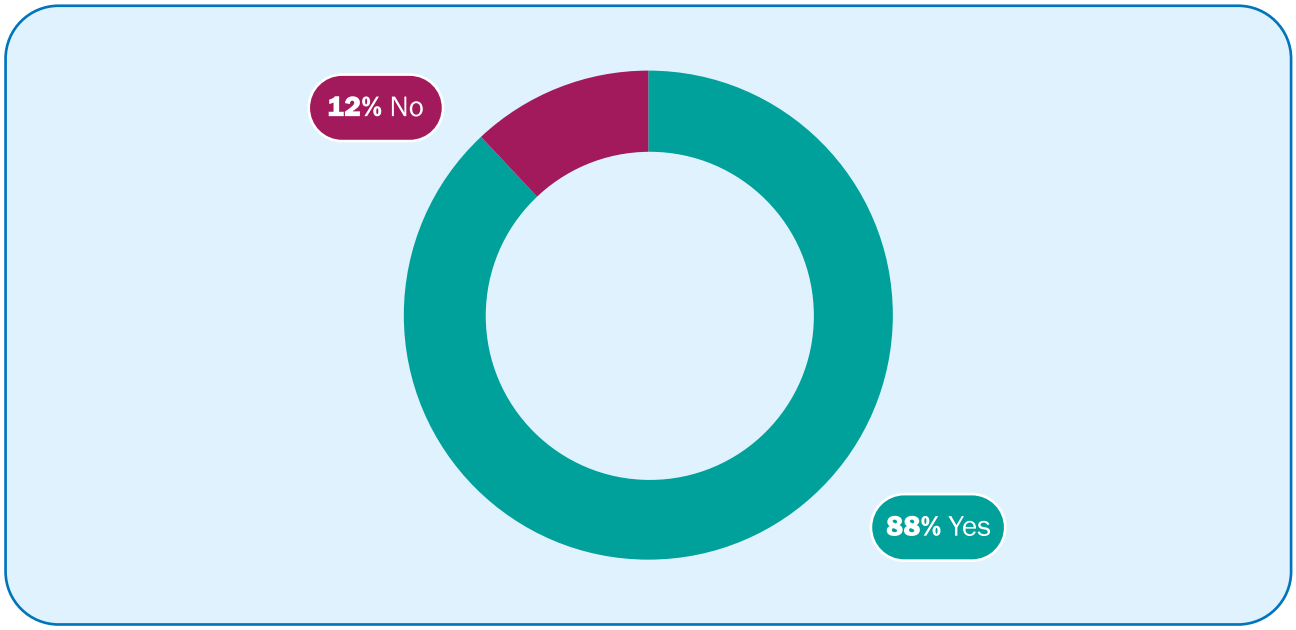
Innovative uses of data through digitalisation solutions was mentioned by 8% of people as an economic opportunity. There was recognition that digital solutions could provide efficiency gains throughout the entire energy system.

Opportunities for growth with new technologies was referred to by 8% of respondents, with reference made to geothermal, biomethane, hydrogen, and battery storage solutions.

There was a difference in opinion as to whether public sector buildings should be the focus of retrofit measures. Some respondents felt that they offered an opportunity to act as an exemplar for change across all sectors. However, others felt that it is likely that fewer people will travel to work in the future and the cost effectiveness of upgrading government buildings was questioned as a result.

Q14: DO YOU AGREE WITH THE ECONOMIC GROWTH OPPORTUNITIES IDENTIFIED WITHIN RENEWABLE ENERGY?

WHAT SUPPORTING POLICIES DO YOU THINK ARE NEEDED TO TAKE ADVANTAGE OF THESE?



WHAT DID RESPONDENTS SAY?

In total, 162 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation, we set out a number of economic growth opportunities related to the renewable energy sector. A number of potential policy options were put forward for consideration including a new electricity consumption target, bringing forward offshore and marine renewables together with support mechanisms, investment in grid infrastructure, supporting micro-generation, trials and wider deployment of low carbon heat and transport, and opportunities for agriculture and the rural economy via biogas and Energy from Waste.

Overall 88% of respondents agreed with the economic growth opportunities identified within renewable energy, while 12% disagreed. A number of comments were received regarding supporting policies needed to take advantage of these opportunities.

Significantly, there is broad agreement that offshore renewables are an essential part of the technology mix for electricity generation in NI although it was highlighted that there are several challenges to delivery. It was cautioned that investment in the short to medium-term in both offshore and conventional power plant should be *"carefully considered against the wider benefits of a distributed systems approach",* and that in the longer-term, any such investments could "*represent an expensive and unnecessary intermediate step".*

A belief was also expressed that a strategic approach to the placement of offshore renewable energy projects and subsequent cabling must be given due consideration from an early stage, informed by a spatially prescriptive, fit for purpose marine plan. There was some industry comment to the effect that while some merchant projects are starting to emerge it is unlikely that the necessary capacity, especially offshore wind, will be developed without some form of revenue support mechanism.

A number of respondents believe that offshore projects are unlikely to be operational in time to contribute to the 2030 renewable electricity target, and that realistically, this target would be met through onshore wind and solar projects. The need to attract continued investment in onshore projects was noted as being critical to the Energy Strategy and the green recovery for NI. Some respondents provided their analysis of the jobs and economic benefits that onshore projects could bring to the local economy. However, the need to address existing levels of constraint and curtailment was raised as a critical issue.

For those agreeing with the main question there were suggestions around the use of geothermal, mainly with regard to heating. For example, there were proposals for policies that recognised the opportunities of geothermal energy while protecting groundwater resources and in relation to renewable heat schemes for deep geothermal energy**.** It was further suggested that there might be potential to extract lithium, which is used in EV batteries, from the brines in geothermal energy systems**.** Counter to these, it was questioned whether there should be progress on geothermal growth opportunities in NI until proven through trials.

There were also numerous references to policies for the deployment of solar technology. These included comments on the installation of solar on all new buildings and specifying that batteries should be installed with domestic solar Photo Voltaic (PV) on the basis that "*Adding solar on its own does not provide significant benefits. Grants should only be given to systems with batteries".* It was further suggested that solar PV is easy to roll out as the necessary skills and experience already exist in NI and that 50% capital grants should be made available for domestic and commercial premises. There were suggestions that despite the significant energy solar PV can generate, thought needs to be given to disposal of panels due to the composite materials containing heavy metals.

A handful of responses refer to the need for taxation as a means of encouraging investment in renewables. Suggestions include potential for a Renewable Fertiliser Obligation to encourage the processing of manures to recover bioenergy, biogenic carbon and bio nutrients to decarbonise agriculture; the need for renewable incentives legislation (tax relief); larger support schemes for domestic renewable energy opportunities; and, regulations requiring new builds to include infrastructure that accommodates renewable energy adaptations.

A number of respondents referred to the use of regulation to encourage investment in renewables with suggestions including expansion of the Utility Regulator mandate to include consideration of net zero and wider economic benefits for NI consumers as well as protecting consumer interests and the need to reform planning regulations and commence a review of connection charging policies to align NI with other regions.

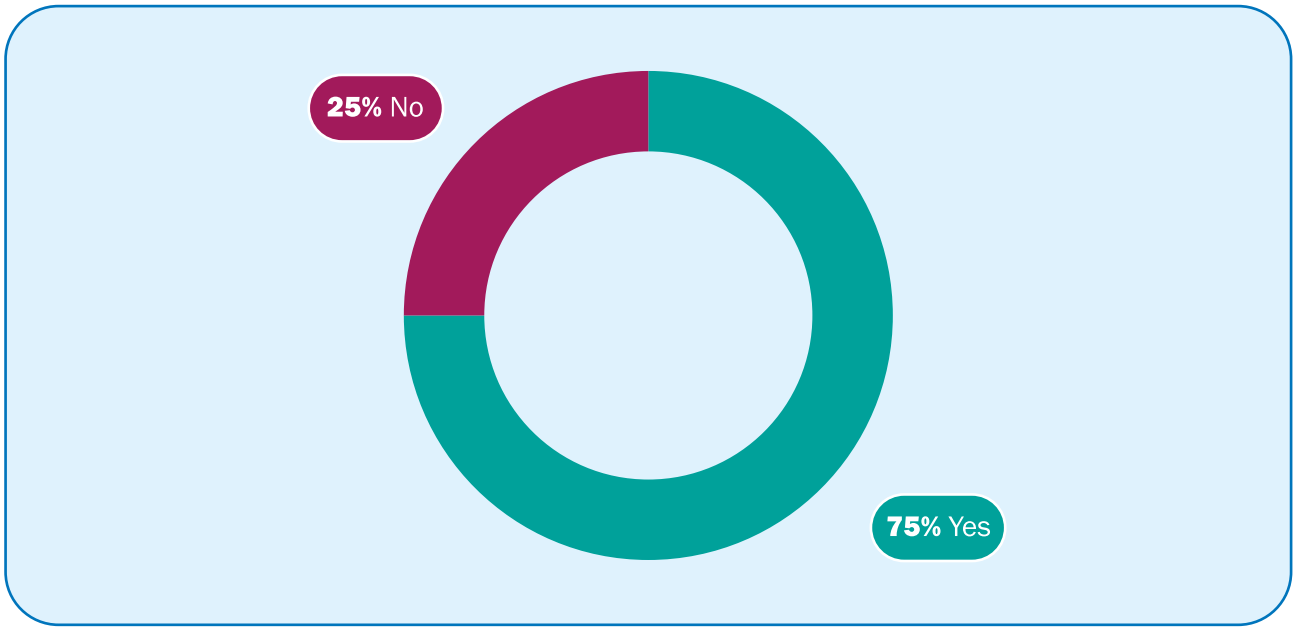
Other suggestions for new policies include integrated waste management infrastructure, which includes energy generation, and stronger links between our world-leading IT sector and connection of renewable energy.

Those disagreeing with the question suggested:

- Dropping net zero and taking a realistic view;
- More onshore wind should also be part of the economic growth within renewable energy - it is a quick alternative to offshore wind and allows landowners and the farming community to benefit from government support;
- Research and Development tax credits should be increased for renewables;
- Micro-generation must be a key area of development requiring a support mechanism; and
- Greater emphasis on community energy.

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?



WHAT DID RESPONDENTS SAY?

In total, 150 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we focused on what hydrogen is, how it can be produced and where it can be utilised. From these first principles, the opportunities in advanced processes and technologies were explored which can lower carbon emissions and provide economic growth potential for NI across the UK. Beyond this, the potential benefits of a hydrogen economy on our supply chains, research base and infrastructure were explored.

There was broad overall support for the economic growth opportunities identified for NI in a hydrogen economy with 75% of respondents who answered this question agreeing, compared with 25% indicating they did not agree.

Domestic consumers responding to this question voiced concerns on hydrogen safety and suggesting the need for a skilled workforce to manage its introduction. Suggested links to other low carbon interventions and biomethane blending noted that hydrogen should operate in collaboration with other technologies to be successful.

Business consumers and energy sector respondents were equally supportive of the opportunities in the hydrogen economy but pushed the focus towards indigenous generation for security of supply and the need for a subsidy mechanism to invigorate early adopters. In terms of supply, queries were raised regarding the required volumes of green hydrogen, and whether the NI wind resource could generate sufficient quantities given the need for higher levels of renewable electricity. Alternatives were suggested such as blue hydrogen. Compliant geological storage was explored by a number of respondents along with queries on CCUS and whether with no carbon sequestration in NI, blue hydrogen could be viable. Policy levers were recognised as being needed along with relevant safety governance on these as well as similar emerging technologies. Many respondents queried the efficiency of green hydrogen creation and its costs.

Many business and energy sector respondents focused on the opportunities that could arise from a developing hydrogen economy, together with the societal change they could bring; suggesting that with the correct funding, levers and policies in place, hydrogen at scale could be successful. The consensus from these respondents was that NI needs a hydrogen strategy, along with specific support mechanisms for project development and / or technology maturation. The link between hydrogen and greater electrification was made on a number of occasions. This included highlighting the need for grid development to allow higher capacities and greater reverse flows. Most submissions focusing on transport viewed buses and larger Heavy Goods Vehicles (HGVs) as being early adopters of hydrogen and fuel cells with domestic vehicles becoming electrified.

Amongst those that indicated they did not support the growth opportunities identified in a hydrogen economy, the reasons given for this include:

- Potential safety factors associated with hydrogen and its use;
- Potential higher costs and inefficiencies of green hydrogen;
- Concerns over hydrogen related infrastructure and technology readiness levels;
- Concerns over fuel cells being applied to HGVs when batteries are readily available;
- Focus should be on energy efficiency and renewables first;
- High degree of uncertainty over the future role of low carbon hydrogen in the NI power sector; and
- Concerns over volume of storage mediums needed to have a flexible supply system.

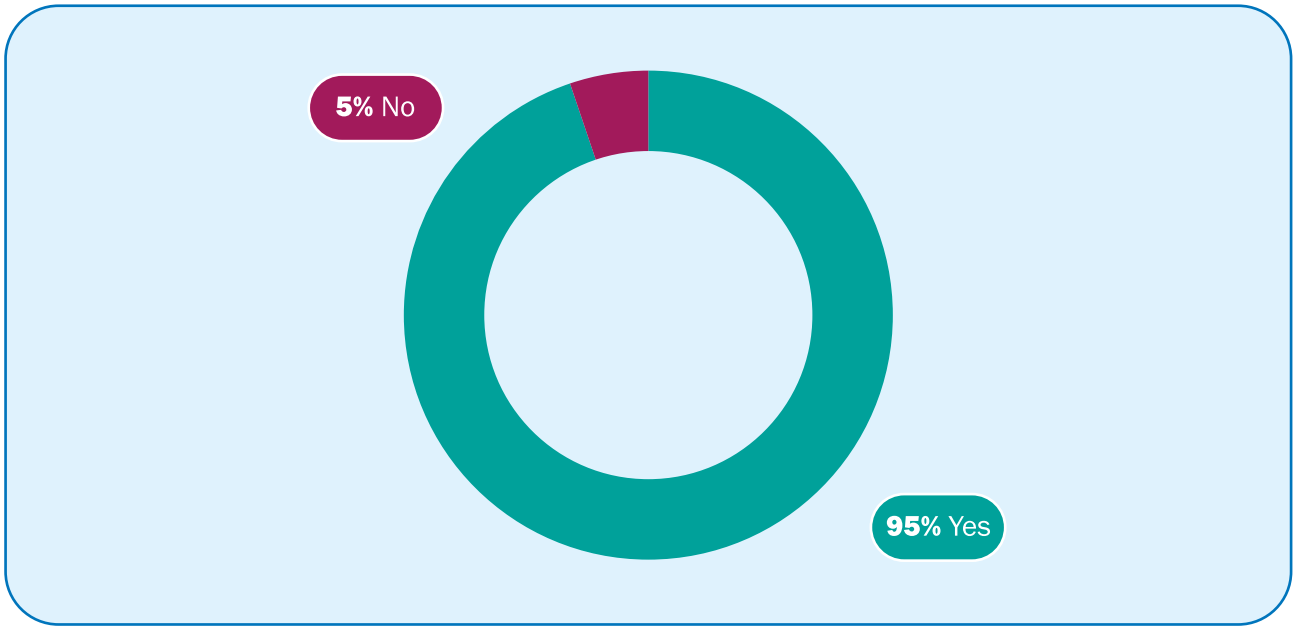
Those in support of the hydrogen economy included reasons such as:

- Potential economic growth opportunities along with a new highly skilled workforce;
- Potential substantial contribution of hydrogen to decarbonisation targets;
- Demonstrator of pilot level projects in this field would be welcomed; and
- Major time limited opportunity for NI to be at the forefront of hydrogen development and to become a leader in this market.

Overall, there were clear messages of opportunity, safety concerns, funding needs, integration to other forms of renewables and early development projects. A number of respondents suggested that if hydrogen at scale is realised in NI, it would be a “game changer” in terms of economic benefit and decarbonisation. Respondents generally felt that while government should be ambitious, it must develop policy carefully being mindful of costs, first movers and the need for adequate stimulus.

Q16: DO YOU AGREE WITH THE UNDERPINNING PRINCIPLES IDENTIFIED WITHIN THE CIRCULAR ECONOMY?

WHAT SUPPORTING POLICIES DO YOU BELIEVE ARE NEEDED TO TAKE ADVANTAGE OF THESE?



WHAT DID RESPONDENTS SAY?

In total, 154 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, the intention to develop a Circular Economy Strategic Framework was stated, as this has the potential to make a significant contribution to developing the economy in a sustainable way. The following three principles to underpin the strategic framework were put forward:

- Design out waste and pollution to reduce greenhouse gas emissions across the value chain;
- Keep products and materials in use to retain the embodied energy in products and materials; and
- Regenerate natural systems to build natural capital and sequester carbon in soil and products.

There was strong support for these underpinning principles, with 95% of respondents indicating their agreement, compared with 5% indicating they did not agree.

Amongst business consumers, 96% agreed with the underpinning principles identified within the Circular Economy. The majority of responses demonstrated that there was an understanding amongst business consumers that the Circular Economy is more than just reducing waste and consumers recycling. When asked to outline supporting policies needed, many respondents felt that policies aimed at compelling industries to examine their production processes would be required. Some noted that this could be done by incentivising the development of renewable products or, by setting "*mandatory monitoring, reporting and targets for waste, embodied carbon, and the circularity of materials*".

Other business consumer respondents felt that policies to ensure the reasonable consumption and production of materials would be needed, such as building regulations, national and local planning policies, and waste and recycling. Some respondents highlighted the need to apply the principles of a Circular Economy to public sector procurement in order to catalyse the private sector. It was also suggested that measurable metrics be developed such as "*Lifestyle carbon emissions associated with resources/waste streams".*

Amongst energy sector representatives, 97% who responded agreed with the underpinning principles identified within the Circular Economy. There was a good understanding of linear and circular models, as well as the role of the energy sector role and potential opportunities. When asked to outline any supporting policies needed to take advantage of these, many respondents felt that the introduction of policies would be essential to drive behavioural change in industry. Other respondents felt that consistent policies from government, together with regulation and independent assurance are essential if the Circular Economy is to succeed.

Amongst domestic consumer respondents, 92% agreed with the underpinning principles identified within the Circular Economy. There was a strong focus on end of life use amongst this group. When asked to outline any supporting policies needed to take advantage of these, many domestic consumer respondents underscored the need for greater compliance type policies aimed at removing processes that produce single use products. Some respondents suggested that this could be achieved through increased taxation or fines.

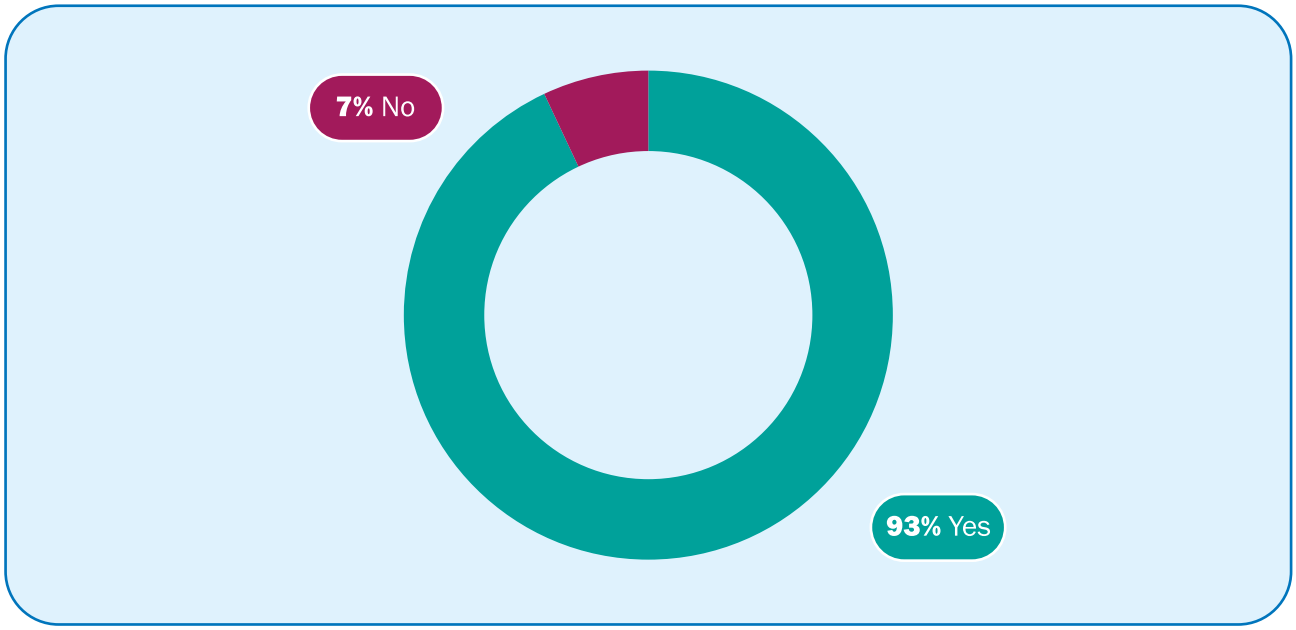
There were numerous suggestions in relation to the transition to a Circular Economy, such as:

- Capture energy from the treatment of waste, e.g. support those with anaerobic digesters to produce biomethane and use of manures to recover bioenergy and bionutrients;
- Explore the role that digitalisation and Artificial Intelligence (AI) can play in accelerating transition;
- Support Community Wealth Building whereby the green economy is focused on communities rather than industries driven by profit alone;
- Utilise digestate from biogas plants to replace imported chemical fertilisers and become a revenue stream; and
- Use electrolysers to convert unused renewable energy to a fuel source (e.g. hydrogen).

The Circular Economy should seek to identify a small number of ambitious but achievable objectives such as, heat recovery from industrial sites, reducing plastics use through refill initiatives or deposit and return schemes or supporting appliance repair networks.

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?



WHAT DID RESPONDENTS SAY?

In total, 161 out of 253 responses were received to this question in Citizen Space.

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. Within the policy options consultation document, we recognised the need for tailored focused green innovation funding for projects / technology, which align with the priorities of the Energy Strategy. This would be competitive in nature and deliver long-term economic benefits to NI.

There was broad overall support for developing a green innovation challenge fund, with 93% of respondents who answered this question agreeing with the proposal, compared with 7% indicating they did not agree.

Domestic consumers supporting development of the fund thought that innovation was difficult and that focused support was a good idea. It was accepted that innovation on emerging technology may not be as successful as hoped but when something does succeed, it can be of significant benefit.

Respondents suggested further developing NI's connection to wider innovation and research sectors across the UK, with as wide a scope as possible to broaden opportunities. There was a general feeling that applicants to the fund should be allowed beyond the private sector and universities, and that schools or the voluntary sector should also be supported. All agreed that Intellectual Property should be generated and a number suggested that EV transport should be an urgent focus.

Business consumers and energy sector respondents all welcomed the opportunity a green innovation challenge fund would bring and provided views on where it should be focused, such as for local councils, upgrading or retrofitting existing buildings, modernising construction materials or methods and the hard to abate carbon emitters.

Many business and energy sector respondents suggested the support should fund collaborative clean energy projects at proof of concept scale with the opportunity to grow nationally. Additional proposals were that the fund should be competitive in nature with those best aligned to achieving net zero by 2050 being supported. The world leading nature of NI in some fields was recognised and this fund, it was suggested, would grow that potential further.

Amongst those that indicated they did not support the developing of the green innovation challenge fund, the reasons given for this include:

- Innovation is difficult;
- Innovation often leads to failure;
- The idea of a competitive fund is a bad one; and
- Concerns over how the money would be apportioned and awarded.

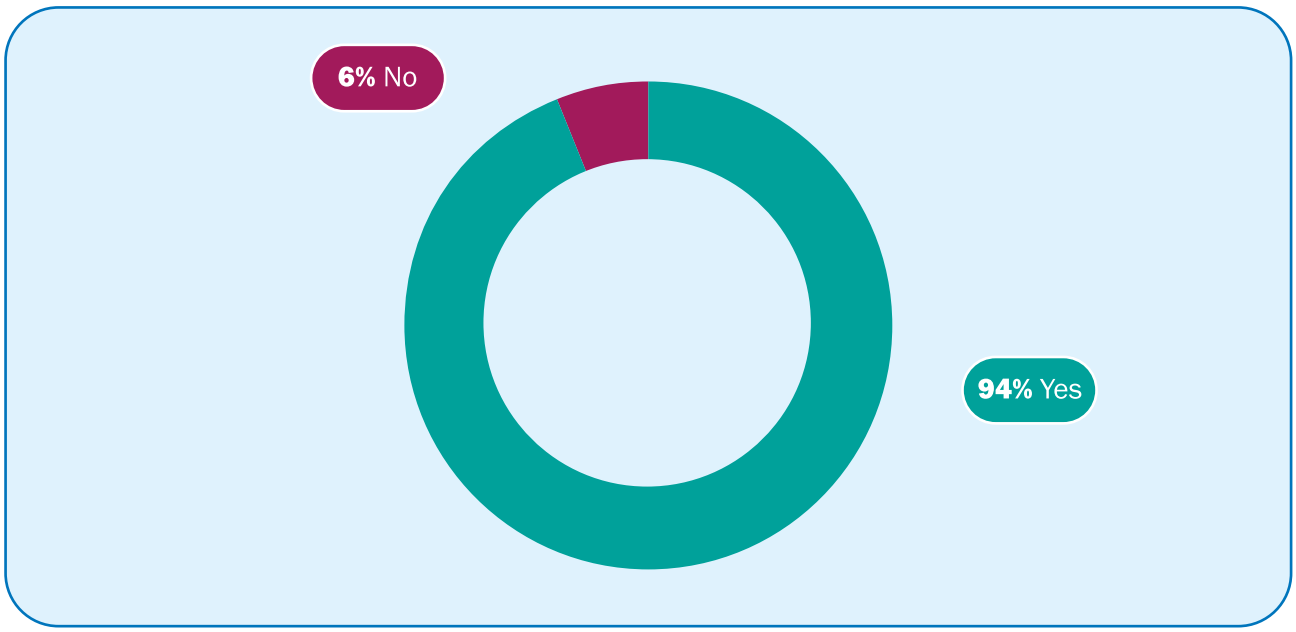
A large number of respondents welcomed the opportunity and recognised the importance of innovation support to power net zero energy by 2050 whilst creating employment and boosting competiveness. There were numerous suggestions regarding the scope of a green innovation challenge fund, including:

- Upgrading or retrofitting existing buildings;
- Modernising construction materials or methods;
- Hard to abate carbon emitters;
- Hydrogen production demonstration projects;
- Hydrogen injection and transportation trials;
- Hydrogen or hybrid boiler trials;
- Hydrogen liquefaction, hydrogen based fuels and aircraft / ships powered by hydrogen;
- Similar trials in biomethane;
- Support for product / process at ranges with a sliding scale of funding;
- Innovation support for gas sector, e.g. similar to the Gas Innovation Fund in the RoI;
- Support for document development, for example feasibility studies, technical reports, environmental studies and design drawings;
- Support for EV sector, e.g. flexible tariffs and on street parking charging for tight streets;
- Development of geothermal energy capability; and
- Compression and cryogenic technologies.

A number of responses suggested that the fund should support collaborative working and encourage consortia across Small-Medium Enterprise / Academia. Others suggested following the Science Foundation Ireland Model / principles, where the problem is posed and bidders are invited to propose appropriate technical solutions.

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 HIGHER RISKS ASSOCIATED WITH INNOVATION PROJECTS?



WHAT DID RESPONDENTS SAY?

In total, 157 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to work with the Utility Regulator to assess how regulation can facilitate a green economic recovery and green innovation.

There was strong support for this approach, with 94% of respondents indicating their agreement, compared with 6% indicating they did not agree.

Amongst domestic consumer respondents, 88% agreed that we should work with the Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation. Some domestic consumers noted that while innovation funding could lead to increased risk it could also lead to big rewards; however, others were concerned with the potential cost implications for consumers. A few respondents queried whether additional expertise was needed within the Utility Regulator in order to appropriately assess potential innovation projects.

Amongst business consumers, 96% agreed with the question. Business consumers recognised the need for the Utility Regulator to invest in innovation and suggested that well designed projects, and pilot projects with measured and controlled outcomes should be considered. Some respondents stated that the focus of the Utility Regulator should be on outcomes, rather than on costs; and that a focus on cost alone will not work with net zero ambitions. It was noted that the cost of innovation could be spread amongst the private sector and government through joint financing models.

Amongst energy sector representatives, 98% who responded agreed that we should work with the Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation. A number of respondents noted that the current regulatory approach was not suitable to facilitate the delivery of NI's decarbonisation objectives. Furthermore, respondents suggested that the Utility Regulator should focus on delivering value for consumers rather than focusing on cost alone. The need to be more proactive and allow anticipatory investment in delivering enabling infrastructure was mentioned by a number of respondents. Other suggestions were that the Utility Regulator should be allowed greater power to act flexibly in its decision making, and that it would need to be adequately resourced for the energy transition. A number of energy sector respondents highlighted the need for Utility Regulator to review connection policy (including rebates) and to consider better alignment with regulators in RoI and GB.

In considering how to minimise risks to consumers, points made included:

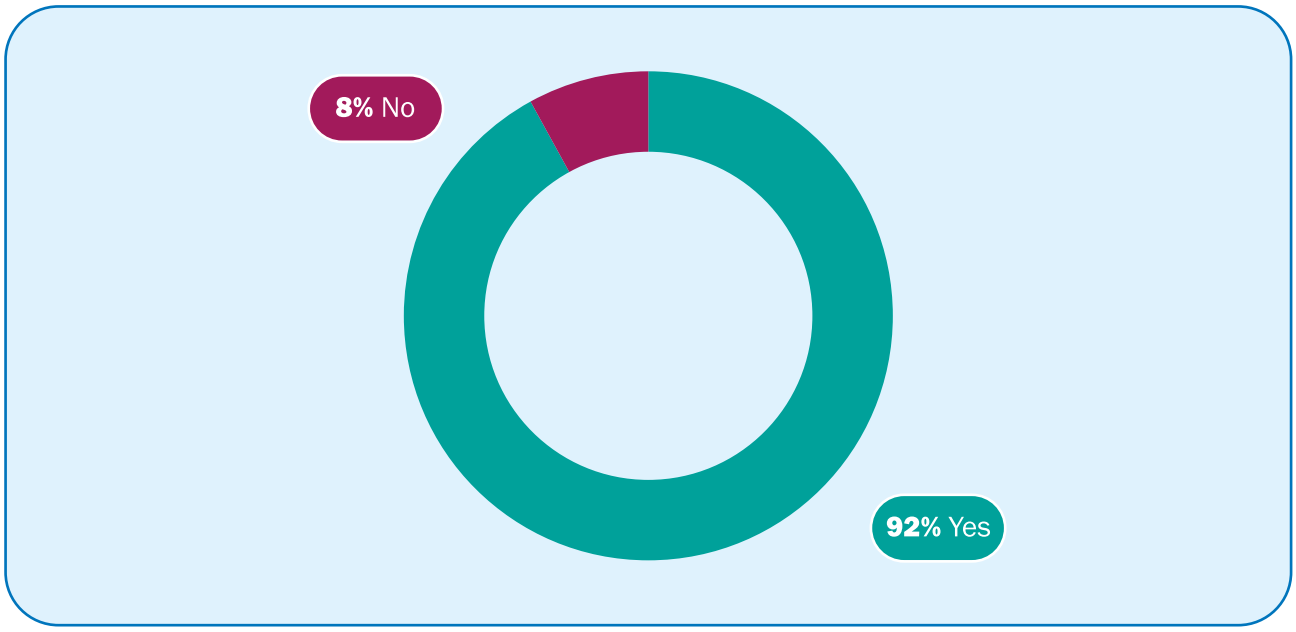
- Higher risk innovation projects could be insured by government backstop funding, similar to current European Investment Bank programmes;
- Ensuring that investment is focused on projects that directly support NI's decarbonisation pathway;
- Use of a committee with appropriate expertise to advise on innovation projects;
- Focus on ensuring that projects are credible and can evidence the potential substantive benefits for NI consumers; and
- Private and public sector collaboration could help ensure NI consumers benefit directly from investment in large-scale, strategic energy infrastructure.

Across all types of respondents there were numerous comments in relation to the role and remit of the Utility Regulator, which included:

- Need to be more supportive of EV charging infrastructure, similar to Ofgem who are working closely with government on strategies to improve take up of EVs;
- Should mirror the Regulatory Sandbox approach of Ofgem, who have produced guidance for innovators focused on four key areas: guidance, rule specific derogations, guidance to new entrants, and overall derogations focused on trials;
- Recommendation to revise its remit regarding fossil fuel-based utilities (including gas) in light of the UK's net zero target;
- Should include a mandate that incentivises and facilitates delivery of a net zero energy system (e.g. enables NI to meet emissions reduction targets), and is supportive of green economic growth and innovation; and
- Updated to reflect and enable new low / zero carbon technologies.

Q19: DO YOU AGREE WITH A FOCUS ON RESEARCH MAPPING, 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.



WHAT DID RESPONDENTS SAY?

In total, 144 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we explored the existing nature and future direction of the world class clean energy research base located in NI and detailed the various key research centres contributing to the innovation sector which will underpin our pathway to net zero carbon 2050. We proposed to focus on research mapping, research funding, business linkages and UK opportunity scanning to maximise the local research base.

There was broad overall support for the proposed focus to maximise the impact of the local research base with clean energy specialisms, with 92% of respondents who answered this question agreeing with the proposal, compared with 8% indicating they did not agree. Support for the focus scope was consistent across sectors, and across urban, semi-urban or rural areas.

Domestic consumers supporting the proposed focus recognised the excellent 3rd level education and research facilities in NI, but would welcome greater international collaboration and longer-term funding programmes to prevent a stop / start approach. There was keen interest for research into areas such as insulation solutions, construction materials and retrofit practices.

Business consumers and energy sector respondents were largely supportive of the proposed focus. Many noted NI's world leading and advanced capability in the clean energy sector but also alluded to longer-term funding programmes being needed. A mapping exercise was welcomed to potentially redirect innovation funding to emerging markets.

Many business and energy sector respondents detailed their active status in, or with, research programmes in the clean energy and innovation areas, illustrating a mature link between academia and business. There was consideration of the differences in societal, geographic and infrastructure issues for NI and it was recognised that disruptive technologies developed in NI could benefit all areas of the UK and lead to export opportunities beyond. A number of respondents suggested engaging with existing trials taking place across the UK and the need for benchmarking. Many respondents who engaged with this question raised the issue of the availability of baseline energy data for NI, its robustness, and the need for improvements.

Although support for the focus on research mapping, funding, business linkages and UK opportunity scanning was significant, a small number of respondents indicated they did not support this endeavour. Some of the reasons given for this were:

- Investment in skills, research and development must start now;
- The need for the Energy Strategy to be integrated with the Skills Strategy; and
- Funding recognised to be critical for research should be sought from the private sector.

There were numerous suggestions for different activities that could be included within the focus. A large number of respondents viewed funding and collaboration as key to success in this area, welcoming a mapping and business audit exercise. However, other suggestions included:

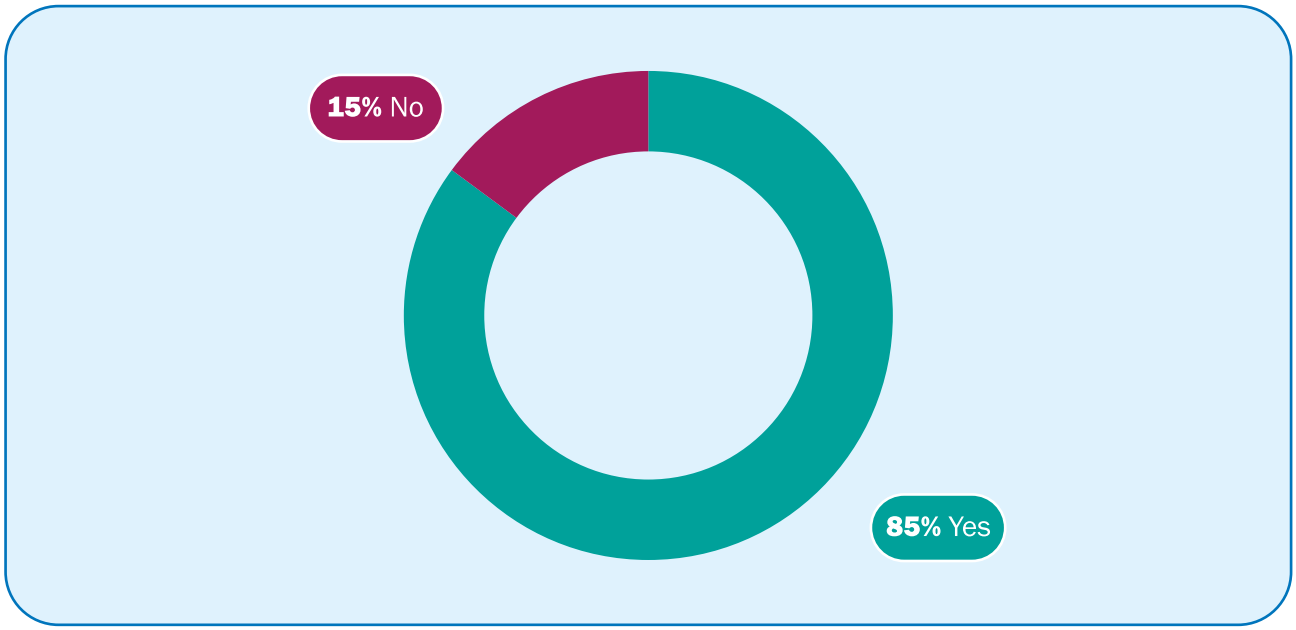
- Linking to other country's research programs for shared goals;
- Need for specific focus on landfill gasses, geothermal and phase change materials;
- Need for an additional mapping exercise to inform business linkages and even businesses themselves growing out of research programs;
- Support for projects to assist local infrastructure such as energy cloud, RULET[4] and Girona[5];
- Reformation of building regulations; and
- Benchmarking and learning in areas of infrastructure and governance from trials across England focusing on hydrogen blending.

All responses touched on the necessity of recurring, longer-term and well maintained strategically aligned funding regimes for effective research whilst supporting the view that an established, active and innovative research base is needed in NI.

4 https://www.ulster.ac.uk/spire2/the-project/case-studies/rulet
5 https://www.gironaenergy.com/

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?



WHAT DID RESPONDENTS SAY?

In total, 148 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated that our intention was "*to seek to utilise the comprehensive range of available training and education routes to provide the short-term skills needed by the clean energy sector*". We indicated that we would deliver this through existing sectoral partnerships, which exist to review and develop the content of all youth traineeship and apprenticeship frameworks. Additionally, a range of relevant level 3 courses are currently provided through further education colleges and universities, which offer a range of relevant undergraduate and post-graduate qualifications.

There was broad overall agreement that the existing education and training routes can meet the short-term skills needs of the clean energy sector, with 85% of respondents who answered this question in agreement, compared with 15% indicating they did not agree.

Amongst domestic consumer respondents, 79% agreed that existing education and training routes should be utilised, however there was a consensus that the identification and development of the skills needed should be made in collaboration with existing business industries. Many respondents also expressed the need for urgency in this matter, as current students will not be in decision-making roles for around the next 10 – 15 years. A number of respondents also suggested that education in this area should start earlier, at a post primary school level.

Business energy consumers and energy sector representatives agreed (87% and 95%, respectively) that the use of existing education and training routes could meet the short-term skills needs of the clean energy sector. Many of those responding noted the need for sustained investment in training across all educational levels in order to develop the required skills, particularly in Science, Technology, Engineering, and Mathematics (STEM). The need to provide more secure employment opportunities and to better retain these skilled individuals in NI was highlighted by a number of respondents. The need for specific skills in areas such as project management, IT and digitalisation, and civil, electrical and mechanical engineering were mentioned.

There were numerous suggestions for improving the existing education and training routes, such as:

- Utilise online training where possible to provide direct access to a wide range of education programmes;
- Need for apprenticeships to have greater prominence within the education sector;
- Curriculum should encourage an uptake of skilled labour in the renewables industries;
- Use of certified skills and accreditation, together with funding support, to incentivise upskilling; and
- Offer more adequate funding for training and covering the cost of training costs.

Amongst those respondents that indicated they did not agree that existing education and training routes should be utilised, the reasons given for this include:

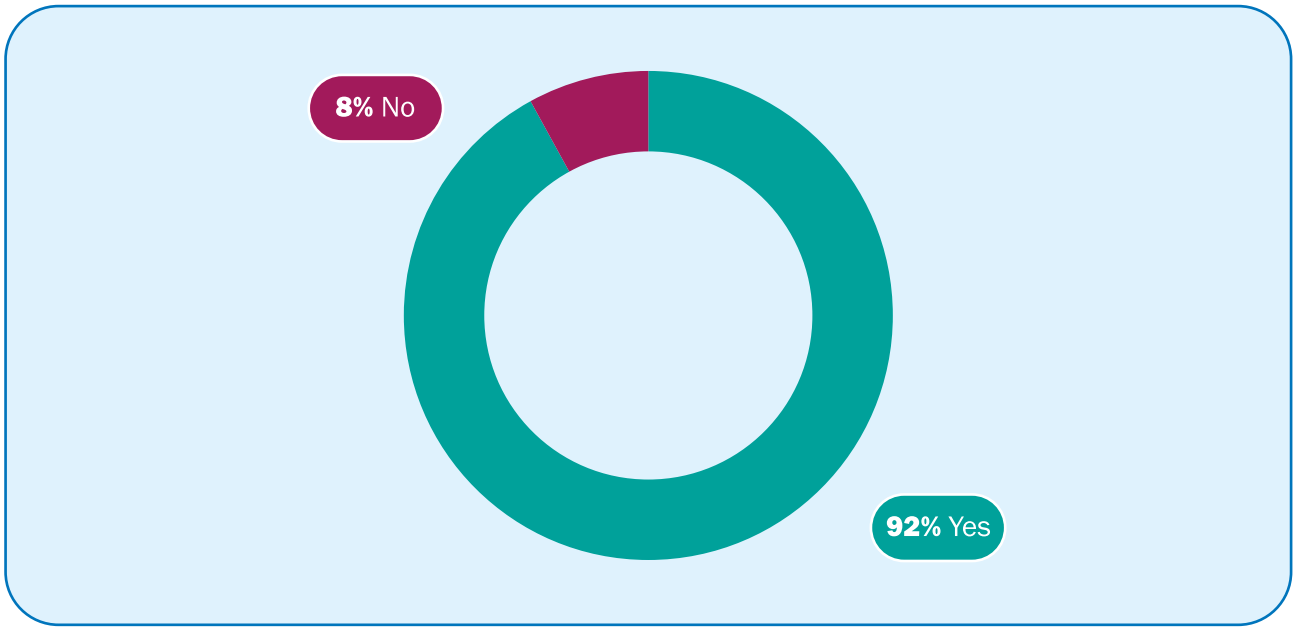
- View that the government and further education sector are struggling to address this issue effectively;
- Current education and training routes are not fit for purpose and require significant overhaul, and the education sector is suffering from a lack of investment in specific areas;
- Recognition that NI is a small population therefore migrant workers will continue to be required to fill roles;
- Concern that the balance of on-the-job training is not right, with a suggestion that more formal training should be provided for trades; and
- Scepticism regarding the need for skills in clean energy, when the need currently exists within the fossil fuel industry.

Whilst the majority of respondents were supportive of existing training routes, a common theme was the need for greater engagement with education providers and companies within the sector to ensure that future education packages are responsive and relevant to new and emerging technologies. Some respondents felt that a root and branch review is required on how we provide skills and training. A political party respondent stated that school leavers were not interested in entering construction related trades, and that more needs to be done to highlight these types of career opportunities.

Finally, many respondents to this question also considered if current existing training routes could meet the long-term skills need for the clean energy sector. Many of those responding expressed the need to build upon current processes, whilst also working strategically with education and industry to identify future skills gaps with a focus on new and emerging technologies.

Q21: DO YOU AGREE WITH THE PROPOSAL TO ESTABLISH AN ENERGY SKILLS FORUM TO SHAPE THE FUTURE SKILLS NEEDS OF THE CLEAN ENERGY SECTOR?

IF SO, WHAT DO YOU BELIEVE THE ROLE, REMIT AND MEMBERSHIP OF SUCH A GROUP SHOULD BE?



WHAT DID RESPONDENTS SAY?

In total, 146 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our proposal to establish an Energy Skills Forum. The forum would cover a wide range of relevant clean energy sectors and would focus on identifying clear pathways to develop skills and ensure that appropriate routes are available for existing workers and new entrants.

There was broad overall agreement with our proposal, with 92% of respondents who answered this question in agreement, compared with 8% indicating they did not agree.

Amongst domestic consumers, 88% agreed with the proposal to establish an Energy Skills Forum. Many domestic consumer respondents underscored the need for the forum to be as diverse and inclusive as possible, and for it to include representatives from education, industry and academia. A domestic vulnerable consumer also expressed that age should not be a barrier to being a representative on the forum and young people, such as those currently involved in academic research, should be considered as it is "*their future that this policy is addressing*".

Amongst business consumers, 92% agreed with the proposal to establish an Energy Skills Forum. Many of those responding noted that representation on the forum should be wide-ranging and include members from areas such as government, education, industry, employers, manufacturing and academia. Some respondents highlighted the importance of a dedicated Terms of Reference to ensure the forum delivers against its remit.

Amongst energy sector representatives, 98% who responded agreed with the proposal. A recurring theme amongst the responses was criticality of the membership and make-up of the forum, as one respondent put it "*any proposed Skills Forum would need to be diverse and far reaching into the many sectors impacted by this energy strategy*". Many respondents noted that forum would be an opportunity to bring together cross sector representation, facilitate discussion, identify skills gaps, and develop a pathway to accomplishing the necessary energy transition.

