Sectoral Emissions Ceilings

Q4: What do you view as the key actions required to ensure the emission reduction targets set out in the Sectoral Emission Ceilings are met?

[redacted] Gas Networks Ireland:

While Ireland's Programme for Government(1) sets out a commitment to reduce overall greenhouse gas emissions by 7% p.a. from 2021 to 2030, with the aim of achieving net-zero emissions by 2050, the latest report from the EPA(2) indicates that:

- Ireland's greenhouse gas emissions have increased by 4.7% in 2021 (compared to 2020 figures);
- By the end of 2021 almost a quarter of Ireland's Carbon Budget for the 5-year period 2021-2025 has already been used, requiring an 8.4% average emissions reduction from 2022-2025 to stay within budget.

Gas Networks Ireland believes that new actions are required in Climate Action Plan (CAP) 2023 to accelerate efforts to ensure emission reduction targets are met.

As part of Ireland's carbon budget programme, sectoral emissions ceilings have now been set for the electricity, transport, buildings, industry and agriculture sectors, with reductions in emissions ranging from 25% to 75% per sector by 2030, relative to 2018 emission levels(3). In addition, the agreement reached on sectoral emissions ceilings also commits additional resources for solar (more than doubling the target to 5,500 MW), off-shore wind (moving from a target of 5,000 MW to 7,000 MW), green hydrogen (an additional 2 GWs of dedicated offshore wind), agri-forestry and anaerobic digestion (up to 5.7 TWh of biomethane), in order to further accelerate the reduction of overall economy-wide emissions. Displacing natural gas with this volume of green hydrogen produced from offshore wind would remove around one million tonnes of CO2 equivalent from Ireland's national emissions annually, which equates to the emissions reduction achieved by removing roughly half a million cars off Irish roads(4). According to a report from the EPA(5), Ireland's 2021 greenhouse gas emissions amounted to 61.4MtCO2 equivalent.

Gas Networks Ireland believes that renewable gas-related 'Further' measures identified in CAP 2021, including deploying zero-emissions gases such as biomethane and green hydrogen, must now be included as 'Core' measures, if we are to achieve our 2030 and 2050 emissions reduction targets, while simultaneously addressing our current dependency on imported fossil fuels. Delivering on these increased biomethane and green hydrogen targets could help Ireland significantly reduce emissions from several sectors, including electricity generation, enterprise, transport and buildings.

While the announcement of the 2GWs of dedicated offshore wind is welcome and would produce c. 5.2 TWh of green hydrogen per annum by 2030, we set out below potential higher targets for green hydrogen production which can be injected into the gas network to support the decarbonisation of multiple sectors of the economy.

- Low Demand – as these sectoral emissions targets do not meet the 51% reduction required, this 2GW offshore wind for green hydrogen ambition could be seen as a low demand target.

- Medium Demand – if Ireland could deliver its fair share of the EU's REPowerEU target by 2030 this would equate to c.17% of gas demand or c.9.75 TWh.
- High Demand – a 20% target (blending limit) would equate to c.11.5 TWh which could be seen as a high demand target in 2030.(6)

Key to realising these targets within this timeframe will be the development of support schemes to incentivise the production and use of both biomethane and green hydrogen. Failure to implement these schemes in a timely manner will likely result in Ireland missing its sectoral emissions targets across a range of sectors.

Reference:

1. Programme for Government https://assets.gov.ie/130911/fe93e24e-dfe0-40ff-9934-def2b44b7b52.pdf

2. https://www.epa.ie/news-releases/news-releases-2022/epa-data-shows-irelands-2021-greenhouse-gas-emissions-above-pre-covid-levels.php#:~:text=The%20Environmental%20Protection%20Agency%20(EPA,a%20significant%20lowering%20of%20emissions

3. https://www.gov.ie/en/press-release/dab6d-government-announces-sectoral-emissions-ceilings-setting-ireland-on-a-pathway-to-turn-the-tide-on-climate-change/

4. Natural gas is responsible for c. 15% (or c. 9MtCO2 equivalent) of Ireland's emissions.

5. https://www.epa.ie/news-releases/news-releases-2022/epa-data-shows-irelands-2021-greenhouse-gas-emissions-above-pre-covid-levels.php

6. The Northern Ireland 'Path to Net-Zero Energy' strategy identifies in its scenarios the need for c.20% of its energy to come from hydrogen by 2050.

Q5: What do you view as the main challenges/obstacles to the Sectoral Emission Ceilings being met?

[redacted], Gas Networks Ireland:

If clear timelines, targets and appropriate support mechanisms for renewable gases are not deployed in a timely manner, it will be incredibly challenging, if almost impossible to meet these sectoral emissions targets (noting Ireland is already behind where we need to be). Whilst there is significant upstream interest in the development of renewable gases to inject onto the gas network, such projects also need to be financeable and so policy support will form a key part of bringing this ambition to fruition.

The rapid deployment of renewable gases, including biomethane and green hydrogen must take place in addition to, not instead of, increased renewable generation capacity and the associated continued electrification of large sections of the economy, to enable Ireland to meet its decarbonisation ambition. As set out in the CAP 2021, both Core Measures and Further Measures are required to meet targets.

Focus needs to be on laying the groundwork now for how we can achieve net-zero, in addition to decarbonisation actions needed on a 5-year carbon budget cycle.

Carbon Pricing & Cross-Cutting Policies

Q6: Are there any unintended barriers within the planning system that should be addressed at national policy level in order to deliver our climate ambitions?

[redacted]Gas Networks Ireland:

Renewable gas produced from Anaerobic Digestion (AD) can support Objectives 23, 53 and 55 of the National Planning Framework. These relate to the development of the rural economy in a sustainable way, supporting the circular economy/bio-economy and promoting renewable energy generation and use. Consideration of zoning areas for AD production and issuing planning guidelines would help to accelerate the development of AD plants. Guidelines would ensure a consistency of approach throughout the country in the identification of suitable locations for AD development and the treatment of planning applications for such projects. This would provide clarity and transparency and should be of assistance to producers and the wider public in considering AD development.

Q7: What further opportunities exist within our taxation system, beyond measures already implemented and planned, to promote emissions reductions, either on an economy-wide basis, or in specific sectors?

[redacted] Gas Networks Ireland:

Decarbonising the gas network is a cost effective, at scale opportunity to reduce emissions and enhance energy security. In May 2022 the EU announced details of its REPowerEU Plan, to reduce European dependence on Russian fossil fuels. The Plan(7) has doubled the target for biomethane, from 17bcm to 35bcm by 2030 (compared to the Fit for 55 target) and has quadrupled the target for green hydrogen from 5.7Mt to 20Mt by 2030, with 10Mt being produced indigenously within the EU and another 10Mt to be imported. The new REPowerEU targets for hydrogen and biomethane, when combined, account for around one quarter of Europe's gas consumption. Delivering these targets will have a clear impact on Europe's energy security and energy system resilience. The EU have recommended that Member States should add a REPowerEU chapter to their Recovery and Resilience Plans (RRPs) to channel investments to REPowerEU priorities and make the necessary reforms.

"Member States wishing to benefit from these additional resources shall submit RRPs (for those without adopted plans) or modified RRPs in accordance with the Commission proposal for the Regulation on REPowerEU chapters in recovery and resilience plans ('Commission Proposal'). Member States are encouraged to make their submissions as early as possible after 30 June 2022, to enable a rapid uptake of the available resources for the implementation of the urgent REPowerEU objectives".

