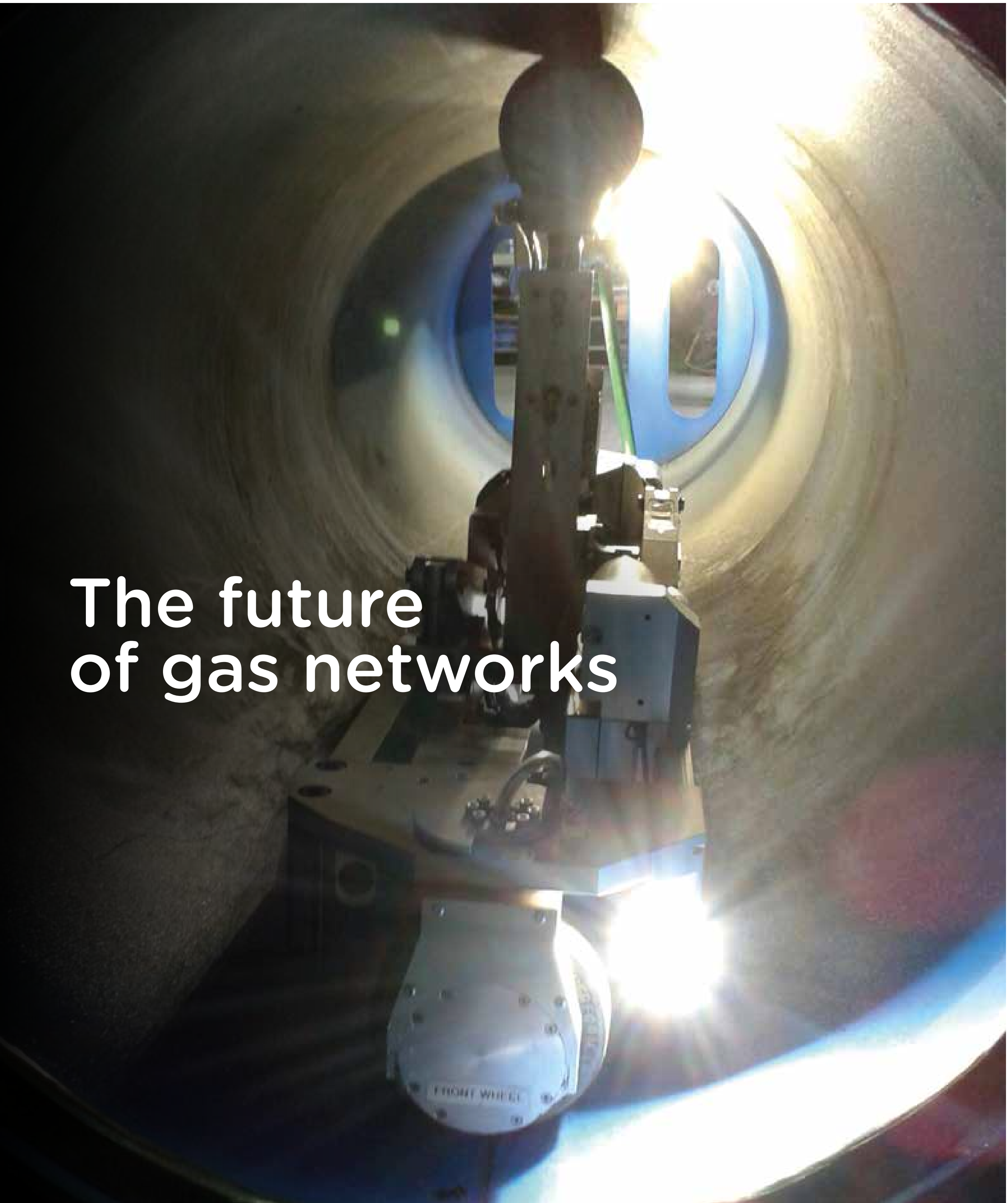
SGN
Your gas. Our network.



The future of gas networks

Overview

The UK benefits from one of the most extensive gas networks in the world which transports the energy to heat almost 85% of homes and much of industry. The UK and Scottish Governments have committed to targets to reduce carbon emissions by 80% from 1990 levels by 2050, which includes an ambition to almost completely decarbonise heat.

With peak heat demand at least four times higher than peak electricity demand, we believe low carbon solutions which utilise our existing gas network infrastructure will allow for the decarbonisation of heat at the lowest cost and least disruption to customers. **In the short-term by blending green gas such as biomethane and bioSNG into the network. In the medium-term adding hydrogen to that blend. In the longer term the potential to move towards 100% hydrogen networks.**

This document sets out our thoughts on the role of distributed gas as we move into future price regulation periods and how the gas distribution networks can underpin a secure and affordable future lower carbon energy mix.