There were numerous suggestions in relation to the Energy Skills forum, such as:

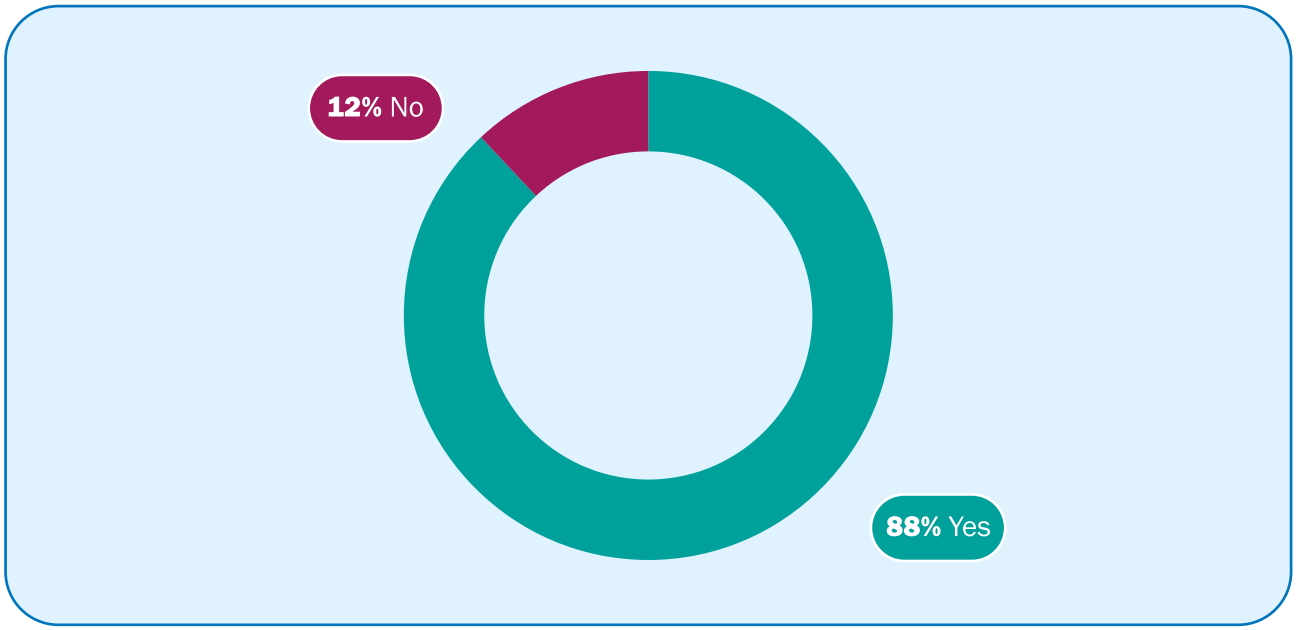
- That the forum is integrated with CAFRE, the NI agricultural college network, and has input from DAERA;
- Follow the Scottish Governments approach, namely the Quality Assurance Short Life Working Group that focuses on the "*quality, skills, supply chain and consumer protection requirements of energy efficiency and heat decarbonisation*";
- Consider the model of the UK wide Offshore Wind Sector Deal - People and Talent Group;
- The forum should be integrated with the research mapping and research base as a single entity. Coinciding with the 'one stop shop' approach to available knowledge;
- The forum should review current structures, fora and committees already in place, together with any reports and research to ensure that lessons learnt are considered in its Terms of Reference;
- That it is important to distinguish the work of any future Energy Skills Forum from that of the National Skills Council to avoid a duplication of effort; and
- A suggestion that this should cover general building and installation skills and could be responsible for accreditation and / or licencing.

Amongst those respondents that indicated they did not agree with the establishment of an Energy Skills Forum, the reasons given for this include:

- Concerns that this could be another NI talking shop, noting that it must have actual outputs;
- Scepticism regarding the membership of the forum; and
- Concern that NI already has too many bodies and this is a waste of money.

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 ON THESE SHOULD BE IN ADDITION TO THE EDUCATION AND TRAINING ROUTES ALREADY PROPOSED FOR A LOW CARBON WORKFORCE.



WHAT DID RESPONDENTS SAY?

In total, 147 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated that a Just Transition means a move to a low carbon economy that is fair and inclusive, leaving no one behind. The transition to decarbonised energy will also bring about significant changes for many sectors and could see a proportion of jobs lost or transformed. Adapting to these changes will require workers to develop new skills and learn new technologies.

There was broad overall agreement with our proposal, with 88% of respondents who answered this question in agreement, compared with 12% indicating they did not agree.

Across all categories of respondents, there was a clear message that the energy transition needs to be fair for vulnerable and low-income consumers, and that appropriate support mechanisms are needed to achieve this. A recurring theme was the need for investment from government in low-carbon infrastructure in the form of financial incentives to support businesses and consumers.

Amongst domestic consumer respondents, 84% support the development of specific measures aimed at ensuring a Just Transition. For many domestic consumers the recurring theme was in relation to job opportunities and retraining those currently employed by the construction and fossil fuel industries.

Amongst business consumers, 80% support the development of specific measures aimed at ensuring a Just Transition. Many of those responding underscored the need to ensure that a Just Transition does not deepen pre-existing social inequalities and in relation to the cost of transition "*weighting of the economic burden being fairly distributed between all manufacturing sectors, the public and the community*".

Amongst energy sector representatives, 96% support the development of specific measures aimed at ensuring a Just Transition. Respondents noted the importance of communication and ensuring that there is clear, concise and consistent dialogue by government with consumers and industry during the transition.

Business and energy sector representatives identified farmers, energy intensive industries, fossil fuel related industries, peat extracting industries, and agri-food as sectors that require support as a result of the energy transition.

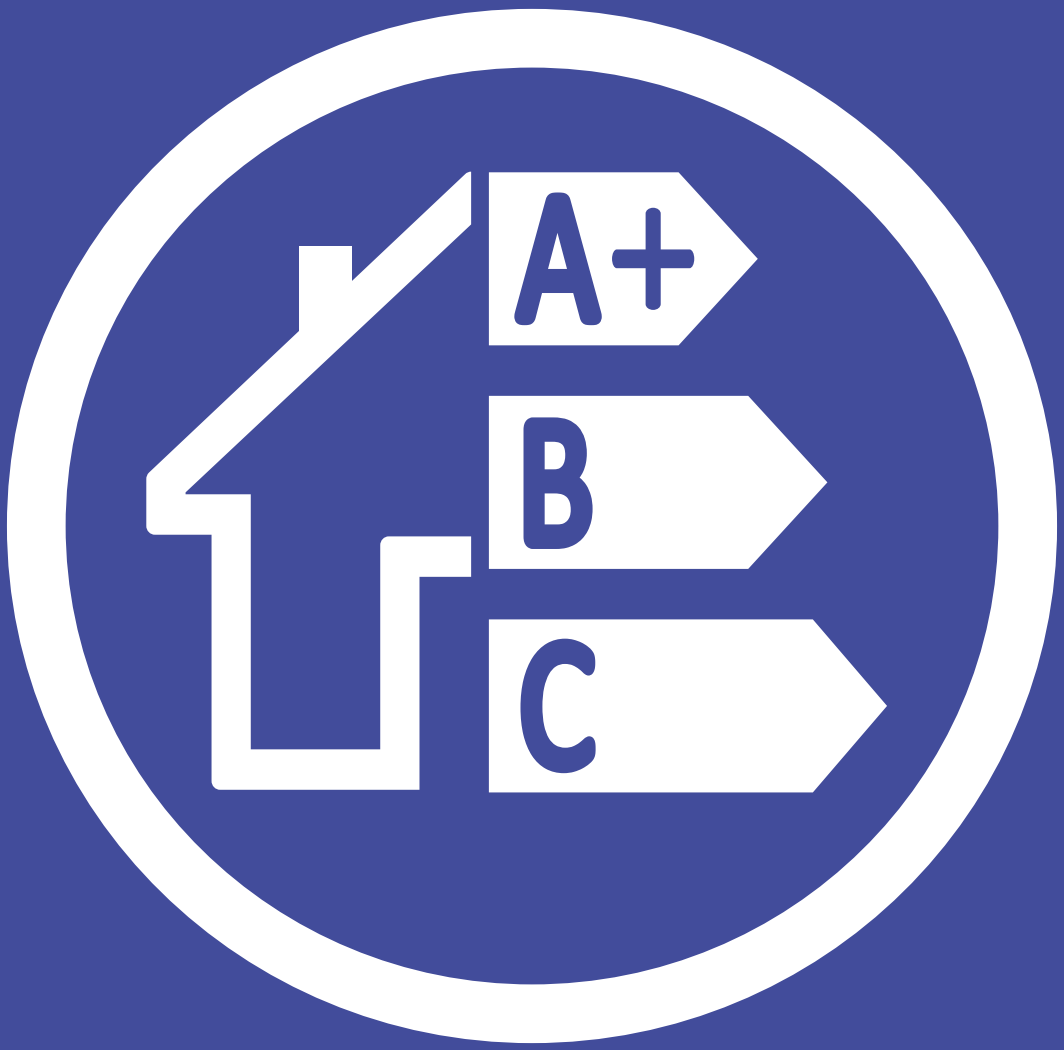
Common suggestions regarding the specific measures aimed at ensuring a Just Transition were:

- Economic burden of the transition should be weighted towards the most polluting industries and manufacturers;
- Update building requirements to include renewable energy, green building materials and services, and minimum energy efficiency standards, together with the development of national green buildings scheme linked with grants / funding;
- Introduce minimum Energy Performance Certificate (EPC) bands for landlords renting properties to tenants;
- Widespread programmes of retrofitting homes, low interest loans, and Green New Deals to encourage society to engage with and support the transition;
- Digital poverty and poor broadband access are major barriers to be addressed; and
- Need for communities to benefit, and be empowered and supported in developing community energy projects.

Amongst those respondents that indicated they did not believe that specific measures aimed at ensuring a Just Transition are needed, the reasons given for this include:

- View that this measure was already embodied in many other principles within the strategy and was unnecessary as a result;
- A change of attitude to the use of fossil fuels can only be achieved through education; and
- NI does not have the population or industry to justify this sort of measure.

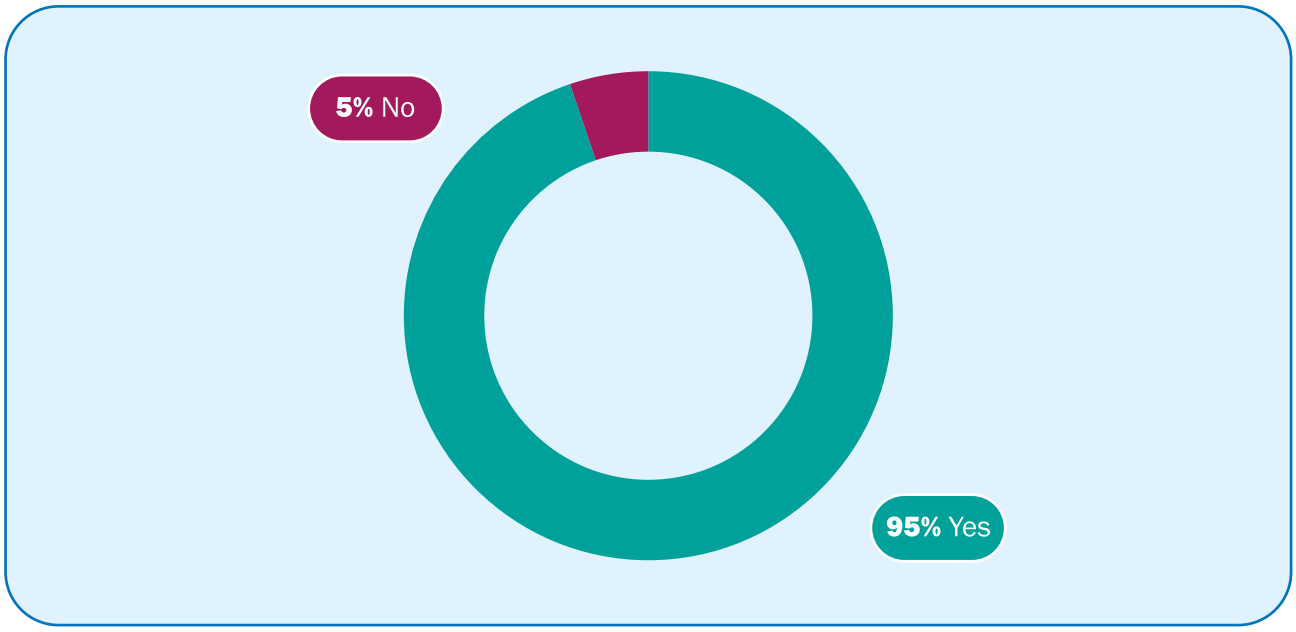
A number of business and energy sector representatives suggested the formation of a body similar to what is in place in other jurisdictions. In particular, a number of respondents highlighted the work of the Just Transition Commission, which was established in 2019 to advise the Scottish government on a net-zero economy that is fair for all. Others referenced the Irish Congress of Trade Unions recommendations for a Just Transition for Bord na Móna.



CHAPTER 4:

Do More With Less – Response Summary

Q23: DO YOU AGREE THAT AN ENERGY SAVINGS TARGET SHOULD BE SET FOR NORTHERN IRELAND?



WHAT DID RESPONDENTS SAY?

In total, 167 out of 253 responses were received to this question in Citizen Space.

This was one of a small number of questions in Citizen Space that did not provide an opportunity for supplementary comments (i.e. it was a yes / no response only). Some respondents provided additional input to this question through their written responses (submitted via email, post, or in response to other questions), which included reasons for supporting the proposed target or suggesting alternatives.

Within the policy options consultation document, we proposed to set an energy savings target for NI. We stated that this target would act as a strategic driver for, and be an aggregate measure of, the energy savings achieved from all policies and schemes, and would facilitate assessment of energy savings by sector.

There was a strong support for the introduction of an energy savings target for NI, with 95% of respondents in support. This was based on the view that the simplest way to reduce emissions, and decarbonise building stock and industry, is to reduce the energy we use through the implementation of energy efficiency measures.

There were numerous suggestions and comments put forward in relation an energy savings target, such as:

- Need to establish an accurate baseline, against which improvements can be measured;

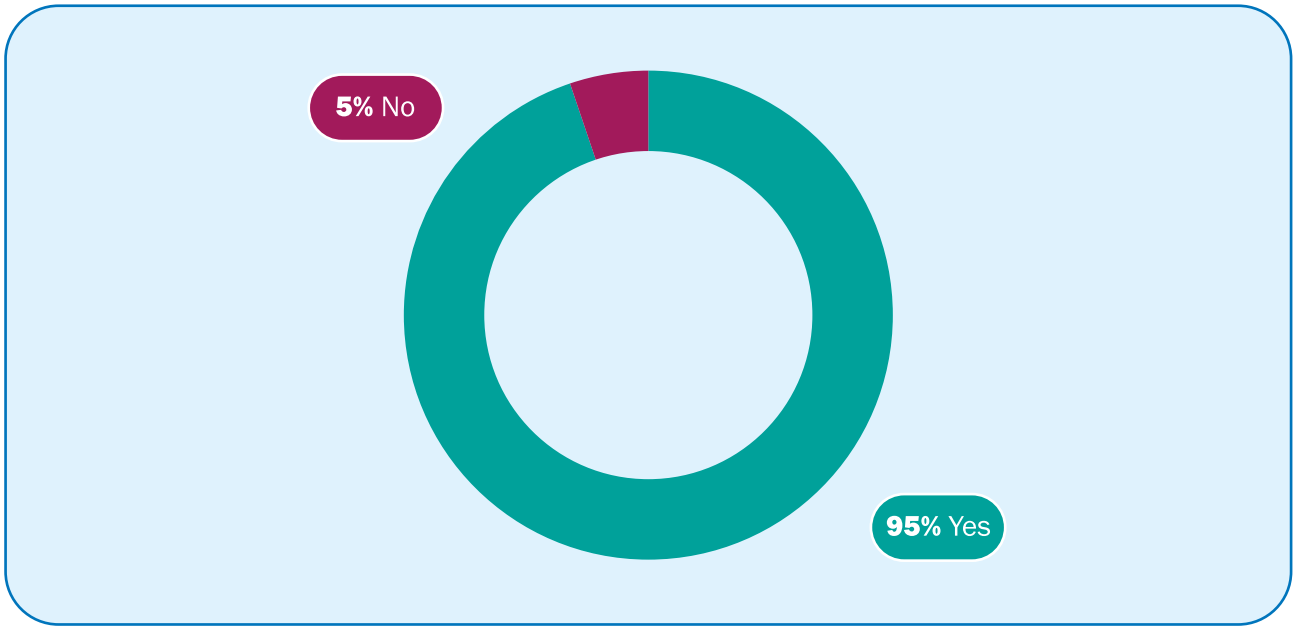
- Target(s) should be realistic and give due consideration to current NI infrastructure and building stock;
- Importance of recognising that different sectors (for example residential, commercial and industrial) have their own unique energy efficiency challenges, and these should be factored into target setting;
- Target should align with internationally recognised reporting methods;
- Target should at least meet, if not exceed, those set in England, Scotland and Wales; and
- Reference was made to aligning with EU Energy Efficiency targets.

In summary, the majority of respondents felt that any target should be ambitious, closely monitored and realistic. Respondents felt that measuring energy savings by way of improved energy efficiency in buildings was the correct approach, rather than focusing on reducing energy consumption as this could have unintended consequences on households and economic activity.

Some respondents noted that targets should be evidence based, and highlighted the importance of identifying the correct metric(s) to measure progress. It was recognised that setting a target was essential to measuring the success of policies.

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?



WHAT DID RESPONDENTS SAY?

In total, 155 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to set Minimum Energy Efficiency Standards (MEES) for existing buildings in NI and sought comments on what type of building should be the early priorities for introducing these standards.

There was overwhelming support for the development of MEES, with 95% in agreement with the proposal.

While MEES focuses on existing buildings, over 30% of respondents that provided comments stressed the importance of ensuring that new builds, and works that involve planning permission, comply with new standards for energy efficiency as a priority. Respondents noted that implementing standards for new buildings was cost-effective and reduced requirements for future retrofit action.

Rather than focusing on one specific area first in the residential sector, 17% of respondents felt that all domestic buildings should be considered a priority for MEES due to the scale of the challenge faced. Some respondents felt that older housing should be addressed first, with buildings pre-1950s mentioned.

A number of those that commented (around 13%) referred to the private rented and social housing sectors as tenure types where MEES could be trialled first. There was a recognition that a policy of upgrading accommodation in these sectors could help to protect vulnerable groups. MEES policies targeting fuel poor households were referred to by 7% of respondents. One Housing Association however raised concerns about the impact of MEES on their older properties, due to cost of upgrades and technical viability. They proposed an approach that considered average MEES across sectors, rather than individual targets on all buildings.

11% felt that the least energy efficient buildings, in domestic and non-domestic spheres, should be targeted. Reference was made to homes below EPC C ratings, or equivalent Display Energy Certificate for commercial premises, as a potential cut off point.

Respondents also suggested targeting buildings that use the most energy, with some referring to large factories, industry and manufacturing. It was recognised that offices and warehouses have different energy needs and MEES challenges.

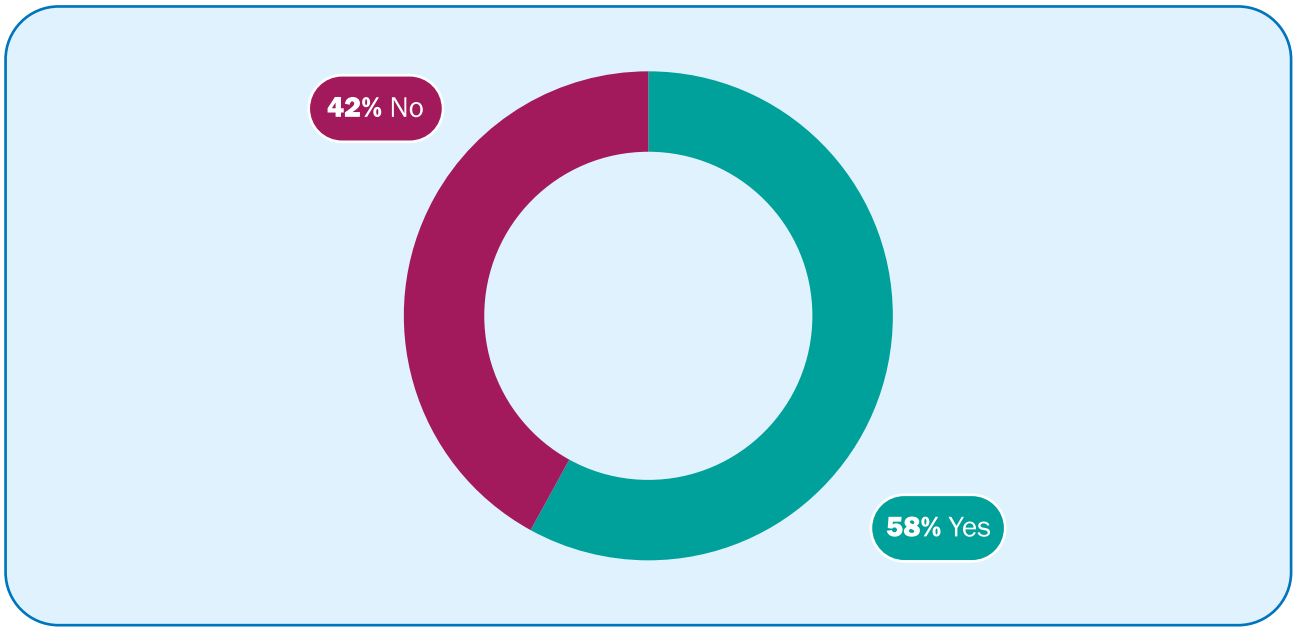
A few respondents noted the importance of government signalling its long-term intentions. They felt this would allow impacted tenure types and premises owners the time to prepare for the new direction of travel and requirements to be placed on their properties. A number of respondents noted the potential high costs, and recommended that, should MEES be implemented, government financial support would be required. The importance of supply chain organisations to deliver MEES was also recognised.

There was some discussion from respondents on the appropriateness of EPCs as a measure. Some respondents noted that they are effectively used in other UK jurisdictions while others felt there were limitations to the methodology underpinning them.

Finally, 6% of respondents referred to issues of compliance, verification and enforcement of new 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.



WHAT DID RESPONDENTS SAY?

In total, 135 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document recognised that the current standards for new buildings in NI need to be uplifted, and the document set out DoF's five phase approach to this. Consultees were asked if they agreed with the general scale and proposed pace of change outlined in the five phase plan for building regulations, which is:

Phase 1: Interim uplift during 2021/22

Phase 2: Discussion document to inform longer-term uplifts

Phase 3: Uplift in 2022/23 that would take into account uplifts planned in other regions in 2021/22

Phase 4: Uplift in 2026/27 taking into account "Future Homes and Future Buildings" standards

Phase 5: Further review in 2029/30

While the majority of respondents, 58%, were supportive of this proposal, 42% did not support it. In considering these responses, it was found that:

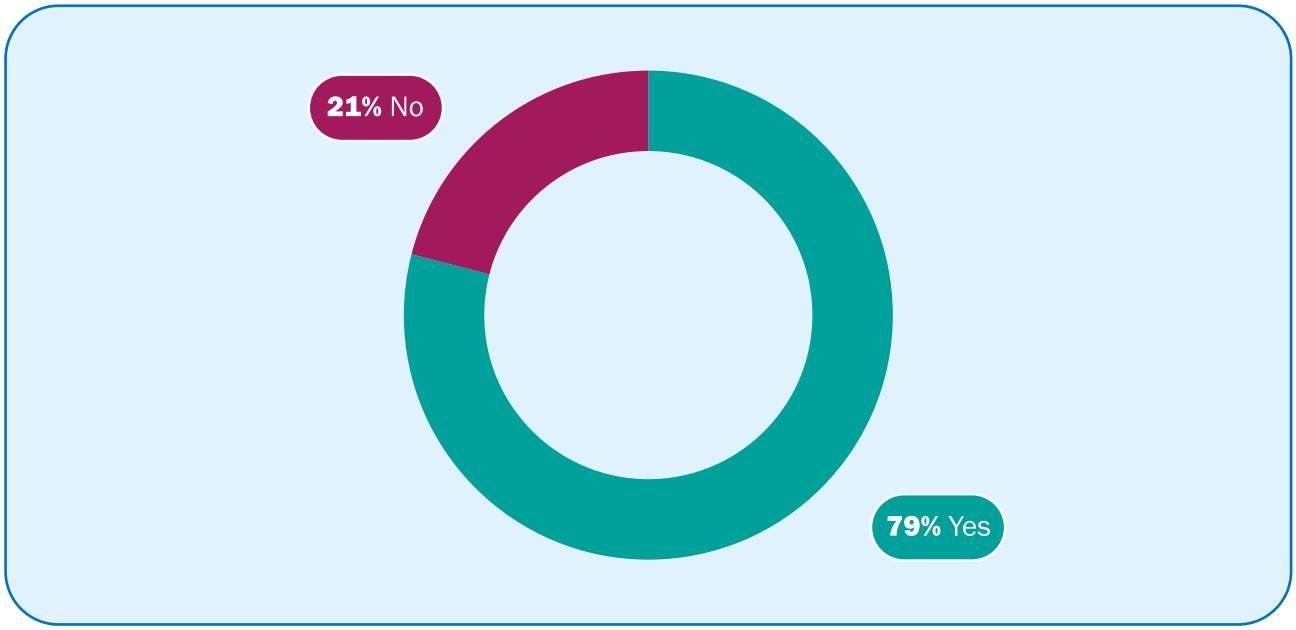
- 41% felt that the building regulation timeline detailed in the consultation was not ambitious enough and recommended that steps should be taken to accelerate the pace of change;
- 21% suggested there should be alignment with regulations rolled out in other UK jurisdictions. Some respondents referred to UK Part L Building regulations. Some suggested that *'net zero'* or the *'Future Homes and Future Building Standards*' should be implemented in NI by 2025. However, some respondents noted an advantage in being slightly behind the implementation of regulations in neighbouring administrations. It was felt that this would allow NI stakeholders time to become familiar with new methodologies and regulations, and that the plan would be more achievable as a result; and
- 16% of respondents thought that the proposals described were appropriate and supported the timeline.

Some respondents felt that there were 'quick wins' that could be implemented, such as the installation of charging points for EVs, making provision for renewable technologies (such as solar panels and micro-generation), and future proofing buildings for the installation of new technologies. A number of respondents referred to heat pumps, with differing opinions. Some had concerns over their performance in colder climates, while others felt that it was important to plan for heat pumps, as well as other low carbon technologies.

The importance of enforcement was raised, with the issuance of penalties for buildings that do not follow the new regulations or have obtained planning approval suggested. There was also a recognition of the importance of ensuring enforcement officers have the appropriate skillset.

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.



WHAT DID RESPONDENTS SAY?

In total, 140 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document suggested that 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.

Of the 140 responses, 79% of these respondents agreed with the proposal to explore how the rates system can be used to encourage energy efficiency.

In the comments provided it was suggested that using the rates system could help increase the attractiveness of embarking on retrofit measures. It was proposed that this could help to create an understanding that there is genuine value in living in a more efficient home which could drive increased energy efficiency in both the new-build and retrofit sectors. It was also suggested that lessons could be learnt from the vehicle tax model, in that those who emit less CO_2 could benefit from a deduction in their rates.

Respondents suggested that a number of issues would need to be considered in respect of this proposal, including for example:

- Educating consumers about the benefits of these changes, to ensure individuals understand how new energy technologies may impact their rates bill;
- How to prevent an absolute reduction in rates levels;
- The need to consider how business rates reform can play a role as part of wider policy thinking on energy efficiency. In the current business rates system, if improvements in energy efficiency lead to the overall value of a building increasing, businesses incur higher rates;
- The scope for the rates system to also penalise inefficiency; and
- Use of the rates system as a means to provide long-term financing for energy efficiency projects - similar to student loan scheme.

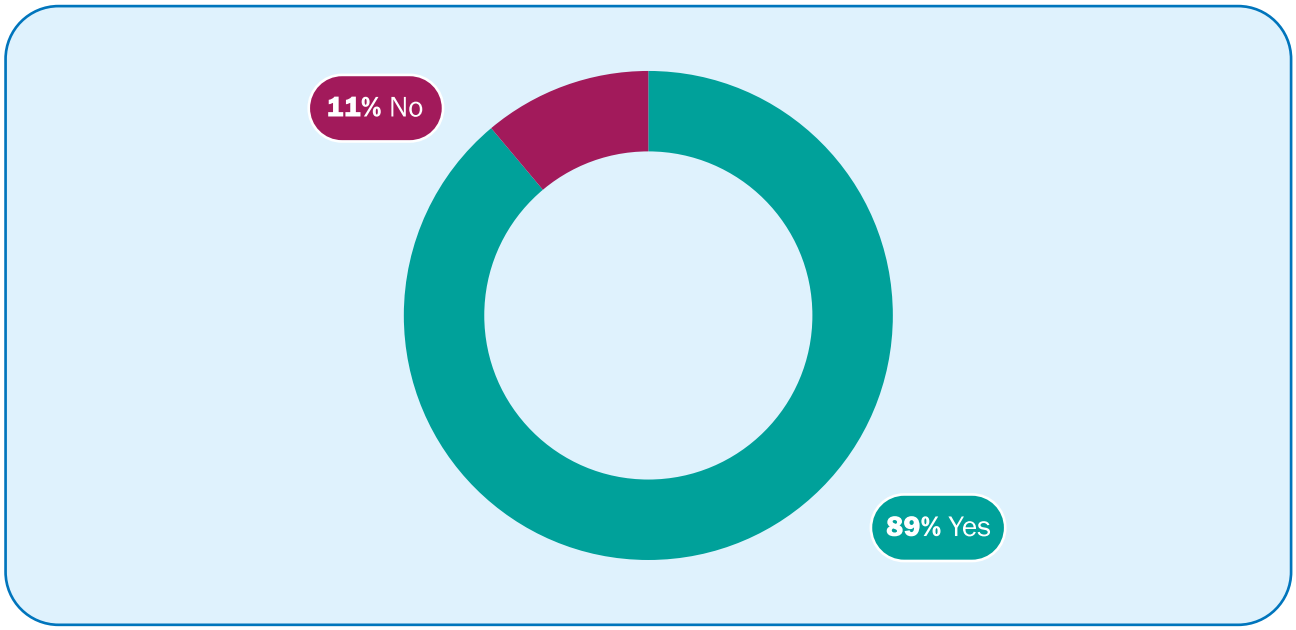
Some reservations were presented in the comments, particularly in relation to the social implications of placing a further burden on those in society who cannot afford energy efficiency improvements. Comments included:

- Affordability will be an issue for lower income homes. Any reduction in rates needs to be in line with the ability of the consumer to make changes. Important that such a scheme does not become an option only affluent individuals can take advantage of;
- Issue of split incentives in the private rented and social housing sectors - where the rates are paid by the tenant, but they have no control over fabric improvements to the property;
- If rates are going to be linked to energy performance, issues around the accuracy of EPCs must be addressed; and
- Proposal could have a disproportionate impact for homes with low EPC ratings on the basis of the level of capital works required to achieve certain ratings.

Alternative proposals were also suggested by respondents, including using the rates system as a means of delivering Property Assessed Clean Energy (PACE) financing where households could receive upfront financial support to undertake energy efficiency improvements with the debt repaid through the rates the household pays. A reduction in stamp duty was also suggested, as were incentives on the purchase and installation price of any energy efficient products like insulation and heat pumps.

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?



WHAT DID RESPONDENTS SAY?

In total, 145 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document stated the intention to introduce a new domestic retrofit scheme offering tailored support to all households. Furthermore, the document stated that following this initial pilot period, the proposed "one stop shop" (OSS) body would take ownership of the new domestic retrofit scheme.

Respondents were supportive of this proposal, with 129 (89%) in agreement. Comments were noted on a number of themes.

Policy and Finance

- The need for clear, long-term strategic direction was identified, with the need for attractive and enduring incentives.
- Design, funding and delivery model needs to give confidence to households and the market.
- The importance of supporting vulnerable consumers was noted, but it was also recognised that this scheme should include tailored support for all households.

- Questions were asked as to how the new scheme will work alongside, and be different to, existing schemes (such as the NI Sustainable Energy Programme (NISEP), and Affordable Warmth), with respondents highlighting the importance of ensuring no gaps between the current and future support schemes.

Timing

- There was a mixed response in relation to the timing of the scheme with some respondents suggesting time was of the essence if Net Zero goals were to be achieved, while others suggested Spring 2022 for a pilot scheme was very ambitious, noting a delay to this timeline would allow for better design of scheme.

Scheme Design

- The importance of early stage collaboration and co-design with stakeholders and industry was recognised.
- A key message was to make the scheme very easy to apply for and affordable.
- It was recommended that the pilot should be regional, 100+ dwellings, with a focus on the most inefficient areas. It was noted that using social housing as a testbed for the pilot could provide economies of scale.
- It was suggested that the pilot should be used to capture information on feasibility and costs of retrofit, level of subsidy required, consumer attitudes, payback times and levels of disruption to inform future policy direction.
- The importance of incorporating lessons from the Renewable Heat Incentive (RHI) and Green Homes Grant schemes in any future scheme design was noted.
- There was a call for a holistic approach to the process for decarbonisation and energy efficiency recognising that none of the individual elements will be sufficient on their own.
- Some respondents noted the need to maximise energy efficiency of homes first, while others suggested the pilot needs to include options for low carbon solutions.
- The importance of ensuring the scheme is future-proofed was highlighted to avoid potential impact from other areas of the new Energy Strategy e.g. low carbon heating, smart metering.

Delivery Model

- The use of online digital data tools to engage market participants was recommended.
- The importance of a trusted provider and impartial information to educate consumers was highlighted and it was noted that the OSS should be more than just advice.
- It was recommended that the OSS should work closely with industry partners to target householders who are entering trigger points, when homeowners are more open to making further investments in energy efficiency measures.
- Respondents identified a number of possible partners / providers involved in existing retrofit work / schemes. These included the Energy Savings Trust, Energy Systems Catapult, Local Councils, NI Housing Executive and Energy Services Businesses.

Skills and Supply Chain

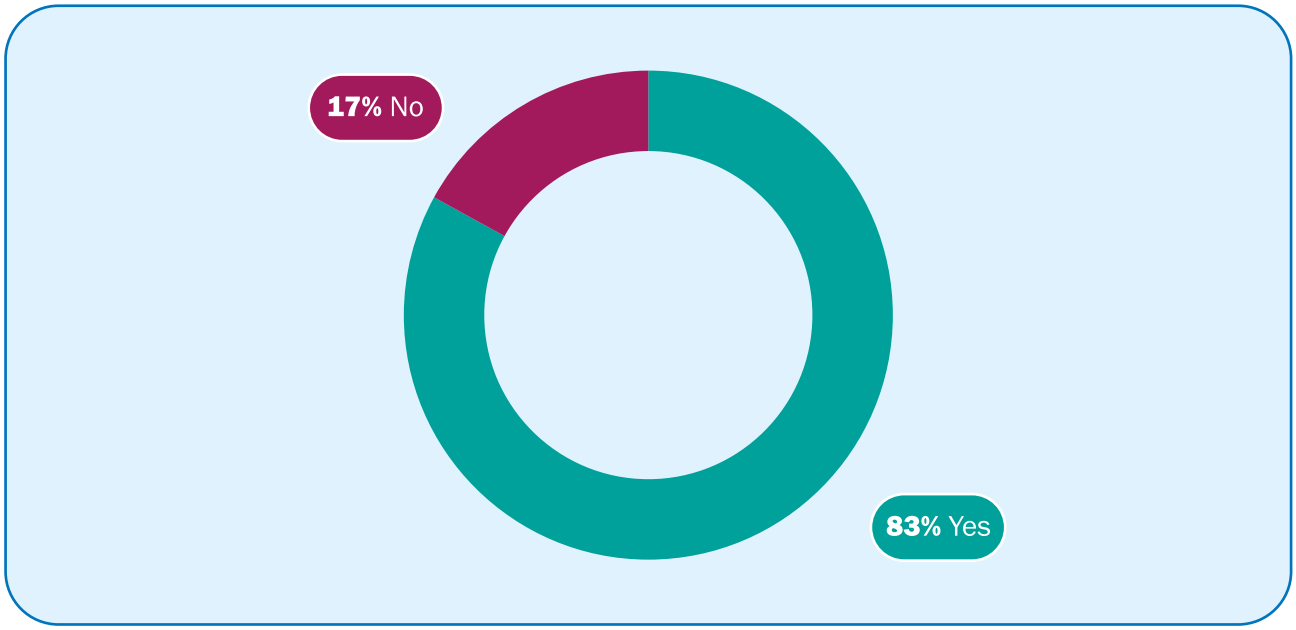
- It was suggested that initial policies should look at scaling up employees skills and the supply chain to ensure there are enough people on the ground that can deliver at scale the assessments and retrofit plans for homes and buildings.
- The need for capacity to ramp up in parallel with targets was identified, otherwise it was suggested that obligations will be met at 'any cost', rather than at best cost.
- There was support for a focus on quality and standards e.g. PAS2035[6].
- The awarding of contractors to scheme needs careful consideration.

The 11% of respondents disagreeing with this proposal noted that the time for pilot schemes is over, as in their view, there is plenty of evidence to inform the design and operation of a domestic retrofit programme. It was recommended that DfE draw on experience of schemes in England, Scotland, Wales and RoI to accelerate this process.

6 PAS 2035/2030:2019 - Retrofitting dwellings for improved energy efficiency. Specification and guidance.

Q28: DO YOU AGREE THAT WE SHOULD RING-FENCE THE PSO FUNDING FOR VULNERABLE CUSTOMERS INCLUDING THE FUEL POOR?

PLEASE ADVISE ON CHANGES YOU BELIEVE SHOULD BE MADE TO THE LEVEL AND SCOPE OF THE PSO FOR ENERGY EFFICIENCY.



WHAT DID RESPONDENTS SAY?

In total, 126 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document proposed that 100% of the Public Service Obligation (PSO) element of funding for the new scheme is ring-fenced for vulnerable and fuel poor households.

Most respondents (83%) agreed with this proposal, noting that PSO funding should be ring-fenced for priority group consumers, provided that this forms part of a wider programme able to support both self-funding domestic consumers and businesses to improve their energy efficiency and transition to low carbon heating.

A small proportion of respondents disagreed with ring fencing the PSO funding for vulnerable consumers and suggested that the PSO funding should be available to all, including small and medium-sized enterprises and industry to encourage efficiencies. Any shortfall or additional support needed for vulnerable consumers could be supported directly by government, similar to the intervention witnessed with welfare reform. Fairness needs to be considered for housing associations who avail of grant funding, i.e. that they in turn pass these energy savings on to their tenants.

It was also suggested that the current structure of PSO charges poses an issue in terms of the fair cost recovery across consumers, as this will depend on the mix of energy sources used by the consumer and the question of the PSO applying to all energy sources. An alternative suggestion was provided to facilitate a fairer funding mechanism, by replacing the PSO charge based on electricity usage with fixed PSO charges per consumer, similar to local council rates charges, ensuring it was independent of the choice of energy source.

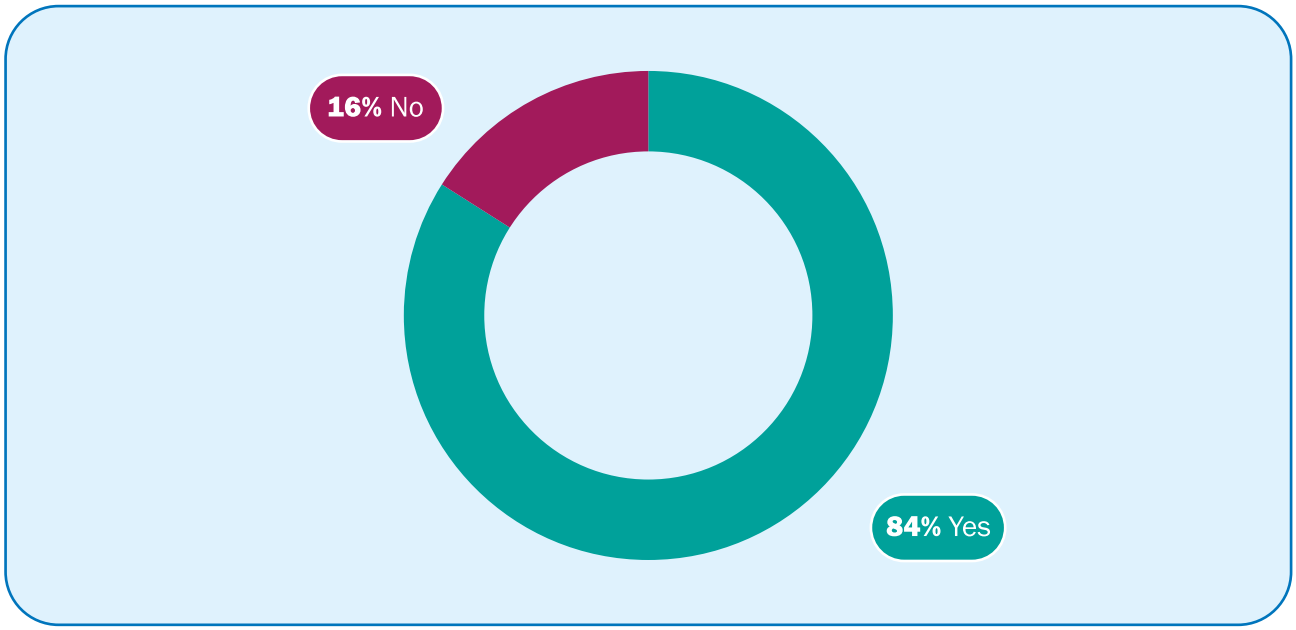
59 responses were provided to the supplementary question in respect of the changes which should be made to the level and scope of the PSO for energy efficiency, with several respondents highlighting the need to extend the PSO beyond electricity providers to include heating oil and natural gas.

The following additional issues were also raised:

- The importance of designing the scheme to ensure accessibility and fairness, so that resources can be properly targeted to those households who are most vulnerable;
- Several respondents suggested the PSO levy should be increased;
- It was highlighted that very little tax is collected on home heating fuels such as oil and this therefore hampers the transition to cleaner fuel sources. It was suggested that considering PSO as a source of funding reflects the 'easy option' of sourcing funding through electricity tariffs to be applied to an Energy Strategy. This was deemed counterproductive as it will increase the cost of electricity and therefore not encourage customers to switch from higher carbon solutions such as oil;
- Additional levies could be ring fenced to insulate the homes of the poor and provide rebates if necessary, making sure low-income groups are not unfairly affected by the levy;
- The need to review and extend the definition of 'vulnerable customer' was identified by a number of respondents, although it was noted that any review could lead to a definition which is too broad to target the original intended customer segment; and
- A number of responses noted that it is not appropriate for businesses to continue to subsidise domestic customers. It was suggested that there is a need to ensure that the scope of PSO levies to fund expenditure for the fuel poor in the domestic sector is not a tax on business. It was recommended that PSO levies to fund domestic sector investments should, therefore, be levied only on domestic sector bills.

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?



WHAT DID RESPONDENTS SAY?

In total, 135 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document highlighted that, alongside new government support, there is an opportunity to explore private funding models. Comments were invited on whether green private finance solutions have a role to play in supporting domestic customers to invest in energy efficiency and what specific green finance solutions should be explored.

Respondents were generally supportive of this proposal, with 84% in agreement and 16% that did not agree. A number of respondents provided feedback as to what specific green finance solutions should be explored.

Most respondents agreed that private finance has a part to play but it was suggested that this should be in combination with government backing or other incentives e.g. grants and/or subsidies. There were concerns from a number of respondents about affordability for vulnerable and low income consumers, with many saying private financing is not an option for all people and that those in vulnerable circumstances should receive full financial support so that these measures did not result in further financial difficulty.

Some respondents noted that incentives and stimuli are needed for the private finance path with rates rebates mentioned. Many noted that careful regulation and legislation are needed, with set or zero interest rates and set profit margins. There were also some concerns noted that financial institutions would benefit rather than consumers and the economy.

A small number of respondents made reference to the RHI model and suggested it could be used, while others stated that that lessons should be learnt from RHI to ensure there are no loopholes. Some respondents noted the lack of upfront payment would not be helpful in dealing with initial capital costs required. RHI was used as an example by some respondents as to why the government should not be involved in financing efficiency measures, with the suggestion that other models, such as the Carbon Trust funding model, were more appropriate.