Details on how to progress this can be found via the following link:
https://ec.europa.eu/info/sites/default/files/c_2022_3300_1_en_0.pdf

GNI strongly recommends that the Government engages with the EU and submits an application for additional funding as part of an updated Recovery and Resilience Plan. GNI is receptive to supporting and working with the relevant Government department(s) leading any such relevant funding applications. [Consideration could also be given to potential reinvestment of carbon taxes collected from gas bills to help support/underwrite the deployment of renewable gases.

Reference:

7. https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/repowereu-affordable-secure-and-sustainable-energy-europe_en

Q9: Are there any significant cross-cutting gaps not previously discussed in Climate Action Plan 21 that need to be addressed?

[redacted] Gas Networks Ireland:

Ireland faces significant challenges in meeting its emissions reductions targets, and recent geopolitical events have highlighted the urgent need to divest away from imported fossil fuels. GNI

strongly believes that renewable gas-related 'Further Measures identified in CAP 2021, including deploying zero-emissions gases such as biomethane and green hydrogen, must now be included as 'Core Measures' if we are to achieve our 2030 and 2050 emissions reduction targets, while simultaneously addressing our dependency on imported fossil fuels. Ireland also needs to establish and plan for a pathway to net-zero on which future carbon budgets and sectoral emissions ceilings should be based.

Q10: Are there any other cross-cutting issues that should be considered in the development of the 2023 Climate Action Pan?

[redacted]Gas Networks Ireland:

GNI recommends that CAP 2023 strengthens/updates CAP 2021 Action 169: Develop renewable gases in the gas grid. New specific sub-actions are needed to deliver the increased levels of ambition for both green hydrogen and biomethane as set out in the National Energy Security Framework (April 2022) and the recently announced sectoral emissions ceilings.

An appropriate and new support scheme for biomethane production could lead to sustainable growth in the rural economy and a reduction in emissions from agriculture. GNI believe that a support scheme offering a price floor of guaranteed revenues for developers and producers of biomethane and/or appropriate grant schemes will be needed to deliver the 5.7TWh of biomethane announced by Government. The development of regional biomethane production plants (using Anaerobic Digestion) could provide an alternative revenue stream to rural Ireland, and could facilitate a transition away from traditional, more carbon intensive practices.

Public Sector

Q74: What sort of practical changes would you expect the public sector to make in leading and delivering Ireland's climate ambition?

[redacted] Gas Networks Ireland:

A number of different solutions are concurrently required to give Ireland the best opportunity to reach its emission targets. The public sector needs to lead by example and demonstrate the use of a multi-pronged approach; multiple technologies are necessary to decarbonise buildings and transport. These include the use of heat pumps, renewable gases, electric vehicles and CNG/bioCNG.

Q76/77 (repeated): What are the biggest barriers (resourcing / tech gaps / funding / policy gaps / etc.) for the public sector in reducing greenhouse gas emissions and how can they be overcome?

[redacted] Gas Networks Ireland:

As outlined in the response to Question 38 and 40 in Section: Built Environment, public sector buildings are difficult to decarbonise, due to their aging profile and the inherent cost and inconvenience of the deep retrofits required to reduce energy loss, increase energy efficiency and switch to an appropriate energy source. Public sector buildings could efficiently meet their heat requirements and reduce emissions with a gas and solar PV solution. In addition, as biomethane and green hydrogen are introduced onto the gas network, these buildings will continue to decarbonise without needing additional investment or changes to appliances.

Traditionally, Solar PV has not been considered a suitable technology for schools, as energy production is highest during the summer when schools are empty. The return on investment associated with the installation of Solar PV technologies in schools has been a significant barrier. However, the introduction of the Micro-generation Support Scheme provides an opportunity for schools to sell this excess renewable electricity back to the grid, creating a revenue stream for those schools taking up this scheme. This will result in shorter levels of payback, immediate emissions savings and the potential for further emissions reductions as renewable gas volumes increase on the gas network. It has been determined by the Department of Education (DoE)(20) in recent trials that electric heat pumps "are not the optimum heating solution for a school" and that "a secondary source of heating would still need to be maintained in a school, therefore duplicating capital and maintenance costs...". In the opinion and experience of GNI, due to the relatively short occupancy periods of schools, a combined gas and solar PV solution is ideal to meet the energy needs of both primary and secondary schools.

Reference

20. https://www.education.ie/en/School-Design/Technical-Guidance-Documents/Current-Technical-Guidance/bu_tgd_033.pdf

(Question 76 and 77 duplicated) - Answer to question: What other opportunities exist to support the decarbonisation of the public sector?

While Action 57 in CAP 2021 seeks to "examine how and when fossil-fuel heating systems could be phased-out of public buildings, including disallowing the installation of any new fossil-fuel heating", GNI believes that an exception should be made for natural gas heating systems, as they can transition to utilise biomethane, and blends of hydrogen, providing an alternative route to decarbonisation, at least cost and disruption to the public sector. In addition, key sectors such as hospitals, schools, fire stations and garda stations require a secure source of energy supply, which the gas network can provide. As previously outlined, the gas network is less susceptible to interruption caused by extreme weather events and is therefore the ideal energy partner for these essential public sector buildings.

Q78: What practical steps should the public sector take to adapt to climate change?

[redacted]Gas Networks Ireland:

As outlined in the response to Question 77, key public sector services should utilise the gas network to avoid the risks posed by extreme weather events, which could negatively impact on energy supply. The gas network is built to be resilient, and as infrastructure that is primarily located underground, is largely protected from extreme weather and other climate change events.

Q81: What should be prioritised / where should actions be prioritised for the public sector to realise its climate vision?; Q82: What would be an appropriate level of ambition/targets/challenge for public sector climate action?

[redacted] Gas Networks Ireland:

Answer to question 81 (as no text box provided). What should be prioritised / where should actions be prioritised for the public sector to realise its climate vision?

To realise its climate vision the public sector should take a prudent approach and keep all options open and be technology neutral. No technology should be ruled out at this point in the process to decarbonise any sector, as different technologies mature and costs reduce at different speeds. Pursing solely the electrification route is not the most cost effective or efficient route to full decarbonisation. As has been widely recognised, domestically and internationally, renewable gases (biomethane and green hydrogen) will be needed and play a crucial role. For example, public sector transport fleets could avail of CNG/bioCNG vehicles, or green hydrogen powered vehicles in the future. Using gas for transport is particularly suitable for use in commercial vehicles where electric solutions are not yet a viable option. Also, public sector buildings could efficiently meet their heat requirements and reduce emissions with a gas and solar PV solution. As biomethane and green hydrogen are introduced onto the gas network, these buildings will continue to decarbonise without needing additional ivestment or changes to appliances.

Renewable Gases

Q13: What role does renewable gas have in the power generation sector?

[redacted] Gas Networks Ireland:

As well as being an essential decarbonisation pathway for Ireland, renewable gases can provide the same critical services (generation, stability and flexibility) to the electricity grid in the future as natural gas does today.

The Government recognises that to achieve net-zero emissions by 2050, all energy carriers will have to be decarbonised, including the gas network. The EU have signalled that by 2050, gases will make up around 20% of final energy demand across the EU, from 22% today. While this percentage will remain relatively stable overtime, the gases transported through the gas networks will be renewable or zero-carbon.

The gas network provides essential stability and resilience to Ireland's energy system, being able to ramp-up and meet increased demand in a way that is flexible, fast and dependable. The gas network facilitates and 'backs-up' renewable electricity generation at times when the sun doesn't shine, and the wind doesn't blow at all or sufficiently to meet demand. As we move to electrify more and more sectors of our economy, this back-up service becomes even more critical to ensuring the continued, uninterrupted supply of electricity.

Transporting renewable gases (biomethane and hydrogen) in the gas network, for use in power generation, would benefit the electricity sector in two key ways. Firstly, burning renewable gases instead of natural gas would result in decreased emissions from the electricity sector, in direct proportion to the percentage of renewable gas in the blended mix. Utilising 100% biomethane or hydrogen gases for electricity generation, in conjunction with high levels of renewable wind and solar generation, would reduce emissions from this sector to their minimum. Secondly, using renewable gases to back-up intermittent renewable electricity generation ensures that the gas network can continue to provide vital flexibility and stability to the electricity system, increasing energy security, while simultaneously decarbonising this sector.

Q22: What measures can be introduced to reduce to F-Gases in the Enterprise sector?

[redacted]Gas Networks Ireland:

F-Gases, such as R410a which has 2,088 times the global warming potential (GWP) of carbon dioxide, are prevalent in today's heat pump technology. Should this current heat pump technology be rolled out at scale, it could result in locking in the use of HFC refrigerants as the equipment being installed today is not suited to natural refrigerants.

Heat pumps using natural refrigerants such as carbon dioxide and or ammonia, both with a GWP of 1, should be mandated as the appropriate technology when they become available, as they will take over from HFC heat pumps as F-Gases are phased down by the EU.

GNI believes that it makes sense for heat pumps to be deployed within new homes in Ireland, but for existing homes, particularly those on or near the gas network, homeowners should have a choice regarding how they reduce their emissions and achieve the required level of energy efficiency, cognisant of factors such as cost and scale of disruption to the home.

Enterprise, Waste & Circular Economy

Q20: What measures can be taken to accelerate the uptake of carbon-neutral low temperature heating in manufacturing?

[redacted] Gas Networks Ireland:

To accelerate the uptake of carbon-neutral low temperature heating, the Government could accelerate the introduction of a support scheme for biomethane and hydrogen and increase the level of ambition for renewable gases. The EU, through REPowerEU have signalled the increased importance of developing indigenous renewable gas supplies as quickly as possible. However, the challenge in Ireland remains that the supply of such gases is low due to lack of a support scheme to date.

Natural gas currently meets c. 40% of Ireland's heating requirements (including industrial and residential); by replacing natural gas with renewable gases such as biomethane and or renewable hydrogen, it will be possible to reduce emissions from these sectors, with low or no upfront costs and minimal actions required by end-users. The alternative (in order to decarbonise such energy users) is significant costs in terms of (for example) a conversion to electricity-based heating systems.

For the most part, the introduction of biomethane or hydrogen (up to a certain blended percentage) will have no direct impact on gas customers, other than to reduce their CO2 footprint. Ireland's gas network is one of the most modern in Europe and up to 100% biomethane could be transported today with no changes required to the network or to end-user appliances. Over 700,000 homes and businesses in Ireland could be decarbonised in this way.

Q21: What measures can be taken to decarbonise high temperature heating in industry?

[redacted] Gas Networks Ireland:

Natural gas is a vital input and heat source for many multi-national industrial customers with high temperature heat requirements. The availability of a secure and cost competitive fuel such as natural gas, and increasingly renewable gas, is a key requirement for many of these companies in choosing to locate or expand in Ireland while maintaining their global competitiveness in their respective markets.

Many industries require gas for high temperature processes, for which they have a limited number of technically feasible solutions. Multi-national and large I&C companies are increasingly seeking to procure renewable gas to meet their Corporate Social Responsibility (CSR) commitments to reduce their carbon footprint. Over 40 companies, including large manufacturing and agri-food companies in Ireland, have signed a carbon pledge to significantly reduce their emissions footprint between now and 2030. Increasing the levels of renewable gases in the gas network will support the decarbonisation of the high temperature heat sector in Ireland.

Replacing coal and oil with natural gas provides an immediate and cost-effective solution for emissions reduction in industry. A 40% CO2 reduction can be delivered by converting from coal to gas with c. 20-25% emissions' reduction from oil users converting to gas. These businesses will then continue to be decarbonised as the gas network ultimately becomes net-zero carbon in the future. More specifically, decarbonising the gas network with renewable gases provides a real opportunity to address the decarbonisation challenge attached to high temperature heating offtakes.

Q22: What measures can be introduced to reduce F-Gases in the Enterprise sector?

[redacted] Gas Networks Ireland:

F-Gases, such as R410a which has 2,088 times the global warming potential (GWP) of carbon dioxide, are prevalent in today's heat pump technology. Should this current heat pump technology be rolled out at scale, it could result in locking in the use of HFC refrigerants as the equipment being installed today is not suited to natural refrigerants.

Heat pumps using natural refrigerants such as carbon dioxide and or ammonia, both with a GWP of 1, should be mandated as the appropriate technology when they become available, as they will take over from HFC heat pumps as F-Gases are phased down by the EU.

GNI believes that it makes sense for heat pumps to be deployed within new homes in Ireland, but for existing homes, particularly those on or near the gas network, homeowners should have a choice regarding how they reduce their emissions and achieve the required level of energy efficiency, cognisant of factors such as cost and scale of disruption to the home.

Q23: How can we encourage the diversification away from products with high levels of embodied carbon, such as traditional cement in construction to lower carbon alternatives?

[redacted] Gas Networks Ireland:

The cement sector in Ireland is responsible for c3Mt/CO2 per annum. Through CAP 2023, the Government could target support for CCS at 2 cement production facilities, removing up to 1.5Mt/CO2 per annum by 2030.

Q24: What role could Carbon Capture and Storage (CCS) have on industry, and what steps would encourage its deployment?

[redacted] Gas Networks Ireland:

CCS can play a key role in decarbonising certain industries in Ireland and is a key part of both the UK's and EU's industrial decarbonisation strategies. Some energy intensive industries like cement factories, iron and steel, chemicals and other difficult to decarbonise sectors could benefit significantly from CCS. Eleven of the largest gas consumers in Ireland account for 60% of gas consumed. Many of these consumers have migrated from high carbon intensity fuels, including coal, oil and peat, to natural gas; further CO2 emissions reductions can be achieved through the use of CCS technology. This technology also provides a pathway for these large users to become carbon negative through the use of CCS and biomethane from the gas network. Ireland should seek to leverage the wider European experience on CCS and provide supports for large industry to explore CCS. There are also potential opportunities for exporting CO2 to multiple storage sites across northern Europe; this could be considered when assessing CCS for industry in Ireland. Industries such as cement and lime should be supported to enable them to identify the optimum decarbonisation appropriate pathway.

Q25: What other opportunities exist to drive the decarbonisation of the enterprise sector?

[redacted] Gas Networks Ireland:

Increased uptake of distributed power generation via Combined Heat and Power (CHP) technologies in the enterprise sector would contribute to reducing Ireland's emissions. With CHP, electricity is generated on site and useful heat is captured from the process and used for heating, hot water and steam purposes. Based on Eurostat CHP data(10), Ireland is the 5th lowest in Europe for the percentage of electricity generation coming from CHP, at just 6.8%. This compares to the EU average of 11.7% and Latvia at almost 46%.