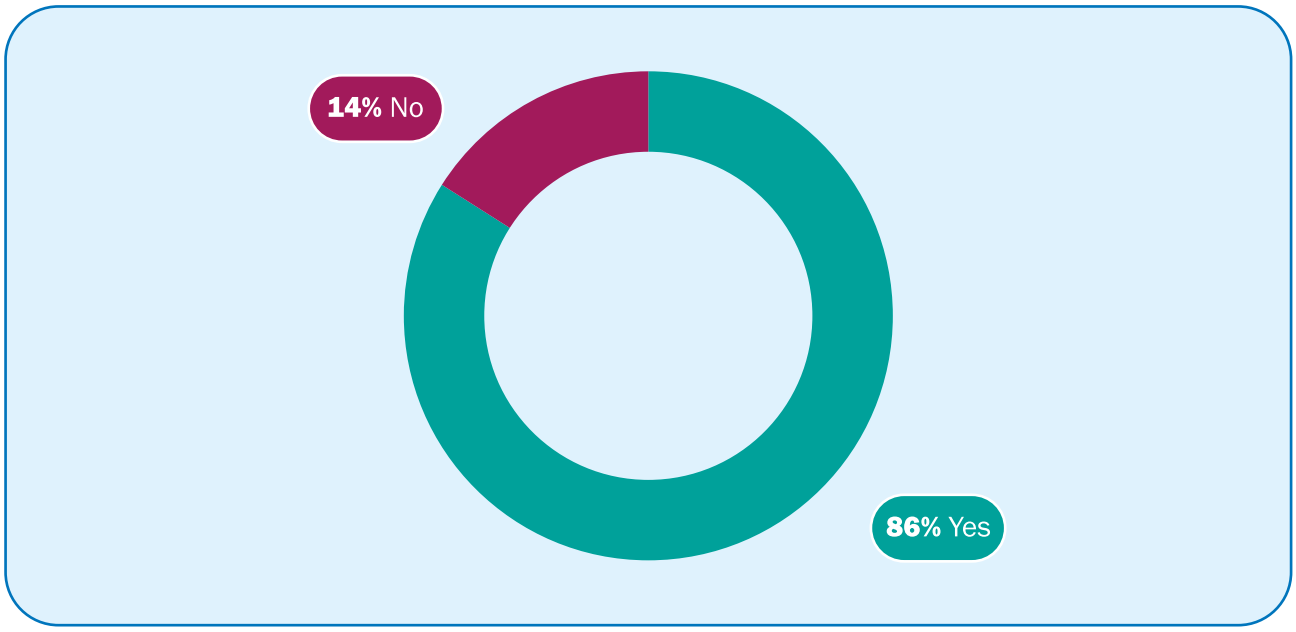
One respondent suggested that financial support should be considered for the construction of carbon neutral homes, highlighting Passive House and Tiny House communities as two examples.

Other key points made by respondents included:

- It is reasonable for homeowners to finance the improvements, where they can afford to, and will financially benefit from the improvements in bill savings or increased asset price;
- Domestic customers wishing to invest in the highest quality technology should have finance options but basic retrofit technologies should be more readily available on grant based systems to ensure a minimum standard;
- Some respondents also recommended that financial institutions are best placed to provide finance options and deal with consumers;
- Underwriting schemes are needed for maintenance and repair costs;
- Money skills and attitudes will affect readiness; and
- The 'On Bill' repayment method could be used but it was noted that increased bills could act as a disincentive and could act as a barrier to switching suppliers.

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?



WHAT DID RESPONDENTS SAY?

In total, 133 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to work with Invest NI to deliver a pilot energy efficiency support scheme for businesses, to be followed by a substantive scheme delivered through the proposed "one stop shop" organisation.

Overall there was good support, with 86% of respondents in agreement to the proposal compared to 14% indicating they did not agree. In regards to those in agreement there are a number of key themes identified in respect of the scheme and what it should offer including:

- Provide tailored support to a wide range of businesses regardless of size, turnover and energy use;
- Scheme delivery to be linked to clear objectives and substantive carbon reductions;
- Provide training and workshops to educate business, including behavioural changes that can improve energy efficiency;
- A range of supports e.g. low interest loans, grants, renewables, technical advice, rate reductions, tax incentives, tailored staff training for businesses; and

- Follow similar schemes such as the Invest NI Resource Efficiency Scheme or SEAI Exceed Grant.

Whilst the responses were mainly positive, a few domestic consumers and energy sector representatives queried the need for a pilot as there has already been previous schemes and support in this area. Some respondents felt it would be more time efficient to roll out a substantive scheme in the first instance. Furthermore, one energy sector respondent commented *"this work should be procured and open to other organisations"* indicating the ability of the private sector to deliver such a scheme.

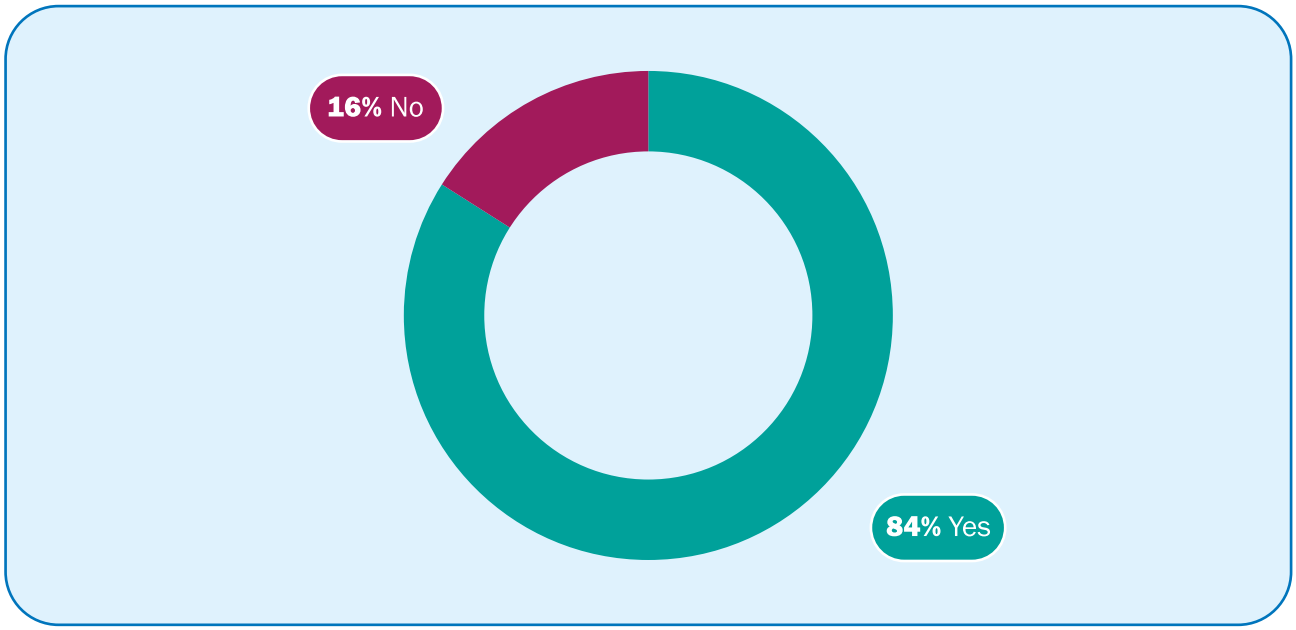
In reference to the OSS, respondents made a number of suggestions including the need for the organisation to:

- Employ trained energy consultants;
- Cover the entire life cycle of a project, from consultancy through to construction;
- Have adequate resources able to provide appropriate technical advice; and
- Be sufficiently broad in scope, with the relevant expertise to provide direction to the appropriate authorities.

Respondents recognised the criticality of energy efficiency to achieving net zero ambitions and supported delivery of a pilot project by Invest NI in the short-term. However, the importance of an enduring delivery mechanism for the scheme was noted. A few respondents expressed reservations about whether the OSS would be able to cope with the breadth of demands and whether it would be sufficiently independent and technologically neutral.

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?



WHAT DID RESPONDENTS SAY?

In total, 128 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document we asked if green private finance solutions have a role to play in supporting non-domestic consumers to invest in energy efficiency and if so, what specific green finance solutions should be explored.

There was broad overall support for this option, with 84% of respondents who answered this question agreeing with the proposal, compared to 16% indicating they did not agree.

In regards to those in agreement there were a number of key themes identified:

- Regulation, transparency, and financial protection are essential;
- Green private finance has to be offered alongside other supports e.g. grants, tax incentives;
- Learn from other jurisdictions e.g. Sustainable Finance Ireland and Salix Finance GB; and
- Financing should be made available to both private and public sector.

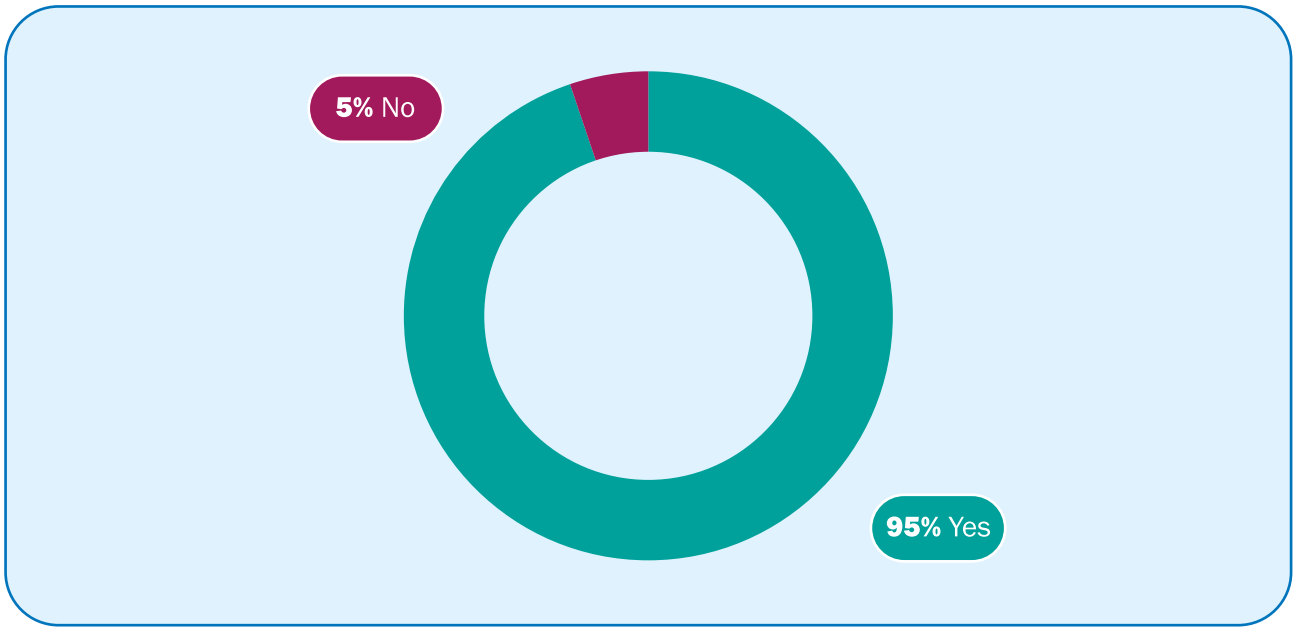
There were also suggestions such as:

- Collaborative and innovative knowledge transfer competitions should encourage developers in this space; and
- Community shares, which have been widely used to finance green projects. It was observed that community organisations will need support and technical advice that they can reach through a local supporting body for community-led energy projects.

The general tone of those in support was summed up best by one respondent who observed that care must be taken that green private finance solutions are genuine investments, and not simply a greenwashing exercise by the finance sector.

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?



WHAT DID RESPONDENTS SAY?

In total, 144 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document stated the intention to progress a range of measures aimed at upskilling the retrofit sector, enhancing standards and providing robust quality assurance in terms of both the installers and the work being undertaken by them. We asked how we can help to prepare the sector for these changes.

Of the 144 respondents, 95% were in favour of the proposal, while 5% were not. A number of respondents provided comments on how the sector can be supported to prepare for these changes.

There was a broad consensus across all respondents 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 for the retrofit sector and that this is vital for consumer confidence.

A number of respondents expressed the opinion that the further and higher education sectors, and industry training should be used to develop skills, and that they should be given a strategy and funding to do so. There were concerns, however, that training and accreditation would be expensive and prove a barrier to obtaining these skills. It was noted that the need for training is urgent because it takes time to get established, noting that other governments are already in the process of setting up retrofit academies. There was support for an Energy Skills Forum to inform the future skills needed as well as support for a green energy college.

With regard to industry capability, low carbon heating was specifically mentioned, noting the current capability of this. The need to understand how buildings work was recognised as a challenge, with reference to the performance of building materials, embedded carbon, heating systems, and the application of building regulations.

A number of suggestions were made by respondents in relation to quality assurance and accreditation, including;

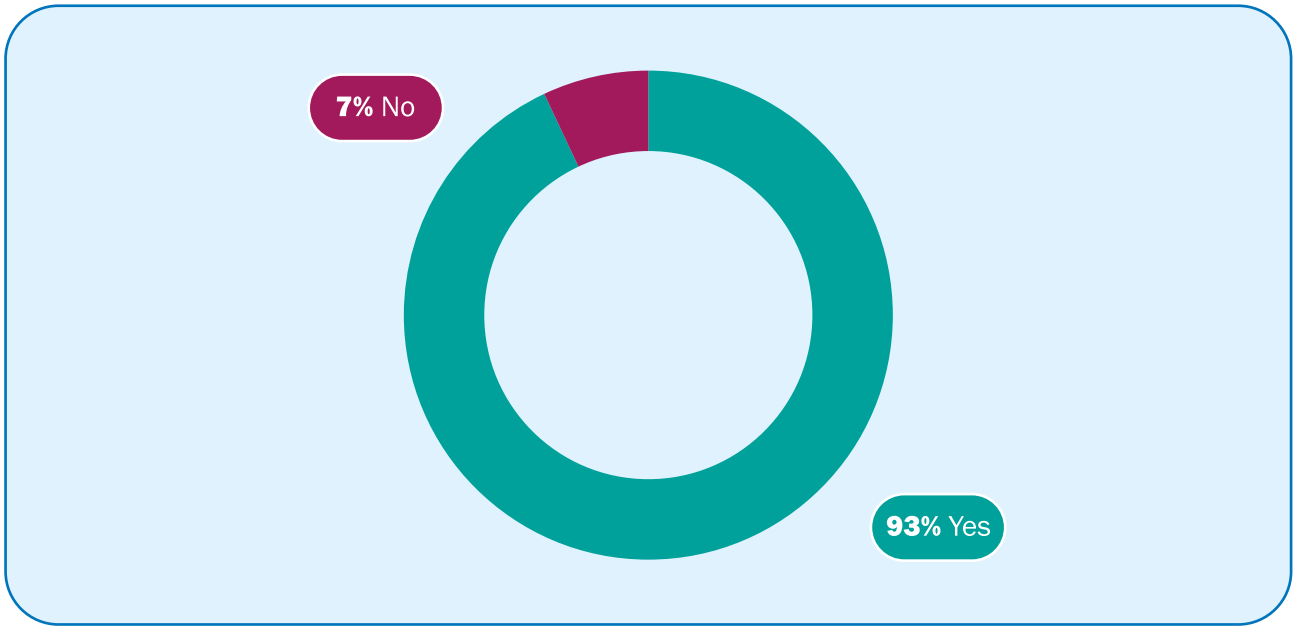
- Using existing standards such as PAS2035[7] and Micro-generation Certification Scheme (MCS)[8] standards;
- Consideration of the Better Energy Home Standards model used in RoI;
- Using Building Control inspectors and their expertise and level of oversight;
- The use of continuous professional development alongside accreditation; and
- The potential to use the proposed OSS as an accreditation body.

There were some concerns that accreditation could act as a barrier to working in retrofit and could be used to increase the cost for consumers. However, importance was also placed on the need for retrofit works to be completed to a good standard, noting the damage caused by work of a poor standard.

7 PAS 2035/2030:2019 - Retrofitting dwellings for improved energy efficiency. Specification and guidance.
8 https://mcscertified.com/

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?



WHAT DID RESPONDENTS SAY?

In total, 151 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to make information, awareness and behavioural change a key part of future energy efficiency support.

Of the 151 respondents who answered this question, 93% agreed with this proposal while 7% did not. A number of respondents provided comments regarding the key behaviours that should be targeted.

Across all respondents, there was strong consensus that awareness, communication and prolonged advertising campaigns are needed to affect behaviour change. The vast majority agreed that changing behaviour is key because consumers are central to the success and financing of the transition to net zero. Some respondents felt this is the most important part of the transition to net zero. Several respondents noted that advice should be impartial and lessons should be learnt from RHI.

Comments from respondents in support of the question are summarised as follows:

Electricity behaviour

- The use of smart meter technology should be introduced, on the basis that if consumers see live information on their energy consumption this could drive changes in behaviours and increase understanding of energy consumption.
- Increasing awareness of peak times and using tariffs could help consumers understand the benefits of spreading energy consumption across the day.
- Some concerns that lowering energy prices could result in increased consumption.
- Awareness of appliance usage and use of standby on devices was highlighted.
- Industry could play a key role in making consumers more aware of appliance consumption using labels to display the cost of consumption.

Heating behaviour

- Domestic household behaviours should be targeted, for example setting the thermostat too high, closing doors, and wearing extra layers.
- Significant amount of heating cost is on hot water and so targeting water usage and awareness was recommended.
- Some concerns raised that fuel poor consumers and the elderly also need educated on maintaining comfort in the home, as confusion could have unintended health consequences.

Spending behaviour

- Incentives will increase spending on energy efficiency measures / retrofitting homes, and also on introducing low carbon heating alternatives.
- Penalties were highlighted as another way of reducing the use of carbon fuels but some respondents felt behaviour change should be based on rewards, not penalties.

Travel behaviours

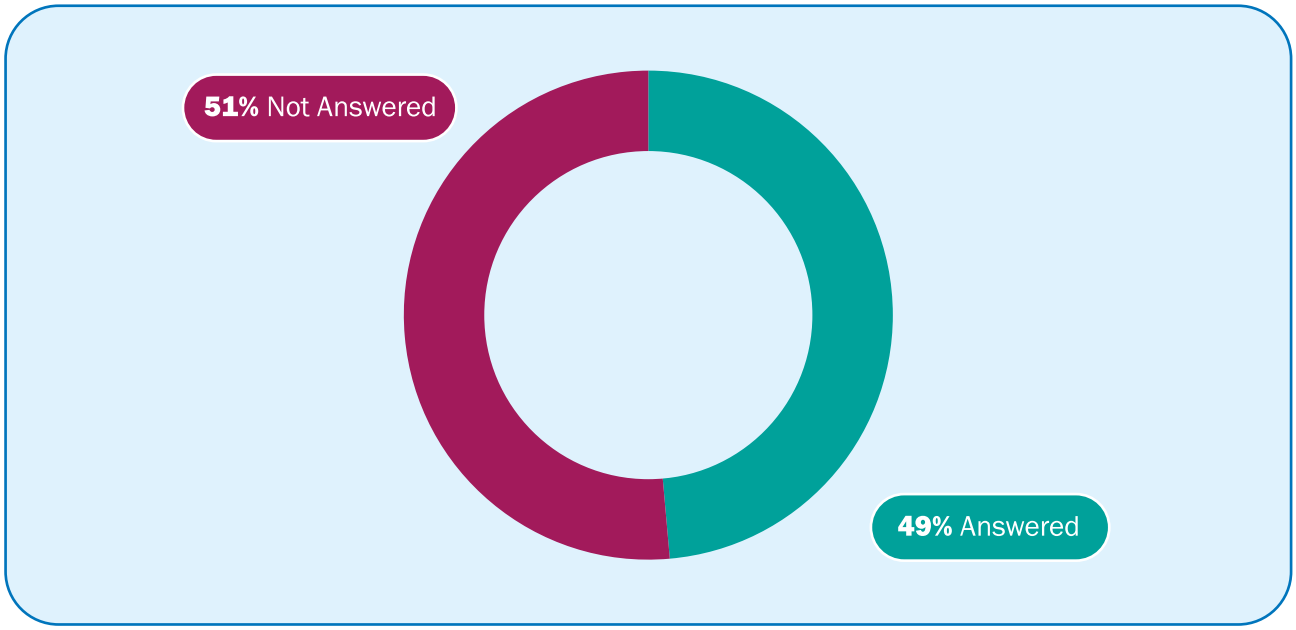
- Targeting travel by improving public transport, lowering prices and undertaking promotions could result in behavioural change.
- Promoting and incentivising purchase of Electric Vehicles (EVs) to drive change in transport behaviours.
- Home working highlighted as a way of reducing travel, recognising that improving internet connections would help this.
- Targeting domestic holidays / tourism behaviours should be considered.

Other behaviours

- Waste management behaviours highlighted by several respondents.
- The need to promote food consumption from lower in the food chain as well as targeting farming behaviours to reduce carbon.

Q34: WHAT MEASURES DO YOU THINK CAN HAVE THE MOST IMPACT ON CHANGING BEHAVIOURS TO CHANGE HOW WE TRAVEL AND REDUCE PRIVATE VEHICLES?

PLEASE EXPLAIN YOUR RATIONALE.



WHAT DID RESPONDENTS SAY?

In total, 123 out of 253 of stakeholders responded to this question on Citizen Space. It should be noted that this question only asked people to provide comments setting out their views.

Within the policy options consultation document, we asked respondents what measures they think can have the most impact on behaviours to change how we travel and reduce private vehicles.

Nearly 50% of respondents commented providing detailed views on a very broad range of options to reduce our reliance on the private car and change how we travel. There were those who were uncertain about the impact of measures that promote alternatives to the private car. However, in general, there was support for a transport modal hierarchy approach which prioritises walking and wheeling, cycling, public transport, shared transport and goods vehicles, and private cars and motorcycles in that order.

Respondents provided views on how we can change the way we travel to work and access goods and services. A long list of options included building on many of the initiatives which have been put in place over recent years, as outlined below:

- More Greenways and spend on walking and cycling infrastructure;
- More EV charge points to support introduction of EVs;
- More green public transport and less expensive fares;
- More working at home and less commuting;
- Better broadband access to facilitate home and remote working;
- More alternative fuels technologies adopted;
- Better Town and Transport Planning;
- More Pool Cars and Car Sharing Schemes; and
- More e-bikes and legal e-scooters.

Respondents also highlighted issues that they felt needed to be considered, drawing on lessons learned from the Covid pandemic, where appropriate, and addressing past challenges. These included:

- Less congestion and more disincentives for the most polluting vehicles entering our towns and cities;
- Less pollution through introduction of clean air / emission free zones;
- No silent congestion with EVs simply replicating existing travel patterns;
- Key road infrastructure projects need to be completed to provide better, less congested transport corridors;
- Reducing parking capacity in town and cities to encourage public transport use;
- No return to daily commute when homeworking can be accommodated;
- Progress on encouraging people to shift to Active Travel options; and
- Cheaper alternative fuelled vehicle options.

Responses indicated differing views on what the priorities should be and where investment should be targeted. Many of the responses focused on single issues without consideration of how other options could be integrated or impacted. This may be reflective of the number of options (including digital solutions), with new ideas and new technologies competing for the markets of the future.

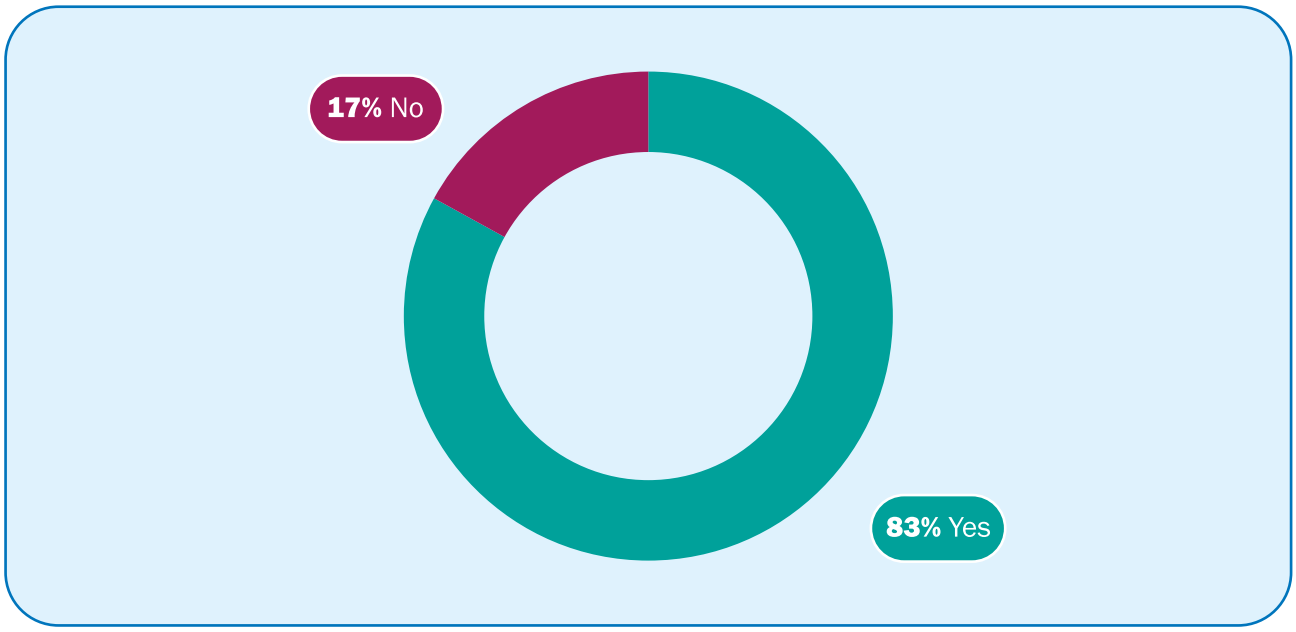
This question provided a broader opportunity for respondents to share their vision of transport in the future, covering everything from future planning needs to the creation of fifteen minute neighbourhoods where consumers can access goods and services locally without having to use the car.

This vision conveyed from those that responded was one of a healthier society, moving freely on clean public and private transport accessing goods and services which have been manufactured, grown or delivered in an environmentally friendly way.

CHAPTER 5:

Replace Fossil Fuels With Indigenous Renewables – Response Summary

Q35: DO YOU AGREE WITH SETTING A 70% RENEWABLE ELECTRICITY TARGET BY 2030, WHILST RETAINING THE FLEXIBILITY TO INCREASE THIS TO 80%?



WHAT DID RESPONDENTS SAY?

In total, 169 out of 253 responses were received to this question in Citizen Space.

This was one of a small number of questions in Citizen Space that did not provide an opportunity for supplementary comments (i.e. it was a yes / no response only). Some respondents provided additional input to this question through their written responses (submitted via email, post, or in response to other questions), which included reasons for supporting the proposed target or suggesting alternatives.

Through this question, we sought to capture views on the intention to drive decarbonisation of the power sector by establishing new renewable electricity consumption target. We proposed to set a renewable energy target of 70% by 2030, with the flexibility to increase this target should it prove feasible and cost effective.

In general, the proposed target was supported with 83% of respondents in agreement and 17% not in agreement.

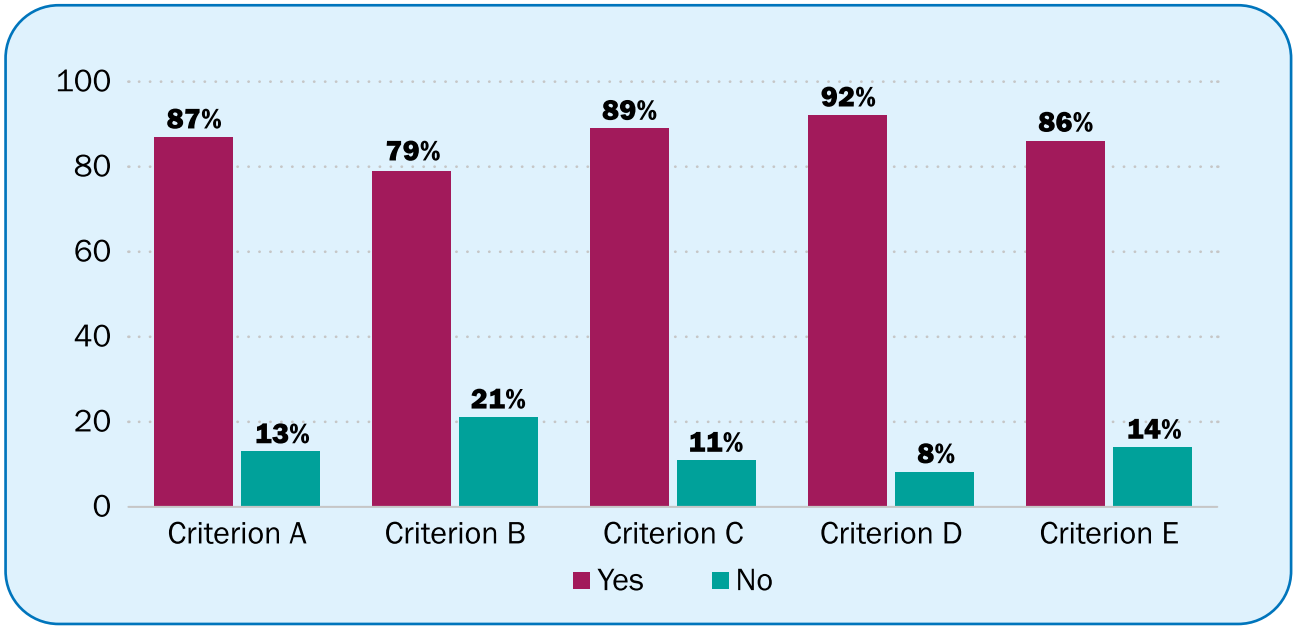
The majority of comments were made by business consumers and energy sector representatives, as well as some environmental organisations that supported the proposal. Many of the respondents that did not agree felt that the target was not sufficiently ambitious and that it should be 80% by 2030, or that the flexibility to increase the target should go beyond 80% and up to 100% by 2030 in some cases. A small number of respondents did not actually answer the question as such, but suggested that a target of 80% by 2030 from the outset would be more appropriate.

Some respondents suggested alternative/parallels to a percentage target including setting of a power sector carbon reduction target or the establishment of capacity targets broken down by technology.

Q36: DO YOU AGREE WITH THE CRITERIA IDENTIFIED THAT WOULD ALLOW US TO CONSIDER ANY FUTURE INCREASES TO 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?



WHAT DID RESPONDENTS SAY?

For this question, between 140 and 142 responses for the proposed criteria were received in Citizen Space.

In the policy options consultation we proposed setting a target for the consumption of electricity from renewable sources by 2030. Following on from this, the purpose of this question was to gather views on the criteria that would be used to determine when future increases in the renewable electricity target should occur.

While levels of support varied per criterion, on average 87% of respondents agreed with the criteria while 13% did not agree. The responses demonstrate a wide-range of views although, in general, there was broad support for the five criteria. Analysis for each criterion is set out below.

Criterion A - Projects can be delivered in a cost-effective manner

Of those disagreeing, there was a view expressed that 'cost-effective' is too vague and needs to be better defined, while others suggested that costs should not be viewed as a barrier to pursing further renewables on the basis we cannot take an approach of the lowest bid wins in relation to renewables and reducing carbon emissions. The 2006 Stern Report[9] was referenced as a specific source of evidence to back the assertion that costs should be a secondary consideration and the belief that the cost of inaction in addressing climate change outweighs the cost of decarbonising. This was suggested as being a core message when trying to change mind-sets and behaviours.

Other comments received range from a necessity to review the cost of connection to the network to the need to consider the trade-off between marginally higher consumer bills in the short term and subsidising innovative technologies to commercialisation.

Criterion B - Offshore wind can be delivered by 2030

Of those disagreeing, views ranged from offshore wind being a waste of money to suggestions that it will take a long time to plan, finance and deliver and that a project would need to be in planning in early 2022 if there is to be any possibility of being operational by 2030. Some caution was advised in adopting a policy that is reliant on the rapid deployment of offshore wind in NI waters, suggesting that alternatives should be considered such as investment in storage technologies, repowering of existing onshore wind turbines, and community and domestic renewable energy schemes if a 70% target is to be achieved.

While recognising that there will be challenges, others responding positively to the criterion believe that offshore wind by 2030 is possible if there is commitment and immediate policy movement to include appropriate planning and grid engagement, support and reform with a suggestion that DfE should lead in this area to ensure public support.

Criterion C - Storage technologies can minimise system curtailment of renewables

Of those who agreed with criterion, there was reference to a Carbon Trust report (May 2021) which shows that GB can save £16.7bn per year from 2050 through flexibility[10] and a suggestion that storage and flexibility is a pillar of decarbonisation. It was further suggested that battery storage should not be classified as 'generation' (referring to a recent Planning Appeals Commission finding) and that a range of storage technologies should be considered (not just conventional battery) to include compressed air, pumped hydro, thermal energy, liquid air energy and novel battery technology. It was also suggested that the gas pipeline could be used as an energy storage facility and that organic flow batteries would particularly suit the local land-based sector and integration into farm systems.

Of those disagreeing, a belief was expressed that *"storage is unnecessary and detrimental to the environment"* while others suggested that conventional thermal generation should remain on the network for providing security of supply in periods of low wind and poor daylight with a specific suggestion around pursuing Combined Cycle Gas Turbine (CCGT) plant firing on hydrogen.

9 https://webarchive.nationalarchives.gov.uk/ukgwa/20091118113059/http://www.hm-treasury.gov.uk/sternreview_index.htm
10 https://publications.carbontrust.com/flex-gb/analysis/

Criterion D - Greater clarity on electricity demand for heating and transport

Those who supported this criteria suggested that greater understanding and continued monitoring of the increasing demand for electrification of heating and transport will be required to ensure the there is a clear pathway towards 80% by 2030. Support is expressed for the roll-out of smart metering with a suggestion that it should be focused initially on properties that are self-generating renewable electricity and may also be converting to electric heating and transport. However, there were also suggestions that there is a need to assess heat and transport demands separately.

In rejecting the criterion, views were expressed around the unwillingness to use an electric car for reasons including lack of charging infrastructure, range anxiety, the price of vehicles, and the short lifespan of batteries.

Criterion E - Consumers' bills are not disproportionately impacted

Those who supported this criterion made reference to the NIE Networks 'Networks for Net Zero' Strategy"[11] and its assessment of the impact on use of system costs. Noting that, in the long-term, costs to the consumer would actually reduce as a result of the investments made. While costs associated with the Energy Strategy are important, concerns were expressed that if climate change is not addressed, it will also increase the costs that consumers have to pay e.g. through contributions to flood defences, etc.

Those who disagreed with this criterion did so on the basis that it may be an oxymoron to ask if consumer bills will be disproportionately impacted in order to produce energy which may require constant back-up. Others pointed out that they would like more emphasis placed on the cost of not tackling climate change and that we should be upfront with consumers that doing so will not be cost-neutral, but is absolutely necessary.

In response to the question of what alternative criteria might be used, the following were identified:

Embrace the Agri-Food Sector: It is suggested that the agri-food sector has already delivered a substantial contribution to NI's energy mix, and that planning and grid reforms can ensure that it continues to develop renewable energy solutions to meet its own needs and those of others although a new financial support mechanism will be required as a stimulus.

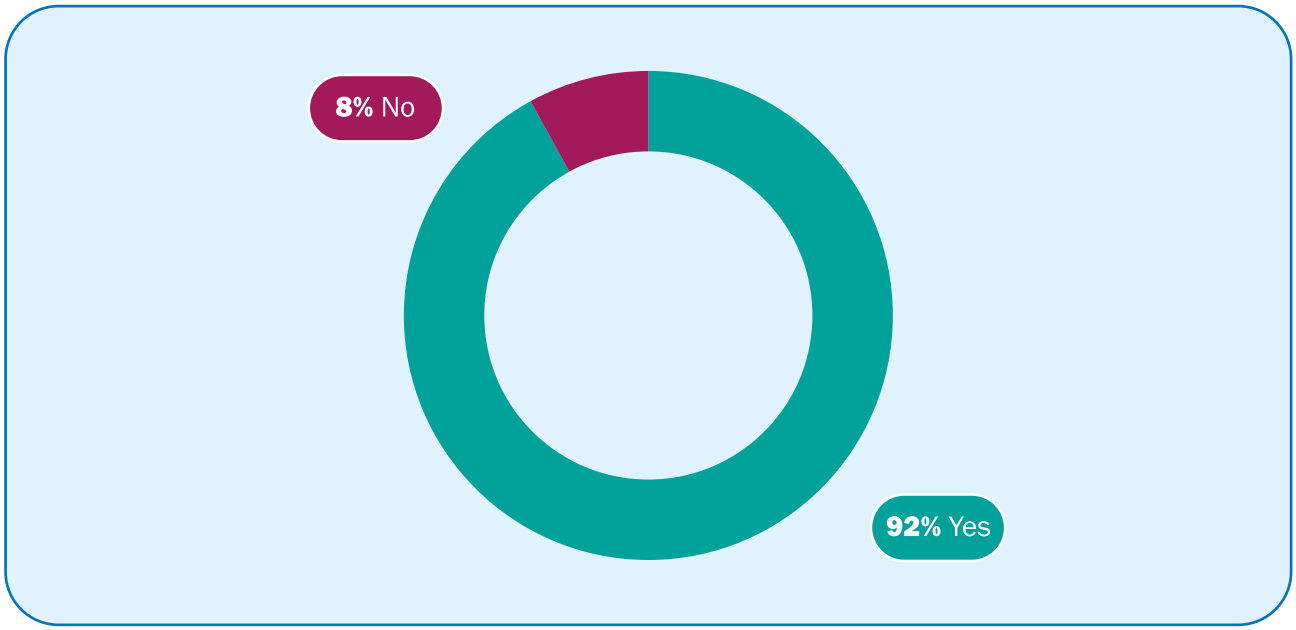
Small and Medium-Sized Support: Respondents pointed out that government support schemes have tended to introduce changes in support at specific scales, which leads to technology installations gravitating towards upper capacity boundaries, and suggested that inclusion of small and medium scale support will be very important.

Role of Distributed Generation: Also suggested as requiring more prominence given its contribution to electricity generation on-site, rather than transmitting energy over the grid from large, centralised facilities. It is specifically proposed that criterion a), b), and c) be amended to *"(a) Projects make economic sense (b) Offshore wind can be delivered and connected by 2030; and (c) Storage technologies and interconnection can provide sufficient levels of system flexibility to minimise system curtailment of renewables".*

11 https://www.nienetworks.co.uk/documents/future-networks/networks-for-net-zero.aspx

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?



WHAT DID RESPONDENTS SAY?

In total, 143 out of 253 responses were received to this question in Citizen Space.

In the policy options consultation, we suggested an approach for securing a support scheme that will provide revenue certainty and investor confidence for renewable energy developers. The purpose of this question was therefore to gather views on whether the Contracts for Difference Scheme (CfD), which operates in GB, should be considered for extension to NI as the principal support mechanism for facilitating investment in renewable power generation.

Respondents were supportive of this proposal, with 92% in agreement and 8% that did not agree. Those in support of the proposal made a wide range of comments and suggestions.

Some respondents commented that in considering any support scheme, the risk to the consumer should be the greatest consideration and that support should not be offered in a manner whereby the consumer is guaranteed to lose out. In particular, a number of respondents were of the view that the greatest risk should be placed with the energy generator. There were a number of suggestions that DfE should draw on any evaluations undertaken and lessons learned by the Department for Business, Energy and Industrial Strategy (BEIS) to date.

It was also suggested by some that other forms of support scheme should be examined first, e.g. Alternative Energy Requirement, Renewable Energy Support Scheme (RESS), Renewables Obligation (RO). The opportunity to consider the benefits of both the CfD and RESS schemes was highlighted. Some respondents asked if a bespoke arrangement might be more applicable to NI based on the best aspects of each, as well as considering investment from an all-island position and the benefits of greater interconnection.

In supporting the proposal there were a wide range of views on the potential scope of the CfD scheme in NI, although there was a clear preference for a designated ring-fenced pot for NI projects. Within this ring-fenced pot for NI, it was suggested that there should be a category for projects of 500kW to 5MW scale, as well as for new technologies including floating offshore wind, geothermal (heat and power), hydrogen, biomethane, biomass, biofuels and storage. Respondents were of the view that a separate pot would mean that NI generators would only be competing against each other for the award of a contract, rather than with GB generators, although it was recognised that the feasibility and legal basis of this approach would need consideration.

It was also cautioned that added care should be taken to ensure low-income consumers are protected (e.g. ensuring that NI consumers are not exposed to historical costs of previous auction rounds in GB or negotiated CfDs and are only exposed to the costs for generation of which they can avail of in NI). The need to reflect local NI conditions and take account of differences between the GB and NI markets was also raised in the context of planning systems, grid connection costs, higher levels of dispatch down, and maturity of technologies. Contract duration was also raised with concerns around avoiding stagnation by awarding long-term contracts to mature technologies at the expense of promoting newer or less established technologies.

Should it transpire that the CfD scheme could be successfully extended to NI, it is considered essential that timing should allow NI generators to participate in the next auction round currently scheduled for 2023. Front loading of system design was also raised as being on the critical path. For example, a dedicated financial settlements IT system will be needed that could take well over 4 years to design and implement, meaning that payments might not be possible before 2025/26, even if policy decisions are taken quickly.

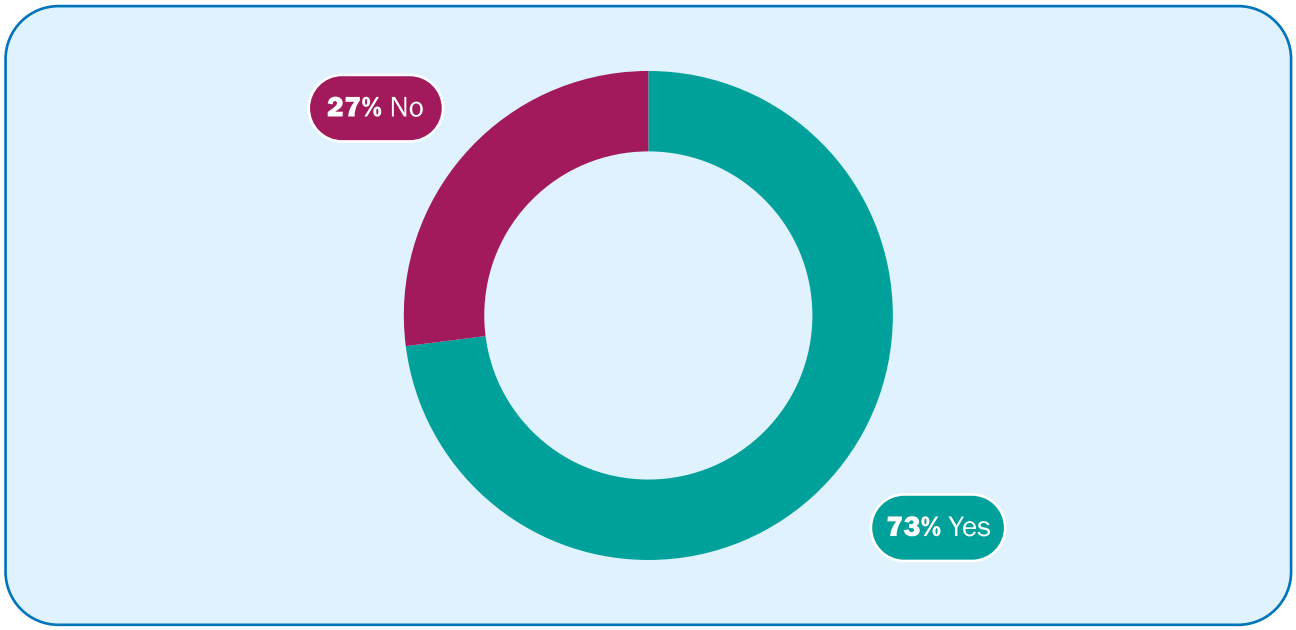
Other suggestions included the need to make improvements in energy infrastructure a pre-requisite before introducing a new scheme; the need to support community energy; and obligating generators to share financial benefits with the host community on an individual household basis. Planning policy was also referenced with a belief that a broader strategy on repowering is needed.

Business consumers that did not support the proposal reasoned that the UK market is already very expensive and that the CfD model does not provide energy security or affordability, but that other global models existed that were more appropriate.

Energy sector representatives that were not in support of this proposal encouraged DfE to explore other mechanisms that support the growth of community energy in NI. Another stated the need to have a full understanding how the extension of CfD auctions would impact costs to consumers, in particular the fuel poor and vulnerable.

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.



WHAT DID RESPONDENTS SAY?

In total, 132 out of 253 responses were received to this question in Citizen Space.

In the consultation, we proposed to take a two-stage approach facilitating the deployment of offshore energy developments in NI waters. The purpose of this question was to capture views on the potential to have an offshore wind project in place and operational in NI waters before 2030 and, if the answer is yes, what actions might need to be taken to ensure that it becomes a reality.