As biomethane and hydrogen are introduced into the gas network, this sector will continue to decarbonise without the need for further significant investment or any change to appliances. This approach avoids "carbon lock-in" because it future proofs businesses for mixtures of renewable gas and hydrogen and avoids the requirement for any significant follow-up efforts. Hydrogen is suitable for a wide range of applications currently served by gas. In order to avail of the opportunity for hydrogen at national and EU level, and to contribute significantly to the energy transition, a well-functioning and competitive EU-wide hydrogen market is required. Injection of hydrogen into the gas network is necessary to ensure the development of a hydrogen market at scale which can be used across the industrial, transport and heat sectors. An appropriate regulatory framework, including adaptation of current gas regulations to incorporate hydrogen, is therefore necessary. The EU gas legislative review currently underway will allow maximisation of the role of gas networks in building an integrated energy system and the delivery of a regulatory framework for hydrogen.

Reference:

10. Eurostat 2017: Link https://ec.europa.eu/eurostat/documents/38154/4956229/CHPdata2005-2017.xlsx/871cc151-5733-423f-ae38-de9b733aa81e

Q26: What measures should be taken to address the risks that climate change poses for enterprise?

[redacted] Gas Networks Ireland:

The gas network is designed to withstand harsh weather conditions and therefore already exhibits a certain resilience to extreme weather events, which now occur more frequently due to climate change. Ireland experienced exceptional weather conditions in late 2009, early 2010, late 2017 (Storm Ophelia) and early 2018 ("the beast from the East") and the gas network continued to deliver gas safely and securely to gas customers. The gas network now supplies energy to over 711,000 customers in the Republic of Ireland and has the capacity to deliver more gas to more customers. Enterprises utilising gas are less exposed to risks posed by climate change. In particular, key services such as nursing homes and hospitals require a secure reliable energy supply at all times which natural gas (and renewable gases in the future) can provide. Over reliance on electricity could leave key customers exposed at times of power outages. As Ireland's energy system continues to evolve in this challenging time the role of the gas network has never been more relevant. Its resilience and reliability ensure that it can and will play a key role in the transition to a cleaner energy future for Ireland, as part of a more integrated energy system.

Rather than targeting certain enterprises, to fully decarbonise with single site solutions, decarbonising the gas network would allow all enterprises connected to the network to decarbonise at the same rate over time.

There is a risk that businesses that have already or are to set net-zero ambitions for themselves and their supply chain may decide not to invest in Ireland if a pathway to decarbonise in Ireland is unclear. Bearing this in mind, Ireland should plan now at national level to provide large-scale hydrogen via imports initially, as part of the development of its Hydrogen Strategy.

Q72: What other opportunities exist to support decarbonisation through the acceleration of a transition to the circular economy?

[redacted] Gas Networks Ireland:

The production of indigenous renewable gas in Ireland through Anaerobic Digestion is a way of minimising waste, while supporting the circular economy and sustainable agriculture. As well as reducing on-farm emissions and supporting more sustainable supply chains, an indigenous biomethane industry can also provide significant opportunities for local communities, as well as diversification of income for farmers, through the sale of the biomethane produced, the potential sale of the feedstock used to produce the renewable gas and the sale of the bio-fertiliser that is a by-product of the process. It facilitates sustainable circular economies, with businesses having the

opportunity to power their operations via renewable gas made from their own waste / agricultural feedstock.

Electricity

Q11: What options are available to increase the penetration of renewable electricity beyond the up to 80% committed to in Climate Action Plan 2023?

[redacted]Gas Networks Ireland:

The focus should be on further decarbonising electricity generation as opposed to increasing the penetration of renewable electricity.

There is an opportunity to further decarbonise electricity generation by replacing natural gas with renewable gases, such as biomethane and green hydrogen. By decarbonising the gas network, Ireland can continue to deploy as much renewable electricity as is technologically possible, safe in the knowledge that the gas network will provide the back-up generation with flexibility and stability that the grid requires.

Furthermore, the curtailment of wind energy, which can impact on the commercial viability of renewable projects and lead to higher costs for consumers, can be reduced by using this excess wind to produce green hydrogen which can be blended into the gas network and used, in turn, for electricity generation. Integrating the energy systems in this way will help to achieve increased renewable electricity and support the further decarbonisation of both the electricity grid and gas network.

By injecting renewable gases into the gas network and using these blended gases for electricity generation, coupled with the deployment of Carbon Capture and Storage (CCS), Ireland could achieve negative emissions. The EPA through, its IE-NETs Report(8), has called for the accelerated deployment of CCS to existing fossil fuel power plants.

The gas network is the lynchpin of Ireland's energy system, securely supplying more than 30% of Ireland's total energy (with twice as much energy transported in gas pipelines than in electricity wires), including 40% of all heating and c. 50% of the country's electricity generation. The gas network moves energy around the country, ramping up to meet demand when and where it is needed and providing the electricity grid with energy storage, flexibility and long-term stability. As electricity demand increases (due to more houses, electric vehicles, electric heating etc.), and becomes even more weather dependant, (with increased renewable electricity generation), the importance of the gas network is going to increase even further. GNI believes the gas network can play a similar role in helping to deliver Ireland's carbon neutral energy future, by safely and securely transporting and delivering renewable gases, such as green hydrogen and biomethane.

Reference:

8. https://www.epa.ie/publications/research/climate-change/Research_Report_354.pdf

Q12: What can be done to accelerate/facilitate the delivery/deployment of offshore wind and solar PV in particular, in the context of Climate Action Plan 2021 and the REPowerEU ambition?

[redacted], Gas Networks Ireland:

Reports suggest that Ireland has the potential to generate up to 30 GWs of offshore renewable generation. To realise this and to increase the uptake of offshore wind and solar PV in Ireland, the Government could provide certainty around route to market for all renewable electricity. Green hydrogen production is one such route to market and the Government should link offshore wind and green hydrogen production through financial supports, planning regulations and policy frameworks.

It is critical, both for the future uptake of offshore wind and the broader net-zero climate targets, that offshore wind and green hydrogen policies are developed in conjunction with each other. This is a central tenet of the EU's Offshore Energy Strategy.

As previously noted, the opportunity from excess wind generation to produce green hydrogen to blend into the gas network presents Ireland with an opportunity to maximise its renewable energy potential.

The Government could place an obligation in future RESS auctions, for offshore wind projects to produce a certain percentage of hydrogen as part of their overall strategy. The Government could also develop hydrogen export/import infrastructure to allow offshore wind developers access to global markets for hydrogen and enable Ireland to import hydrogen as required.

The EU's REPowerEU Plan also sets ambitious targets for indigenous renewable gases, and Ireland has recently announced increased ambition for both biomethane and green hydrogen. Similar to the delivery of offshore wind and solar PV, certainty around route to market is required to deliver these targets in time for 2030. It is proposed that CAP 2023 incorporates these actions as Core Measures and includes specific actions to deliver same.

Q13: What role does renewable gas have in the power generation sector?

[redacted]Gas Networks Ireland:

As well as being an essential decarbonisation pathway for Ireland, renewable gases can provide the same critical services (generation, stability and flexibility) to the electricity grid in the future as natural gas does today.

The Government recognises that to achieve net-zero emissions by 2050, all energy carriers will have to be decarbonised, including the gas network. The EU have signalled that by 2050, gases will make up around 20% of final energy demand across the EU, from 22% today. While this percentage will remain relatively stable overtime, the gases transported through the gas networks will be renewable or zero-carbon.

The gas network provides essential stability and resilience to Ireland's energy system, being able to ramp-up and meet increased demand in a way that is flexible, fast and dependable. The gas network facilitates and 'backs-up' renewable electricity generation at times when the sun doesn't shine, and the wind doesn't blow at all or sufficiently to meet demand. As we move to electrify more and more sectors of our economy, this back-up service becomes even more critical to ensuring the continued, uninterrupted supply of electricity.

Transporting renewable gases (biomethane and hydrogen) in the gas network, for use in power generation, would benefit the electricity sector in two key ways. Firstly, burning renewable gases instead of natural gas would result in decreased emissions from the electricity sector, in direct proportion to the percentage of renewable gas in the blended mix. Utilising 100% biomethane or hydrogen gases for electricity generation, in conjunction with high levels of renewable wind and solar generation, would reduce emissions from this sector to their minimum. Secondly, using renewable gases to back-up intermittent renewable electricity generation ensures that the gas network can continue to provide vital flexibility and stability to the electricity system, increasing energy security, while simultaneously decarbonising this sector.

Q14: What role could carbon, capture and storage have in decarbonising our power sector?

[redacted] Gas Networks Ireland:

In Ireland, 57% of the gas consumed is used in the production of electricity. The power generation sector has leveraged the gas network to migrate away from high carbon intensity fuels such as coal, oil and peat. Ireland can further leverage the current CO2 savings achieved through this move to natural gas-fired power plants by using Carbon Capture and Storage (CCS) technology, whereby a relatively small number of power generators in Ireland could become carbon neutral or

carbon negative with the introduction of CCS technology coupled with deployment of renewable gases

EirGrid have stated that they need additional and sustained levels of gas-fired generation out to at least 2040. This new gas-fired generation must be decarbonised if Ireland's climate ambitions are to be met.

The role that CCS can play in reducing emissions from the power sector is twofold. Firstly, CCS could be deployed to existing or new gas-fired generation, potentially capturing over 95% of CO2 emitted, for permanent underground storage. Secondly, by blending biomethane into the gas network and then using this blended gas in electricity generation, coupled with CCS, Ireland can achieve 'negative emissions' whereby the biomethane/blended gas contains CO2 which has been taken from the

atmosphere and is captured and permanently stored underground. Negative emissions will be needed to achieve net-zero emissions across all sectors, as some cannot be fully decarbonised.

Modelling by UCC/MaREI identifies a role for CCS not only in achieving net-zero by 2050, but also possibly playing a much earlier decarbonisation role by 2030. This research strongly suggesting that CCGTs with CCS (or another form of dispatchable low or zero emissions electricity) can support the achievement of the 7% per annum by 2030 (51%) as set out in the Programme for Government and now legislated for and legally binding.

This analysis appears to align with the Government recent statement about requiring between 2 GWs of new dispatchable generation by 2030.

The EPA recently published a study exploring Negative Emissions Technologies (NETs) and their potential for Ireland. This study(9) clearly identifies the potential for CCS to reduce emissions as well as its role in negative emissions. It states that "CCS should be deployed on existing fossil fuel electricity generation sites", noting "CCS could already contribute significantly to mitigation of existing gross CO2 emissions in Ireland" and that "there is a clear national interest in progressing fossil fuel CCS proactively".

The EPA research indicates that given our limited expected carbon budget between now and 2050, and the likelihood that Ireland is going to overshoot its National Carbon Quota (NCQ), Ireland should be doing everything in its power to reduce emissions now – and capturing emissions from electricity generation and industry with CCS is one way to do this.

According to the Irish Business and Employers Confederation (Ibec), "natural gas generation will provide stability to the grid in 2050 and be supported by carbon capture and storage technology". The report adds, "failure to deploy CCS would significantly undermine Ireland's ability to meet its 2050 emission reduction targets while also maintaining security of energy supply and industrial competitiveness. To meet the power sector's needs, Ireland would need to develop

alternative sources of low carbon dispatchable generation and our options are very limited".

Reference:

9. https://www.epa.ie/publications/research/climate-change/Research_Report_354.pdf

Q15: What other opportunities exist to support the decarbonisation of the electricity sector?

[redacted]Gas Networks Ireland:

Renewable gases and Carbon Capture and Storage are real opportunities that can be deployed to support the full decarbonisation of the electricity sector.

Natural gas is responsible for generating c. 50% of electricity in Ireland and even with Ireland's 80% renewable electricity target for 2030, this still leaves 20% of electricity to be generated most likely by a gaseous fuel. By decarbonising the gas used for electricity generation (by replacing natural gas with renewable and zero-carbon gases such as biomethane and green hydrogen), Ireland can further reduce emissions from this sector. In addition, by deploying CCS to the existing gas-fired generators

in Ireland, this sector can be further decarbonised. Across the EU, certain Member States are now moving to support carbon reduction technologies as opposed to renewable only technologies.

To achieve Ireland's increased climate ambitions cost effectively, it is important that there be a shift in focus to carbon reduction solutions rather than solely relying on intermittent renewable technologies.

Q16: What measures might be taken to improve the resilience of the electricity system to the impacts of climate change?

[redacted]Gas Networks Ireland:

The electricity system could be made more resilient (and further decarbonised) by replacing natural gas with renewable gases such as biomethane and green hydrogen. Furthermore, as gas-fired generation will be required for the foreseeable future, to backup renewable electricity generation and provide flexibility and stability to the grid, deploying CCS could enhance the decarbonisation and resilience of the electricity grid.

Another way to increase the resilience of this sector is to transport indigenously produced hydrogen and other renewable gases, such as biomethane, to existing and new gas-fired generators. These gases can be used to generate dispatchable (on demand) carbon free electricity regardless of the prevailing weather conditions. Hydrogen can be stored at very large scale indefinitely providing a degree of resilience significantly above that of battery storage technologies.

This type of energy system optimisation is at the heart of the EU's Green Deal, in particular its Energy System Integration Strategy. As more and more of Ireland's energy demand is met by renewable electricity, it becomes increasingly important that the backup to this is decarbonised and available at scale. Power-to-Gas and Gas-to-Power will improve the resilience of Ireland's electricity system and reduce emissions from this sec

Q18: What financial incentives are needed to increase renewable generation capacity?

a. To incentivise commercial scale production.

b. To incentivise microgeneration.

[redacted] Gas Networks Ireland:

GNI believes a 'technology neutral' approach should be taken when identifying the least cost pathway to net-zero and that a shift from a renewable only focus to embrace all carbon reduction solutions will be required.

With any nascent technology, financial supports will be required to incentivise the required investment necessary to scale-up and reach commercial viability. Support schemes such as the RESS auction process should be expanded to include technologies such as green hydrogen production and anaerobic digestion. Clear targets and timelines will be required.

Transport

Q43: What changes should be considered in relation to the management of Ireland's road network (e.g. reducing speed limits, parking policy, road user/congestion charging) to reduce congestion and support the priorisation of more sustainable modes?

[redacted], Gas Networks Ireland:

The Low Emissions Vehicle Toll Incentive (LEVTI) has the potential to play a greater role to encourage reductions in transport emissions and build a climate resilient low carbon transport sector. As road tolling represents significant cost to haulage operators, by switching from a set limit on the amount that can be claimed under the Toll Incentive, to a percentage cap of the total amount of tolling fees accumulated, it would provide a more substantial enticement to invest in CNG/bioCNG vehicles.

Q52: What specific measures can be applied in the commercial transport sector to encourage or accelerate a change to EVs or to other zero carbon alternatives?

[redacted]Gas Networks Ireland:

CNG/bioCNG vehicles provide a significant avenue to decarbonisation for commercial transport. It is particularly suitable for use in commercial vehicles where electric solutions are not yet a viable option.