The majority of respondents (73%) believe that it is possible to have an offshore wind project operational in NI waters before 2030, while 27% do not. A number of respondents commented as to what targeted actions they thought needed to be put in place. Suggestions include:

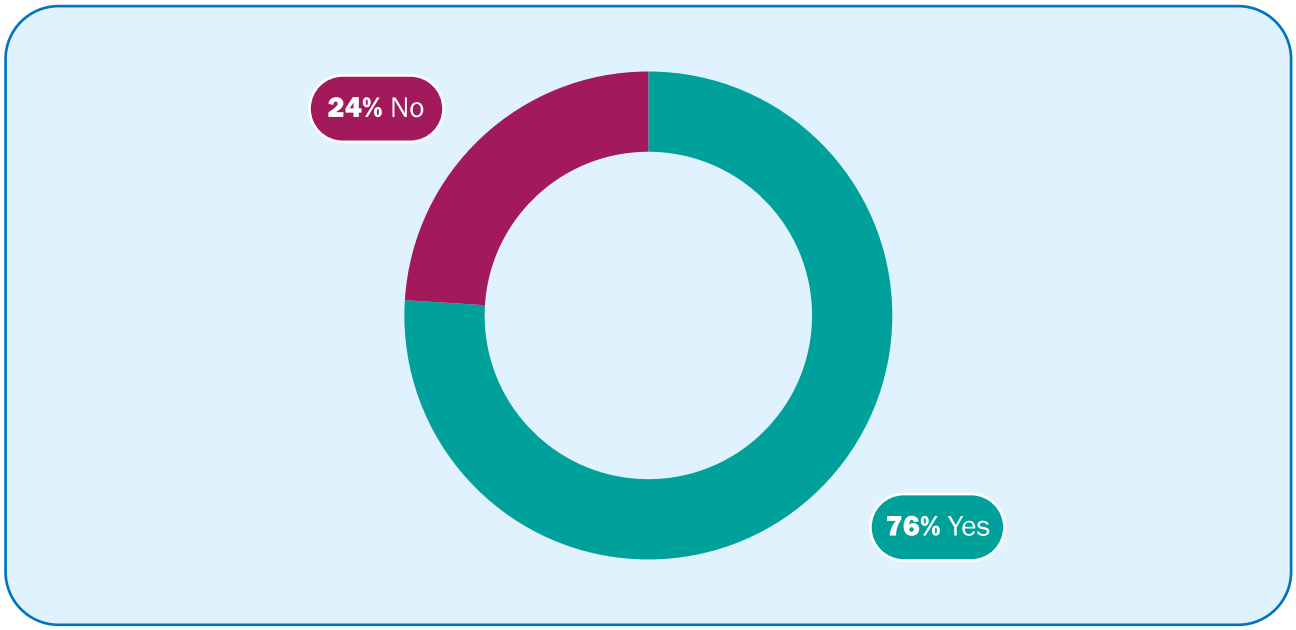
- **Identify areas suitable for installation:** Comments included the need to designate specific energy zones, the need to be close to where electricity will be used or stored, setting out areas of search and statutory assessment criteria, conducting surveys to identify suitable locations, and identifying areas of geological hazard;

- **Planning:** A number of respondents pointed to a need for planning reform with a suggestion that offshore wind planning reviews need to be streamlined/prioritised, perhaps even having an individual planning board to review separately any proposals. Some respondents pointed to the need for a sectoral marine plan to identify the most sustainable options for the future development of commercial-scale offshore wind energy, supported by detailed assessments of the potential environmental, social, and economic impacts;
- **Grid capacity/investment:** Many respondents noted that grid access is an essential requirement for developing offshore energy. Many energy sector representatives believe that investment in infrastructure needs to be given priority to improve availability of capacity. A number of respondents suggested a more appropriate model for connection charging is needed;
- **Co-location:** A number of respondents suggested that consideration should be given to co-locating offshore energy generation with storage facilities or with electrolysers for the production of hydrogen. Views on how offshore energy should be utilised were varied with some suggesting that conversion to hydrogen would avoid the need for a grid connection, and others suggesting that generated energy should connect to the electricity grid and / or battery storage;
- **Incentivisation:** Views on this ranged from suggesting that incentives were not required to a suggestion that government provide a financial support mechanism, such as a CFD round ring-fenced for NI;
- **Regulatory relaxation/reform:** A number of proposals have been made by energy sector representatives for reducing regulatory burden on offshore wind development. Suggestions were that a more proactive approach to network development should be taken. A number of respondents noted that changes to the licencing regime were needed, such as providing a clear definition of the steps required for each licence application, imposing fixed timelines for consultations and licence determinations, and the need for NI government departments to be adequately resourced for the current level of licence determinations and the likely increase resulting from the transition to net zero; and
- **Public awareness/education:** Several respondents, mostly domestic consumers and energy sector representatives, pointed to the importance of stakeholder engagement and the need to manage public awareness around offshore projects, emphasising the benefit to NI and addressing public concerns that exist (for example around visual impact).

Of those responding that it is not possible to have an offshore energy project operational in NI waters by 2030, the rationale for this opinion generally centred on the typical timeline for project completion being 10 years from inception, and that the planning system and grid connectivity were unsuitable. Other issues mentioned were that NI had enough variable energy produced by wind and the lack of knowledge or expertise in the region.

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?



WHAT DID RESPONDENTS SAY?

In total, 119 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to diversify the renewables base, with a particular focus on offshore and marine renewables. While we acknowledged that floating platform offshore wind is likely to be the best long-term option for NI, we stated that fixed platform offshore wind is also likely to play a role and asked for feedback. 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.

There was broad overall support for targeting a fixed platform offshore wind project as part of the technology mix, with 76% of respondents who answered this question agreeing with the proposal, compared with 24% indicating they did not agree.

In identifying how to overcome some of the associated challenges, domestic consumers made comments on the need for environmental impacts of offshore wind projects to be minimised, the need to protect sites of natural beauty, and to protect popular tourism areas by positioning wind farms out of view.

Business consumers also commented on issues of environmental impact and the need to minimise impacts on marine life and habitats. Another common area of concern was around the planning system in NI, including the need for a review and a new offshore planning regime. Other concerns raised in relation to planning were that NI is not yet being included in The Crown Estate leasing rounds, and the necessity for a strategic approach to planning across marine, coastal and terrestrial areas. The need for early and inclusive cross-sectoral dialogue was another suggestion raised.

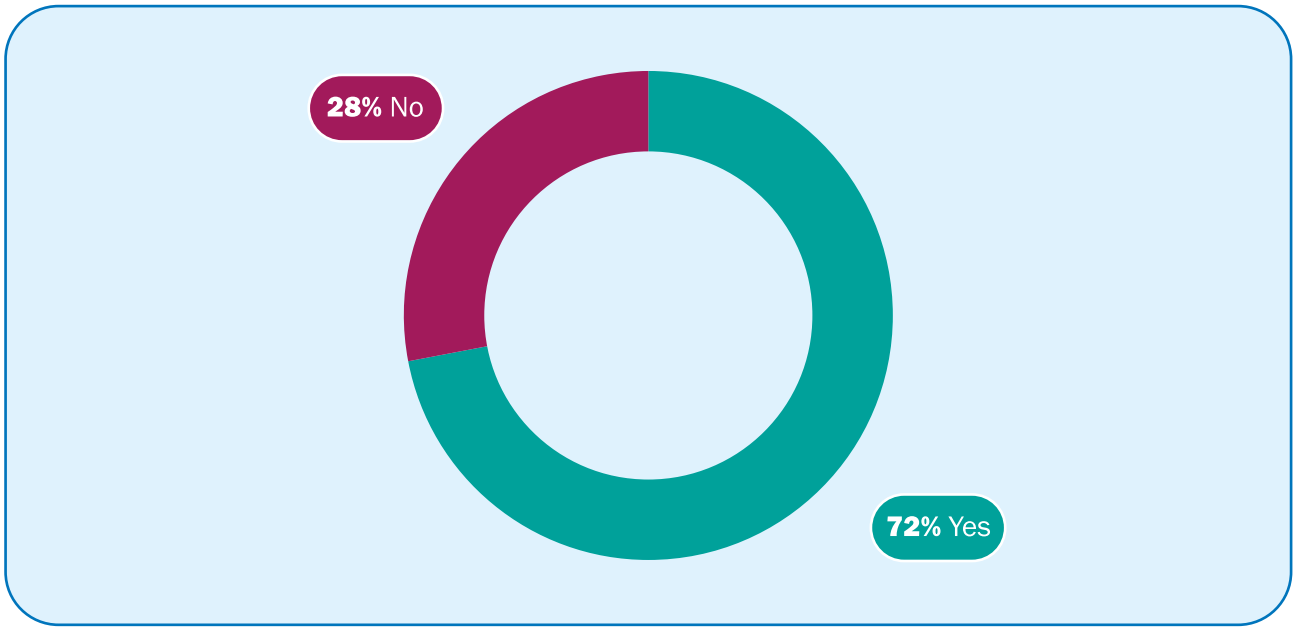
Energy sector representatives suggested aligning strategic planning with the approach set out in GB's Offshore Transmission Network Review, and others suggested that NI should seek to align policy with that of the RoI. Multiple energy sector representatives proposed that support measures for renewables should be technology neutral, responding along the lines of "let developers decide" which technologies should be deployed.

Across the groups, consistent messages emerged on the associated challenges with some respondents also offering views on how these could be overcome. These included:

- **Environmental impact:** the need for robust Environmental Impact Assessments (in line with legislative requirements) and research into potential impacts on marine life;
- **Strategic approach to planning:** ensuring that renewable generation is developed in the most appropriate areas of the power network, involving close collaboration between central and local government, grid operators and renewable developers;
- **Timescale of 2030 not achievable:** the conditions are not currently in place to attract investors and developers of offshore wind projects in NI. Additionally, respondents noted that offshore wind projects have typically long development times (7+ years);
- **Energy storage rather than generation:** more energy storage provides flexibility to the electricity system and the ability to respond to variability in renewables output, creating a more efficient electricity system that requires less generation to be deployed;
- **Blended offshore wind assets:** developing hybrid wind alongside storage or hydrogen electrolysis assets provides greater flexibility to the electricity system and avoids waste of renewable energy (curtailment) when natural resource availability is high;
- **Floating offshore wind rather than fixed platform**: floating offshore wind farms are able to be deployed further offshore and are preferred as they are less visible from land;
- **Analysis of grid delivery models**: reviewing delivery models to bring offshore wind on to the grid in the most efficient way to minimise grid reinforcement costs; and
- **Understanding system costs:** analysing the additional system costs incurred to ensure security of supply and back up capacity to facilitate higher levels of variable renewables.

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?



WHAT DID RESPONDENTS SAY?

In total, 110 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to diversify the renewables base, with a particular focus on offshore and marine renewables. 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. We acknowledged that floating platform offshore wind is likely to be the best long-term option for deployment in NI due to the geology of the surrounding seabed, and we asked for feedback.

Overall respondents supported the proposal that floating offshore wind provides the best long-term opportunities, with 72% of respondents who answered this question agreeing with the proposal, compared with 28% indicating they did not agree. A range of responses from business consumers and energy sector representatives discussed the cost and benefits of floating offshore wind. These centred around the following themes:

- Community benefit that could be realised from floating offshore wind projects;
- Maximising the local supply chain content through building an offshore wind sector;
- Job creation opportunities in floating offshore wind development;
- Predicted price reduction over time of floating offshore wind technology;

- Savings from reduced spending on fossil fuels; and
- Reduction in CO_2 emissions through decarbonised generation.

Other comments included differing opinions on the possible positive and negative environmental impact of floating offshore wind. Themes centred around the following three points:

- Floating offshore wind minimises the impact to seabed and the marine environment compared to fixed platform wind;
- That fixed platform wind farms provide greater benefits for marine biodiversity when compared to floating platform wind; and
- Research to address technical, environmental and economic evidence gaps is required.

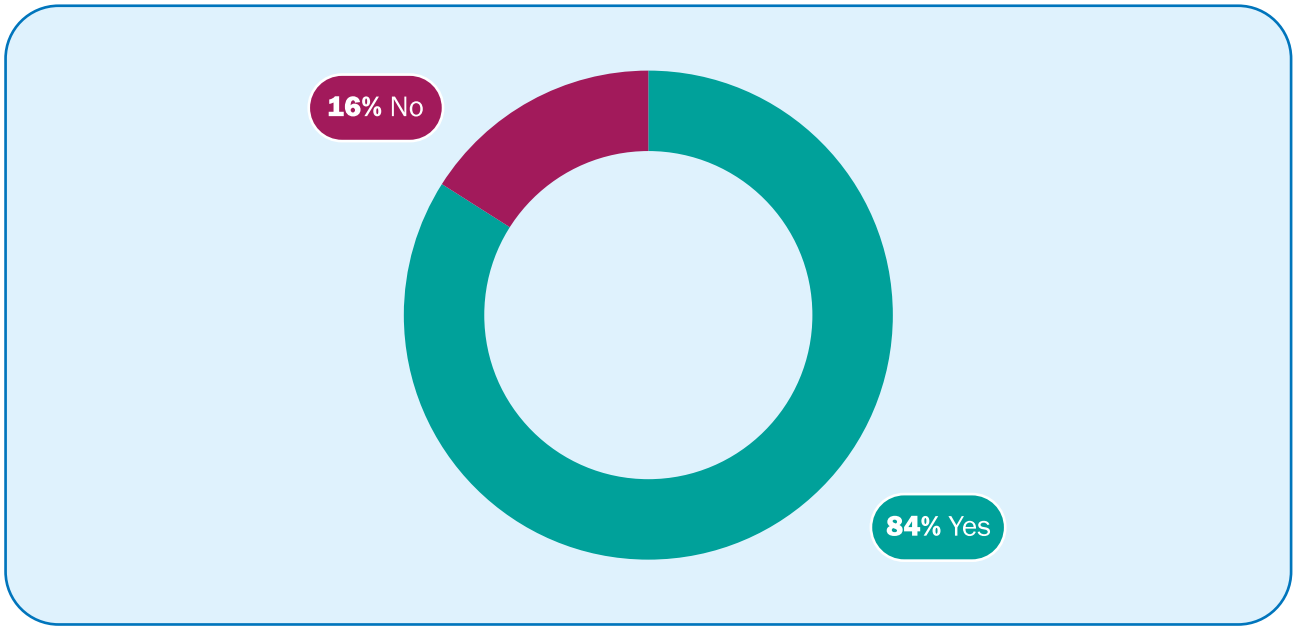
Energy sector representatives and business consumers also shared their views on floating offshore wind and a strategic approach to planning and grid development. Themes centred around the following points:

- Grid development should be a priority in the transition;
- Offshore wind projects should be permitted within 13km from the shore (as GB has done) as this may result in greater scale of offshore delivery; and
- Floating offshore wind opportunities are being developed in the Celtic Sea after the last leasing decision by The Crown Estate; similar announcements should be made in NI to drive investment and development.

Additionally, responses commented on the importance of diversifying the technology mix covering views such as combining existing wind farms with hydrogen electrolysis or storage, and the view that fixed platform offshore wind is only likely to be financially viable in combination with floating offshore wind.

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.



WHAT DID RESPONDENTS SAY?

In total, 121 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to diversify the renewables base, with a particular focus on offshore and marine renewables. Our renewable electricity pipeline demonstrates some changes in renewable generation and storage technologies, but onshore wind still largely dominates. 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. We asked for feedback on whether marine renewables (including from other sources than offshore wind) can play a key role in our generation mix, what technologies these might be, and what steps could be taken to support them.

There was broad overall support that other marine renewables would play a key role as part of the technology mix, with 84% of respondents who answered this question agreeing with the proposal, compared with 16% indicating they did not agree.

Across the groups of respondents, the majority of responses focused on recommending specific technology types. The SeaGen turbine tidal energy research project delivered at Strangford Lough was mentioned in a number of responses. Other technologies cited included:

Other forms of tidal capture power;

- Wave capture power;
- Hydropower;
- Floating solar PV;
- Battery storage;
- Seaweed as bio-fuel; and
- Oscillating water column technology.

Business consumers and energy sector representatives made suggestions on how government support should be implemented. Suggestions focused on the need for:

- A technology neutral energy policy in order to stimulate innovation and bring down the cost of commercial solutions;
- A strategic approach to planning to facilitate the deployment of marine renewables in terms of marine, terrestrial and grid infrastructure requirements and to provide assurance for developers by decreasing project risks in the planning process; and
- Evidence-based policy design to cover knowledge gaps on the environmental, technical and economic impacts of marine renewable deployment in NI.

A number of respondents noted that the GB-wide CfD scheme has successfully incentivised projects. Additionally, technology capital grants and pilot demonstration schemes were suggested to bring newer, pre-commercial technologies into the electricity generation mix.

Across the groups of respondents, comments on the economic potential of marine renewables were provided. These included:

- Capitalising on the existing industrial capability and strengths of NI such as Belfast Harbour, ports and docks and the shipbuilding and relevant manufacturing industries;
- Potential for maximising local representation in supply chain for marine renewables projects;
- Potential for job creation in marine renewables projects; and
- Developers of marine renewable projects should share financial benefit with communities.

At the same time, business consumers and energy sector representatives highlighted key challenges and barriers to marine renewables deployment in NI. These concerns, many of which were shared in relation to offshore wind, included:

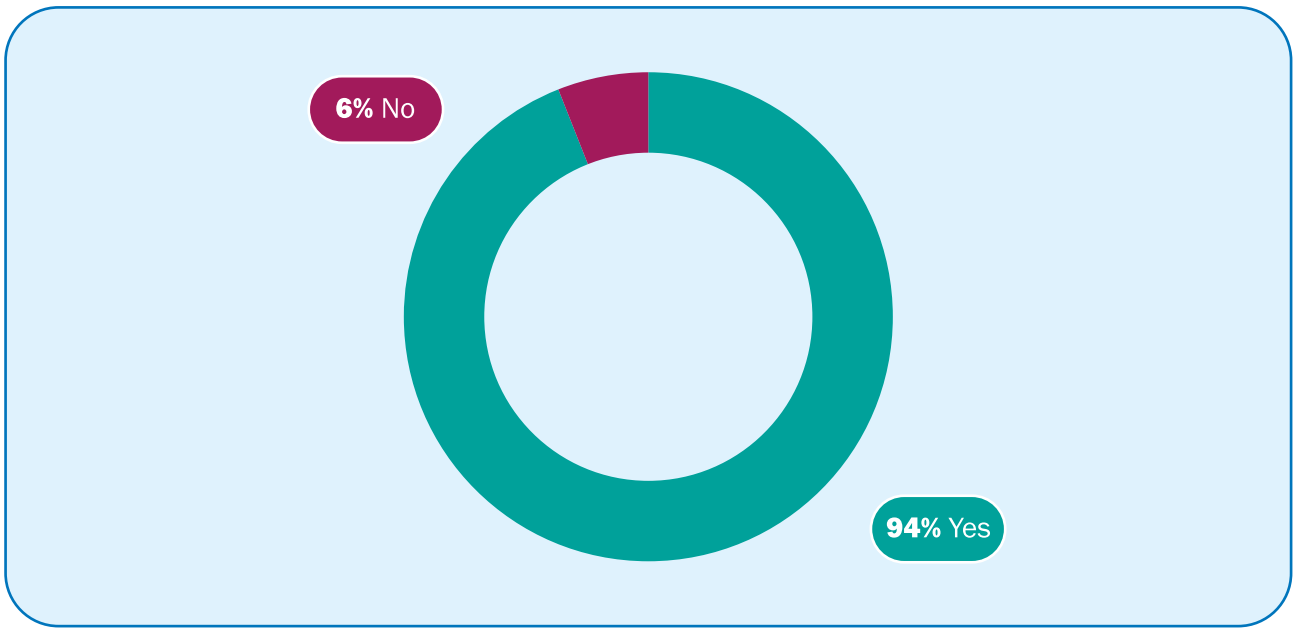
- Impact that different marine renewable technologies may have on the environment and marine life;
- Need for research into environmental impacts alongside robust monitoring and regulation;
- Impact on the electricity system from intermittent marine renewables (i.e. renewable sources of energy that depend on variable natural resources such as wind, sun, tides); and

- Taking a strategic approach to planning, including transmission / distribution network planning of capacity into the networks to accommodate marine renewables, and a joined up institutional approach to licensing and consenting.

A number of geographical locations that could potentially be used for test and demonstration sites for marine renewables were suggested, such as Torr Head and Fair Head, Strangford Lough, Belfast, Larne, the Northwest region, and revisiting sites included in the previous The Crown Estate's NI leasing round for the North Coast.

Q42: DO YOU AGREE THAT A STRATEGIC APPROACH TO PLANNING THE LOCATION OF RENEWABLE PROJECTS SHOULD BE TAKEN?

IF SO, WHAT PRACTICAL STEPS THAT COULD BE TAKEN TO DELIVER THIS?



WHAT DID RESPONDENTS SAY?

In total, 144 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we proposed 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 developers to diversify the renewables base, with a particular focus on offshore and marine renewables. We asked for feedback on this.

There was broad overall support for taking a strategic approach to planning of renewable projects, with 94% of respondents who answered this question agreeing with the proposal, compared with 6% indicating they did not agree.

Many comments from across the group of respondents contained the following themes:

- **Considering the environmental impact** in the planning of renewables projects;
- **Community benefit** that would see financial and social benefits of renewable developments accrue to the communities that host them;
- **Strategic grid and network planning** to ensure a more efficient electricity system with lower network cost impacts;

- **Streamlining the planning system** to reduce approval timeframes and allow quicker deployment of renewables to aid the achievement of net zero targets; and
- **Taking a whole systems approach** to ensure that the wider system impacts of deploying different renewables generation technologies are considered.
- Domestic consumers commented on the need for a strategic approach to planning of renewables projects citing reasons such as utilising low cost, low quality land and positioning of projects in non-intrusive places. Comments also focused on aligning planning with areas of best natural resources. Local council engagement and community engagement were cited as key concerns to be addressed, as was the need for projects to have a thorough assessment of the environmental impacts.

Similarly, business consumers commented on the importance of impact on the environment in decision making. Many comments focused on the planning approval timeframes involved in the current system, suggesting various ways of streamlining the system such as early engagement with consumers and stakeholders, and taking a joined-up approach by all stakeholders involved. Whilst many comments advocated that local councils were best placed to set their own renewables targets and to make planning decisions, other respondents suggested the need for a centralised approach to planning. Others highlighted the need for a national plan to ensure the streamlining of processes and approvals timeframes.

Various energy sector representatives responded that environmental, grid planning and community perspectives should be considered in taking a strategic approach to planning. Respondents also noted the need for technology specific planning, some identifying the need to bring forward specific technologies, such as geothermal energy. Others commented on the need for legal renewables development zones that would provide certainty and form a viable market proposition to prospective investors. Co-location of large energy users and strategic spatial planning of generation close to demand were also suggested.

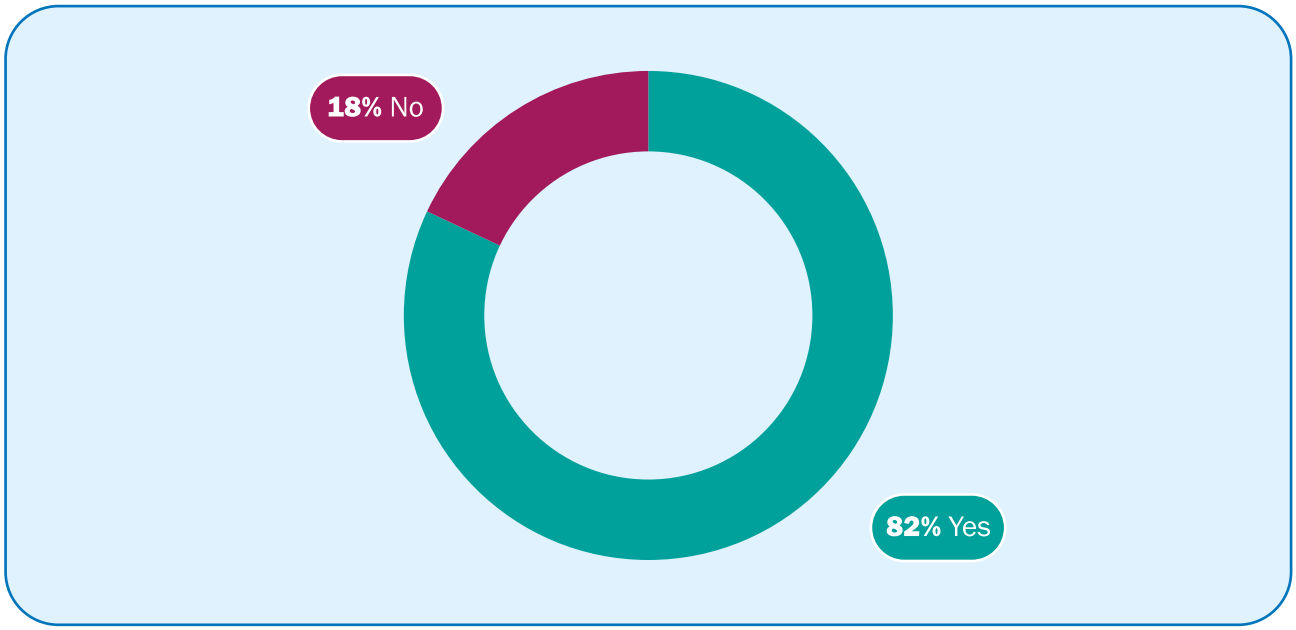
Some respondents did not agree that a strategic approach for planning should be taken or raised issues that may be problematic in doing so. These included:

- Ensuring that the OSS did not deal with planning issues;
- Various responses put forward the need for a centralised approach to planning, and at the same time others argued for a local council led/local area energy planning;
- Other respondents commented that planning should be developer-led, letting the developer decide the location of renewables; and
- Development of single-source generation alone should be avoided and instead hybrid assets, such as wind energy alongside hydrogen electrolysis for storage, to ensure that the full potential of the renewables industry is unlocked by taking a whole systems approach.

A point of warning shared by several respondents claimed that the absence of a strategic approach to terrestrial and marine planning would jeopardise environmental commitments and net zero targets.

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.



WHAT DID RESPONDENTS SAY?

In total, 141 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we asked for feedback on the proposal that requirements would be put in place to ensure the financial benefits of renewables projects are shared with local communities. This might align with the proposed approach in relation to community energy to enable local communities to shape their own energy system.

There was broad overall support for renewable developers to share some of the financial benefits of developments with local communities, with 82% of respondents who answered this question agreeing with the proposal, compared with 18% indicating they did not agree.

Domestic energy consumers who agreed with the proposal commented on the need for financial support to be given to vulnerable and low income members of the community. There was a suggestion made that these financial benefits could contribute to local council funds or directly to community benefit projects, such as infrastructure improvements. Other suggestions included shared financial benefits used to fund micro-generation installation for host communities.

A comment shared by all groups of respondents was that the principle of developers sharing financial benefits with communities would be important to achieve community buy-in to projects and to engage communities in the transition towards a net zero energy future.

Business consumers focused on ensuring that the cost of sharing benefits with communities would not be prohibitive to attracting investors to NI. Other suggestions recommended mirroring or learning from arrangements implemented in other neighbouring jurisdictions such as Scotland, Wales, England and RoI. The opportunity for communities to invest in large-scale private sector led developments was another suggestion put forward. The necessity of a transparent and nationally agreed protocol to deliver community benefit that had a sustained effect was suggested, as well as the inclusion of biodiversity net gain and ecosystem services.

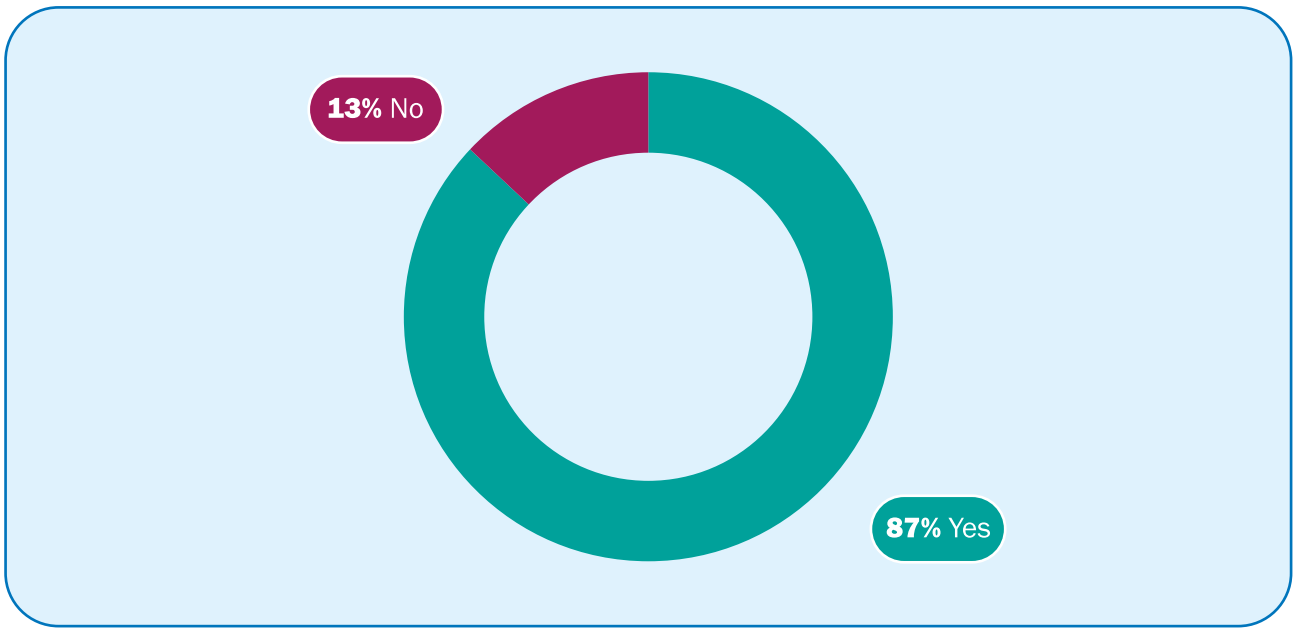
Energy sector representatives suggested that local communities that invest in their own energy system would take greater responsibility in becoming more sustainable overall. It was noted that communities investing capital at the start-up phase of projects would reduce risk for developers and would give the community a greater role in how the project was managed post-delivery. The role of co-operative energy / heating projects was raised for consideration. Government policy impacts were also discussed. Scottish and Welsh examples of policy ambitions were cited as giving clear signals to developers and communities that the local benefits of renewable developments will be taken into account in planning applications and funding support. Respondents expressed divergent opinions as to whether community benefit should be prescriptive (e.g. in design and scope) or should be left more open so that it can flex to meet the needs of a particular community. Some respondents expressed a concern that mandatory community benefit would ultimately end up on consumer bills. Across the groups, several comments noted that a one-size-fits-all approach should be avoided and rather a project and community specific approach should be taken to allow the community to engage in decision making.

From across the groups, the comments from respondents that replied “no” to this question centred around the following themes:

- Community benefit comes in the form of health and environmental benefits from decarbonisation therefore no other form of benefit needs to be shared;
- Mandatory requirements to share benefits with local communities will attract fewer investors to NI and could create expectations from the community, whereas it should be up to the developer to engage with local community;
- A shared fund should be limited to large-scale projects;
- A centrally delivered community fund sourced from a generation levy on fossil-fuel generators should be put in place instead;
- It is too early to be definitive about community benefit, as that will depend on the kind of route to market implemented in NI; and
- Concern that community benefit may be counter-productive and could lead to higher electricity costs for consumers, particularly if a one-size-fits-all approach is taken.

Q44: DO YOU AGREE WITH TAKING SEPARATE APPROACHES TO ON GAS GRID AND OFF GAS GRID CONSUMERS?

IF NOT, WHAT APPROACH SHOULD BE TAKEN?



WHAT DID RESPONDENTS SAY?

In total, 158 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we explained that decarbonising heat is the biggest challenge in meeting net zero emissions and that there is not a one-size-fits-all solution for how best to achieve this. We indicated that there are likely to be parallel on gas grid and off gas grid approaches that consider the cost effectiveness of solutions and the impact on consumers.

Of the 158 responses to this question, 87% agreed with the proposal to have a separate approach for on and off gas grid consumers and 13% disagreed. The percentage of respondents who agreed with the proposal was broadly similar for domestic and business consumers, for urban and rural responses, and from the energy sector. The majority of detailed comments were provided by the energy sector.

A significant number of respondents specifically mentioned the different heating options for on and off-grid consumers. Converting oil users that were on the gas network to gas was suggested as a useful short-term, intermediate step to deliver a significant cut in carbon emissions. Some responses noted that many consumers have already switched to gas, but that persuading them to do so was often difficult and that convincing these consumers to switch to other technologies (such as heat pumps) in future could be even more challenging.

Respondents indicated that, in the long-term, they saw the need for the network to convert to hydrogen and / or biomethane to deliver fully decarbonised heat to gas users. A small number of responses highlighted the potential advantages of decarbonised gas over the electrification of heat particularly in view of the high cost of heat pump installation, the challenge for the existing electricity network to power widespread use of heat pumps, and the current unsuitability of much of NI's existing housing stock for this type of technology.

Some responses considered gas to be a short-term option only, and outlined that the majority of consumers both on and off-grid would potentially need to install to heat pumps in the longer-term, while highlighting the costs and disruption a double transition would involve.

Responses from the energy sector supported the electrification of heat for off gas grid homes with some suggesting that this was currently the most effective method of decarbonising heating, as it was a long-term 'low regret' option, and harnessed NI's increasingly renewable electricity supply. Others quoted the CCC (2019) NI report[12], calling for the widespread electrification of heating. A number of responses suggested the need for heat pump trials, whilst others stated it was a well-established technology and trials were unnecessary. All references to the installation of heat pumps related to their use in a domestic setting only.

Some respondents called for financial support schemes to be developed specifically to promote off gas grid electrification and build support for renewable heating amongst consumers, supply chains and wider stakeholders. It was suggested such support could be linked to any energy efficiency schemes and targeted at low-income households. A small number of respondents mentioned the need to phase out oil boilers and the fitting of heat pumps in new builds (both on and off gas grid) was also suggested.

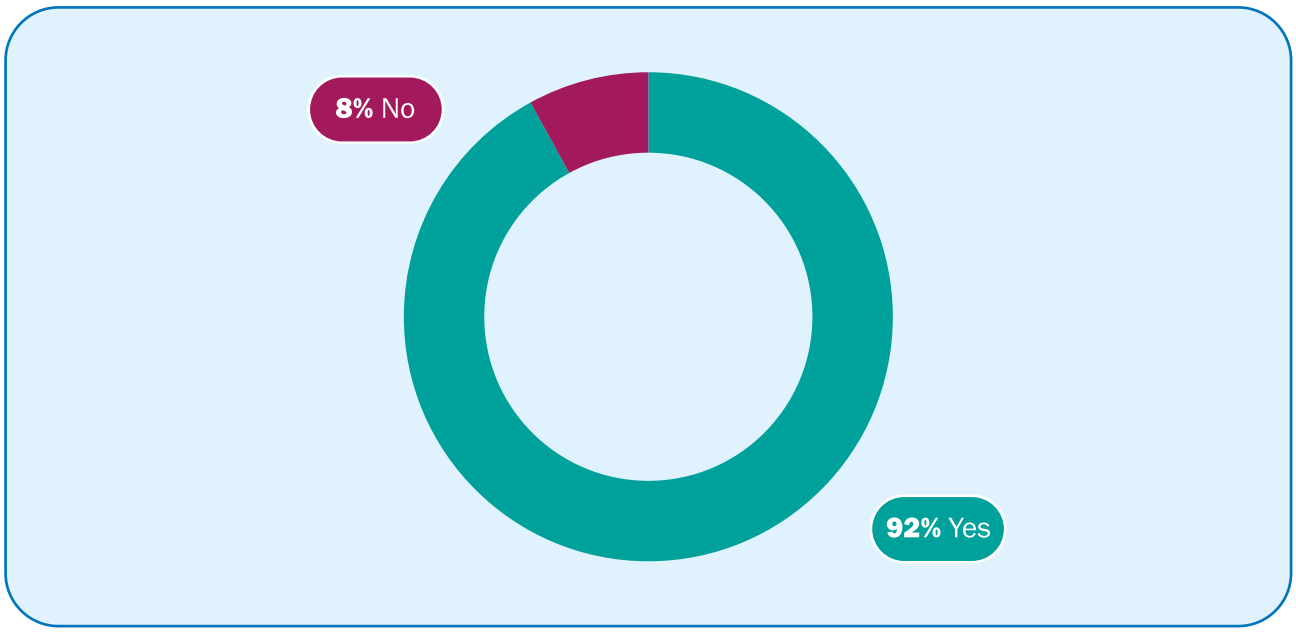
Some energy sector respondents highlighted the role biofuels could play in heating off-grid homes. Some respondents suggested that the cost of upgrading the insulation of some homes to a standard suitable for heat pumps could be prohibitive, and that biofuels would be a more appropriate alternative. They also mentioned that the high cost of upgrading the electricity network in certain areas to support heat pumps would be another reason to consider biofuels. Similarly, a few responses suggested biomass as an option stating that it is a well-established renewable source of heating.

A small number of responses indicted that there should be unified single approach to on and off gas grid heating. Some called for the phasing out of all fossil fuels and the electrification of heat. Others mentioned a one-size-fits-all approach for on or off-grid would not be appropriate, would reduce consumer choice, and that the lowest carbon option for each consumer should be considered on a case-by-case basis.

12 https://www.theccc.org.uk/publication/reducing-emissions-in-northern-ireland/

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.



WHAT DID RESPONDENTS SAY?

In total, 168 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we set out the challenges in decarbonising heat and indicated that more work is needed to understand the differing technical solutions. We propose to carry out trials of different solutions (e.g. heat pumps, biofuels and hydrogen) to help us understand the technical and economic viability of each. We suggested that no low or zero carbon heat solutions should be ruled out at this stage.

Overall 92% of the 168 responses to this question agreed we should not rule out potential low and zero carbon heat solutions at this stage. There was strong agreement across the responses from domestic, business and energy sectors. Many mentioned it was important to allow consumers to choose from a range of low carbon heating solutions. Others were concerned that innovation in new low carbon technologies may be curtailed if some options were ruled out at this stage.

Several responses agreed in principle but suggested that we should concentrate on proven technologies, specifically mentioning heat pumps. An energy sector representative stated that, given the short time frames everyone is working toward to decarbonise the energy sector and tackle climate change, it was their view that proven technologies should be deployed and the long-term focus should be on electrifying heat as much as possible.

A small number of comments were received from those who disagreed, for example, suggesting only zero carbon solutions should be considered or that low and zero carbon heating were too expensive. Other responses questioned the viability of heat pumps and hydrogen.

Domestic consumers who responded to this question raised concerns over the cost of low or zero carbon heating.

There was strong agreement among responses from business that no low or zero carbon heat solutions should be ruled out. Several mentioned that the electrification of heat should be prioritised as this existing technology is already potentially zero carbon, thus preventing a disruptive and costly switch from existing low carbon heating in the future. There was also a recognition that new technologies will become available in future, and further work in the form of research or trials may be necessary.

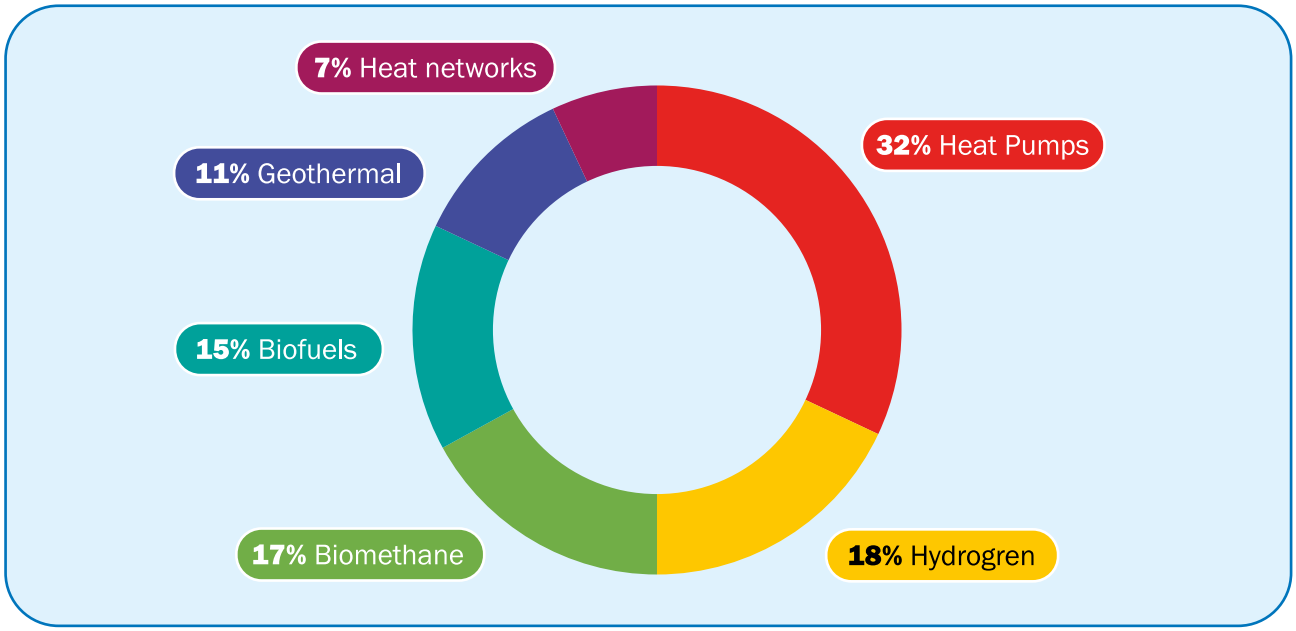
The energy sector strongly agreed with the need to consider all low and zero carbon heating technologies. However, there was a much greater range of responses, with a number of solutions being supported including heat pumps, hydrogen, biomethane, biofuels, biomass, bioLPG, solar thermal and heat networks.

A number of responses from the oil sector proposed that biofuels (in particular Hydrotreated Vegetable Oil or HVO) would provide a low risk form of decarbonised heating for off-grid or heating oil consumers. Other respondents suggested that heat pumps are the most efficient route to decarbonisation. One response from an electricity provider cautioned against 'carbon lock in' and recommended ruling out options which cannot contribute to the full decarbonisation of heat. Other responses from the electricity sector suggested excess wind power could be used to generate green hydrogen for heating or transport.

Some responses suggested that hydrogen (especially renewably generated green hydrogen) should play an important role in future, as it would utilise the existing gas infrastructure and minimise disruption to consumers. They also questioned the suitability of heat pumps for many consumers, suggesting costly retrofit would be needed given the levels of insulation in NI's housing stock, and stated that decarbonised gas would be more appropriate in the long-term.

Q46: WHAT LOW AND ZERO CARBON HEAT SOLUTIONS SHOULD WE PRIORITISE FOR TRIALS?

PLEASE IDENTIFY WHERE SUCH TRIALS SHOULD BE FOCUSED AND WHAT KEY ISSUES SHOULD BE TESTED WITHIN EACH.



WHAT DID RESPONDENTS SAY?

In total, 144 out of 253 responses were received to this question in Citizen Space.

The policy options consultation document set out a proposal that trials of technologies such as heat pumps, decarbonised gas, biofuels, geothermal and heat networks should take place. The rationale for these trials is to provide valuable information on the technical and economic viability of each technology.

A wide range of responses were received to this question evidencing that respondents are aware of the range of low carbon heat technologies that are currently available, including hydrogen.

Almost a third (32%) of respondents supported heat pumps for trials. Respondents specifically referenced the need for trials in relation to vertical Ground Source Heat Pumps (GSHP), hybrid heat pumps and integration of heat pumps with solar thermal. They also suggested that there should be an investigation into improvements needed to the electricity network to cope with additional load and demand flexibility resulting from wider installation of heat pumps. Others commented on the need to investigate the suitability of different housing types as well as long-term operating costs.

There was strong support for heat pump installation for new housing developments, social housing and off gas grid areas, including shared GSHP in new housing developments.

Just under a fifth (18%) of respondents supported hydrogen trials and made the following suggestions:

- Need to test the safety and suitability of existing gas network for hydrogen;
- Carry out hydrogen production trials in association with local industry; and
- Conduct trials in closed local grid starting at 20% hydrogen.

In terms of responses related to other technologies:

- 17% support for trials of biomethane injection into the gas network, particularly in closed networks and rural areas;
- 15% support for biofuels trials including a trial of a biofuel / kerosene mix particularly targeted in off gas grid areas; and
- 11% of respondents referred to geothermal trials and particularly of deep geothermal energy in geological formations in the Lough Neagh basin.

A smaller number (7%) of respondents suggested that there should be trials of heat networks that use waste heat from industry or wastewater from treatment works with heat pumps to raise working temperatures. One respondent suggested that heat network trials should focus on new housing developments.

Some respondents advocated trialling proven, safe and unobtrusive technologies particularly for retrofitting low-income housing. However, others (particularly in the energy sector) were against the trialling of proven and established solutions and indicated the focus should be on pilot schemes and accelerating the roll out.

Other comments included that:

- There should be linkages between different 'trial' technologies in a retrofitting scenario whereby heat pumps, hot water storage and regional heating systems could all form part of a basis for a trial;
- NI policy should not duplicate work carried out elsewhere and should be informed by successful deployments in GB, Europe and the US;
- Regulatory and statutory requirements should be fast-tracked to allow biogas and hydrogen injection into the gas grid and conduct hydrogen-ready boiler trials; and
- Other technologies should be subject to trials including the use of heat pumps in retrofitted dwellings, and the use of biofuels, biogas and medium / deep geothermal district heating.

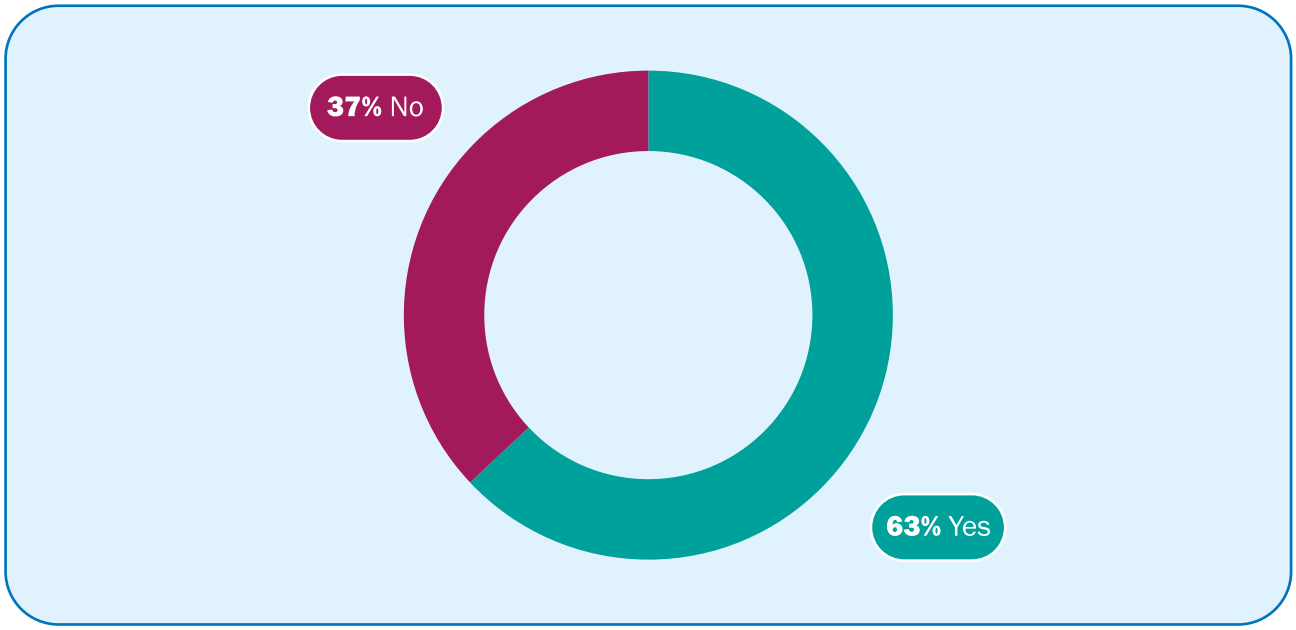
Some energy sector respondents indicated that they had already identified low and zero carbon heat solutions that could be prioritised for trials suggesting that they were uniquely placed to facilitate small scale trials. Other suggested technologies for trials included Anaerobic Digestion (AD), integrated systems involving heat pumps, and locally sourced and stored solar PV and solar thermal.