Several measures that could be employed to encourage a change to low emission vehicles, which are discussed in turn, including:

a) Developing a policy and regulatory roadmap for the decarbonisation of HGVs by 2030;

b) Change to planning policy to facilitate the rollout of refuelling infrastructure;

c) Motor tax amendments;

d) Potential for green hydrogen use in the future.

Q55: As a transitionary fuel to help decarbonise the road haulage sector, what obstacles to you foresee in raising the blend proportion of biofuels in road transport to 10% bioethanol (E10), and 20% biodiesel (B20) by 2030? Is there potential for greater ambition?

[redacted] Gas Networks Ireland:

GNI is supportive of the introduction of an advanced biofuel obligation and believes that CNG should be subject to a full biofuel obligation. Ireland has a huge opportunity to benefit from indigenous biomethane production which can be used as a direct substitute for natural gas in CNG/bioCNG vehicles with no technical limitations.

Indigenous produced biomethane should be incentivised in the Biofuels Obligation Scheme to ensure that domestic renewable gas sources are developed instead of relying on fuel sources from other jurisdictions. This will benefit Ireland both from an economic perspective by providing jobs and an income stream for farmers, and for Security of Supply.

Q60: What other opportunities exist to support the decarbonisation of the Transport sector?

[redacted] Gas Networks Ireland:

The Low Emission Vehicle (LEV) Taskforce Phase 2 Report was published by the Government in November 2019(16). Actions based on the recommendations of this task force should be incorporated into the next iteration of the Climate Action Plan:

- Extend duration of the current Excise Duty treatment for gas in transport to 2032, in line with the UK(17);
    - Or a time when 20% of the HGV market has been reached;
- Maintain multi-year vehicle purchase grants for low emissions vehicles within the HGV category;
- Extend the duration of the LEV toll incentive scheme;
    - And amend the set amount limit to a percentage cap;
- Extend duration of the Accelerated Capital Allowance scheme.

- In addition: Biomethane use in transport needs to be incentivised - indigenous produced biomethane should be incentivised in the Biofuels Obligation Scheme.

CNG technology provides a lower carbon alternative to diesel for public sector transport fleets and can significantly contribute to the recently agreed Sectoral Emissions Ceiling for transport, including helping drive the 5.7 TWh target set for biomethane. Renewable gas can be utilised by CNG vehicles as bioCNG, resulting in a significant reduction in transport emissions, improvements in air quality and promoting the circular economy.

In addition, (green) hydrogen has the potential to play a key role in the future of transport with zero carbon emissions and improvement in air quality. Appropriate support schemes should be put in place to develop hydrogen in this sector. In road transport hydrogen is particularly suited to heavy use vehicles, such as buses, trucks and emergency response and delivery vehicles. The gas network may play a role in directly supplying hydrogen refuelling stations and or fuel terminals, thereby reducing overall costs of developing this sector by utilising existing infrastructure and reducing the amount of fuel tanker traffic. New markets will also emerge for hydrogen overtime, such as using green hydrogen to decarbonise aviation and maritime transport.

To decarbonise the transport sector it would be prudent to keep all options open with a technology neutral approach adapted. No technologies should be ruled out at this point in the process to decarbonise the transport sector, as different technologies mature and costs reduce at different speeds. Also, when calculating the emissions of a particular vehicle, the more comprehensive and science-based Well-to-Wheel or life cycle assessment approach should be adapted, which would guarantee a more technology-neutral approach to calculating emissions.

Reference

16. Low Emission Vehicle Taskforce Phase 2 Report, November 2019: https://www.gov.ie/en/publication/564409-phase-2-low-emission-vehicle-taskforce-report/

17. CNG Fuels website, Your cost savings: Fixed Fuel Duty Price Until 2032: https://www.cngfuels.com/learn-more/#:~:text=The%20fuel%20duty%20in%20the,diesel%20at%2057.95p%2Fltr.&text=Substantial%20increases%20in%20demand%20for,in%20the%20UK%20and%20internationally

Agriculture & LULUCF

Q61: What are the opportunities to increase take-up of measures identified in AgClimatise and encourage adoption of other practices which reduce emissions?

[redacted]Gas Networks Ireland:

Action 20 in the AgClimatise roadmap refers to maximising the potential opportunities from Anaerobic Digestion (AD) for the agriculture sector. AD can also assist in achieving other AgClimatise actions, such as Action 12 which seeks to promote the development of a sustainable circular bio-economy. In particular, AD can promote a circular bio-economy by using food and organic wastes to produce a valuable biofertiliser in the form of digestate.

Action 1 from AgClimatise requires a reduction in the use of chemical fertilisers and supports the use of non-chemical nutrients such as bio-based fertilisers. The digestate that is produced as part of the AD process is a biofertiliser that can replace chemical fertilisers. Slurry and silage are used to produce biomethane through the AD process. During this process, an organic derived digestate, i.e. the remaining substrate of the AD process which has readily available nutrients, is also produced. This can be applied as a biofertiliser to grass and tillage lands, as a sustainable organically derived alternative to chemical fertiliser application.

More broadly, AgClimatise calls out the key role the agriculture sector can play in "the provision for bioenergy feedstock for the production of biogas/biomethane as a key renewable energy resource for the decarbonisation of the transport and heat sectors in particular". By implementing AD, farmers who wish to supply silage to an AD facility will have to increase their grassland management practises, thus promoting Action 4 which relates to maximising grass production. AD can also contribute to Action 13 of AgClimatise, which aims to explore all options in relation to land use diversification such as energy crop production. Another benefit of AD is that by diverting slurry to AD facilities rather than keeping it in open stores, this reduces emissions, including ammonia losses. In addition, the carbon dioxide captured during the biomethane production process can be used in applications, such as greenhouse crop production, and/or for food and beverage manufacturing.

Q62: What policies and measures would be needed to support farmers diversify their farm activities to include opportunities such as bioenergy, vegetable growth, forestry, organic farming, etc.?

[redacted]Gas Networks Ireland:

To maximise the usage of manure and silage as feedstock for Anaerobic Digestion (AD) and biomethane production of for grid injection, the Government could incentivise the production of feedstock to AD plant developers. Without a support scheme in place these feedstock are unlikely to emerge at scale. The support scheme could be based on recent supports put in place for

renewable electricity generation. Capital grants could also be made available to AD developers, which would provide farmers and biogas/biomethane producers with a level of security when financing and developing their businesses. There are also funding opportunities for biomethane under REPowerEU chapter that should be explored as part of Ireland's Recovery and Resilience Plan. Supporting the biogas/biomethane industry would, in turn, help decarbonise agriculture. Manure can be recycled in the production of biogas/biomethane. Digestate produced during the anaerobic process can replace chemical fertilisers. It has also shown that digestate biofertiliser is more readily absorbable by plants than slurry and chemical fertilisers and can naturally strengthen grass and crop resistance to parasites and weeds, thus reducing or eliminating the need for pesticides and herbicides on grassland swards and some crop types(18). Furthermore, mixed species swards have demonstrated at the Global Lighthouse Farm in Dowth to require 70% less nitrogen fertiliser (chemical or bio) than traditional monocrop ryegrass, while yielding >70% higher production yield.(19) This demonstrates the potential to further reduce the requirement for chemical fertiliser, whilst simultaneously improving grass production.

Reference

18. Composting and Anaerobic Digestion Association of Ireland, 2-year report on crop trials demonstrating use of compost and digestate in Irish Agricultural uses (Dun Laoghaire, 2012). http://www.cre.ie/web/wp-content/uploads/2010/12/2-Year-Report-on-Crop-Trials.pdf
19. http://www.cre.ie/web/wp-content/uploads/2010/12/2-Year-Report-on-Crop-Trials.pdf

Q63: What can be done to maximise the use of manure and silage as feedstock for biomethane generation in closed digesters and inject into the gas grid to offset natural gas?