Some respondents made specific suggestions for trial scenarios including:

- Deep geothermal (base heat load) for new net zero leisure centre with pool to include local schools and businesses or as a demonstration project for offices; and
- Re-engineer a local Council office building heating system using a local river for water based heat pumps for base load heating and cooling.

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.



WHAT DID RESPONDENTS SAY?

In total, 150 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we indicated that we did not see any viable pathway to net zero that did not include the use of heat pump technology. However, we recognised that the role of heat pumps may vary depending whether properties are on or off the gas grid and asked stakeholders what the specific roles for heat pumps should be.

While 63% of respondents agreed that the role of heat pumps will be different depending on whether customers were able to connect to the gas grid or not, comments provided from respondents varied widely.

A number of respondents who agreed that there should be a different approach for on and off gas grid consumers noted that this should be a short-term approach. They suggested that this would have the benefit of concentrating on reducing the use of more carbon intensive fossil fuels initially, such as coal and oil, allowing time for the options around decarbonised gas to be developed further. Some respondents also suggested that, in future, decarbonised gas could be a lower cost option than heat pumps.

In contrast to this, among those who answered 'no' to this question, the future viability of hydrogen was challenged, including the possible high costs and technical issues.

Some respondents also felt there was no real difference between on-grid or off-grid heat pump scenarios, and others argued that low carbon heating technologies should be prioritised over any fossil fuel heating option, whether oil or gas. In addition, some respondents highlighted that there were other more significant factors that should influence the decision to install a heat pump, including individual building suitability.

A number of similar responses were received from the home heating oil sector, noting the potential challenges with retrofitting heat pumps to buildings located off the gas grid; including in regards to typical age and size of homes and the potential cost of upgrades to the electricity grid in more rural locations. Similar concerns were raised regarding the application of heat pumps to some non-domestic sectors, including where the need for hot water may be more prevalent.

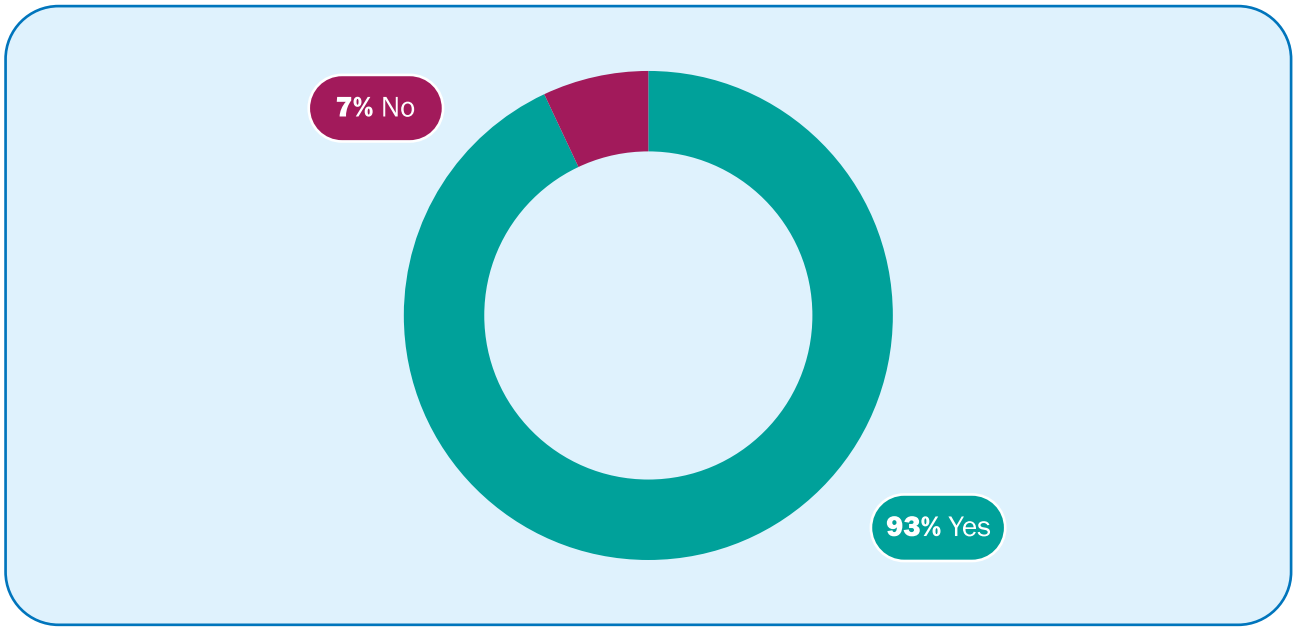
Concerns were raised by a number of respondents around the wider application of heat pumps, including the need for appropriate building fabric improvements, potential changes to heating systems, and consumer education. There were also different views on the impact on energy costs with one respondent noting the savings that could be delivered, whilst another stating that current tariffs do not allow the publicised financial savings to be made.

Respondents also suggested that:

- Heat pumps should be installed in new homes, regardless of whether they were located on or off the gas grid;
- Hybrid heat pumps may be suitable for both on and off gas grid applications; and
- Consumer choice is important, including ensuring that heat pumps are not discouraged because they would be in an area where the gas network is available.

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.



WHAT DID RESPONDENTS SAY?

In total, 161 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we asked for views on our proposal to develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers in NI, noting that we will consult separately on this in the future.

There was overwhelming support for a pilot grant scheme with 93% of respondents agreeing with the proposal. The responses to this question were varied with some respondents indicating that grant support should be technology agnostic. However, a larger number of respondents, whilst acknowledging that there may be a need to apply different approaches depending on the suitability, considered that heat pumps, in particular, should be prioritised for support to test their implementation.

Most objections to the proposal for a pilot grant scheme were on the basis that respondents believed there was no need for it and there was enough information from other jurisdictions to allow for the introduction of a full grant. A few respondents thought that any assessment should be based on the performance of similar schemes in other jurisdictions and learning from those applied before implementation.

Respondents highlighted a wide range of key issues that would need to be considered in designing and delivering a scheme including having a fair grant which took account of capital, operational, location and savings, as well as the need to use all technologies outlined in the strategy options including solar and battery storage.

A number of respondents commented on the substance of the proposed pilot:

- Pilot grant schemes are essential to kick start a change in behaviour and adoption of new technologies;
- It should take a fabric first approach, whereby the dwellings must be fit for purpose for heat pumps before installation;
- The rollout of heat pumps should be tested with customers and compared against hydrogen before there is a wider rollout in NI;
- The scheme should be designed so that it is easy to access with minimal paperwork for consumers and be delivered by competent persons;
- Grants may not be the best approach and options such as green loans, tax rebates and other measures that benefit the end user should be considered, as seen in parts of the EU; and
- Any approach taken should consider measures that encourage rapid uptake until the point that support is not required, as the supply chain has matured and costs have reduced.

Energy sector respondents highlighted a number of factors that should be considered to best implement heat technologies including:

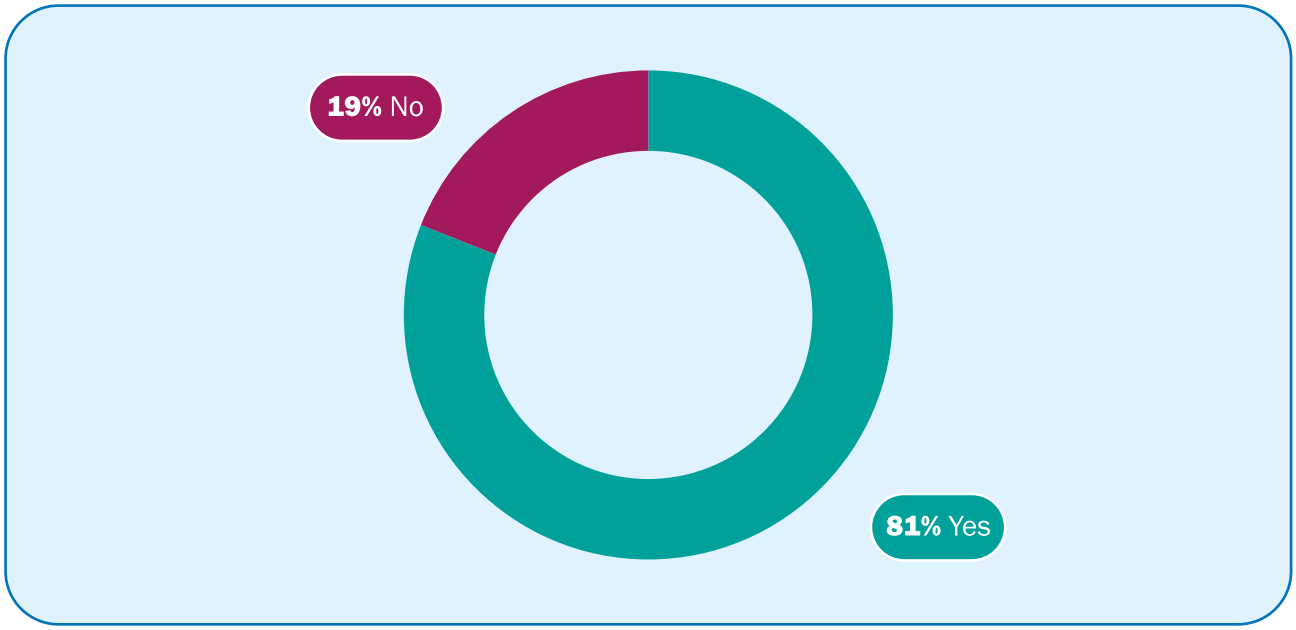
- Type of housing, including age, construction, design standard and performance of insulation and air tightness;
- Tenure of housing, e.g. social, owner occupied or rented;
- Provision of independent advice and information through a OSS or similar;
- Access to design and construction services through recommended / approved installers; and
- Need to develop a range of financial products from grants to loans / mortgages that are available to the appropriate customer groups.

Others were more detailed with an emphasis on the energy efficiency requirements that must be in place before installation of heat pumps, outlining the following considerations:

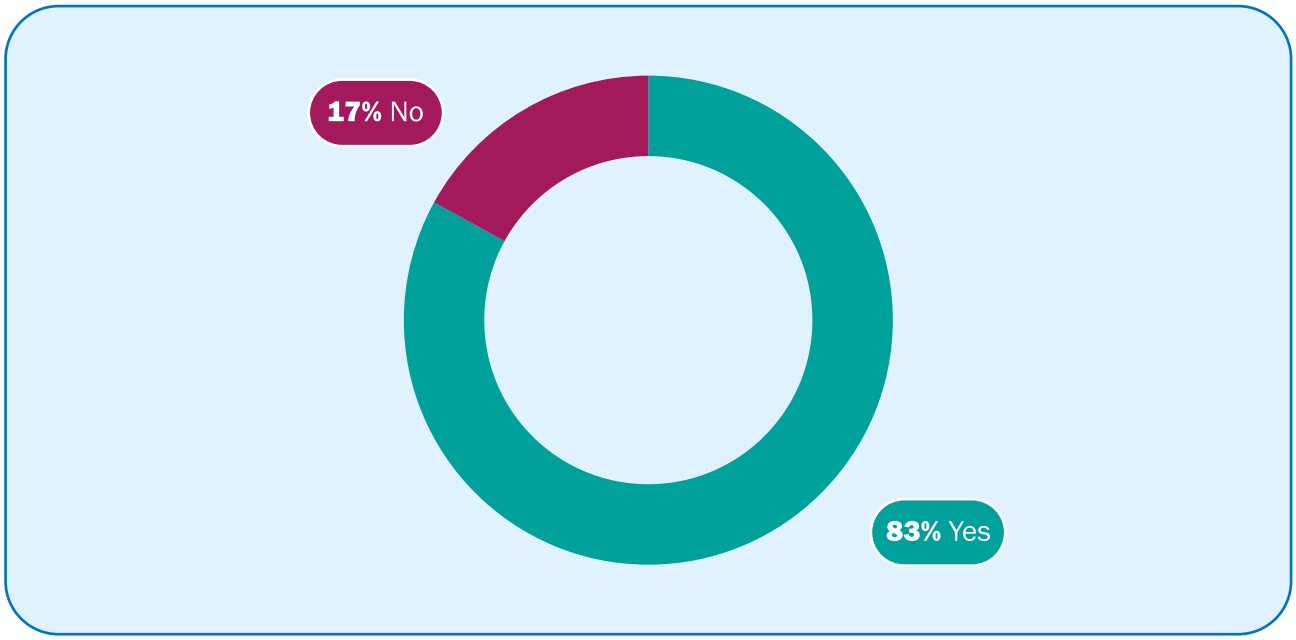
- Oversized heat distribution systems / underfloor heating;
- Highly insulated with lower U-Values for windows and doors;
- Waste water heat recovery systems must be installed; and
- Appropriate ventilation must be in place.

A community based rural organisation, while supportive of the proposal, noted that any pilot scheme needs to include a range of house types and have a sufficient number of different applicants taking part in order for there to be confidence in the scheme. In particular, they highlighted the importance of understanding whether specific technologies, such as heat pumps, would work for all customers (noting the emphasis for this technology to be directed at households not on the gas grid). Furthermore, they stated that in advance of any pilot, applicants must be well advised on the costs and long-term benefits of the low carbon heat technologies they are installing.

Q49: DO YOU AGREE THAT LEGISLATIVE AND REGULATORY STEPS SHOULD BE TAKEN TO FACILITATE BIOMETHANE INJECTION INTO THE GAS NETWORK?



IF SO, DO YOU BELIEVE THAT A SUPPORT SCHEME SHOULD BE PUT IN PLACE TO INCENTIVISE GREEN GAS PRODUCTION?



WHAT DID RESPONDENTS SAY?

In total, 132 out of 253 responses were to part one of this question, and 110 out of 253 responses to part two of this question were received in Citizen Space.

In the policy options consultation document, we stated that zero carbon gas would need to be introduced into the gas network in NI to help meet emissions targets. We suggested that biomethane injection should be the initial focus, and stated our intention 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.

There was broad overall support for taking steps to facilitate biomethane injection into the gas network with 81% of respondents who answered this question agreeing with the proposal, compared with 19% who disagreed. Support was particularly evident from businesses and the energy sector.

Gas industry representatives generally felt that steps to facilitate biomethane injection should be progressed as a priority. They pointed out that this is a proven technology, which is already utilised in GB and RoI for electricity generation, heat, and vehicle fuel; and that biomethane represents an opportunity to support a zero carbon heating solution that is affordable and does not require consumers to radically change their behaviour, or carry out an expensive retrofit of their home.

However, respondents to the consultation also raised a number of issues which they felt should be considered in planning for biomethane injection:

- **Technical issues**: biomethane may impact gas quality specifications if injected into the gas network. A detailed system-wide impact assessment and study, in conjunction with gas-fuelled power plants and their respective Original Equipment Manufacturers, is needed to assess the impacts of gas quality changes;
- **Injection points**: questions as to whether biomethane injection should be facilitated at gas transmission or distribution network level;
- **Sources of biomethane:** the source of the biomass determines whether or not biomethane is a net zero carbon process - investment should be prioritised in the greenest forms of heating, not just 'greener' forms;
- **Limitations:** biomethane production in NI will never be of a scale to wholly substitute imported natural gas, which means that biomethane alone cannot provide a full and long-term solution to decarbonising the gas network; and
- **Costs**: AD from animal waste is a significant opportunity, but the cost of transportation could rule out marginal opportunities and create a CO_2 cost for moving biomethane unnecessarily.

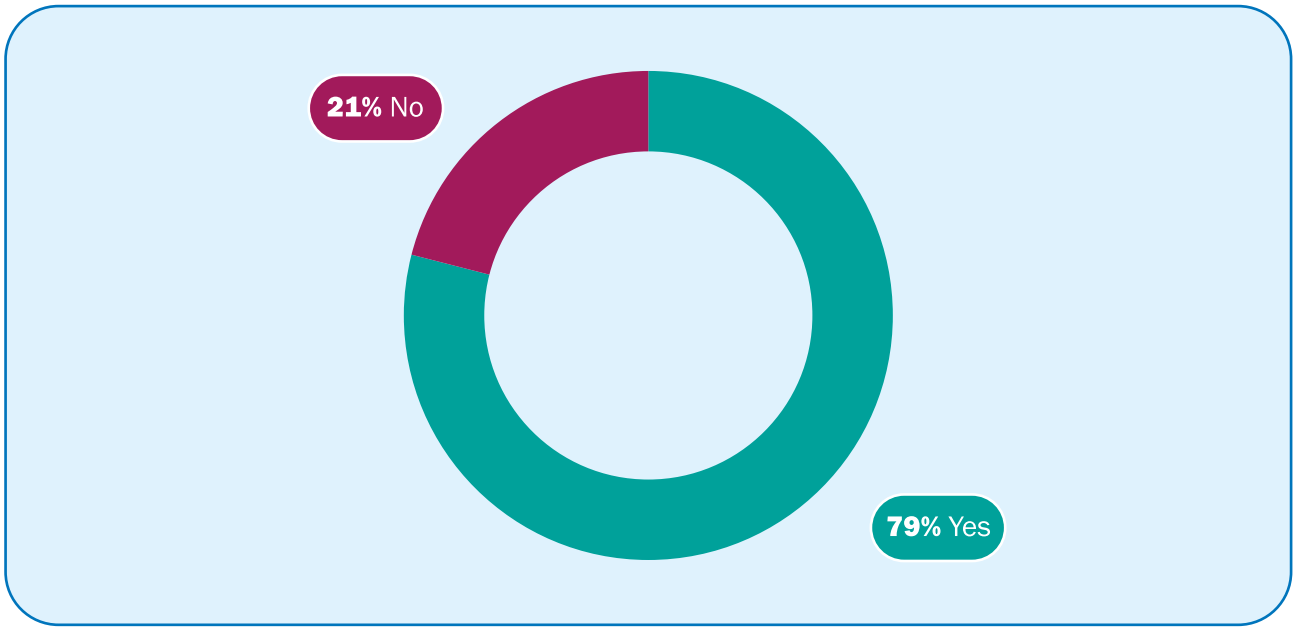
A number of respondents suggested that we draw on lessons learnt from other jurisdictions, including England, during their implementation of biogas injection into the gas network in order to enable a smoother transition to biomethane injection in NI.

One respondent commented that, as the CCC has identified heat pumps as the primary technology for decarbonising heat, biomethane should only be prioritised in buildings where a heat pump is not feasible.

On the supplementary question, there was broad support for incentivising green gas production, with 83% of the 110 respondents who answered this question agreeing that support should be provided, compared with 17% who disagreed. Respondents mostly provided their more detailed comments on the issue of incentives in response to the next consultation question (Q50); however, an energy sector representative did raise the possibility of using Green Gas Certification as an incentive to create a link between a business' gas usage and their support of a specific biomethane facility.

Q50: DO YOU BELIEVE THAT SUPPORT SHOULD BE PROVIDED TO ENCOURAGE BIOMETHANE PRODUCTION FOR INJECTION IN THE GAS NETWORK?

IF NO, PLEASE OUTLINE BELOW WHAT ALTERNATIVE APPROACH SHOULD BE TAKEN TO DECARBONISING THE GAS NETWORK.



WHAT DID RESPONDENTS SAY?

In total, 128 out of 253 responses were received to this question in Citizen Space.

In the policy options consultation document, we suggested that biomethane injection should be the initial focus of efforts to decarbonise the gas network. We outlined our proposal to undertake a review of the costs and benefits of biogas and biomethane which would seek to identify the potential scale of local biogas production, the commercial viability of this and the need for additional support. We also noted that the UK government has announced plans to introduce a Green Gas Support Scheme for biomethane production from AD in GB for injection into the gas grid.

There was broad agreement that support should be provided to encourage biomethane production for injection in the NI gas network with 79% of respondents who answered this question agreeing, compared with 21% indicating that they did not agree.

Agreement was strongest from the energy sector and larger businesses and from respondents from rural areas.

While the majority of respondents believed that support should be provided, many noted that it would be important to ensure that any support scheme for biomethane production is carefully structured so that it does not inadvertently create a market that incentivises waste production.

Respondents also raised a range of issues and concerns which should be considered in designing any support programme for biomethane production:

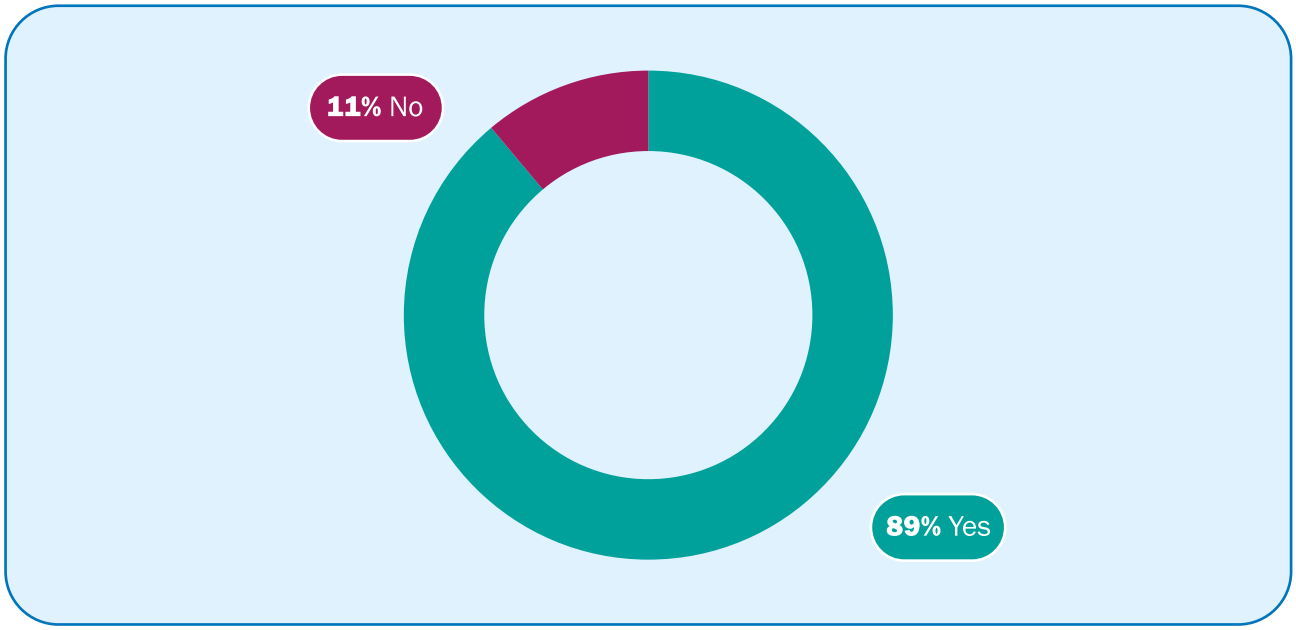
- Support needs to be balanced against that for other carbon reduction measures and technologies in order to avoid diverting existing AD plants away from renewable electricity production and adversely impacting on the mix of technologies that could provide similar benefits in carbon reductions;
- Support should only be available on the proviso that strict criteria is put in place to regulate the industry;
- In designing support, consideration should be given to environmental issues to avoid mistakes made in other jurisdictions, which led to subsequent damage to the environment;
- Support should have a clear timeline in place to help build new infrastructure, but to be weaned off once biomethane production is self-sustaining;
- Support is needed for innovative feed-in management to reduce the waste involved in traditional biomethane injection; and
- Consideration should be given to support for using biomethane at source, e.g. fuelling local tankers, in order to reduce the environmental impacts of transporting it.

A number of respondents suggested that we should learn from action being taken in other jurisdictions, including GB and RoI. Reference was made, in particular, to the Green Gas Support Scheme in GB, which is funded by a green gas levy on gas bills (£1 a year on average for consumers). Consumer representatives supported the proposal to undertake a review of the costs and benefits of biogas and biomethane but said that this must consider the impact of biomethane subsidies, such as a green gas levy, on NI consumers.

In total, 24% of stakeholders (61 out of 253) provided comments in response to the supplementary question. Some noted that, while biomethane injection into the gas network may be helpful in the short to medium-term, it is not a long-term solution. One respondent commented that biomethane cannot provide significant volume substitutes for natural gas and another agreed that biomethane has a limited contribution to make. Several respondents suggested that greater focus should be placed on the potential for hydrogen injection, particularly green hydrogen, while others doubted that it would be possible to decarbonise heat in buildings by injecting biomethane and hydrogen into the gas network and thought that the focus should therefore be on heat pumps and / or electrification.

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?



WHAT DID RESPONDENTS SAY?

In total, 159 out of 253 responses were received to this question in Citizen Space.

In the policy options consultation document, we stated our belief that, while natural gas does not have a long-term role in net zero carbon energy emissions for heating, this does not mean that our modern gas network cannot have an important role to play. We outlined our proposal that the Gas Network Operators (GNOs) in NI should provide a credible pathway to Net Zero by 2050 which will allow us to consider their plan alongside related policy measures around the electrification of heating, alternative renewable fuels, energy efficiency and carbon capture.

There was broad overall agreement that GNOs should develop and publish a plan to decarbonise gas out to 2050, with 89% of respondents who answered this question agreeing with the proposal, compared with 11% who disagreed.

One respondent said that achieving net zero without some form of low carbon / clean gas would be difficult, while others noted the role the gas network could have to play in achieving net zero, both in the short-term by transitioning consumers off home heating oil, and in the longer-term via use of biomethane and / or hydrogen.

In total, 41% of stakeholders (103 out of 253) provided comments in response to the supplementary question, raising a number of key issues which they felt should be addressed as part of any gas decarbonisation plan:

- Carbon intensity of alternative fuels and technologies and their wider environmental impacts;
- Resource potential in NI to produce and / or import renewable and decarbonised gases;
- Technical issues relating to the network and optimal volumes of gaseous fuels in a net zero energy mix;
- Cost of access to the gas network both for input and offtake;
- A pathway to support the introduction of biomethane and hydrogen injection into the gas network and the regulatory and legislative changes required to achieve this;
- Assessment of end-use sectors and the likely role gas could play within each and identification of technology options, the research and development needed, and changes required in order to shift these sectors to renewable and low carbon gases;
- Total cost of transition including capital costs, storage and transport costs and ongoing operational costs;
- Affordability for consumers;
- Safety issues associated with hydrogen;
- Regional opportunity and cohesion; and
- Clear and unambiguous targets.

Representatives of the gas industry noted that they are already working collaboratively to develop a pathway that will set out the short-term priorities for decarbonisation of gas networks in NI, as well as the required actions out to 2050. This will be updated following completion of planned consultant-led research, modelling and analysis. Some respondents suggested that, in drawing up such plans, we should learn from action planned or already being taken in other jurisdictions to decarbonise gas networks, including GB and RoI.

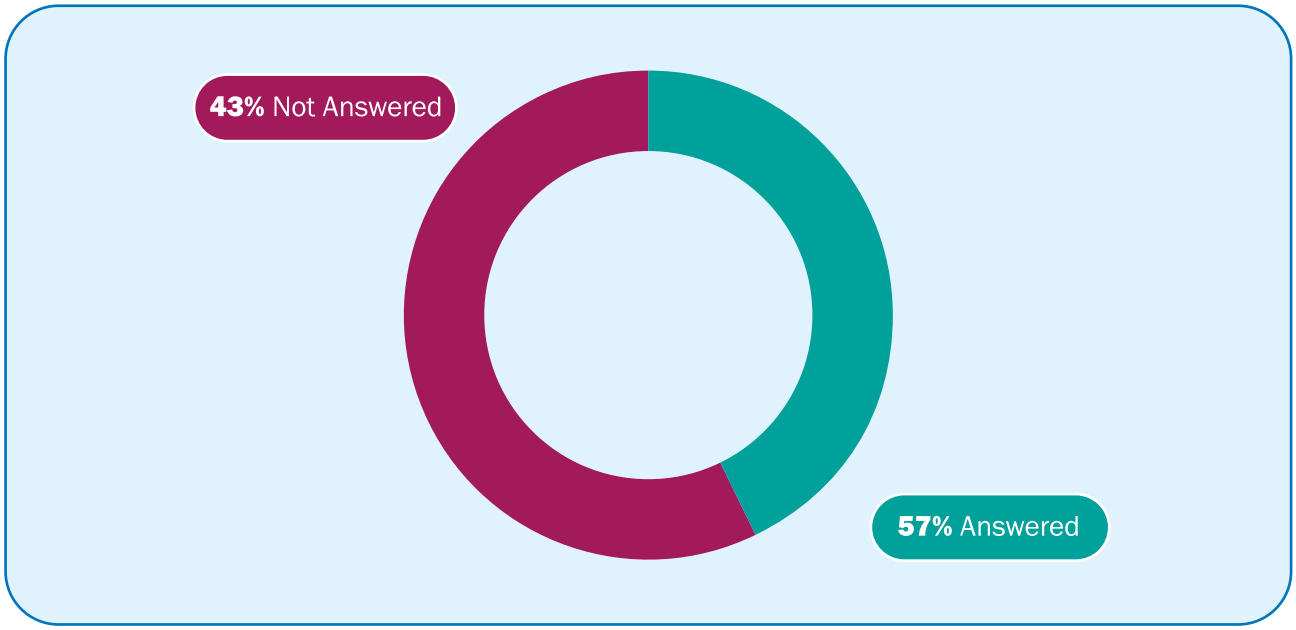
Some respondents felt that gas should be decarbonised sooner than 2050. An energy sector respondent suggested that we establish a forum to facilitate collaborative, strategic development of NI energy infrastructure to deliver an optimal, cost effective approach to the transportation and distribution of renewable energy, either in the form of electricity, renewable gas or other biofuels.

However, a number of respondents urged caution, with a domestic consumer saying that legislation, pathways, and visions for the future of energy should be driven by public representatives, not by private operators. An energy sector representative stated that further development of the gas network in NI should be viewed with caution until the longer-term decarbonisation strategy for gas has been financially and technically assessed in full.

Some respondents voiced doubts that it is feasible to decarbonise gas networks. One political representative said that, as hydrogen and biomethane replacements are as yet largely unproven technologies at scale, it is perhaps premature to require gas network operators to demonstrate how natural gas can be replaced. Another respondent commented that gas decarbonisation plans would divert valuable resources from other areas.

Q52: DO YOU BELIEVE THAT ON GAS GRID CUSTOMERS 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?



WHAT DID RESPONDENTS SAY?

While 143 responses to this question were received, we note that the question in the published consultation document was not the same as on Citizen Space (in Citizen Space the question related to the cessation of the sale and installation of new oil boilers for consumers on the gas grid). This means that a quantitative analysis of the responses cannot be undertaken; however, as the questions were similar in nature we have summarised the comments received below.

Our consultation emphasised that fossil fuel heating oils have no long-term future in our energy mix, and as such, options to phase out fossil fuel heating oil need to be considered. One such option is to allow on gas grid consumers to retain their oil boilers for use with biofuels.

A number of those supporting the retention of oil boilers were concerned about limiting consumer choice, reducing options to achieve net zero, and having stranded communities, assets or investments. Concerns around increases in fuel poverty were mentioned if oil boilers were to be prohibited. A significant number of responses were received from the oil industry indicating strong support for HVO (a biofuel) as a direct replacement for kerosene. One respondent also suggested that the reduction in carbon emissions by replacing oil with gas is sometimes less than claimed and is not a desirable end objective. Responses included the suggestion that the sale of liquid fuelled boilers should only continue if they are biofuel compatible.

Respondents highlighted the challenges associated with electrification of heat, with one suggesting that hybrid heat pumps alongside boilers that use biofuels or biomethane could be a solution. Others highlighted that biofuels were just one of a range of options.

Many of those that disagreed with the retention of oil boilers stated that oil users should be encouraged to move to lower carbon gas as an interim measure, with the potential for further carbon reductions as the gas grid decarbonises. Some respondents proposed that it was preferable to switch directly to low or zero carbon heating, with such a move also including relevant energy efficiency improvements. Others were sceptical that biofuels could be a suitable replacement for oil, with concerns over the availability of supply. One respondent suggested that further research into biofuels was required, and that costs associated with biofuels would need to be comparable to other heating options. A number of respondents raised concerns regarding the sustainability of biofuels, noting that this is not a sustainable, long-term solution if food crops are displaced, biofuels are imported from outside NI, or if habitats (e.g. peat bog, woodlands) are not adequately protected and were harmed as a result of this type of policy measure.

The lack of regulation of the oil sector was raised as a specific challenge when considering any future phasing out of oil or introducing a requirement to switch to biofuels. Similarly, some respondents queried how the use of biofuels would be mandated and regulated.

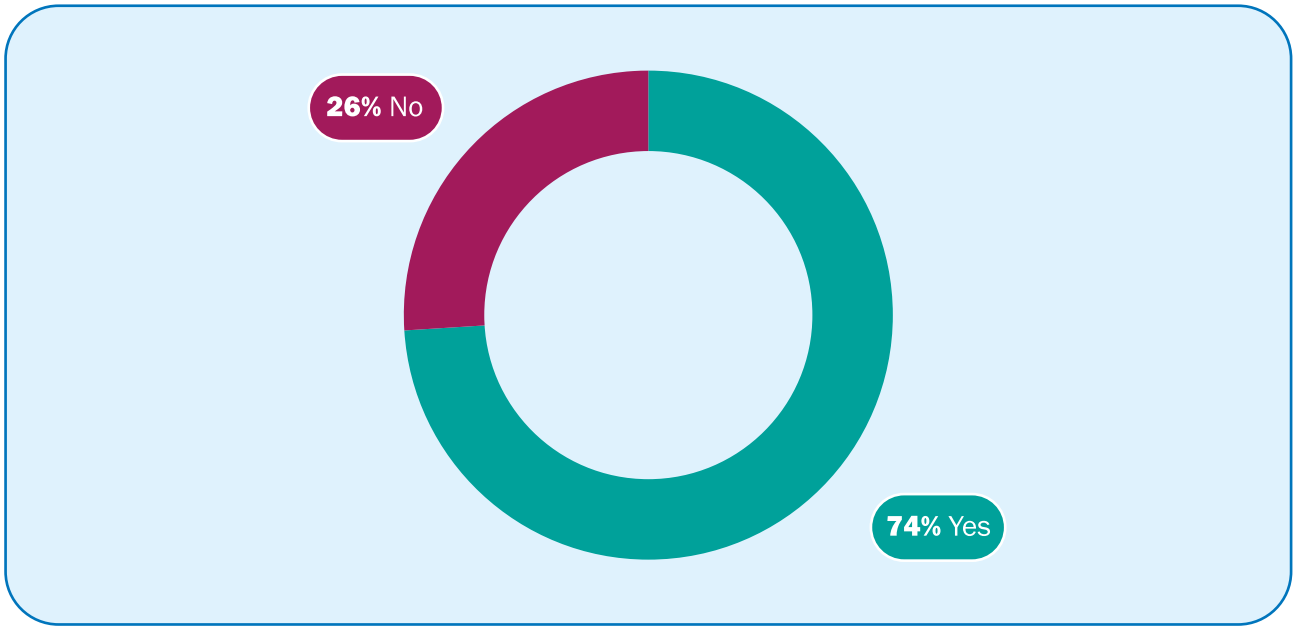
Some respondents expressed uncertainty around carbon emissions, with one assuming that biofuels may be net zero, whilst another stating they are not zero carbon. Oil sector respondents suggested that biofuels offer significant reductions in emissions. There was also a distinction made between new and existing homes by some respondents, suggesting that new homes on the gas grid should not be permitted to use oil boilers. However, others emphasised the need for consumer choice and raised concerns around allowing gas in new homes while not permitting lower carbon alternatives such as an HVO boiler.

Responses indicated that there may be a need for consumer support if either a ban on oil boilers was to be implemented, or there was to be a switch to biofuels; with this support proposed to include both funding and advice for consumers. Some respondents suggested that measures should be taken to avoid the risk of consumers reverting from biofuels to fossil fuel heating oil.

Only a limited number of responses suggested a timeframe for banning oil boilers, with some instead referencing trigger points, such as when an oil boiler requires replacement. Allowing a longer time before introducing any ban on oil boilers would allow more boilers to reach the end of their life. Lifecycle costs were referred to by a number of respondents, including the negative cost and impact of prematurely disposing of oil boilers (including the waste that would be generated). Of those responses where timeframes were suggested, the most common were for new homes by mid 2020s and existing buildings in 2030s.

Q53: DO YOU BELIEVE THAT OFF GAS GRID CUSTOMERS 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 CUSTOMERS?



WHAT DID RESPONDENTS SAY?

In total, 141 out of 253 responses were received to this question in Citizen Space.

Our consultation emphasised that fossil fuel heating oils have no long-term future in our energy mix, and as such, options to phase out fossil fuel heating oil need to be considered. One such option is to allow off gas grid consumers to retain their oil boilers for use with biofuels.

This proposal received significant support from respondents, **with 74% agreeing that off gas grid consumers should be able to retain their oil boilers for use with biofuels**.

Many of the respondents referred back to their response to Question 52, or raised similar points, which included:

- Concerns around reducing options and limiting consumer choice. This is more relevant where the option of gas is not available;
- The potential impact on fuel poverty;
- The opportunity to reduce emissions through biofuels (such as HVO);
- Support for only permitting low or zero carbon heating in the future;
- Concerns around biofuels, including sustainability, impacts on land use and costs;
- Lack of regulation of the oil sector;

- The opportunity to prioritise low or zero carbon heating in new buildings, with retrofitting deemed more of a challenge; and
- The need to provide support for consumers.

In addition to these comments, some respondents who supported retaining oil boilers for use with biofuels focused more on the type of fuel. For example, it was suggested that taxing fossil fuel heating oil may be a means of phasing this out, as was banning the sale of fossil fuel heating oils. However, the challenge of determining whether consumers are using biofuel or fossil fuel heating oil was also highlighted.

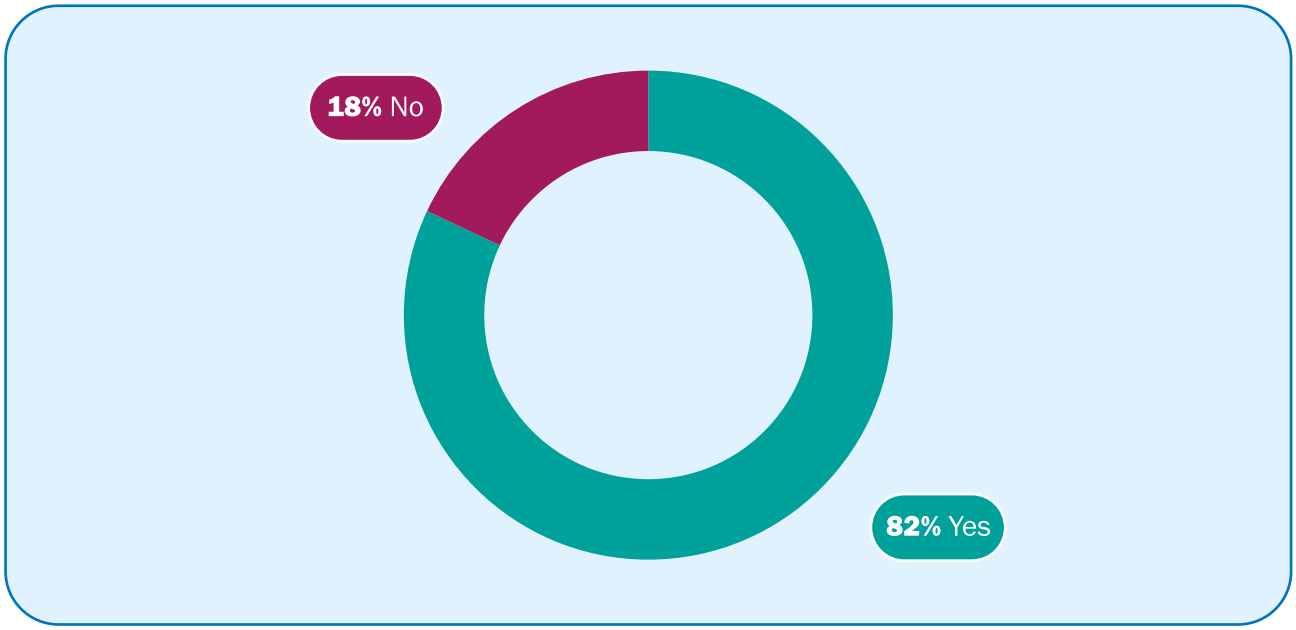
One respondent widened the question to LPG and bioLPG, noting that some specific sectors may rely on these heating options and alternatives such as electrification of heating may be difficult and expensive.

Of those that disagreed, there was a view that biofuels should not be used for this purpose. The CCC recommendation that bioenergy should be limited to applications such as hybrid heat pumps in hard to treat off gas grid homes and district heating was noted. As was the fact that NI does not have a significant indigenous supply of biofuels, increasing the risk that biofuels will need to be imported and that food crops will be displaced (particularly in poorer countries) in favour of growing energy crops. An alternative approach of considering closed gas networks for some off gas grid buildings was also suggested.

Similarly to Question 52, whilst there were a limited number of responses in relation to a potential timeframe for banning oil boilers, those that commented most commonly suggested dates in the 2020s and 2030s. A number of these respondents were of the view that new build homes should be subject to earlier requirements whereby only low or zero carbon heating should be permitted.

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?



WHAT DID RESPONDENTS SAY?

In total, 139 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we emphasised that fossil fuel heating oils have no long-term future in our energy mix. We proposed that the oil industry in NI provide a credible pathway to Net Zero by 2050 involving biofuels and that this work had to provide robust and comprehensive information on current and future costs and supply.

Overall 82% of respondents agreed that the local oil industry should develop and publish a plan on how biofuels could decarbonise heat. There was strong agreement from the business and energy sectors (89% and 91%, respectively) but lower levels of agreement from domestic consumers (70%). Though there was widespread agreement in calling for a plan, some respondents were sceptical that a practical plan was possible. Respondents mentioned that any plan must address issues of cost, availability and sustainability. Others raised concerns that biofuels would need to be imported and asked how security of supply would be addressed in these circumstances.

A limited number of comments were received from respondents who disagreed with this question. Some did not consider that it was possible for oil distributors to decarbonise. Others stated such plans should be the responsibility of government, not business, while some respondents suggested biofuels could not deliver sustainable low carbon heating.

Domestic consumers were more sceptical than other sectors. Several respondents raised concerns about fuel costs and the cost to upgrade existing boilers to use biofuels. Others did not believe the oil industry could be relied upon to decarbonise and suggested only government should have responsibility for a biofuel plan.

Business consumers were more positive about a plan for biofuels, and responses called for the plan to address a number of issues, including:

- Fuel costs;
- Security of supply;
- Timeline for decarbonisation;
- Effectiveness in comparison to other low or zero carbon heating options;
- Sources and sustainability of biofuels; and
- Regulation of the oil industry.

A number of similar responses were received from local councils, including the suggestion that *"the methodology must include a review of the carbon intensity of alternative fuels and technologies, as well as wider environmental impacts."*

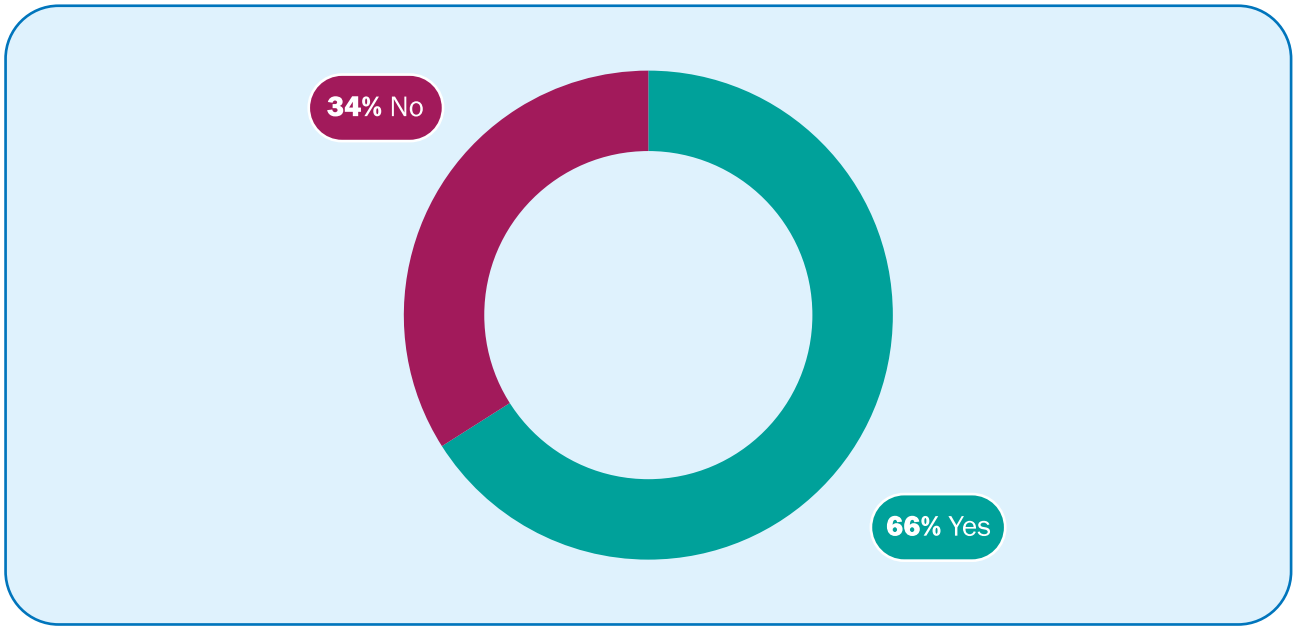
Responses from the oil industry noted that a plan for the use of biofuels in decarbonising heat has already been sent to DfE. A response from the LPG sector noted that they too had provided a plan for bioLPG.

Respondents from the gas industry agreed with the question, and called for further clarity on the use of biofuels, noting its potential for off gas grid consumers. Respondents from the electricity sector noted biofuels could have a role to play, but mentioned the CCC recommendation that biofuels should have only a limited future role in heat. They also asked for the plan to address issues relating to cost, local production and security of supply. A range of responses from others in the energy sector suggested that:

- The oil industry has a vested interest in moving their business model to net zero;
- Biofuels should be regulated;
- NI should not be reliant on imported biofuels;
- Comparison to other low carbon heating is necessary; and
- Blending of biofuels with kerosene could be an interim step.

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.



WHAT DID RESPONDENTS SAY?

In total, 122 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we emphasised that fossil fuel heating oils have no long-term future in our energy mix. We indicated that the use of biomass is likely to be focused on off-grid consumers where heat pumps alone are not a viable option. As a result, we asked whether support should be introduced to promote the uptake of biomass for off-grid consumers.

Overall, 66% of respondents agreed that support should be introduced to promote the uptake of biomass for off-grid consumers.

Several respondents supported capital or boiler replacement grants. A significant number of responses raised the issue of sustainability and suggested that biomass burned in NI should be from sustainable sources (e.g. waste wood), and not have a detrimental impact on the environment and ecosystems. Other respondents suggested biomass should only be used in off gas grid areas, where no other forms of renewable heating are viable.

Of the 34% of respondents that did not agree with support for the uptake of biomass, common concerns were that biomass is not a sustainable or long-term solution. Some mentioned air quality issues related to burning biomass, others referred to the CCC report[13] that recommended that biomass be used only in very limited cases for heating. A number of respondents expressed concern the recent RHI scheme involving payments for burning biomass.

The NI Housing Executive raised a number of concerns in relation to their experience of wood pellet boilers, which showed issues around the manual handling involved and the need for regular cleaning. They also indicated that they considered that any solution has to be affordable, sustainable and carbon free.

Responses from domestic consumers tended to focus on the availability of financial assistance to install biomass boilers. Sustainability was also a commonly raised concern. The possibility of using energy crops, such as short rotation willow, was suggested as a possible solution. Others disagreed and argued for biomass from organic waste products, not wood pellets.

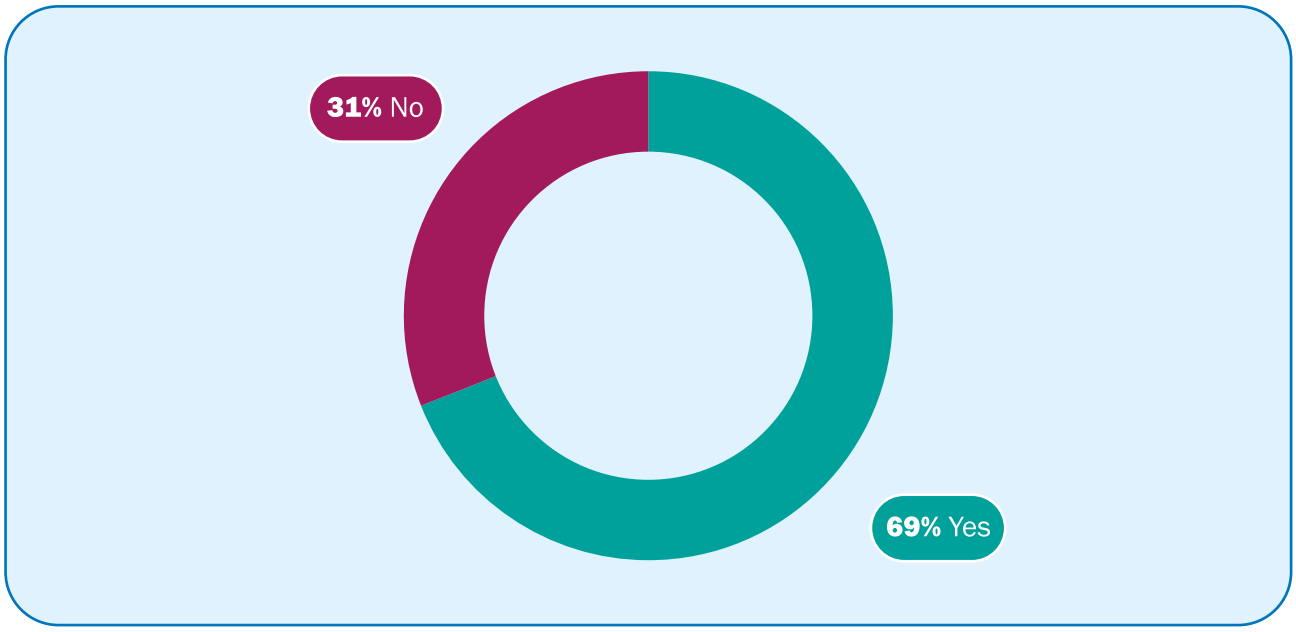
Many business consumers also highlighted the issue of sustainability. Responses indicated that biomass should not be given preference and that support should be available to other forms of low carbon heating. Several local councils supported biomass, but only in limited situations. For example, one local council stated that they would approve of limited uptake support to be provided for individuals who live in areas where other options are not viable. The council added that biomass should ultimately be phased out for mass energy users.

Several respondents from the energy sector suggested that any future support (both information and financial) should be available for all low carbon or renewable heating technologies, not just biomass. Some acknowledged that biomass has an important role to play, but only in 'hard to heat' cases where houses were located off the gas grid. Other energy sector respondents called for:

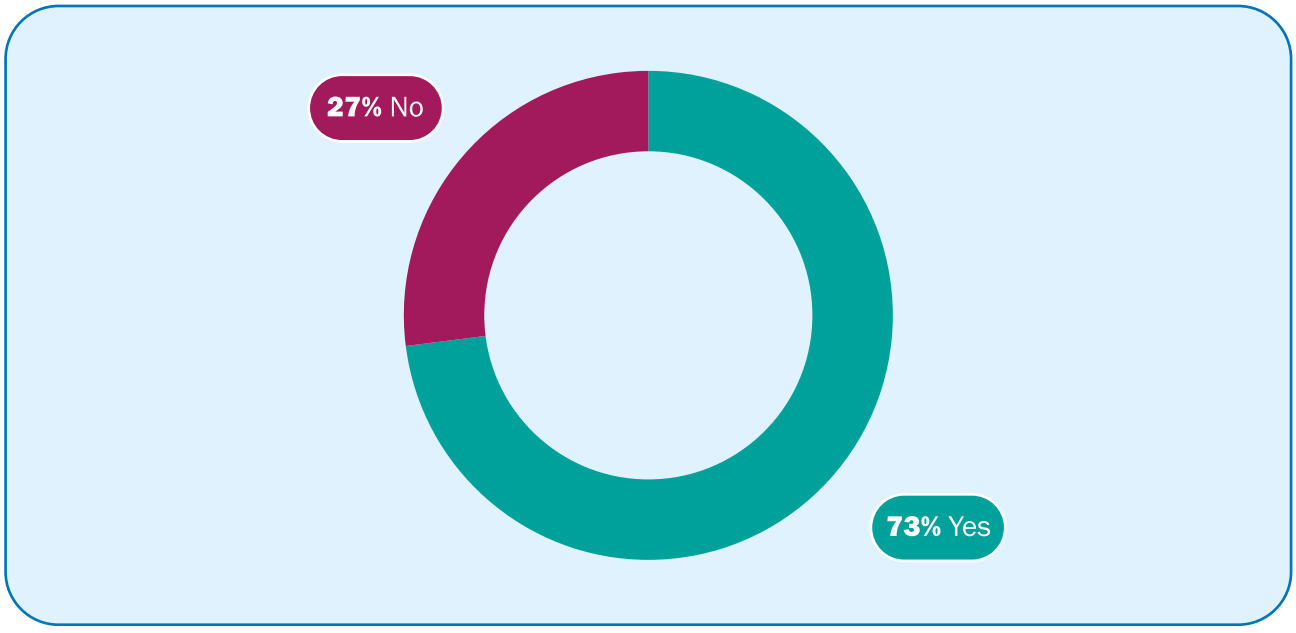
- Support for local biomass skills development;
- Regulation of the biomass fuel supply;
- Development of an information programme for consumers on biomass;
- Focus support on rural commercial and industrial applications for biomass; and
- Grants for tree planting to provide a local source of biomass.

13 https://www.theccc.org.uk/publication/biomass-in-a-low-carbon-economy/

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?



WHAT DID RESPONDENTS SAY?

In total, 136 out of 253 responses were to part one of this question, and 100 out of 253 responses to part two of this question were received in Citizen Space.

Within the policy options consultation document, we stated that regardless of whether consumers are on gas grid or off gas grid, action is needed now on coal and solid fuels. This question was intended to gather views on the phasing out of solid fossil fuels with a view to decarbonising heat. The first part of the question examined support for a ban on the sale of coal and wet wood whilst the second part sought views on whether any ban should be extended to include other solid fuels (with the exception of kiln dried wood).

Respondents were supportive of these proposals, with 69% of respondents in agreement with a ban on coal and wet wood and 73% of respondents agreeing that this should be extended to other solid fuels.

Of those who agreed with a ban on sale of coal and wet wood, the primary theme running through the responses was the urgent need to address air pollution for improving health and to reduce carbon emissions. There was only a slight divergence in opinion between urban and rural areas. A health charity indicated that domestic wood and coal (solid fuel) burning could account for almost 40% of background levels of toxic fine particulate matter, which in turn could have serious health implications.

Some respondents indicated that the ban on solid fuels should not include biomass. The need to ban the burning of peat and protect peatlands was also mentioned. Respondents highlighted the need for all wood products used for heating to be from sustainable, and preferably, local sources as the sustainability of imported wood could not be guaranteed.

A sizable number of respondents referenced the need to protect vulnerable consumers and to avoid creating fuel poverty.

Of those who disagreed with banning coal, some stated concerns about its impact on sections of the population that are least able to afford conversion to alternative heating sources.

One respondent (who supported the objective in principle) suggested that rather than ban coal, users should be encouraged to upgrade to a modern heating system or to use biomass. Others suggested that if those in fuel poverty or the elderly were forced to switch fuels, then they should be supported in making this change. Some respondents highlighted that banning coal would have limited effect as so few use coal for heating. Increasing the cost of solid fuels instead of a ban was suggested.

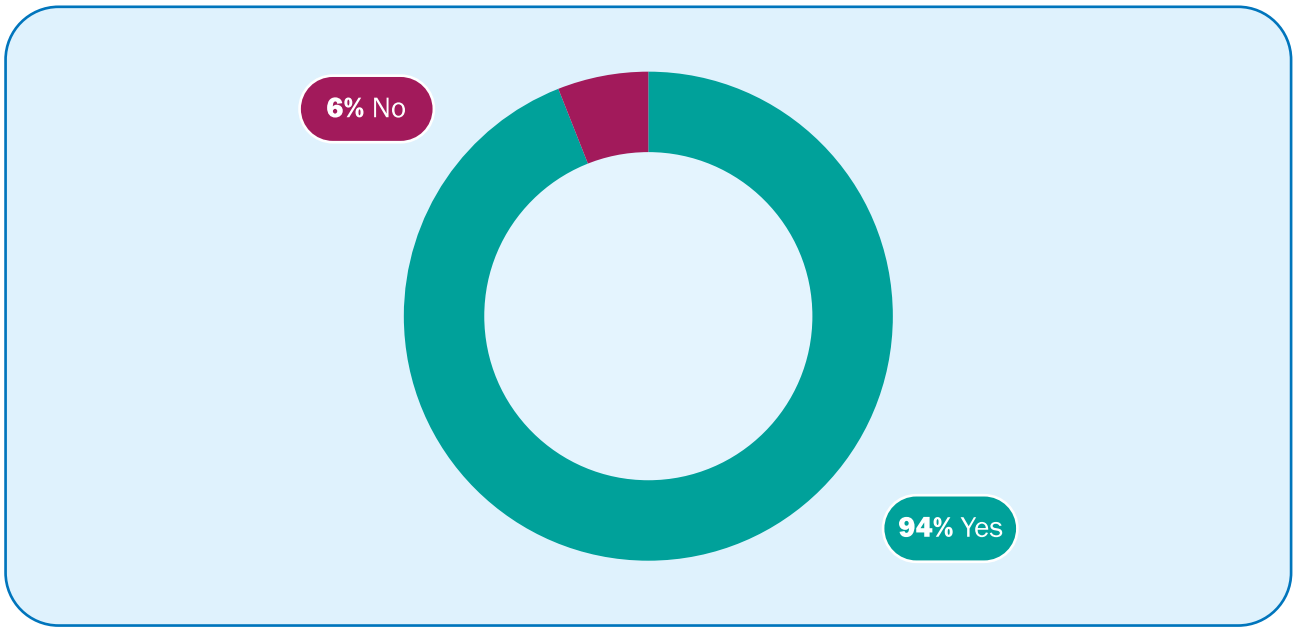
Of those who disagreed the ban should be extended to other solid fuels, their reasons for disagreeing included concern about the carbon emissions of kiln dried wood, the rights of workers, and the potential impact on fuel poverty.

Of those who agreed the ban should be extended to other solid fuels with the exception of kiln dried wood, the vast majority of respondents answered this as one question, rather than two separate questions. Their reasons varied from a perspective of mitigating factors including consumer education, price and availability of alternatives.

In the main, the reasons cited for extending the ban on coal were similar to those regarding a ban on coal itself. Some other respondents said that the burning of all solid fuels should be banned as there were air quality impacts from the practice.

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 "YES", PLEASE OUTLINE BELOW WHAT NORTHERN IRELAND SPECIFIC ISSUES NEED TO BE FACTORED INTO THIS IN ORDER TO ACCELERATE THE UPTAKE OF ZERO EMISSIONS VEHICLES?



WHAT DID RESPONDENTS SAY?

In total, 155 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we proposed the development of a NI specific strategy for an overarching, long-term plan for cleaner, greener transport and travel. This strategy will show how we will meet future net zero emissions targets within the transport sector, building on wider UK Transport Decarbonisation Plans.

There was significant support for such a strategy from those who responded to this question with 94% of respondents supporting this approach.

In outlining what NI specific issues need to be considered in order to accelerate the uptake of Zero Emissions Vehicles, respondents provided insightful views from a wide range of perspectives. Key suggestions for the strategy to address included customer focused needs, infrastructure requirements, balancing net zero vehicle transport options with active and sustainable travel solutions, and the need for funding to support the introduction of a range of alternative fuels (all of which could progressively decarbonise transport in NI).

There were those who expressed reservations with regard to the pace of change and how that would impact on consumers who may not be able to afford to transition to alternative fuel vehicles, or had vehicles which they would wish to continue to use in the classic markets.

The responses also indicated a desire for solutions to be tailored to suit the geographical context of NI. There was a clear consensus that there was no one-size-fits-all solution for decarbonising transport and that a range of fuels and initiatives needed to be considered across the freight, car, van and public transport markets to provide clean transport where active travel solutions were not practical.

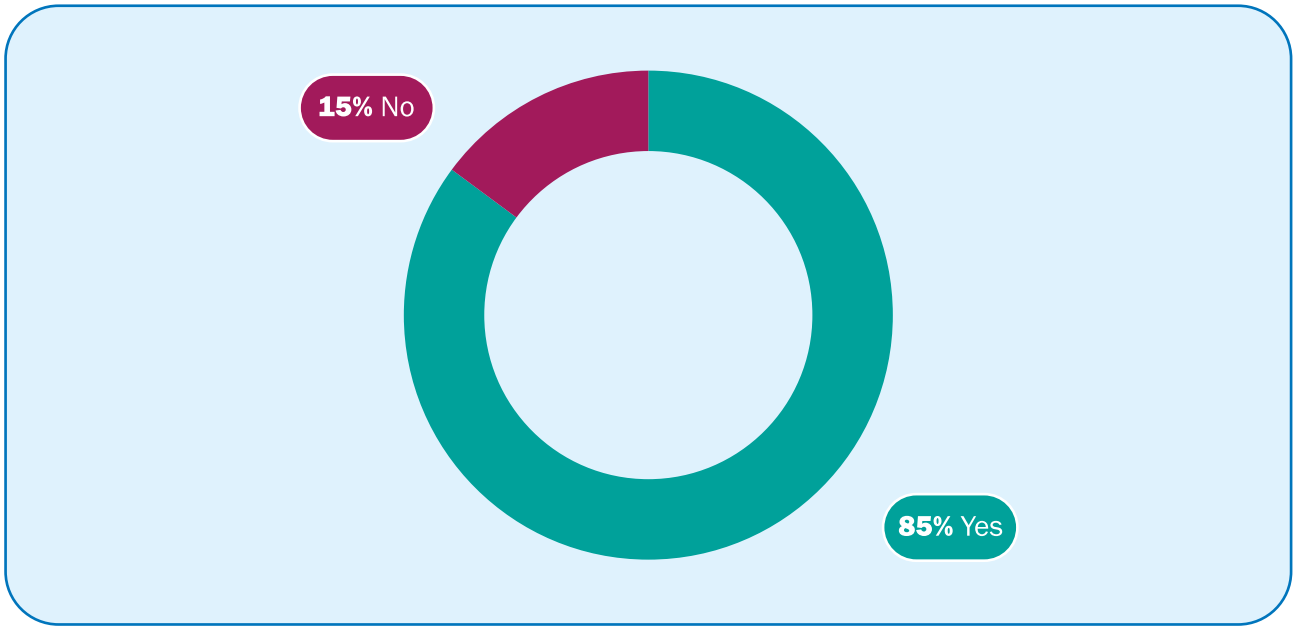
Respondents considered that change needs to be incentivised by central government, local government and manufacturers; and that removing barriers to change such as grid capacity issues, planning considerations, infrastructure provision, vehicle cost and availability requires a joined up approach.

The responses also reflected the expertise that exists within NI in key delivery areas such as vehicle manufacturing, fuels development, renewable energy and academia. The responses reflected a desire to decarbonise our transport system using local resources and developing technology in our businesses, colleges and universities.

Responses indicated a need to understand how new technologies, including battery production, impact on our planets resources and how we can avoid unnecessary pressures on public and personal finances that may arise from moving too quickly to adopt solutions in fast changing markets.

Q58: DO YOU AGREE THAT AN EV COMMUNICATION CAMPAIGN SHOULD BE RUN IN NORTHERN IRELAND?

IF "YES", PLEASE OUTLINE BELOW WHAT KEY MESSAGES WOULD BE MOST IMPACTFUL FOR CONSUMERS AS PART OF THIS?



WHAT DID RESPONDENTS SAY?

In total, 144 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we proposed that an EV communication campaign should be run in NI and asked that respondents considered what key messages would be most impactful for consumers as part of this campaign.

There was broad support for such a campaign from those who responded to this question with 85% of respondents supporting this approach. A large number of respondents provided details on the key messages for any such campaign. Some respondents believed that improvements in charging infrastructure, vehicle availability and cost of transition would need to be addressed before a campaign was launched.

Taking into account the very important issues around the timing of the campaign, most respondents considered that there was an opportunity to educate consumers on the benefits of driving EV's. The cheaper, greener and cleaner message came across throughout the responses. Respondents recognised that the introduction of EV's to a mass market needed time, resources and a staged approach by manufacturers, infrastructure providers and government. This was needed so that in making the switch, EV's could provide the same driving experience as conventionally fuelled vehicles, but with additional environmental benefits.

Respondents noted a wide range of benefits that could be derived from the mass introduction of EV's including cheaper motoring, quieter cars, vans and trucks. The benefits of battery storage and vehicle to grid solutions that could drive down household energy costs, and from the availability of renewable energy in NI to provide green electricity were also recognised.

It was accepted that government had taken steps to incentivise EVs but that grants already available for vehicles, home, workplace and on street residential charging infrastructure could be more widely publicised. Furthermore, barriers that lead to range anxiety and affordability needed to be addressed first.

It was a widely held view that the decision as to when it would be appropriate to launch such a campaign could be addressed in one of two ways:

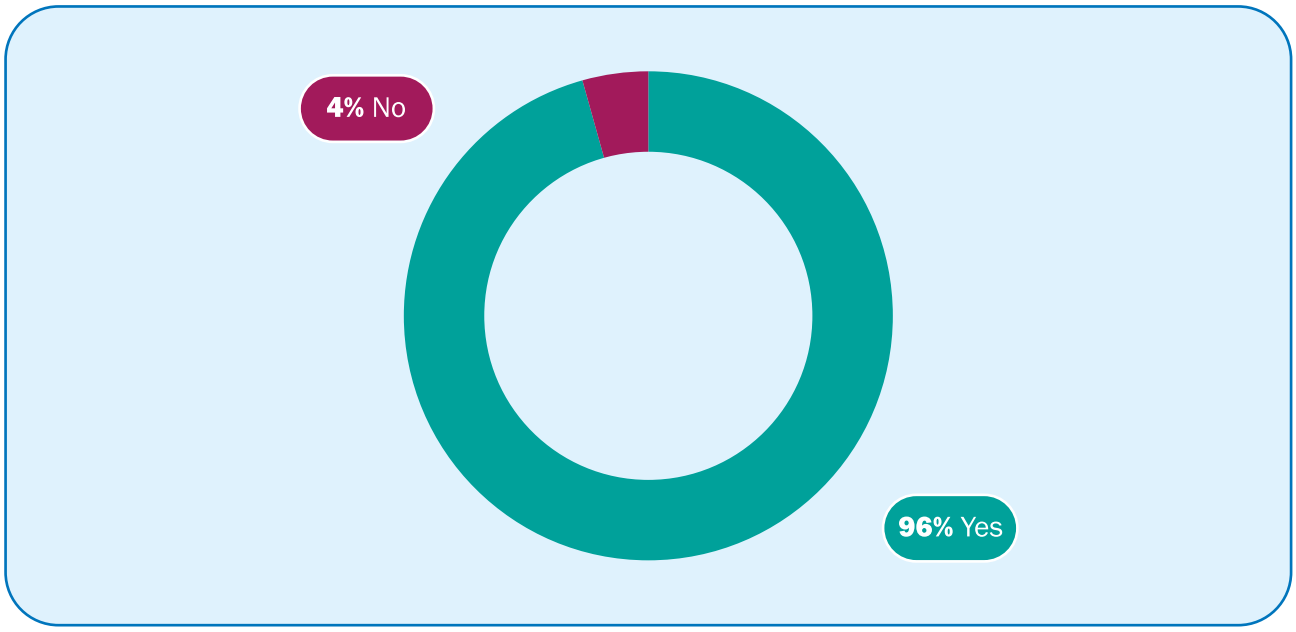
- The proposed local Transport Strategy; or
- By an EV group made up of government and industry experts who could gauge the right time to launch such a campaign and achieve maximum impact.

A number of respondents noted that some of the barriers that still exist should be addressed as fundamental prerequisites to reaching out to consumers. The barriers referenced included charge point network design, grid capacity, the availability of smart metering and smart charging to maximise benefits of vehicle ownership.

It was also clear from the responses that EV ownership is not the panacea for decarbonising transport and that any communication plan should be broader in scope covering the benefits of active travel and clean public transport solutions. Some respondents noted that the use of other alternative fuels that are in development, such as hydrogen and compressed and liquefied natural gas, could also provide transitional solutions.

Q59: DO YOU AGREE THAT THE PRIVATE SECTOR AND LOCAL GOVERNMENT HAVE A KEY ROLE TO PLAY IN DEVELOPING EV INFRASTRUCTURE?

IF "YES", PLEASE OUTLINE BELOW WHAT BARRIERS CAN GOVERNMENT ADDRESS TO ENSURE THAT SUCH PROJECTS ARE COMMERCIALLY VIABLE?



WHAT DID RESPONDENTS SAY?

In total, 138 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we asked if respondents agreed that the private sector and local government have a key role to play in developing EV infrastructure and for views on what barriers government could address to ensure that projects are commercially viable.

The vast majority of respondents (96%) agreed that the private sector and local government had a role to play. There was also the view that whilst NI had been an early adopter of EV technology, the existing charging infrastructure had become dated and needed further investment to ensure that growth could be supported.

Respondents said that central government should support the private sector and local government in upgrading existing EV infrastructure. This included introducing on street residential charging, removing any barriers to commercial viability (such as high grid connection costs and planning issues), and exercising enforcement powers to secure residential charge point access. However, some respondents felt it was for the market alone to deliver solutions.

There was also a view that central government's role (including its arm's length bodies) was to provide certainty in the market, ensuring that charge point provision meets the needs of individual users whether it be publicly available, in the workplace or at home. Respondents suggested that reviewing price control measures, facilitating smart charging solutions and developing EV friendly tariffs would encourage drivers to make the switch and allow them to reap the financial benefits of these new technologies.

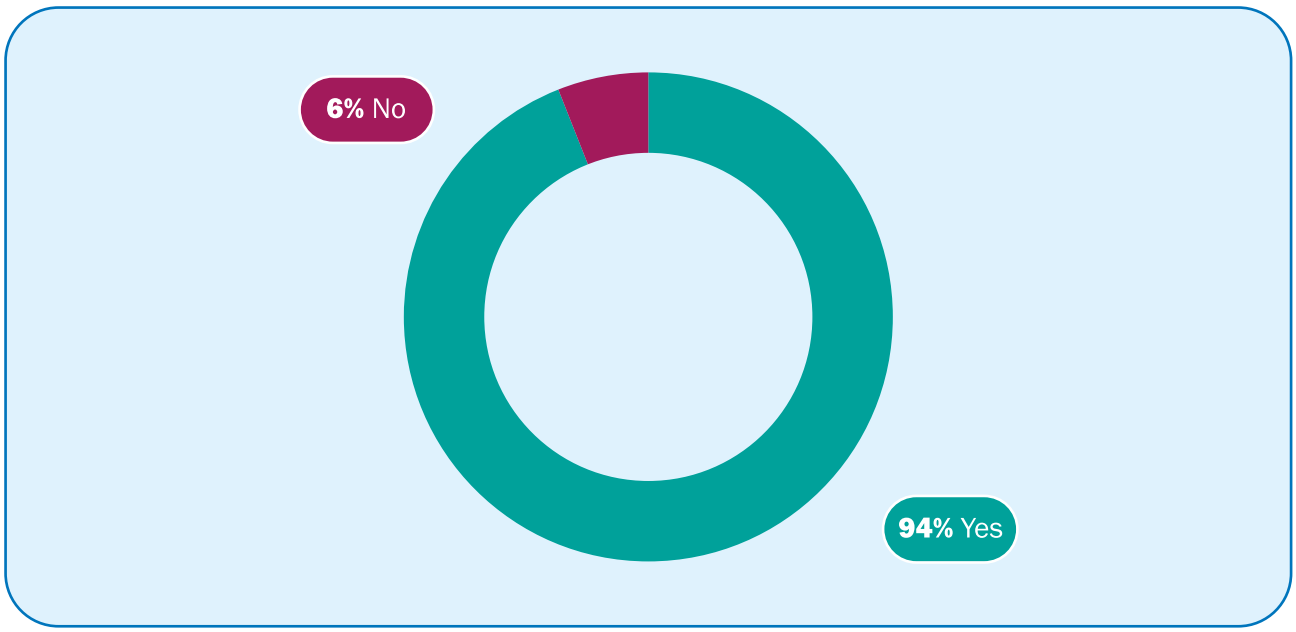
From a local government perspective respondents indicated that there was an opportunity for local councils to use Local Development Plans to facilitate EV charging through workplace and on street residential solutions and that this could also be embedded in Council action plans to inform a pathway to net zero for their organisations and ratepayers.

It was clear from respondents that the private sector has a desire to seek new commercial markets, recognising the need for change and that the energy landscape, how we will travel in future and noting that commercial enterprise opportunities are still developing. Key measures identified to help attract investment included financial incentives, ensuring grid stability, reducing connection charges and encouraging competition in the market.

Responses suggested that representatives from key industries and local authorities could provide input into how best to progress NI's EV ambitions including in respect of charging infrastructure and that this could be included in the proposed local Transport Strategy. In addition, it was suggested that councils in NI could learn from other jurisdictions where local solutions are being developed to suit similar geographical needs and consumer demand.

Q60: DO YOU AGREE THAT WE SHOULD DEVELOP AN EV CHARGING INFRASTRUCTURE PLAN IN COLLABORATION WITH PUBLIC AND PRIVATE PARTNERS?

IF "YES", PLEASE OUTLINE BELOW WHAT THE KEY PRIORITIES OF THE PLAN SHOULD BE?



WHAT DID RESPONDENTS SAY?

In total, 141 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we asked if respondents agreed that we should develop an EV Charging Infrastructure Plan in collaboration with public and private partners. If yes, we asked respondents to elaborate on what the key priorities of the plan should be.

There was a very clear signal given by respondents (94% agreed with this proposal) that an EV Charging Infrastructure Plan needs to be developed and that a cross-sectoral approach is taken. There was also an indication that there is a wider need for a net zero plan for transport that would encompass EVs, but also cover other alternative fuels such as hydrogen, which could provide solutions for heavier vehicles alongside biofuels, Compressed Natural Gas (CNG) and Liquified Natural Gas (LNG).

In seeking to outline priorities respondents provided a very comprehensive view of what needs to be addressed, who needs to be involved and how we can learn from what has been successful in other jurisdictions.

In terms of what an EV Infrastructure Plan should address, the responses covered a wide range of issues. This included what the charge point network should look like, covering issues such as location, quantity, type, standards and method of payment. There was the suggestion that there needed to be a re-evaluation of who should regulate the market when considering costs associated with charge point installation. In addition, the need to consider it from a consumer protection perspective was highlighted in order to ensure users would be able to take advantage of new technologies associated with owning an EV.

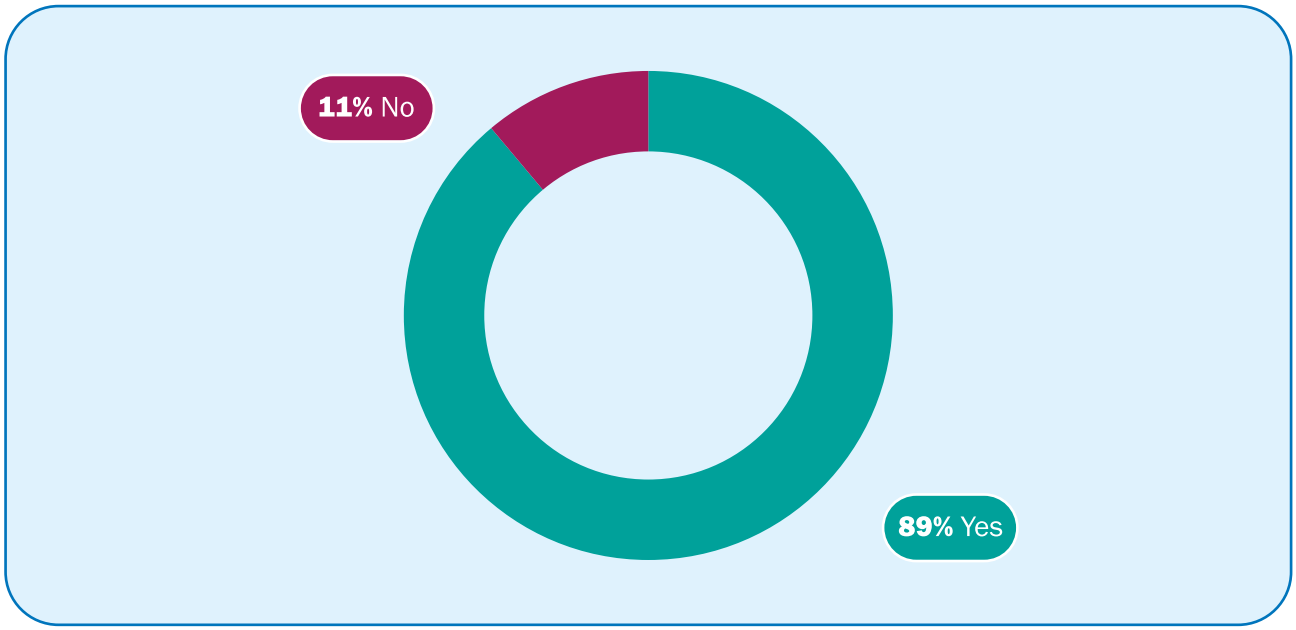
There was also comment on who would operate and maintain this new infrastructure, where the skills would come from and how safety of operation and use could be ensured. Potential for wider benefits were also highlighted including how battery technology solutions could be used to offset energy bills.

There was considerable appetite for a consortium type approach to developing the EV Infrastructure Plan with representatives from central government, the EV sector and energy providers working collaboratively. It was also suggested that projects could be delivered through private-public sector partnerships with the UK Government continuing to provide support through funding for demonstration projects, vehicles and charging infrastructure. Respondents noted that the NI EV Infrastructure Plan will need to be aligned to the forthcoming UK Charging Infrastructure Strategy, but should specifically address the needs of NI users and support the development of the EV market in NI. It was a widely held view that this approach would allow the NI context to be addressed so that the right technology is introduced at the right time, and in the right locations. Another suggestion was that an independent, impartial and expert panel could provide input to infrastructure planning.

Finally, respondents highlighted that other measures such as low emission zones and disincentives for driving conventionally fuelled vehicles would need to be considered to support transition.

Q61: DO YOU AGREE THAT PUBLIC SECTOR CONTRACTS CAN BE A KEY DRIVER FOR DEVELOPING TECHNOLOGIES AND MARKETS FOR ALTERNATIVE FUEL VEHICLES?

IF "YES", PLEASE OUTLINE BELOW WHAT SPECIFIC OPPORTUNITIES ARE THERE THAT COULD BE PROGRESSED?



WHAT DID RESPONDENTS SAY?

In total, 136 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we asked if respondents agreed that public sector contracts can be a key driver for developing technologies and markets for alternative fuel vehicles and, if so, what specific opportunities could be addressed.

With 89% supporting with this concept, there was a very clear message from respondents that public sector contracts could be a key driver in stimulating the use of alternative fuels across a range of fleet types. It was felt that public sector organisations needed to lead by example and that, where vehicles were available, the migration to alternative fuels should be by default in respect of procurement. Respondents highlighted that there may be opportunities for organisations to trial multiple vehicle types and fuels, share experience, and help markets grow through the provision of infrastructure to support private sector growth.

Respondents also felt that in developing new arrangements for procurement of public sector contracts, consideration should be given to the tender criteria in order to encourage applicants to use EVs or alternatively fuelled vehicles. It was also indicated that government could require organisations to produce Carbon Reduction Plans, which set targets or goals for long-term options for net zero technologies in their business areas, should they wish to bid for work for contracts over a certain threshold.

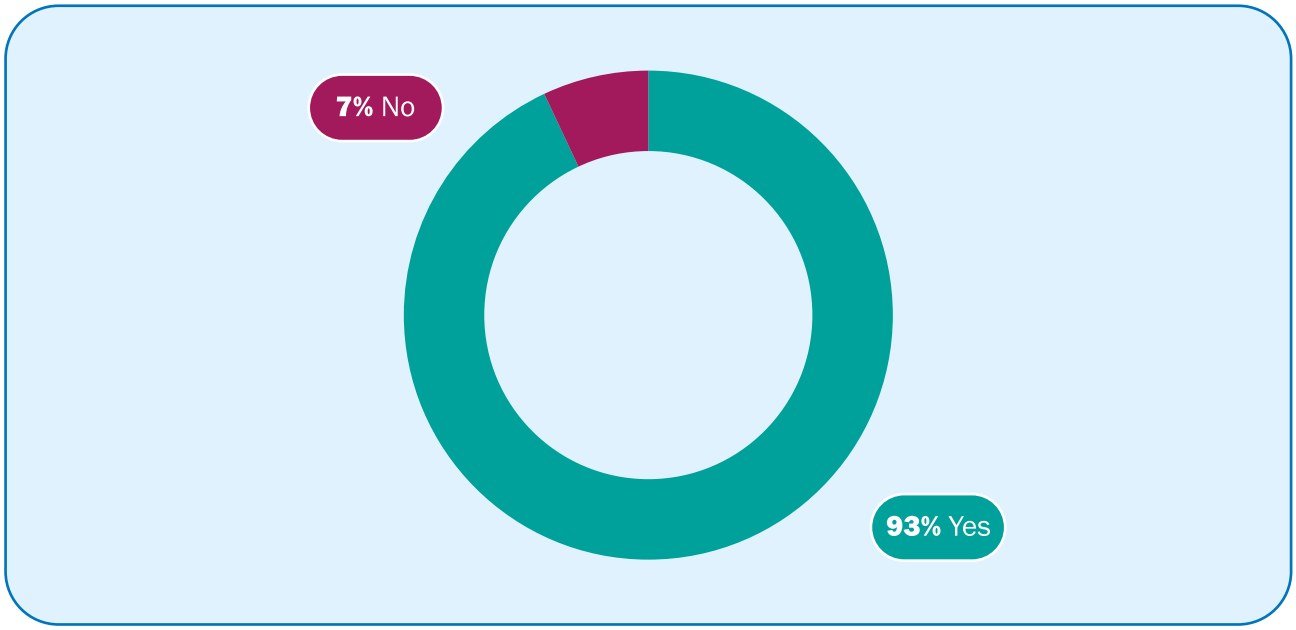
From the responses, there was a consensus that no one solution should be locked in as the way forward, and that through private-public sector partnerships there was opportunity to test technologies. In doing so, data and operational capability analysis could be shared with fleet managers across the private sector to assist in the preparation of business cases and create confidence in these new technologies.

Respondents also indicated that a fuel mix for long-term decarbonisation and interim solutions would be desirable. The use of fuels such as hydrogen and biofuels (such as Bio CNG, and in the shorter tem CNG / LNG) would help to alleviate grid pressures, which could arise due to mass electrification. In order to achieve this, some responses indicated that government could review how support could be provided for production of these new fuels in NI.

It was also indicated that the procurement should include measures which required bidders to demonstrate that the fleet they would be using to fulfil contracts was using the low emissions technologies which were available in particular sectors. This approach could help drive demand for new vehicles and fuels, driving down prices for non-publicly funded projects.

Q62: DO YOU AGREE THAT COLLABORATIVE RESEARCH WILL BE IMPORTANT TO DEMONSTRATE ALTERNATIVE FUELS?

IF "YES", PLEASE OUTLINE BELOW WHAT ARE THE BEST ROUTES TO IDENTIFY AND PROGRESS POTENTIAL PROJECTS?



WHAT DID RESPONDENTS SAY?

In total, 113 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we asked if respondents agreed that collaborative research will be important to demonstrate alternative fuels and what were the best routes to identify and progress potential projects.

Respondents (93%) indicated that there was opportunity for continued collaboration in this area. Across the responses, clear examples of public-private sector collaboration with local universities and further education colleges were provided. The consensus was that we were already doing this well in NI, but that there was an opportunity to avoid a silo approach to decarbonisation by coordinating research and development across different sectors.

Place-based research was considered to be key to successful collaboration. It was suggested that this could be provided by learning lessons from other successful initiatives such as the Scottish Government's ClimateXChange[14], a network that provides an independent evidence base for Scottish Government policy-making through the provision of timely and objective research and expert advice.

14 https://www.climatexchange.org.uk/

Demonstration projects were also identified as a priority to show how technologies can work in practice. In recent years, demonstration projects in cities have shown diesel buses can be successfully replaced by low emission alternatives in high emission corridors. However, there are also opportunities in other sectors (such as agriculture and freight) to develop fuels, and decarbonise agricultural machinery and movement of goods.

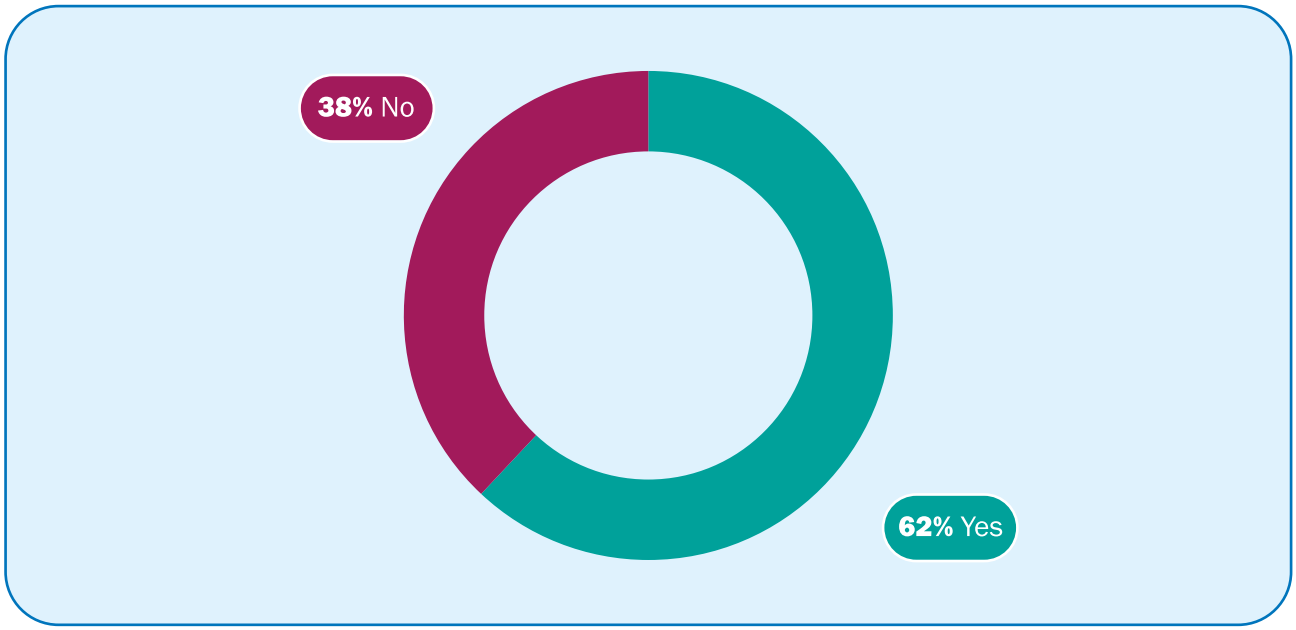
Respondents indicated that a collaborative approach is needed across Executive Departments and with other bodies, such as Invest NI, which are working on a day to day basis with local companies seeking new markets and have expertise in alternative fuels technologies and in the manufacturing process.

In doing so, respondents felt that we could better understand how the pinch points in heat, power and transport can be addressed and how these new fuels and technologies can be exploited to achieve net zero.

Working collaboratively in NI could help develop a pipeline of green technology projects that would stimulate economic activity in low carbon technologies, build a local skills base to educate our future engineers and help provide real opportunities for decarbonisation in some very challenging sectors.

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 "YES", OUTLINE BELOW HOW THE GOVERNMENT CAN HELP TO ENCOURAGE THE PRIVATE SECTOR TO TRIAL AND USE THESE FUELS?



WHAT DID RESPONDENTS SAY?

In total, 121 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we asked if respondents believed that fuels such as Compressed Natural Gas (CNG) / Liquid Natural Gas (LNG) and / or synthetic fuels can play a role as an interim measure to decarbonising transport and how the government can help to encourage the private sector to trial and use these fuels.

Most respondents agreed with this proposal, with 62% in support and 38% disagreeing. Responses to this question provided an insight into the debate that is taking place on the continued use of fossil fuels in providing cleaner transport options.

Opinions are clearly divided with some adopting the view that natural gas is essential in the pathway to decarbonisation of transport. Others adopted the alternative view that continued fossil fuel use in whatever form would be a hindrance to achieving net zero targets.

The current situation is complex in that some hold a strong view that NI is well placed to produce a specific biofuel, Bio CNG, in quantities that could support the decarbonisation of heavy transport for NI, GB and for the RoI.

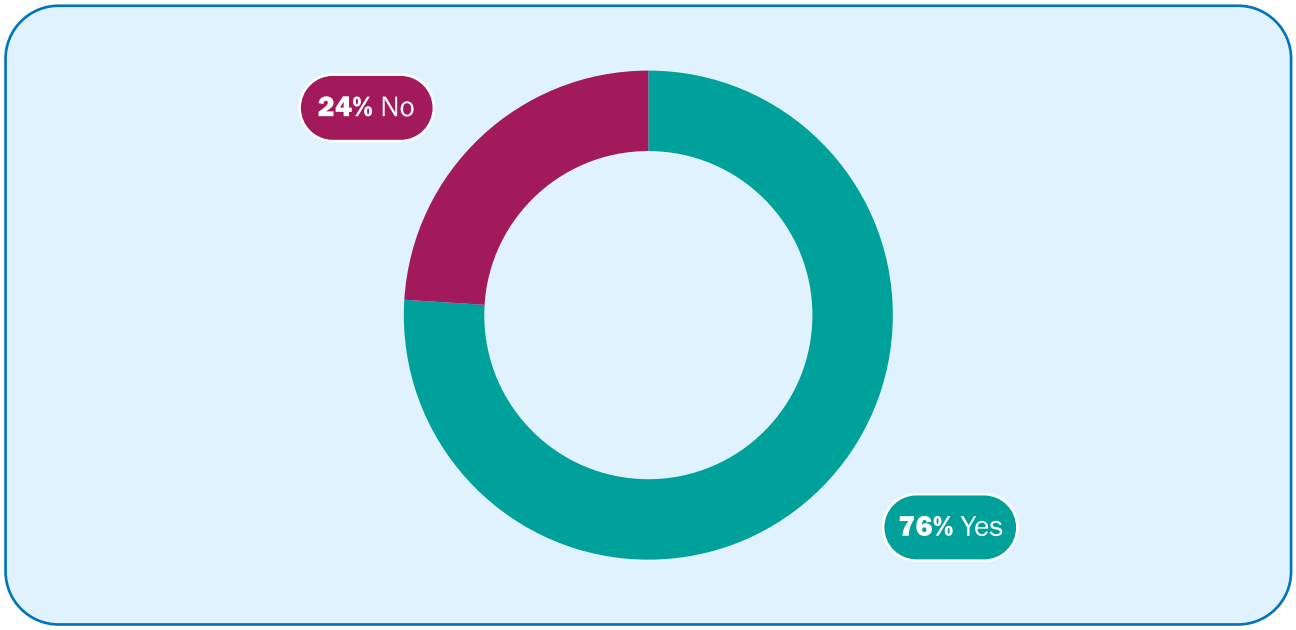
In support of the use of blended fuels, respondents indicated that hauliers in NI were already disadvantaged relative to GB counterparts due a lack of biofuel options to satisfy growing environmental requirements of customers. Conversely, there was also strong opinion that this technology should be "leap frogged" in that the CCC has indicated that blended fuels are not an option post 2030[15].