[redacted] Gas Networks Ireland:

As outlined in the response to Question 62, market certainty for AD developers is required to encourage investment in the sector. This would enable producers to maximise the use of manure and silage as a feedstock for biomethane production.

Q69: What other opportunities exist to support the decarbonisation of the agriculture, land-use and marine sectors?

[redacted] Gas Networks Ireland:

The production of indigenous renewable gas in Ireland, not only provides a solution to emission reduction and security of energy supply, but also promotes sustainable growth in rural areas, providing significant benefits to the local agriculture sector and economy in the region. By employing the AD process, food and farm wastes can be minimised and the production of biomethane and digestate from these wastes and other feedstock contributes to the circular economy. GNI has the capability to develop renewable gas grid injection infrastructure and a connections policy is in place to facilitate renewable gas connections to the gas network. In order for renewable gas producers to connect to the gas network there needs to be some stimulus in place to kick start the AD industry in Ireland and ensure final investment decisions on projects can be made with more financial certainty. This is explored further in the response to Question 62.

Built Environment

Q32: Housing for All Commits to 100% funding to retrofit 40% of local authority housing stock to B2 by 2030 at a cost of 1.4 billion euro. How can we further support local authorities to help them deliver on social housing retrofit targets?

[redacted] Gas Networks Ireland:

Achieving a B2 BER rating should not be conflated with installing an electric heat pump. It is possible to meet and exceed a B2 BER rating by installing hydrogen-ready gas condensing boilers with some shallow fabric upgrades. By achieving a B2 or better rating, the building has reduced its carbon footprint to the same standard that would be achieved by retrofitting a home to a B2 rating using a heat pump, with significantly less disruption and at a significantly reduced cost compared to an electrification solution deploying heat pumps with deep retrofits. By encouraging local authorities to employ the most cost-effective method of attaining a B2 BER rating, the 1.4 billion euro allocation could upgrade a far greater number of homes.

Q34: How could the roll-out of district heating be accelerated and what needs to be done to expand its coverage in Ireland?

[redacted] Gas Networks Ireland:

The SEAI's National Heat Study(11) suggests that district heating could provide as much as around 50% of building heating demand in Ireland. GNI believe that to accelerate the roll out district heating at this scale requires a national utility model and would need safety, regulatory and legal frameworks to be developed. Actions to deliver same could be included in CAP 2023.

Combined Heat and Power (CHP) technology can act as a highly efficient source of heat for district heating; a technology which is compatible with low carbon gases, including biomethane and green hydrogen. Support and incentives should be made available for high efficiency CHP technology to support the district heating sector and wider decarbonisation effort.

Reference:

11. https://www.seai.ie/publications/National-Heat-Study-Summary-Report.pdf

Q35: Are there any specific obstacles in the planning system that is impeding the rollout of district heating and the national retrofit plan? How can we overcome these barriers?

[redacted] Gas Networks Ireland:

As more waste heat becomes available from sources such as Data Centres, and district heating develops and becomes more established in Ireland, obstacles in the planning system are likely to arise. A national District Heating body with capability to raise finance, plan and roll out pipe networks in urban environments is needed. This entity is also likely needed to manage metering etc.

Q37: Further to the existing supports financed by carbon tax revenues, how can we protect those who are currently experiencing fuel poverty and those who are at risk?

[redacted] Gas Networks Ireland:

It is crucial that the economy is decarbonised at least cost; one way to ensure this would be to allow all carbon reduction technologies and decarbonisation pathways to compete on a cost basis.

In addition, replacing old energy inefficient appliances with new energy efficient appliances, in conjunction with other simple or shallow retrofit measures that which low cost/high decarbonisation impact, should be considered regardless of the fuel type or appliance.

Q38: What specific measures can be implemented to improve the efficiency of rolling out the National Retrofit Programme?

[redacted] Gas Networks Ireland:

The national target should be set to decarbonise over 500,000 homes instead of just a target for retrofitting these homes by 2030. While retrofitting is seen as the "vehicle of choice" for decarbonisation Ireland's housing stock, it should not be considered as the only option. Other solutions need to be considered, ensuring that the solution selected is best suited to the building type (apartment, semi-detached, detached, townhouse etc), the age of the building, the BER Energy Rating of the home (if applicable), the current fuel source and the property owner's economic capacity etc. Following detailed analysis, GNI believes that gas boilers fuelled with biomethane, in conjunction with solar PV panels, complemented by some shallow retrofit activities in certain situations, is the most cost effective, practical and non-invasive route to decarbonising some of Ireland's existing housing stock. A support scheme for biomethane production and grid injection would lead to greater availability of this renewable energy on the gas network and would give homeowners a wider range of options to decarbonise their homes with significantly less disruption and at a significantly reduced cost compared to deploying heat pumps with deep retrofits. Biomethane can be used in gas appliances in the same way as natural gas without a need to change

the appliances or the disruption associated with switching technologies.

Exceeding a target of retrofitting 500,000 homes by 2030 is considered ambitious by many stakeholders. Ireland is experiencing a growing housing shortage and faces challenges with increasing the availability of new homes in the market. In addition, there are shortages of resources i.e. manpower and materials and other challenges relating to rising costs of living and buildings' materials and very valid questions over who will pay for such deep retrofitting. Retrofitting homes is an important solution where no other lower cost, lower disruption options are available; however, this is not the case, with multiple pathways available to decarbonise Ireland's homes and buildings. The current ambitious deep retrofit target will be challenging to achieve, if not unattainable(12), putting pressure on an already stressed housing supply chain. Up to 40% of the national target or 200,000 homes could be substantially decarbonised by simply switching fuel source from oil/solid fuel to natural gas. These additional 200,000 homes which are currently on or close to the gas network, combined with the existing c. 689,000 gas homes could then be further decarbonised, at least cost and least disruption, by increasing the availability of biomethane, and in time green hydrogen, via the gas network.

Reference:
12. https://www.irishtimes.com/business/construction/cif-says-plans-to-deep-retrofit-500-000-homes-by-2030-unrealistic-1.4670734

Q39: Further to those technologies identified in previous iterations of the Climate Action Plan, what other additional measures could be used to reach our emission reduction target in this sector?

[redacted] Gas Networks Ireland:

As previously outlined in response to question 38, a range of innovative solutions is required across all sectors and all energy carriers to increase energy efficiency and expedite decarbonisation. There will be some uncertainty around the early development of key technologies and as to whether certain technologies can be scaled-up and costs reduced to competitive levels. Given this uncertainty, it is important not to rule out any technologies at an early stage.

All technology options should be treated on an equal basis and evaluated in terms of their energy efficiency and decarbonisation potential. Evaluation of the business cases for different decarbonisation technologies and pathways should be carried out on a system-wide basis and consider the investment required in electricity and gas networks to facilitate their deployment and integration into the energy system.

A recent report by the ESRI(13) found that the significant capital cost of retrofitting the existing housing stock may prompt a re-examination of electrification as the primary method of decarbonising the heating sector. Considering this, it would seem prudent not to rule out any potential more cost-effective solutions at this point.

Reference:
13. https://www.esri.ie/news/new-research-suggests-that-electric-heating-will-increase-generation-costs-and-decrease

Q40: What specific measures would incentivise a greater rate of oil boiler replacement?