There was also a view that government support mechanisms for clean fuels such as the Renewable Transport Fuel Obligation, taxation, capital allowances, permitted development rights and the Green Gas Trading Scheme need to be reviewed if these fuels are considered to be an interim solution in the pathway to net zero.

15 https://www.theccc.org.uk/publication/biomass-in-a-low-carbon-economy/

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?



WHAT DID RESPONDENTS SAY?

In total, 116 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we considered Carbon Capture, Utilisation and Storage (CCUS) technologies, costs and applications. We noted that in hard to abate sectors, CCUS is the only option to achieve necessary carbon emission mitigation at this time. In relation to this, we stated our intention to review whether to continue licencing of onshore fossil fuel exploration and development (see Question 65 for more detail).

There was broad overall support for CCUS playing a role in NI, with 76% of respondents who answered this question agreeing with the proposal, compared with 24% indicating they did not agree.

Domestic consumers supporting CCUS in NI considered a nature-based approach utilising more tree planting as appropriate. A number of respondents also suggested CCUS for our power stations and linked Bioenergy with Carbon Capture as part of the solution.

Business consumers and energy sector respondents were largely supportive of the need for CCUS. Some indicated a positive view to concentrated nature based approaches using increased land and marine assets to sequester CO_2. Other areas of focus were on biomass energy cycles and agricultural practices with carbon utilisation therein linked to biofuels and leading to increased employment opportunities.

Many business and energy sector respondents indicated that engineered solutions linked to power stations, hydrogen and storage should be included; however, it was recognised that NI does not have high levels of industrialisation prevalent across the rest of the UK.

Amongst those that indicated they did not support CCUS in NI, the reasons given for this include:

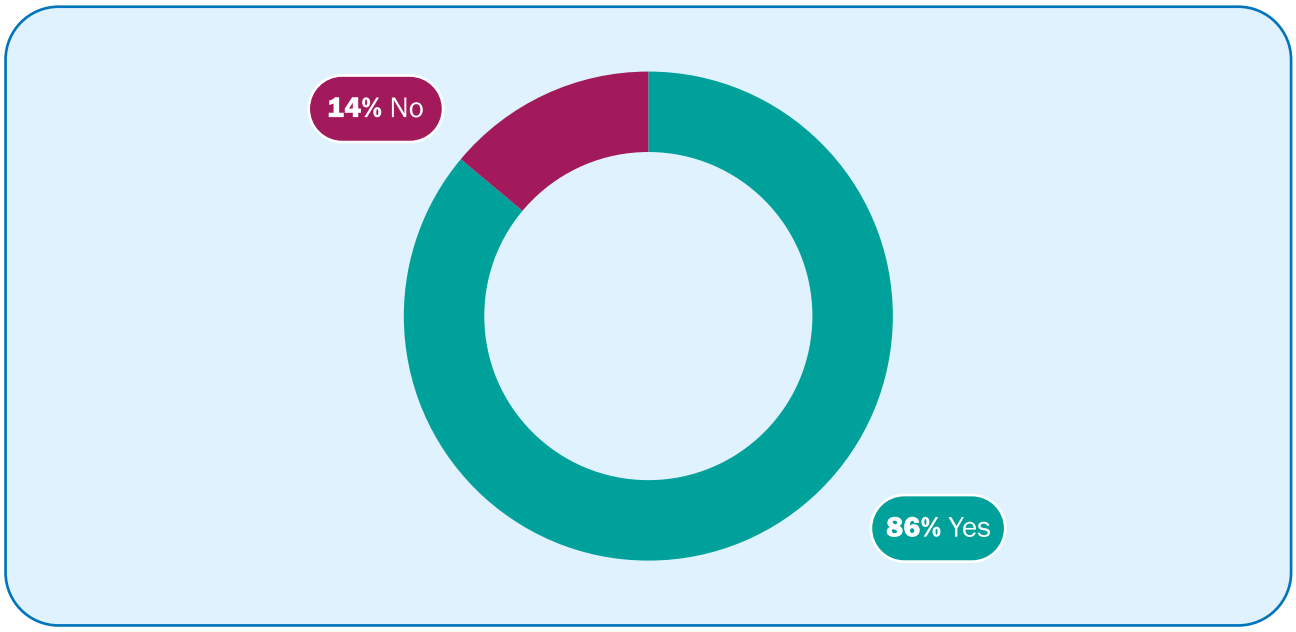
- It was noted that there are no active CCUS sites in the UK as of June 2021;
- Concern that CCUS includes high infrastructure costs;
- Concerns regarding the lack of commercial viability and the need for additional research and development;
- Safety concerns due to substantial volumes of CO_2 being stored, which could be hazardous if suddenly released;
- Whether CCUS in NI would make a significant impact on emissions; and
- The view that CCUS should only be used as a last resort.

There were numerous suggestions for application of CCUS and a large number of respondents did see a role in an NI context, such as:

- CCUS clusters could be implemented around Belfast port, including at Kilroot and Ballylumford;
- Any future thermal generation should only be in conjunction with carbon capture;
- Collected CO_2 could be transported by ship for sequestration at existing CCUS clusters;
- Captured CO_2 can be repurposed by agriculture and industry in NI;
- Bioenergy could play a significant role alongside CCUS;
- Carbon may be sequestered into long-term crops, soils and unmanaged habitats; and
- Link CCUS to hydrogen creation from steam methane reforming which can potentially produce tremendous volumes of hydrogen at scale, quickly reducing carbon emissions in difficult sectors.

A number of responses noted the need for funding in this area with a long-term view to the 2030s to allow for infrastructure planning and development. Respondents proposed that funding support could come in the form of CFDs, such as in GB, with a focused NI allocation or through a capital funding scheme for projects.

Q65: DO YOU BELIEVE THAT OUR APPROACH TO PETROLEUM LICENSING SHOULD CHANGE IN LINE WITH OUR COMMITMENT TO DECARBONISE ENERGY?



WHAT DID RESPONDENTS SAY?

In total, 115 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated that future policy decisions around petroleum should be taken with a full understanding of the issues. These include the positive and negative economic effects, as well as the impacts on the environment and society.

There was broad overall support for the proposal, with 86% of respondents who answered this question agreeing that our approach to petroleum licensing should change in line with our commitment to decarbonise energy.

Most of the respondents described themselves as domestic consumers or energy sector representatives, 46% and 30% respectively. There was an even representation from rural and urban dwellers.

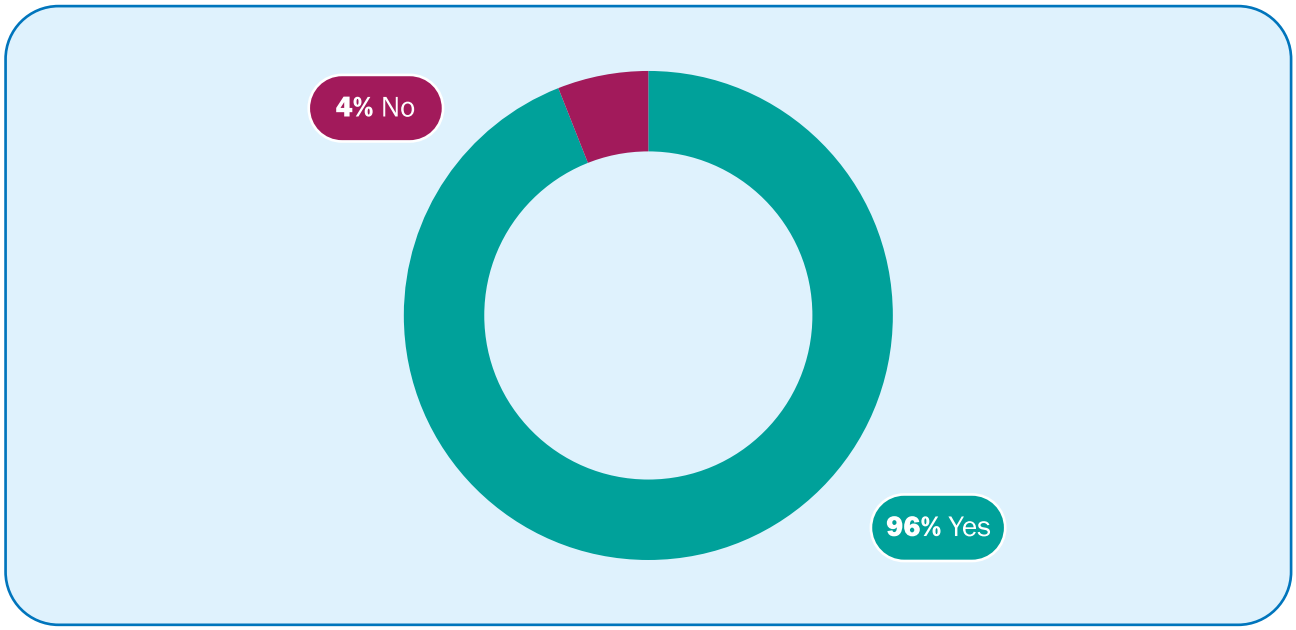
Only a small number of written comments were received; however, the majority of these called for all petroleum licensing to be banned in NI. Respondents were largely of the opinion that continuing to support petroleum extraction would be wholly inconsistent with net zero commitments and the Energy Strategy's general direction of travel to move away from high carbon emitting fossil fuels and towards renewable, low carbon energy sources. In addition, some respondents noted the potential negative impacts on the environment and society in supporting a change in approach to petroleum licensing.

CHAPTER 6:

Create a Flexible, Resilient and Integrated Energy System - Response Summary

Q66: DO YOU AGREE THAT THE ELECTRICITY NETWORK OPERATORS SHOULD PROVIDE 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?



WHAT DID RESPONDENTS SAY?

In total, 143 out of 254 responses were received to this question in Citizen Space.

The policy options consultation set out the need for a power system based around flexibility to integrate more renewables in a way that minimises costs for consumers and ensures security of supply. The measures to achieve this include flexible markets and infrastructure, a smart and digitalised energy system and decentralisation of generation, control and consumption.

The respondents were strongly and consistently supportive (96%) of the System Operators (SOs) working together, with the guidance of DfE, to produce long-term pathways to achieve a zero carbon grid. Respondents were very clear that they expected the two SOs to produce a holistic and coordinated pathway, suggesting that a clear, long-term pathway would provide market participants with commercial certainty. Some suggested that the SOs start at the end point of net carbon zero by 2050 and work backwards to ensure a comprehensive plan.

Respondents recognised that there will be very significant investment required, from now to 2050, to achieve a zero carbon grid, and that investment will need to be strategically directed by the pathways that the SOs will produce. Flexibility was seen as another requirement for a net zero grid, it was also seen as a means to lower the overall investment costs.

DS3 is seen as a positive factor for NI's achievements so far, but is seen as underfunded and in need of updating. Several respondents recommended that the 2018 cap on DS3 payments for system services should be increased to meet the needs of renewables delivering a zero carbon grid. Other flexibility tools recommended for a zero carbon grid included demand side services, inertia and storage.

To achieve a zero carbon grid, respondents recommended that DfE set clear, detailed and ambitious targets for the SOs when they are developing their combined pathway to a zero carbon grid. For example, *"DfE should introduce capacity targets in line with the SONI Tomorrow Energy Scenarios (TES) 'Accelerated Ambition' pathway which include 2,542MW of onshore wind."* Specific targets for Dispatch Down were also recommended. Ambitious targets are seen as particularly important given the increase in electricity demand from electrification of heat and transport that respondents see as necessary for achieving net zero for NI.

The SOs were widely commended for the quality and vision of the numerous reports on working towards a zero carbon grid that they have published. SONI's 'Shaping Our Electricity Future' consultation and 'Tomorrow's Energy Scenario for Northern Ireland', and NIE Network's 'Networks for Net Zero' were some of the reports commended.

Involving industry and other stakeholders in developing strategy, policy and pathways was also a consistent suggestion. The Joint Working Group set up by DfE as part of the strategy development process was cited as a positive example.

As part of a Just Transition, affordability and security of supply were material concerns for many individual respondents. Putting consumers (especially active consumers) at the heart of future pathways was commonly referenced in responses.

Developing a smarter grid, with much increased digitalisation and quality data were seen as key parts of the pathway to a zero carbon grid. Smart Meters, smart EV charging and other smart grid features were all cited as tools to be used in the pathways.

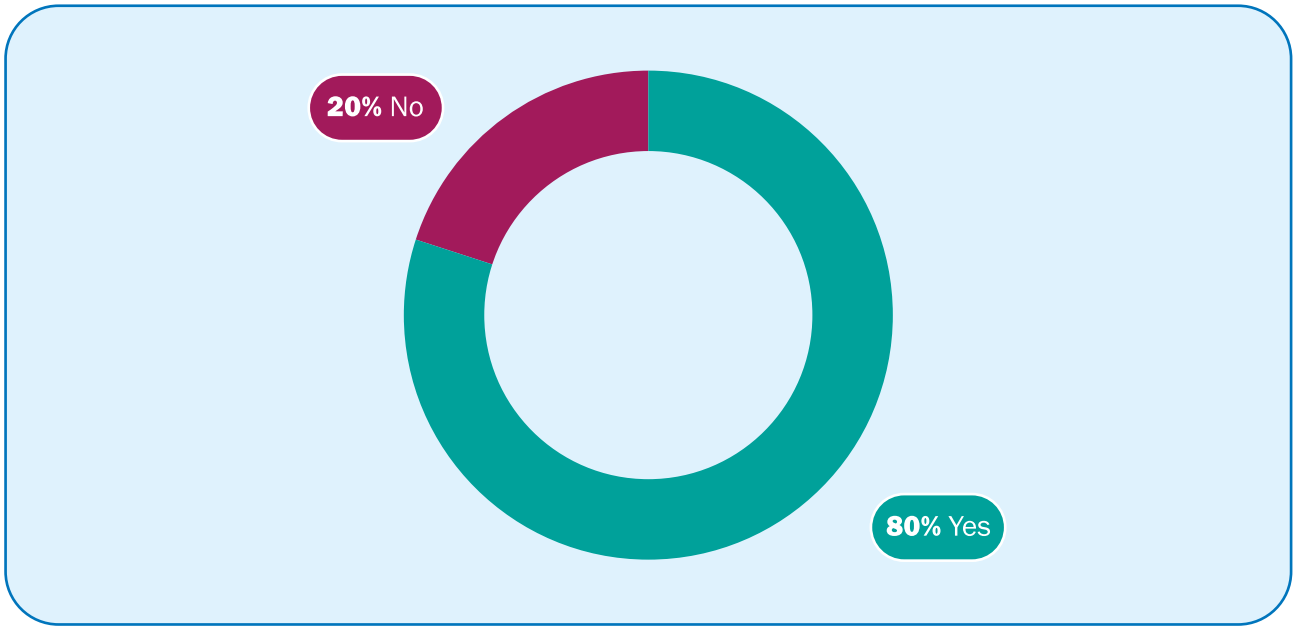
Integrating the pathways to zero carbon grid with the existing gas network, using low carbon gas and using surplus wind energy to produce hydrogen were suggestions that link to other areas of the strategy.

The issue of constraint and curtailment were common issues that respondents suggested the pathway to a zero carbon grid need to solve. NI's high level of constraint and curtailment were cited as key reasons for change and investment. The slow speed of grid reinforcement was mentioned a problem for many involved in renewable energy, and suggestions included addressing Associated Transmission Reinforcements (ATRs) and the publication of progress on ATRs.

In summary, respondents noted that energy and flexibility market structures are essential to achieve a zero carbon grid and that existing programmes (in particular DS3) need to evolve and be adequately funded. Respondents noted that maintaining security of supply, system resilience and energy affordability throughout the transition were critical.

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?



WHAT DID RESPONDENTS SAY?

In total, 130 out of 253 responses were received to this question in Citizen Space.

In the policy options consultation, we noted that conventional power generation is required to maintain system stability and our security of supply. However, it recognised that over time the right policy signals may result in these conventional power generators moving toward new low and no carbon technologies.

Most respondents agreed that conventional power generation had an important role to play in the pathway to decarbonised energy, with 80% agreeing with this statement. The question was asked to gauge stakeholders' opinion on the ongoing use of conventional power stations and to seek alternative opinions if their use is to be withdrawn / reduced on a permanent basis. Many were in favour of short-term use of this type of energy while others advocated it in the medium to longer-term in order to ensure security of supply.

Domestic consumers suggested that conventional power plants should be used as minimally as possible in order to maximise energy from renewable sources, to be used in a limited fashion and then closed as quickly as possible. A number of suggestions were made for repurposing of the plants on closure.

Business consumers prioritised security of supply as one of the main reasons for using conventional plants to provide energy.

Some disagreed completely and want these plants phased out entirely in favor of renewable sources of energy production. Representatives from the energy sector generally agreed with the use of conventional power plants even while trying to reduce their use, again with the focus on maintaining security of supply.

A number of political parties responded and they appear to agree with moving away from using conventional plants as power generators in a short a time frame as possible.

Energy sector representatives had varying opinions on continued use of conventional power plants, some examples included:

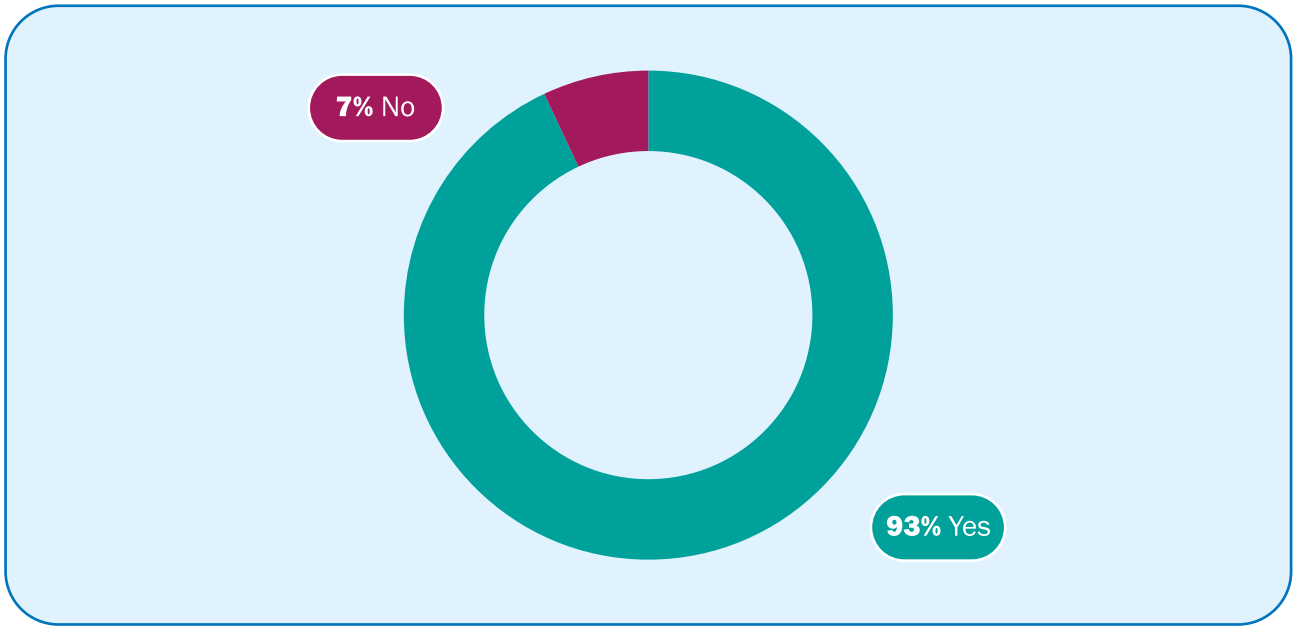
- Conventional power plants face challenges, but will still be required as part of the security of supply solution as the plans for future demand uncertainty driven by many variables, which include electrification of heat and transport, and circumstances whereby forecasted new generation does not materialise;
- A respondent disagreed with the statement that conventional generation plays an important role in the pathway to decarbonised energy and urged the government to show that it is fully committed to phasing out fossil fuels completely and to show that Net Zero by 2050 is achievable;
- Conventional power generation could help ensure generation adequacy in combination with decarbonised gas and a wider hydrogen economy, these developments were deemed to be critical by some to successfully deliver the Net Zero energy target and maintaining robust security of supply;
- Wind energy will be the main contributor to decarbonisation, both onshore and offshore, but for reasons of security of supply and network stability conventional generation will also be required, in a lesser but important way. These plants should be economically viable;
- Peak demand may outstrip renewable capacity in the near future so conventional plant will play a part and standby generation should be used to supplement the grid. Combined Heat and Power (CHP) and AD could provide a sustainable energy and heat source, but that infrastructure needs investment; and
- Existing conventional plant is what will enable the 2030 target to be met and is also required to cover extended periods of low wind beyond 2030. The energy market should remain unconstrained, and incentives and flexibility are key requirements for the future.

A variety of suggestions were made on what to do with conventional power plants once they cease to produce power from fossil fuels, including that:

- They become energy storage centres for hydrogen production and storage due to already having excellent connectivity to the grid. Stored hydrogen could be utilised to power turbines during lower renewable output;
- They are used for co-location of different renewable technologies;
- That gas turbine plants would be well placed to produce and inject hydrogen into the natural gas network due to links to existing infrastructure;
- That they can be used for large scale hydrogen production if located near to marine infrastructure; and
- That they could be repurposed to run on renewable sources.

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?



WHAT DID RESPONDENTS SAY?

In total, 122 out of 253 responses were received to this question in Citizen Space.

The policy options consultation set out the flexibility and efficiency in markets and networks created by interconnectors and the importance of the North South Interconnector. The question asked about whether further interconnection would be needed and whether a new revenue mechanism would be needed to deliver this.

Of those who expressed an opinion, **93% agreed that further interconnection will be needed in the future.** There was broad general support from respondents in relation to further interconnection. The benefits were expressed as enabling security of supply, assisting in balancing the system, and lowering carbon emissions and costs.

The North South Interconnector was seen as a priority and a key enabler for integrating additional renewables, improving security of supply, allowing the grid to operate on an All-Island basis and allowing NI to benefit from RoI's interconnection projects to GB and France. Respondents expressed frustration that this had not been delivered as of yet and hoped that lessons could be learned. Some concerns around interconnection were expressed such as that work to reinforce current grid infrastructure should be prioritised over building new infrastructure or that interconnection could lead to carbon leakage.

The North South Interconnector was seen by many respondents as a key enabler of renewables in NI that would reduce curtailment, congestion and dispatch down.

Two energy sector respondents noted that without the North South Interconnector it is unlikely that the 70% target can be met.

Respondents said that there is an economic case for greater interconnection as it allows export opportunities and can reduce prices in the wholesale electricity market. It was expressed that future interconnection should demonstrate that benefits outweigh the costs. One energy sector representative noted that east-west interconnection is not on its own sufficient to deliver generation adequacy; however, it reduces the capacity of indigenous dispatchable back-up generation required to ensure robust security of supply.

Many of those who answered yes to the question had queries regarding the current operation of the interconnectors. Respondents advocated concentrating on reinforcing existing grid infrastructure as a priority, ensuring that NI security of supply is not jeopardised, to review existing interconnection performance, to expand the capacity of the Moyle Interconnector in conjunction with National Grid, and ensuring that interconnection does not encourage carbon leakage or environmental degradation in other jurisdictions.

Respondents called on the TSOs in NI and RoI to carry out and publish analysis on future interconnection opportunities, including Multi-Purpose-Interconnectors, considering the potential for future offshore renewable projects and to set a target for further interconnection.

Regulation and coordination across jurisdictions was raised by a number of respondents as a barrier. Respondents stated that interconnection should be coordinated, both on an All-Island basis and via a UK-wide approach, with another noting that the Utility Regulator and Ofgem need to work together to coordinate the development of the interconnector regulatory framework between GB and NI.

Respondents were critical of the delays to the North South Interconnector project. Some energy sector representatives disputed that the lack of interconnection is due to funding constraint and stated that planning permission and consumer engagement is the barrier to development. They requested that DfE bring forward mechanisms to streamline and expedite the planning process for issues of critical national infrastructure.

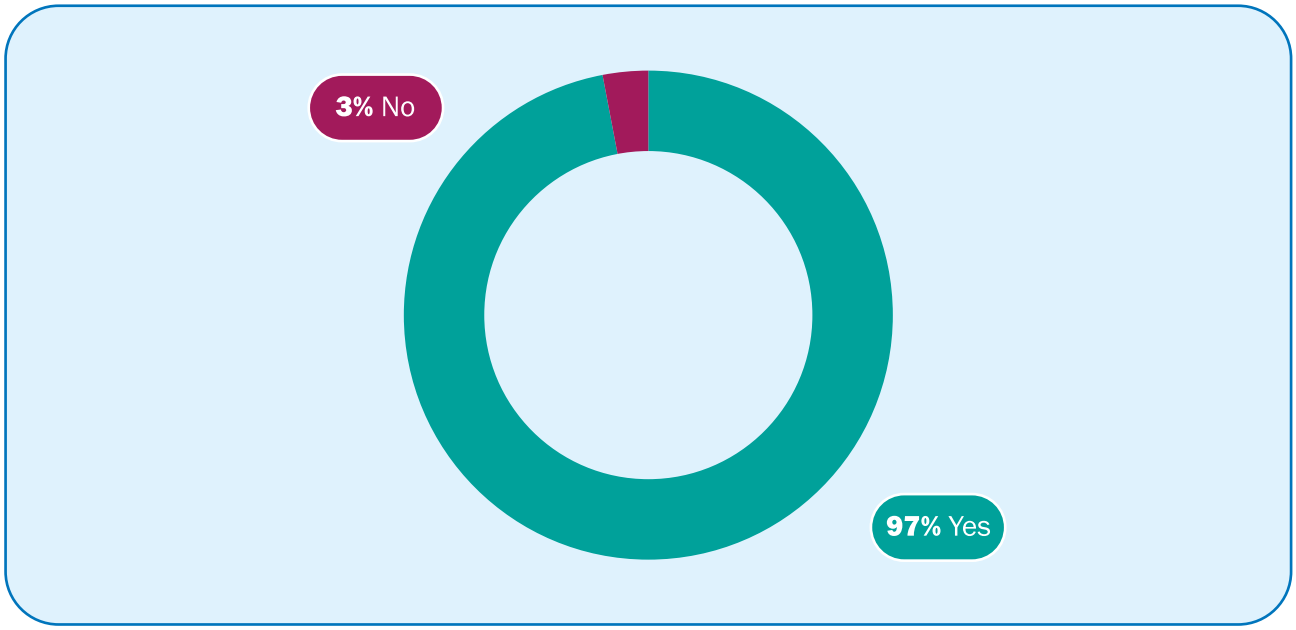
Many respondents had comments on the funding mechanism for interconnectors. Respondents expressed support for a number of funding mechanisms, including:

- The mutualisation model currently in place;
- A more equitable mutualisation model where those who benefit on both sides of the interconnector ought to contribute;
- A transmission system operator owned and operated link between NI and Scotland with full regulatory underpinning;
- Annual revenue stream or narrow banded cap-and-floor model; and
- Complete deregulation with investment guided by the market.

Respondents stated that the revenue streams should not distort the system services and capacity markets where interconnection is underpinned by the consumer, and that there should be transparency on costs. Respondents also stated that future interconnection should demonstrate that benefits outweigh the costs.

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.



WHAT DID RESPONDENTS SAY?

In total, 132 out of 254 responses were received to this question in Citizen Space.

The policy options consultation set out potential routes to having a power system based around flexibility to help achieve a decarbonised system at the lowest cost to consumer, whilst maintaining security of supply, including supply-side flexibility, storage and demand side flexibility. This question seeks to gauge the level of support for this approach.

The vast majority of those who responded to this question agreed that our power system should be based around flexible solutions to align demand and supply, with 97% in favour of this and only 3% disagreeing citing concerns around the levels of generation in NI and a need for conventional power. General feedback was that a range of solutions will be needed to achieve the best result as developments in electrification of transport and heat will lead to higher demand.

Storage

It is clear from stakeholders that storage is viewed as an essential part of a flexible network with a call for a bespoke policy to be developed for storage, covering the regulatory and legislative framework and including planning approval for storage facilities. Several types of storage were referenced including battery, pumped hydro, compressed air and deep geothermal, as well as maximising the hydrogen economy using the existing gas network for storage.

Smart Metering and Data

Good support evidenced for smart metering with stakeholders noting, in particular, the value of data (particularly half-hourly data), and the need for time of use tariffs to maximise the benefits of smart metering and smart grid.

Demand Side Management

Demand side technologies and management were noted as an important aspect of a flexible network with one stakeholder highlighting that demand side technologies currently provide flexibility services at a fair cost and without the need for large upfront investment, long planning times and additional grid network charges. Another response suggested that a future power system should be based on increased demand side participation, alongside flexible dispatchable back up generation, increased interconnection and roll out of energy storage. There was also a call for demand side support through a demand side policy plus incentives for domestic demand side.

Incentives

The need for financial incentives for these flexible solutions was a common theme across responses. Suggestions included:

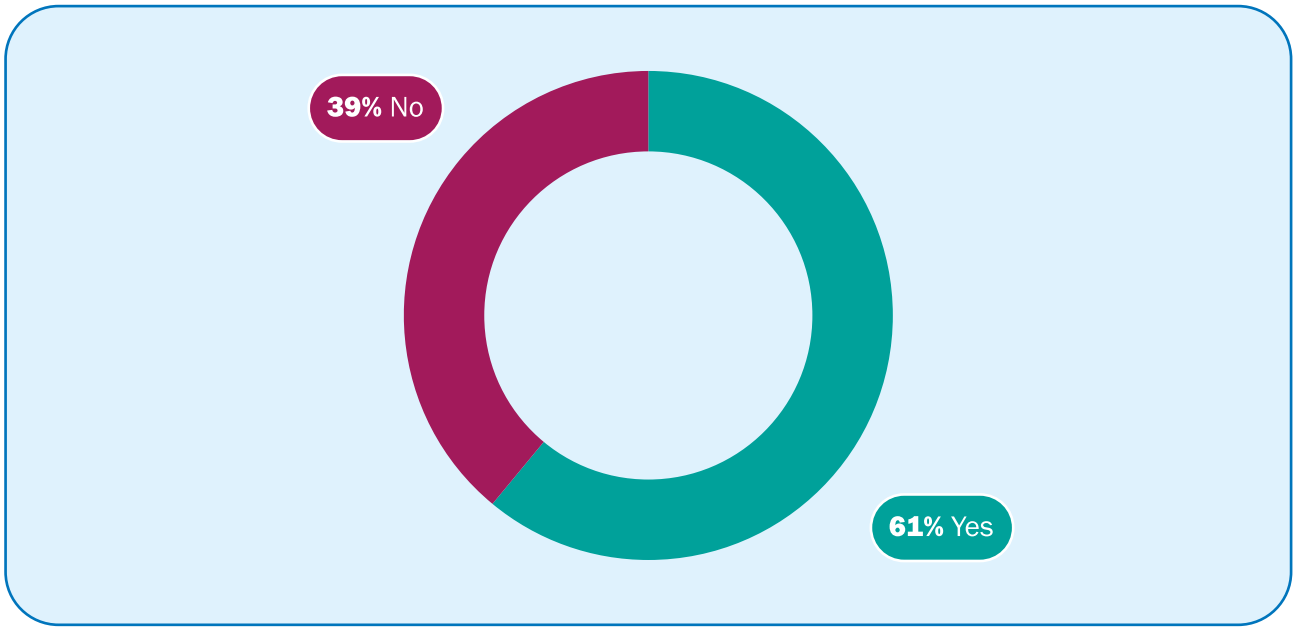
- Time of use tariffs to encourage uptake of energy through smart metering;
- Market / pricing signals needed for storage and demand side services to ensure incentives for consumers to respond to the signals and help support additional demand on system;
- Barriers to investment should be identified and eliminated as early as possible;
- High investment costs and volatile / unpredictable revenue were noted as barriers;
- Long-term contractual support mechanisms or early exit strategies for private investors could assist;
- Review of connection charging methodology needed; and
- Affordability of the system depends on large energy users being connected and using high levels of energy.

Network / Security of Supply

The role of flexibility in assuring security of supply was noted but it was also recognised that sufficient interconnection is essential. An ongoing role for conventional generation was mentioned, but it was suggested that a maximum level should be set and that this back up generation should be flexible. DS3 was highlighted as an example of addressing barriers to high renewables on the system.

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.



WHAT DID RESPONDENTS SAY?

In total, 92 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to develop a flexible and integrated energy system. Three central objectives were identified to achieve this, one of which was ensuring flexible markets and infrastructure that are necessary to facilitate an integrated energy system based around our power sector. There are currently two markets for generators in NI, the Single Electricity Market (SEM; the wholesale market), and DS3 (the system services market). This question aimed to understand the potential need for further market routes for the required infrastructure that will enable a flexible and integrated energy system.

Of those responding to the question, 61% agreed that SEM and DS3 offered sufficient market routes to support flexible technologies, and 39% disagreed. Among those who agreed that SEM and DS3 were sufficient there were respondents who suggested improvements to both, implying that SEM and DS3 could be adapted to offer sufficient market routes, rather than implementing alternative markets.

Those that disagreed that SEM and DS3 were sufficient suggested the following:

- Need to develop viable routes for smaller generators;
- Introduction of a local flexibility market for congestion management in the distribution network could provide an alternative market route for flexibility technologies;
- Peer-to-peer trading;
- Improvement of behind the meter technology;
- Development of micro-grids; and
- Introduction of smart tariffs.

There was significant agreement between both energy sector representatives and domestic energy consumers in stating that there needed to be routes for smaller participants. This includes micro-generators who should be further incentivised to install, generate and sell onto the grid. It was suggested that development of aggregation and energy storage could support smaller participants. Respondents considered the consultation to be lacking on these topics.

Energy sector representatives felt that the following technologies required alternative market routes, or better facilitation in current markets: electricity storage, the gas network, hydrogen, high voltage electrode boilers, negative generation, geothermal, demand response, combined heat and power generation, and flexible demand as an asset. Respondents also noted that the above could be more adequately catered for in both the SEM and DS3. One respondent stated that technical characteristics need more adequate description, while another asserted that current arrangements discriminate against demand response.

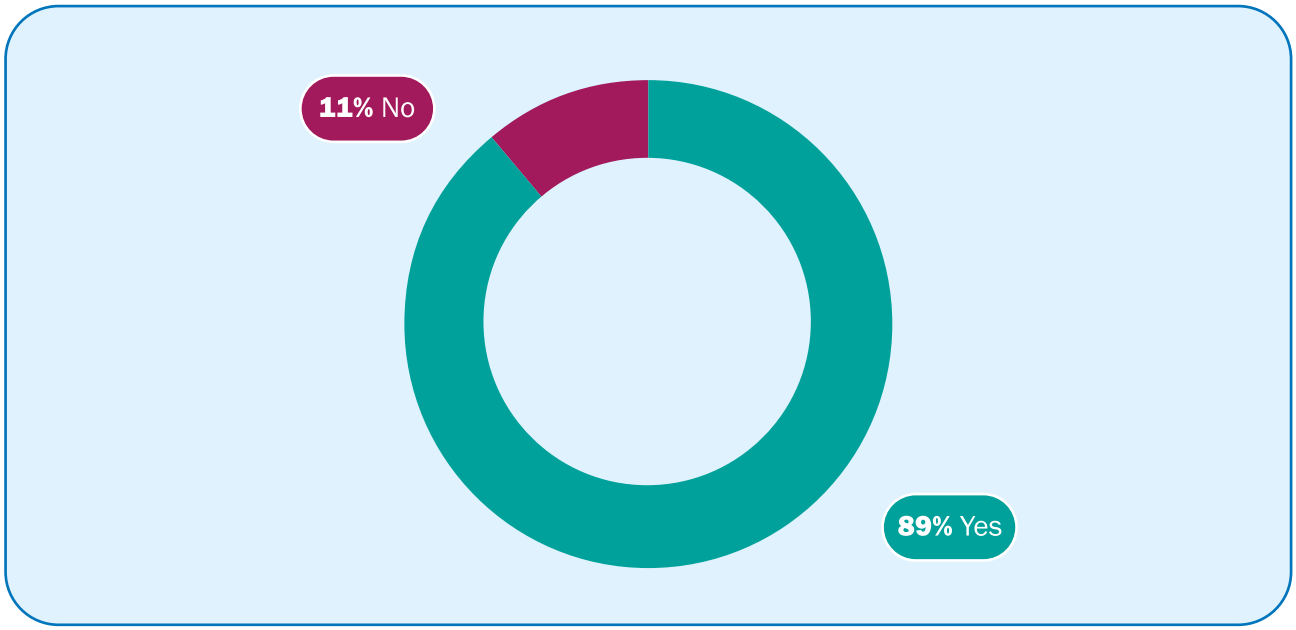
While the role of DS3 (as currently operating) in supporting achievement of 2020 targets was noted, respondents made the following points:

- It does not provide suitable routes to market for all type of technologies and all sizes of providers;
- It does not work for small generators and a route needs to be found for them to participate in the market;
- Budget caps set by the SEM committee should be reviewed to attract investment where needed to meet 2030 targets;
- It will need to evolve to accommodate emerging technologies;
- Congestion management at distribution level is equally important; and
- Investors need revenue certainty, so need to understand what supports will be available post 2023.

There were also recommendations regarding improvements that could be made in the SEM. Several respondents recommended that the capacity market be used as a way to support new investment in flexible and low carbon technologies. Spain was used as an example in terms of long-term capacity contracts, which will only be provided to zero emissions technologies.

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.



WHAT DID RESPONDENTS SAY?

In total, 122 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to carry out a review of consumer data to inform the development of a future policy framework that benefits consumers.

There was broad overall support for the proposed review of consumer data, with 89% of respondents who answered this question agreeing with the proposal, compared with 11% indicating they did not agree.

Domestic consumers supporting the review underscored the need for appropriate regulations and associated monitoring to ensure data is used for the purpose it is intended, for 'big' data to be harvested from multiple cross government agencies and departments, and to use open data that must be granular.

Respondents also noted the need for a competent body to provide the interface between meters in homes and businesses and energy supply companies, with the use of broadband connections, believing that better demand side management will lead to less curtailment of renewable energy. The facility to share data would bring multiple benefits to consumers and the network through tariff reforms and smart metering as a key enabler for domestic flexibility, peer-to-peer trading, and vehicle to grid. Furthermore, respondents noted that datasets would need to be close to real time, downloadable and usable by third parties (interoperability).

A small number of consumers are opposed to companies and systems accessing their data, giving the following reasons:

- Smart meters are expensive and not needed in a region as small as NI where renewable energy subsidies are paid out;
- Fear that personal data could be intercepted and robust data protection rules would not be in place; and
- Feeling that consumers are being monitored in their own homes.

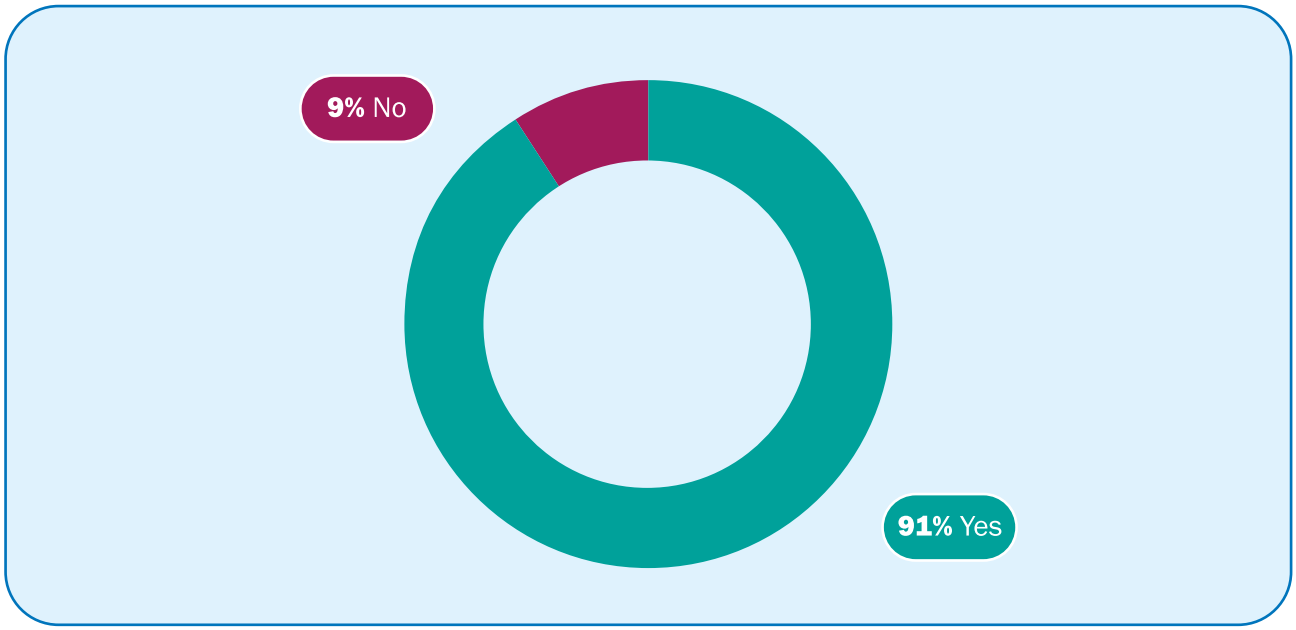
Business and energy sector respondents were supportive of a review of consumer data and the development of a new framework. They highlighted the need to ensure appropriate data protection regimes would look after consumers and ensure trust. Some highlighted the success of Open Banking in the UK allowing third party access to and the use of financial data, it was suggested this could be replicated for energy data. Data was cited as a powerful tool allowing industrial, commercial and domestic customers to understand their energy usage patterns and give them informed control to the benefit of everyone. In saying this, respondents noted that data must be used carefully, and should have a legal framework together with guidance on data provision and publication.

To gain real benefits from data, respondents encouraged the provision of smart meters or a tool to allow better data flows and demand shifting techniques such as pre-heating in buildings, storage availability, and smart vehicle charging to provide flexibility. One response suggested that 'real time' data would deliver financial benefits and in turn lead to improved energy efficiency.

Respondents noted that homes and businesses with online access to enhanced energy usage data could benefit from increased energy efficiency if it led to them changing behaviours. It was also suggested that analysing energy use data together with survey datasets from EPCs could help make investments in home energy upgrades more cost-effective, reducing the overall cost of decarbonisation.

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.



WHAT DID RESPONDENTS SAY?

In total, 105 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to assess how the recommendations of the Energy Data Taskforce could be applied in NI, ensuring that consumers and consumer representatives are involved in this work.

There was broad overall support from respondents that answered this question, with 91% agreeing with the proposal, compared with 9% indicating they did not agree. In general, the vast majority of respondents did not provide any detailed comment. This may be because this is a specialist subject area and, in the main, responses came from energy sector representatives.

Only one domestic consumer responded with detail to say that energy data can drive change and empower consumers and it would be important to capture relevant market data to create more innovative solutions.

Similarly, there was limited information from small businesses. Those that responded noted the high reliance on heating oil, Brexit, and the high rate of fuel poverty as issues in NI that are different to GB, suggesting that NI should adopt its own approach.

Energy sector representatives all commented positively on the taskforce recommendations being made applicable in NI, highlighting that:

- Unlocking value from data is key to delivering greater competition, driving innovation, services and business models, and producing a more efficient, cost-effective energy system;
- With demand for electricity expected to almost double, demand shifting techniques such as pre-heating in buildings, storage availability, smart vehicle charging and decision making informed by smart metering would provide flexibility and ensure optimised infrastructure;
- Tariff reforms and smart metering are key enablers for domestic flexibility, peer-to-peer trading, and vehicle to grid;
- An overall digitalisation strategy centralised on streamlining, consolidating and integrating data with a view to it being made more open and easier to use in the future is needed; and
- More information is required to better understand the challenges, complications, resource requirements and other learnings of implementing the recommendations in GB before setting off in NI and becoming a 'fast follower'.

Recognising the differences between the GB and NI energy market, respondents highlighted that:

- A roadmap will be essential with detail on the transition from where we are to the future vision, laying out the key actions, milestones and anticipated costs. This should fit with how data is captured, stored and transmitted using new technologies;
- A key difference between the NI and GB energy markets is that NI has only one Distribution Network Operator (DNO), NIE Networks, whereas GB has 14 DNOs;
- Current metering technology in NI means that the granularity of data from some meter points will differ from GB where smart meters are available;
- Any changes to the use of energy data would be more productive in an All-Island context; and
- A framework for innovation should be developed, setting out the regulatory / network approach to facilitating third parties in the innovation space.

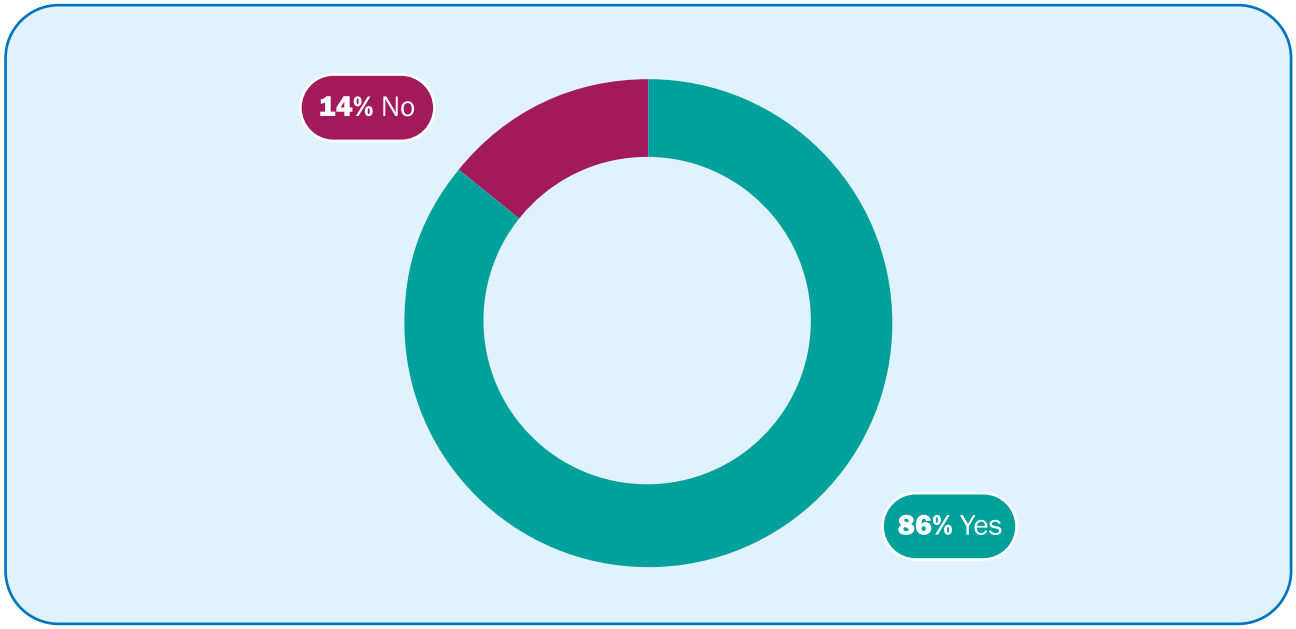
A stakeholder held the view that improved data could have benefits for fuel poor households, for example better understanding when they might self-disconnect and giving charities access to data to allow them to offer assistance.

In relation to security, energy sector representatives held the following views:

- Issues around data security, network security, cyber resilience and data privacy need to be considered;
- Review the cyber security status of other government departments and the current intention of Westminster / NHS Digital to share patient data, indicating consumers might need high levels of assurance before participating in any open energy system data platform;
- Detail on funding arrangements for data security, penalties for data breaches and the initial cost of designing and implementing data collection systems is needed; and
- Licence and / or legislative changes may be needed where consumers have not given consent to disclose information as it would be necessary to collect a specific amount of data.

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?



WHAT DID RESPONDENTS SAY?

In total, 120 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated our intention to conduct a Cost Benefit Analysis (CBA) of smart meters taking into account the broader benefits they can bring to consumers as an enabler of energy data and a smart system.

There was broad overall support from respondents to this question to take forward a CBA of smart meters, with 86% agreeing with the proposal, compared with 14% indicating they did not agree.

Domestic consumers supporting the CBA indicated the following:

- Government should provide subsidies and help explain how people can make more use of off-peak energy prices by using battery storage;
- Investigate the results available from the smart meter roll-out in GB;

- Incentivise consumers to use smart appliances that shed load when the frequency drops, or add load when it increases;
- Provide live pricing data; and
- Include smart controllers that do not require regular input from individual customers, e.g. the software ensures minimum costs and maximises use of renewable electricity.

The small number that disagreed with conducting a CBA were mainly domestic consumers who suggested that installation is expensive and they could already monitor energy efficiency at home.

Business consumers largely agreed with the wider concept of the CBA and indicated the following:

- Smart meters will not only inform and empower consumers, but also provide key data for balancing the system as more renewable energy enters the grid;
- Peer-to-peer networks could be considered; and
- Driving down the cost of smart meters and their installation is important. With robust data, consumption trends and analysis, consumers will be able to make informed decisions on new products they can either benefit from or sell into the market.

Energy sector respondents were largely supportive of the proposal for the CBA, highlighting the following views on potential items it should include:

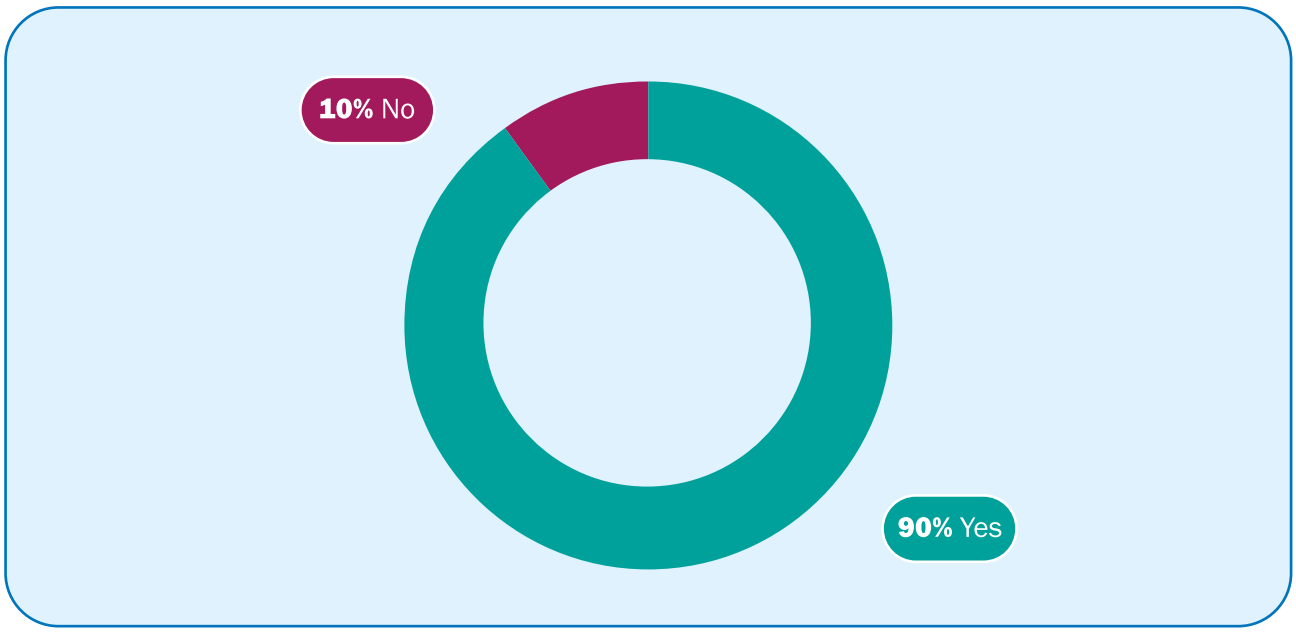
- Review of the supplier-led transition adopted in GB;
- Check broadband quality before deploying related technology;
- Measure the effect of better information (including outage and power quality data) which will act as a key enabler to future smart-cities and communities;
- Consider tariff benefits (including those distribution network influenced tariffs yet to be fully developed) by the retail and / or wholesale markets;
- Include reduced meter reading, enhanced prepayment, debt management, remote disconnection and electricity theft prevention and detection;
- Further deployment of renewables (heat pumps and EVs);
- Carbon emissions savings and household expenditure decreases;
- Examine the types of benefits that could be realised, for example NI's contribution to UK net zero targets, role in the transition to a green economy, and as a catalyst to decreasing fossil fuel consumption;
- Clarify how non-domestic consumers will benefit, particularly farms improving energy efficiency and reducing emissions;
- Consider consumers who cannot use smart meters;
- Data protection and privacy to be explored, e.g. codes of practice;
- Conduct a large scale pilot;
- Review smart grid services for water, energy, and gas under one sole connection service and deliver economies of scale; and
- Deliver targeted awareness campaigns to promote behavioural change and to persuade consumers to adopt new technologies.

The consultation asked if there might be alternative approaches. Stakeholders suggested the following:

- Consider how we can use disruptive technologies to deliver the required outcomes (e.g. GridDuck);
- Gather dynamic energy data deeper in the distribution network (e.g. at local substations);
- Improve existing keypad meters to allow data to flow back to the network operator; and
- Aggregation of residential demand flexibility requires revenue-class metering of sufficient granularity to demonstrate performance under the various markets (energy, capacity, system services, and grid congestion management). An alternative may be a more basic metering solution with the necessary settlement data to facilitate demand side flexibility.

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?



WHAT DID RESPONDENTS SAY?

In total, 126 out of 253 responses were received to this question in Citizen Space.

In the policy options consultation, we acknowledged the role that micro-generation could play in the energy transition but recognised that a range of measures would be needed in order to realise the benefits of this decentralised energy in a cost-effective way. It would mean that micro-generation be accompanied by smart technologies, aligning demand and supply as part of a flexible system.

Of those that responded to the question, 90% felt that financial support should be provided for micro-generation to increase the number of active consumers in NI, while 10% did not agree.

Reasons given for not supporting the provision of financial support for micro-generation to increase active participation included:

- Concerns with provision of financial support where the long-term benefits are uncertain;
- Need to improve the electricity grid so that existing micro-generation is utilised before any changes to micro-generation levels in NI; and
- Need to increase the number of prosumers (i.e. those generating to meet their own needs).

Domestic consumers in support of the proposed policy felt that some form of grant is required in order to assist with installation and maintenance of appropriate systems. There was a suggestion that if the grant aid provided is in the form of a loan, repayment of the loan could be made via selling excess electricity back to the grid.

A number of energy sector representatives felt that financial support should be provided and designed in a way that encourages efficiency and the adoption of smart and flexible technologies. Respondents felt that there are many support scheme models that could be adopted for use, including:

- Feed in Tariff and Smart Energy Guarantee Scheme in GB;
- Micro-generation Support Scheme in the RoI, with some suggesting that this initiative should be introduced in NI; and
- A support similar to Carbon Trust Loans could be put in place to support households in fuel poverty.

Other suggestions by energy sector representatives included that consideration be given to domestic CHP trials, whereby households would connect to the gas grid, develop their own energy, and receive a fair price selling excess renewable energy back to the grid. It was noted that the uptake of solar PV, EV, batteries and energy efficiency measures will require grant support, and that similar markets were thriving in RoI due to a capital grant scheme focusing on self-consumption. Some respondents stated that sustainability should be a key consideration, as should meaningful engagement with the consumers and those groups who represent their interests. Furthermore, respondents mentioned the importance financial support to stimulate the market, but the level of support for micro-generation should not affect the levels of support provided for other technologies. In order to stimulate the market, electricity suppliers should be encouraged to provide a range of tariff structures for consumers who do generate through micro-generation schemes; and that after a pre-set timescale this support should be phased out.

Domestic consumers in support of this proposal commented that:

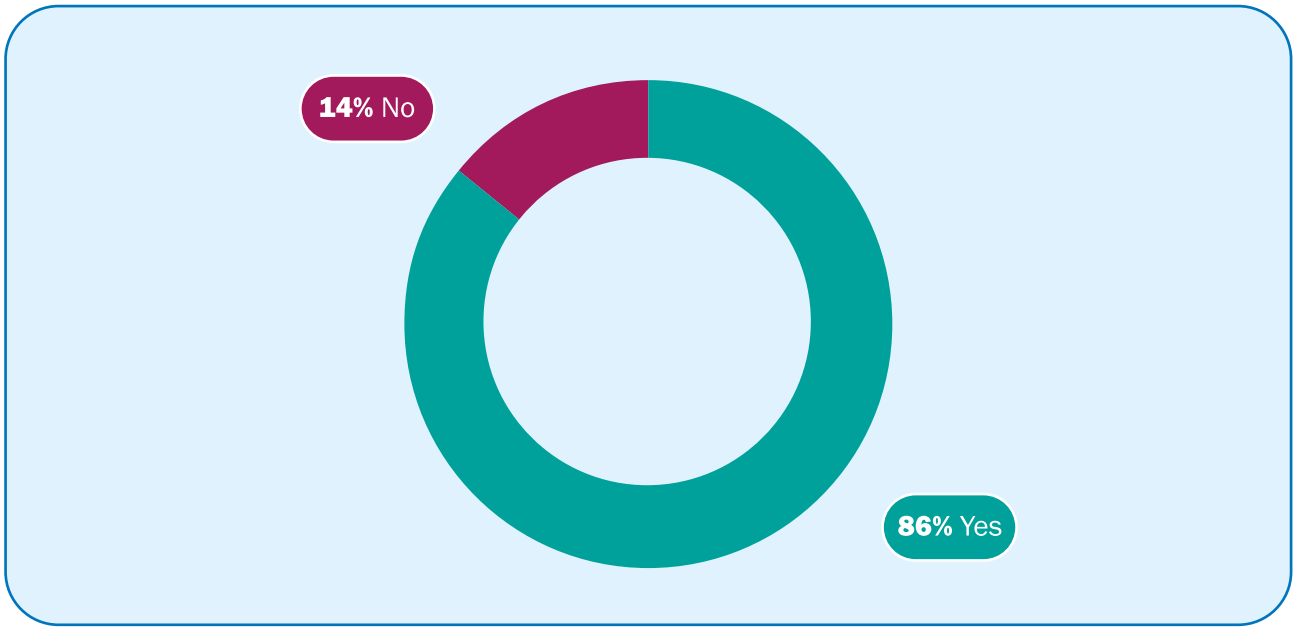
- Financial support would help the take up of renewable systems as many will be unable to take up these measures without some assistance; and
- The Feed in Tariff should be reintroduced, which provides a minimum 10 year guarantee to people considering installing a home solar PV system as this would incentivise more people to install micro-renewable energy which supports the grid.

Other comments were that a scheme will be needed to incentivise early adoption of small scale micro-generation, by paying producers for any electricity exported to the grid; and that payment rates could be varied to incentivise non-intermittent or ‘dispatchable’ renewable electricity generation such as dammed hydro-electricity, biomass or geothermal power. In addition, the support of micro-grids through grant aided funding should reduce the need for investment in grid infrastructure, and therefore should be supported by distribution stakeholders.

While respondents made it quite clear they are in favour of financial support being provided for micro-generation to increase the number of active consumers in NI, the need to run a successful scheme learning from past mistakes was raised as an important consideration.

Q75: DO YOU AGREE THAT NETWORK CHARGING WOULD NEED TO CHANGE IF THE ELECTRICITY SYSTEM BECOMES MORE DECENTRALISED?

IF SO, WHAT ARE THE PRINCIPLES THAT SHOULD BE ADOPTED IN DISTRIBUTING FUTURE NETWORK COSTS ACROSS CONSUMERS?



WHAT DID RESPONDENTS SAY?

In total, 109 out of 253 responses were received to this question in Citizen Space.

The policy options consultation asked for views on the need to undertake a review of network charging should the electricity system become more decentralised. We noted that the review would focus on ensuring that on-grid customers are not paying consumers who are less reliant on the grid (as they generate their own electricity), but still require access to the network for resilience and to sell energy they generate.

Of those responding, 86% agreed that network charging in a decentralised energy system will need to change. These respondents felt that costs should be distributed fairly across the system. Individuals from poorer communities should not be priced out of the market and opportunities should be made available to all.

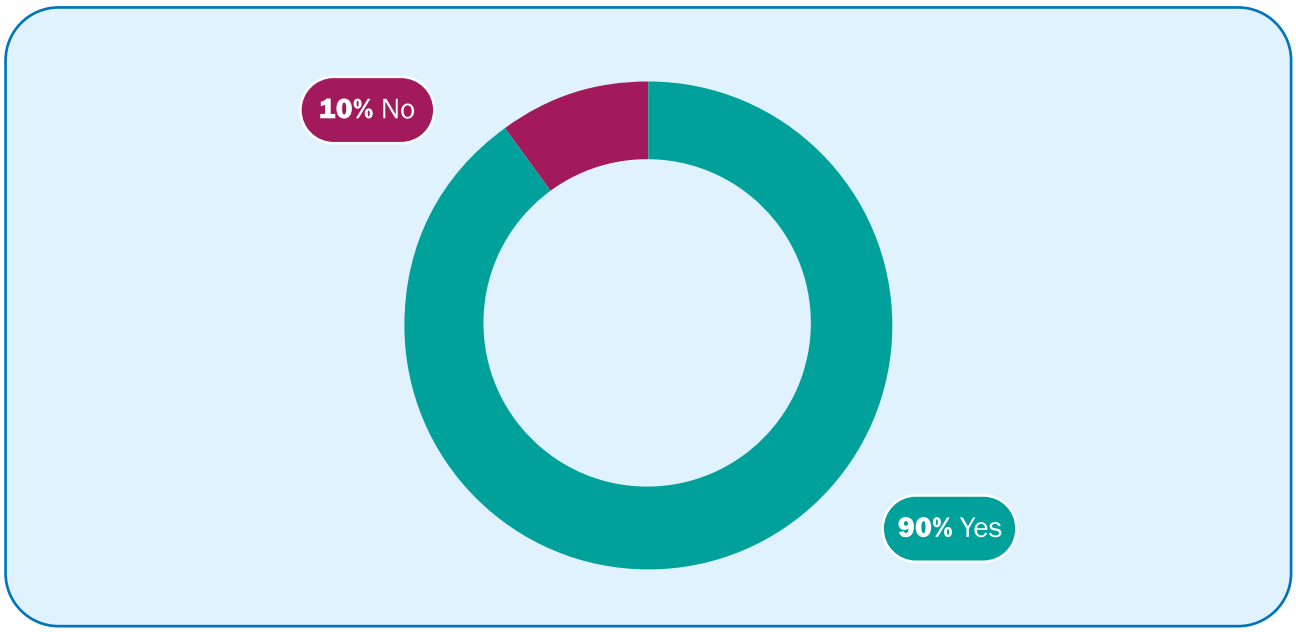
The main opinion was that network charging needs to be kept under review. Respondents noted that while there will be more self-generation, there will also be increased demand due to electrification of heat and transport. While affordability should be a key consideration, it was noted that consumers should not be placed at a significant disadvantage regarding costs, nor should any consumers (vulnerable or otherwise) be pushed into poverty regarding their bills. It was noted that network charging should be reviewed to ensure a fair cost recovery for all. References were also made to the need to ensure passive and vulnerable consumers do not pay a disproportionate amount of network costs as the use of the network changes to facilitate new low carbon technologies and decentralised energy.

Respondents felt that network charging in a decentralised energy system should change and noted the belief that it has been inequitable in the current system for some time. Those who held this view noted that a small number of monopolies dominate the system and benefit from the profits. It is felt that conditions and charging need to change to ensure that different types of users can compete on a level playing field.

Some detailed arguments were made in responses, including how both fixed and variable network costs are currently apportioned and their impacts on consumer bills. There were references to the impact of network costs on certain types of consumers and warnings of the consequences of policies that could incentivise consumers to go off-grid, and the subsequent impacts on other 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?



WHAT DID RESPONDENTS SAY?'

In total, 108 out of 253 responses were received to this question in Citizen Space.

In the policy options consultation, we noted that the relationship between suppliers and consumers is likely to change in a decentralised energy system as consumers become more active. As a result, we suggested that a new regulatory framework may be needed to protect consumers outside of the traditional supplier-consumer model and we asked what protection measures should be included.

The vast majority of respondents, 90%, believe that a new regulatory framework is needed to protect consumers who engage in decentralised arrangements, while 10% did not agree.

We asked those who answered yes to recommend consumer protection measures that should be considered as part of any new framework. The responses included the following:

- Ensuring consumers have adequate representation and an oversight role on regulatory and policy development;
- Introducing consumer redress arrangements that include minimum service standards and an effective complaints process;
- Providing price protection for small generators and passive consumers;

- Adopting a flexible approach that ensures the framework has the scope to define procedures, roles and responsibilities along with appropriate governance arrangements in respect of new products and energy services that enter the market;
- Operating codes of practice that market participants must comply with and that are subject to regulatory oversight and enforcement; and
- Introducing licencing or accreditation requirements for new market participants, such as third-party intermediaries.

Some respondents provided high-level analysis of the type of framework that they felt should be considered. The suggestions and comments included the following:

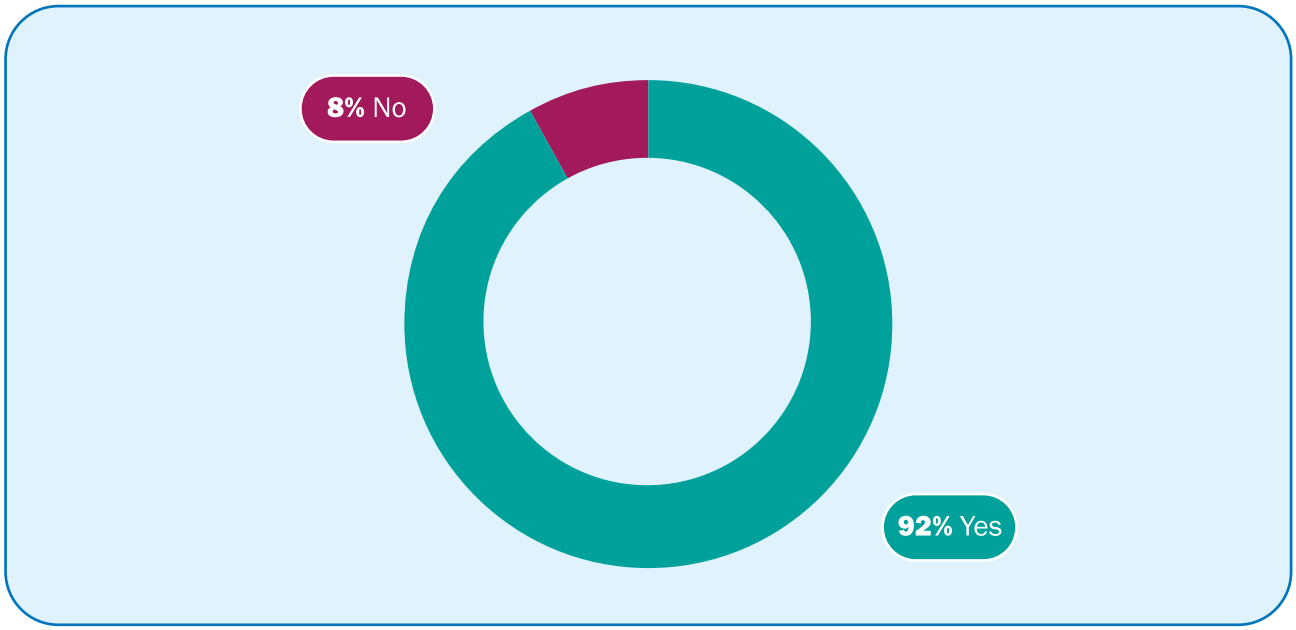
- Any framework should support a fair and competitive playing field whilst guaranteeing private companies have their incentives aligned with broader, long-term societal goals;
- The type of regulation should be proportionate and appropriate to the nature and scale of the decentralised arrangements, and the capability of each consumer group;
- The guiding principle of any new framework should be protecting consumers while encouraging innovation;
- Any new framework must be clear in what the specific aims, drivers and targets are for the different initiatives and activities in terms of reduced CO_2 emissions, increased renewable energy, lower energy costs, etc., in order to provide clarity to consumers and industry;
- There may not be a 'one-size-fits-all' solution to ensuring consumer protection due to the wide range of activities that may fall under decentralised arrangements;
- Guidelines of best practice and / or codes of practice could be utilised to provide a minimum level of consumer protection;
- The primary objectives of any framework should be to achieve a fair outcome for all consumers in terms of price and service, with special focus on the most vulnerable; and
- The current regulatory framework, specifically the statutory duties and licencing regime, is not fit for purpose in the context of the energy transition. The statutory duties of the Utility Regulator do not cover the range of other participants active in the electricity market, and this is likely to increase significantly under the energy transition goals.

Of those respondents that did not agree a new regulatory framework is needed to protect consumers who engage in decentralised arrangements, the main reasons were that:

- There may be a need to know how the framework will develop before we try to regulate this; and
- Competition within this market is already there.

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?



WHAT DID RESPONDENTS SAY?

In total, 129 out of 253 stakeholders (51%) responded to this question on Citizen Space.

In the policy options consultation, we stated our intention to develop a policy framework for community energy and asked what role stakeholders thought energy communities should play in the transition. Furthermore, we asked stakeholders to tell us what support is needed for energy communities, or what alternatives are required.

The vast majority of respondents supported these measures with 92% in favour, compared with 8% who said they did not agree.

Respondents in support of energy communities highlighted the benefits this could bring to NI noting that it encouraged active participation, would give communities more control over their energy and could benefit the energy system (e.g. provide system services and reduce network costs). Stakeholders noted that NI is behind other jurisdictions and many responses encouraged the department to look at examples in these jurisdictions, in particular the Community and Renewable Energy Scheme (CARES) established in Scotland. The need for any renewable support scheme to include community energy projects was noted. Finally, a number of respondents encouraged the department to:

- Provide support for a 'Community Energy Enterprise Programme' for the lifespan of the Energy Strategy;
- Develop financial mechanisms to secure and support the growth of community owned renewable energy production; and
- Promote interdepartmental support and policy alignment to facilitate the growth of community energy enterprises and initiatives.

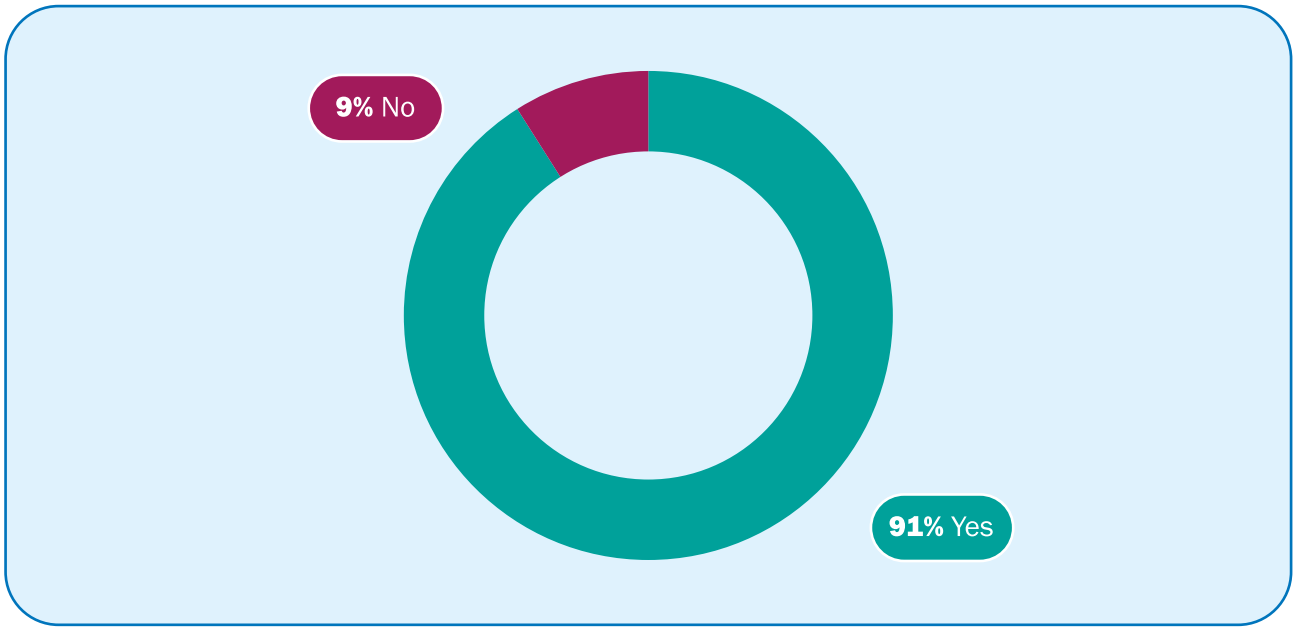
Those who supported citizen energy communities as an element of the energy transition identified the following support measures:

- Adopting a community energy definition;
- Introducing a legislative framework;
- Delivering policy support;
- Developing a supporting investment strategy;
- Setting up a NI community energy development body;
- Identifying and implementing revenue mechanisms to improve the economic feasibility of local projects (feed in tariffs, Renewable Obligation Certificates, Power Purchase Agreement);
- Having access to specialist information, support and finance;
- Providing capability training for communities;
- Learning from Energy Scotland, CARES, SEAI and examples of energy communities in other jurisdictions;
- Maximising local council support;
- Reviewing connections process; and
- Exploring the benefits of the Social Enterprise model.

Respondents that indicated they did not support the proposed approach stated that there is no alternative option because the development of citizen energy communities is a legal requirement. In addition, respondents encouraged the department to be more ambitious in its approach (e.g. setting targets, developing financial mechanisms for community owned energy).

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?



WHAT DID RESPONDENTS SAY?

In total, 137 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we stated that the potential of geothermal energy should be explored further and asked what applications there are in NI. We explained that initial work had started on understanding the implications of heat networks more broadly for our legislative and regulatory frameworks.

There is wide support for further exploration of geothermal energy, with 91% of the 137 respondents agreeing with the proposal.

A number of responses were received from organisations and individuals with expertise in geothermal energy. They stated NI is geologically well suited to develop geothermal energy; the Sherwood sandstone formation under Greater Belfast was specifically mentioned. Respondents noted that deep geothermal could be used for district heating, while shallow geothermal may be more suitable for building heating and cooling or for buildings without access to the gas network. Several responses also suggested the benefits of geothermal energy to the commercial and agricultural sectors.

Many agreed that despite initial geothermal research indicating potential, further research involving trials and pilot schemes should be carried out. Mention was made for the need for appropriate regulation, the potential for 'lighter touch' regulation to encourage geothermal development was also mentioned. One energy representative organisation highlighted the need for further research into the impacts of shallow geothermal energy on groundwater and freshwater ecosystems.

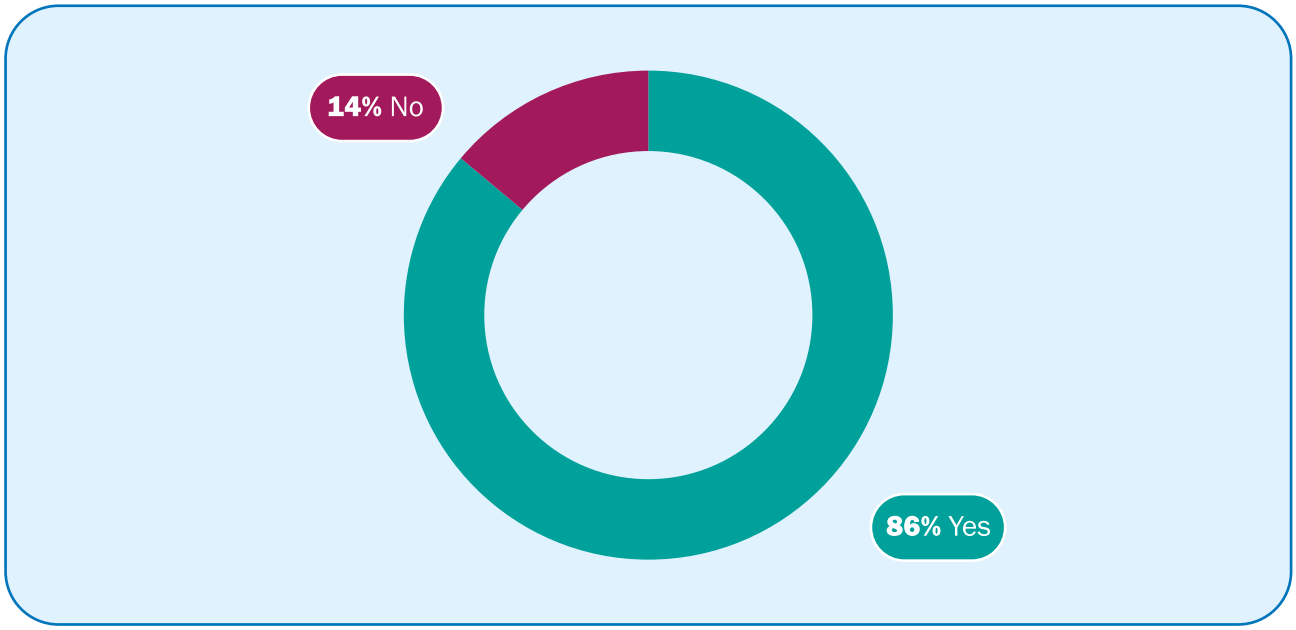
All business sector respondents were supportive of the proposal, commenting that geothermal energy has a part to play in NI's future energy mix. However, it was noted that further research is needed to establish its viability and cost implications before bringing to market.

Similarly all energy sector respondents supported the proposal highlighting that geothermal energy is a renewable resource and that there is potential for both deep and shallow geothermal in NI. Comments included that geothermal energy has a number of benefits in that it is renewable, predictable, controllable and is capable of providing a wide array of system services similar to those provided by more carbon intensive fossil fuel power generation.

Some respondents noted that the cost of geothermal energy needed to be better understood. One energy sector respondent suggested that geothermal was a renewable resource capable of supporting energy generation and therefore should be further explored. In addition, this respondent highlighted that the costs of delivering this energy would be reasonable over the medium to long-term, and that the use of the resource should be supported by a legislative and regulatory framework to enable use of such natural resources in NI.

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?



WHAT DID RESPONDENTS SAY?

In total, 145 out of 253 responses were received to this question in Citizen Space.

Within the policy options consultation document, we proposed that further trials of local heat networks are carried out and that government support for such trials would be needed due to the high cost of heat networks. The trials could potentially use geothermal energy, waste heat and / or biomass.

Overall, 86% of stakeholders responding to this question supported further trials of heat networks.

Common responses from those in support were that heat networks are an efficient means to provide heating, particularly in more densely populated areas. Some (including local councils) called for the development of a NI heat map to determine where heat networks would be best placed.

Of the 14% that did not support trials reasons given were that they are unnecessary, as heat networks are already a mature technology that is tried and tested in GB, the EU and elsewhere. A small number of respondents highlighted the limited success of previous heat networks in NI and the negative attitude some consumers may have to a shared heating system.

Responses from domestic consumers recognised that heat networks are underutilised in NI and rather than undertaking trials the focus should be on demonstrating the effectiveness of heat networks in making decarbonised heat solutions affordable and efficient, and that the trials should focus on measuring energy efficiency and carbon emissions. Some respondents suggested that heat networks would be suitable for localised, potentially rural, housing developments.

Energy Sector respondents highlighted that whilst heat networks have a role to play, particularly in areas where costs to upgrade or extend existing centralised energy infrastructure are prohibitive, or there is an abundance of waste heat, careful consideration is required regarding the scale of investment sought in this area. A few respondents noted that it may be appropriate for limited financial support to be provided to perform feasibility studies and limited trials. All the responses from the fuel sector suggested that heat networks may be most effective in new housing developments rather than in a retrofit situation.

Responses from local councils were supportive of heat network trials, particularly on different scales and with varying heat sources. They also suggested a number of points that should be considered going forward including:

- Need for more information to support decision making, such as a heat map;
- Development of long-term planning policies to support heat networks, particularly with a view to connect new housing developments to those networks;
- Regulatory change, to understand the technical and commercial elements needed to deliver heat networks;
- Awareness raising of potential savings and feasibility studies required in order to mobilise projects; and
- Use of geothermal energy for local heat network trials.

Appendix 1: Breakdown of Respondents by Question

No.		Question	Answered	Yes	No	Not Answered	Yes (%)
1		Do you agree with the overall goal of achieving net zero carbon energy no later than 2050?	210	191	19	43	91%
2		Do you agree with the proposed vision of "net zero carbon and affordable energy" for the Energy Strategy?	203	179	24	50	88%
3		Do the five principles identified provide clear direction around the approach that we want to take with the Energy Strategy?	203	181	22	50	89%
4		Are there any key delivery priorities for the Energy Strategy not captured?	184	104	80	69	N/A
5		Do our proposed indicators adequately allow us to measure success at achieving the proposed Energy Strategy outcome?					
	a	Carbon emissions from energy-related sectors	153	130	23	100	85%
	b	Jobs and turnover in the low carbon and renewable energy economy	152	123	29	101	81%
	c	Domestic energy costs relative to household income	155	124	31	98	80%
	d	Business energy purchases relative to turnover	149	114	35	104	77%
	e	Households in fuel poverty	153	125	28	100	82%
	f	Relative electricity & gas prices	155	116	39	98	75%
6		Do you think there are significantly different illustrative scenarios which should be developed?	159	81	78	94	N/A
7		Do you agree with the four consumer population groups we have identified?					
	a	Domestic consumers living with more vulnerable circumstances	158	146	12	95	92%
	b	Other domestic consumers	158	146	12	95	92%
	c	Small business consumers	159	145	14	94	91%
	d	Larger business consumers	160	145	15	93	91%
8		Do you agree with the five measures identified to "enable and protect" consumers?	160	122	38	93	76%
9		Do you agree with the proposed scope of the "one stop shop"? Please outline below any different activities you think should be included.	162	144	18	91	89%
10		Which approach do you think should be taken to create this organisation?	137	N/A	N/A	116	N/A
11		Do you believe that additional financial assistance to protect certain groups of consumers should be introduced?	145	133	12	108	92%

No.		Question	Answered	Yes	No	Not Answered	Yes (%)
12		Do you agree with the four identified priority clean energy sectors:					
	a	Energy efficiency	172	167	5	81	97%
	b	Renewable energy	171	166	5	82	97%
	c	Hydrogen economy	169	133	36	84	79%
	d	Circular economy	171	160	11	82	94%
13		Do you agree with the economic growth opportunities identified within energy efficiency?	153	141	12	100	92%
14		Do you agree with the economic growth opportunities identified within renewable energy?	162	142	20	91	88%
15		Do you agree with the economic growth opportunities identified for hydrogen production, demand and manufacturing within the hydrogen economy?	150	113	37	103	75%
16		Do you agree with underpinning principles identified within the circular economy?	154	146	8	99	95%
17		Do you agree that we should develop a green innovation challenge fund?	161	150	11	92	93%
18		Do you believe that we should work with the NI Utility Regulator to review how energy regulation can facilitate a green recovery and green innovation?	157	147	10	96	94%
19		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?	144	132	12	109	92%
20		Do you believe that utilising and tailoring existing education and training routes can meet the short-term skills needs of the clean energy sector?	148	126	22	105	85%
21		Do you agree with the proposal to establish an Energy Skills Forum to shape the future skills needs of clean energy sector?	146	135	11	107	92%
22		Do you believe that there is a need for specific measures aimed at ensuring a just transition in NI?	147	129	18	106	88%
23		Do you agree that an energy savings target should be set for NI?	167	158	9	86	95%
24		Do you agree that Minimum Energy Efficiency Standards should be set to drive improvements in energy efficiency?	155	147	8	98	95%
25		Do you agree with the general scale and proposed pace of change outlined in the five phase plan for building regulations?	135	78	57	118	58%
26		Do you think that we should seek to explore how the rates system can be used to encourage energy efficiency?	140	110	30	113	79%
27		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?	145	129	16	108	89%

No.		Question	Answered	Yes	No	Not Answered	Yes (%)
28		Do you agree that we should ring-fence the Public Service Obligation (PSO) funding for vulnerable consumers, including the fuel poor?	126	104	22	127	83%
29		Do you believe that green private finance solutions have a role to play in supporting domestic consumers to invest in energy efficiency?	135	114	21	118	84%
30		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?	133	115	18	120	86%
31		Do you believe that green private finance solutions have a role to play in supporting non-domestic consumers to invest in energy efficiency?	128	107	21	125	84%
32		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?	144	137	7	109	95%
33		Do you agree that information, awareness and behavioural change should be a key strand of future energy efficiency support?	151	141	10	102	93%
34		What measures do you think can have the most impact on changing behaviours to change how we travel and reduce private vehicles?	N/A	N/A	N/A	N/A	N/A
35		Do you agree with setting a 70% renewable electricity target by 2030, whilst retaining the flexibility to increase this to 80%?	169	140	29	84	83%
36		Do you agree with the criteria identified that would allow us to consider any future increases in the renewable electricity target?					
	a	Projects can be delivered in a cost-effective manner	142	124	18	111	87%
	b	Offshore wind can be delivered by 2030	141	112	29	112	79%
	c	Storage technologies can minimise system curtailment of renewables	142	126	16	111	89%
	d	Greater clarity on electricity demand for heating and transport	142	131	11	111	92%
	e	Consumers' bills are not disproportionately impacted	140	120	20	113	86%
37		Do you agree that we should explore with the Department for Business, Energy and Industrial Strategy (BEIS) the possibility of extending the Contracts for Difference scheme to NI?	143	131	12	110	92%
38		Do you believe it is possible that an offshore wind project in NI could be operational before 2030?	132	96	36	121	73%
39		Do you believe that a fixed platform offshore wind project should be targeted to be part of the renewable generation mix?	119	90	29	134	76%
40		Do you believe that floating platform offshore wind offers the best long term opportunities for offshore wind in NI's waters?	110	79	31	143	72%

No.	Question	Answered	Yes	No	Not Answered	Yes (%)
41	Do you believe that other marine renewables can play a key role in our renewable generation mix?	121	102	19	132	84%
42	Do you agree that a strategic approach to planning the location of renewable projects should be taken?	144	135	9	109	94%
43	Do you believe that there should be a requirement for renewable developers to share some of the financial benefits of developments with local communities?	141	115	26	112	82%
44	Do you agree with taking separate approaches to on gas grid and off gas grid consumers?	158	137	21	95	87%
45	Do you agree that we should not rule out potential low and zero carbon heat solutions at this stage?	168	154	14	85	92%
46	What low and zero carbon heat solutions do you believe we should prioritise for trials?	144	N/A	N/A	109	N/A
47	Do you believe that the role of heat pumps will be different depending on whether consumers are on or off the gas grid?	150	95	55	103	63%
48	Do you agree that NI should develop a pilot grant scheme to support low carbon heat technologies for domestic and small non-domestic consumers?	161	149	12	92	93%
49 a	Do you agree that legislative and regulatory steps should be taken to facilitate biomethane injection into the gas network?	132	107	25	121	81%
49 b	If so, do you believe that a support scheme should be put in place to incentivise green gas production?	110	91	19	143	83%
50	Do you believe that support should be provided to encourage biomethane production for injection into the gas network?	128	101	27	125	79%
51	Do you agree that the local Gas Network Operators should develop and publish a plan to decarbonise gas out to 2050?	159	141	18	94	89%
52	Do you believe that on gas grid consumers should have the option to retain oil boilers for use with biofuels?	143	85	58	110	N/A
53	Do you believe that off gas grid consumers should have the option to retain oil boilers for use with biofuels?	141	105	36	112	74%
54	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?	139	114	25	114	82%
55	Do you believe that support should be introduced to promote the uptake of biomass for off-grid consumers?	122	81	41	131	66%
56 a	Do you believe that the sale of coal and wet wood should be banned in NI?	136	94	42	117	69%
56 b	If so, do you believe this should be extended to include other solid fuels with the exception of kiln dried wood?	100	73	27	153	73%

No.	Question	Answered	Yes	No	Not Answered	Yes (%)
57	Do you agree that we should develop a NI 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?	155	146	9	98	94%
58	Do you agree that an EV communication campaign should be run in NI?	144	122	22	109	85%
59	Do you agree that the private sector and local government have a key role to play in developing EV infrastructure?	138	132	6	115	96%
60	Do you agree that we should develop an EV Charging Infrastructure Plan in collaboration with public and private partners?	141	132	9	112	94%
61	Do you agree that public sector contracts can be a key driver for developing technologies and markets for alternative fuel vehicles?	136	121	15	117	89%
62	Do you agree that collaborative research will be important to demonstrate alternative fuels?	113	105	8	140	93%
63	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?	121	75	46	132	62%
64	Do you believe that Carbon Capture Use and Storage can play a role in NI?	116	88	28	137	76%
65	Do you believe that our approach to petroleum licensing should change in line with our commitment to decarbonise energy?	115	99	16	138	86%
66	Do you agree that the Electricity Network Operators should provide a pathway to creating a flexible and integrated energy system?	143	137	6	110	96%
67	Do you agree that conventional power generation can play an important role in the pathway to decarbonised energy?	130	104	26	123	80%
68	Do you believe that further interconnection will be needed in the future?	122	114	8	131	93%
69	Do you agree that our power system should be based around flexible solutions to align demand and supply?	132	128	4	121	97%
70	Do you believe that the SEM and DS3 offer sufficient market routes to support the deployment of flexible technologies for generators of all sizes?	92	56	36	161	61%
71	Do you agree that a policy framework should be put in place to enhance access to and use of consumer data?	122	108	14	131	89%
72	Do you believe that we should take forward the Energy Data Taskforce recommendations in NI?	105	96	9	148	91%
73	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?	120	103	17	133	86%

No.	Question	Answered	Yes	No	Not Answered	Yes (%)
74	Do you believe that financial support should be provided for micro-generation to increase the number of active consumers in NI?	126	113	13	127	90%
75	Do you agree that network charging would need to change if the electricity system becomes more decentralised?	109	94	15	144	86%
76	Do you agree that a new regulatory framework is needed to protect consumers who engage in decentralised arrangements?	108	97	11	145	90%
77	Do you believe that energy communities have a role to play as part of the energy transition?	129	119	10	124	92%
78	Do you agree that the potential of geothermal energy should be further explored, supported by a legislative and regulatory framework?	137	124	13	116	91%
79	Do you agree that further trials of heat networks should be carried out?	145	124	21	108	86%