[redacted] Gas Networks Ireland:

Gas boilers are part of the solution to decarbonise the home heating sector. Approximately 40% of all homes in Ireland currently use oil for home heating.(14) GNI estimates that up to 200,000 of these homes are located within 30 metres of the gas network. If these 200,000 homes replaced their old boilers with new efficient gas boilers, we estimate that this would result in an emission saving of approximately 300,000 tCO2 per annum using natural gas with potential for further emissions savings using renewable gases in turn. An increasing portion of these homes are experiencing fuel poverty, with the current energy crisis and rising prices, and therefore least likely to be financially able to carry the costs of deep retrofits to facilitate the introduction of a heat pump. If grants are made available to these homeowners to convert to high-efficiency hydrogen-ready gas condensing boilers(15), in conjunction with shallow retrofit measures such as wall and attic insulation, addition of smart heating controls and installation of solar PV or solar thermal panels, they would be able to achieve a minimum B2 energy rating. This would reduce energy usage and emissions and provide savings on energy costs. A Domestic Oil Boiler Scrappage Scheme could also be introduced to incentivise a switch from older oil boilers to hydrogen-ready gas condensing boilers. In addition to the above proposals, the c.689,000 homes currently using natural gas for heating, hot water and cooking, can also be switched, with little or no disruption, to indigenous renewable gas and hydrogen blends in the future, significantly reducing overall emissions.

A gas and solar PV solution would also help commercial buildings efficiently meet their heat requirements and reduce emissions. Switching from oil to gas represents a cost-effective, least regrets way of achieving a reduction in emissions. It also means that buildings can be heated comfortably, and disruption can be reduced through minimal retrofitting activities such as implementing shallow, rather than deep, retrofits. In addition, as renewable gas and blends of hydrogen are introduced onto the gas network, these buildings will continue to decarbonise without the need for further investment or to change their gas appliances.

Ensuring appropriate supports and incentives are in place to enable SMEs to decarbonise is important. For certain buildings, with high energy demand, CHP using natural gas and renewable gases (biomethane and blends of hydrogen) should be considered. CHP facilitates users to economically increase energy efficiency and reduce CO2 emissions with the potential to be carbon neutral by using renewable gases.

Finally, a hybrid gas/heat pump option should also be explored and considered; this would reduce energy demand on electricity generating facilities during hours of peak demand. Property owners could garnish the features and benefits of both renewable gas and the Coefficient of Performance of heat pumps.

Reference:

14. CSO data 2017: https://www.cso.ie/en/releasesandpublications/ep/p-rsdgi/regionalsdgsireland2017/env/
15. https://www.cibsejournal.com/technical/fuel-for-thought-hydrogen-gas-boilers/

Research & Innovation

Q91: Are the required research and innovation programmes and structures in place to support our climate ambitions; including the provision of the evidence needed to underpin policy in a timely manner?

[redacted] Gas Networks Ireland:

Research is an important part of Ireland's transition to net-zero emissions by 2050. Research should focus on all three parts of the energy trilemma i.e. competitiveness, sustainability and security, rather than primarily focusing on climate and emissions reductions to the detriment of the other important energy strands – a holistic approach is required, particularly in the context of the current EU energy market. The upcoming Energy Security Review for Ireland demonstrates there needs to be a greater focus on security of supply in conjunction with climate-action related research. Energy storage (hydrogen and battery), biomethane and green hydrogen supply, and decarbonisation of the gas network can all help achieve emission reduction, while strengthening security of supply.

Innovation is incentive driven. Rewarding innovation will likely result in accelerated cost reduction and faster uptake in the demand for and use of green hydrogen. A key Climate Action Plan 2023 driver of innovation would be to set clear time bound targets, coupled with a transparent funding model for industry to deliver hydrogen projects which are geared towards rewarding cost-effective and efficient use of hydrogen. It is proposed that such targets are set across the full hydrogen supply chain from production, transportation, storage to end-use.

CAP 2023 can provide the necessary confidence to academia, public/private organisations and investors, that innovation and R&D is essential to developing Ireland's hydrogen economy, which in turn will incentivise these entities to allocate appropriate resources to drive such innovation. Although we can leverage learnings from other countries, Ireland will need to develop its own knowledge, understanding and capabilities pertinent to hydrogen.

Q92: Have you identified any research and innovation gaps which need to be addressed? If so, how can these gaps best be addressed?

[redacted] Gas Networks Ireland:

As previously outlined in GNI's response to the Hydrogen Strategy Consultation, a complete Gap Analysis should be undertaken into:

- how much green hydrogen is required to support the decarbonisation of Ireland's energy system;
- the process of converting intermittent wind into green hydrogen;

• how much inter seasonal and localised storage is required and how this is achieved (where and how it is stored); and,

• how to identify the optimum (cost effective) transport method for getting green hydrogen to end users.

This analysis should also include an assessment of storage requirements for short-term, medium-term and long-term inter-seasonal storage requirements, in conjunction with Ireland's Energy Security Review.

This complete Gap Analysis needs to be undertaken within a range of hydrogen production scenarios and costs, as the volume and price of hydrogen will affect its ability to decarbonise different end-users. This work also needs to take account of the potential for blends of hydrogen entering the network from the UK gas transmission system, as the UK is currently examining in detail how to inject hydrogen into their national gas transmission network.

Further research is also required to understand where and how hydrogen clusters will develop, including the identification of the optimum sites for green hydrogen production and storage. Research is required around the development of key port infrastructure, including repurposing existing gas networks, which will be shared by hydrogen customers within clusters.

Other potential areas requiring R&D/solutions include:

- Study on Energy System Integration potential as set out in Climate Action Plan 2021;
- Development of billing systems for distributed renewable gases;
- Development of blending injection skids for hydrogen;
- Adaptation of the existing gas network infrastructure and operational systems for hydrogen blends and 100% hydrogen;
- Further development of a Guarantee of Origin scheme for green hydrogen in Ireland.

In line with CAP 2021 Action 169: Develop renewable gases in the gas grid, GNI are currently working to identify the necessary works required to accept hydrogen blended with natural gas entering the Irish gas network via the Moffat Interconnection Point by 2025 and assessing the potential impacts of injecting green hydrogen at appropriate locations into the gas network. Further work is now required across the following areas:

Proposed hydrogen-research Climate Action Plan 2023 Actions:

1. Actions required to undertake a complete Gap Analysis to identify:
    a. how much green hydrogen is required to support the decarbonisation of Ireland's energy system;
    b. the optimum process for converting intermittent wind into green hydrogen (where to produce, store and transport green hydrogen and how to build resilience into the process);
    c. how much inter seasonal and localised storage is required at various clusters;
    d. the optimum transport method for getting green hydrogen to end-users.
2. Ireland's Hydrogen Strategy should set out a series of 'Phases' for the development of Ireland's hydrogen economy, as part of a wider roadmap to net-zero. Action required to develop roadmap.
3. Action required to identify and deliver the changes (technical, safety,

regulatory) required to facilitate up to 5% hydrogen/natural gas blends at the Moffat Interconnection Point by 2025.

4. Research is needed into blending and repurposing Ireland's gas network to support Ireland's net-zero ambitions.
5. Action required to understand the impact of hydrogen/natural gas blends and 100% hydrogen gas for existing natural gas customers connected to the Distribution and Transmission networks, including existing gas-fired electricity generators.

As part of GNI's five yearly Price Control (2022-2027), we have set out ambitions plans to the Regulator on delivering these various hydrogen related actions.