1. Context

1.1 Government policy

The UK and Scottish governments have committed to reducing greenhouse gas emissions by 80% of 1990 levels by 2050. Currently, almost half (46%) of the final energy consumed in the UK is to provide heat and thus the government's plans identify the need for low or no carbon heat by 2050 to meet this target.

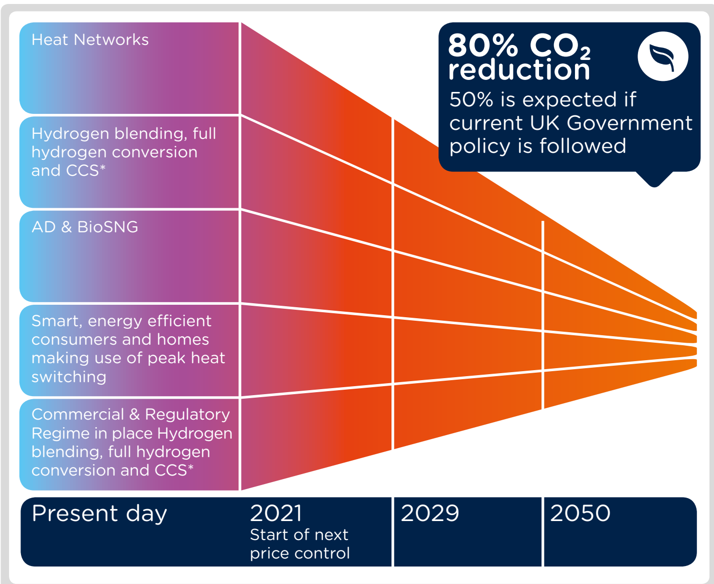
The last UK Government strategy on heat, published in 2013, suggested heat would be decarbonised by fitting electric heat pumps in most homes by 2050[1]. This pathway has since been shown to be an expensive one, costing in the order of £300bn, due to the significant investment required in additional electricity generation capacity and reinforcements to the electricity networks to meet the large diurnal and seasonal swings in heat demand currently served by gas (see section 3).[2] These costs would ultimately be passed on to customers through their energy bills.

The UK Government is currently working to re-assess the best value option to decarbonise UK heat. It aims to better understand the infrastructure requirements and impacts on customers the different option, or mix of options, would have. The government will over the coming years, gather evidence and analysis and try to fill key gaps relating to options such as the future of the gas network, electrification of heat, and district heating. Major UK Government policy decisions on heat are not expected until the early 2020s.

The Scottish Government published its Energy Strategy in December 2017. This sets a target for the equivalent of 50% of the energy for Scotland's heat, transport and electricity consumption to be supplied from renewable sources by 2030.

This strategy supports us in demonstrating the viability of a 100% hydrogen network in Scotland in recognition of the role hydrogen could play to help meet climate change targets.

There are multiple possible solutions, and we believe maintaining future optionality for heat decarbonisation is key to ensure potential least cost routes to UK heat decarbonisation are kept open. Retaining the ability to utilise and repurpose our existing gas network infrastructure is therefore vitally important. This will allow the evidence base to develop around options including blended and 100% hydrogen networks during the rest of the current price control (RIIO-GD1) and throughout the next (GD2). This will also allow for decisions to be made on rolling out low carbon gas at scale during GD3, and appropriate funding to be included as part of future price control settlements.

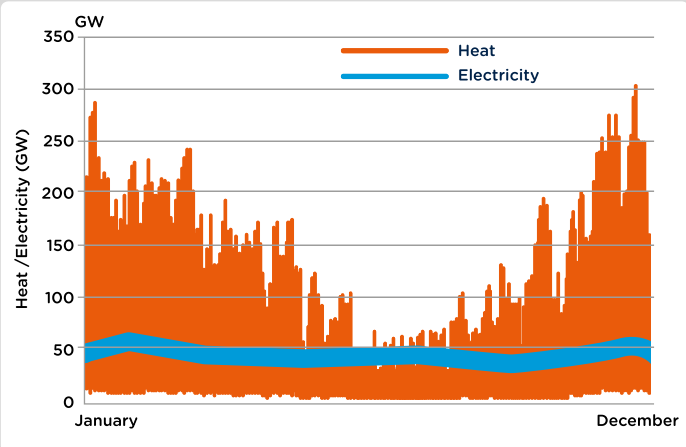


The distribution networks alone are worth over £17 billion[4]

1.2 The gas network of today

Britain has one of the most advanced and efficient gas infrastructure networks in the world with 23.2 million customers connected to 284,000km of pipeline, including almost 85% of homes. The distribution networks alone are worth over £17 billion.[4] The use of gas heating is safe, reliable and with customers paying a third of the price for each unit of gas than for electricity, a connection can provide a real benefit to customers, including those in fuel poverty.

While electricity demand remains reasonably constant throughout the year, in winter heat demand is at least four times higher than peak electricity demand. The gas networks allow peak heat demand to be met in an affordable way and continuing to do so as we decarbonise will remain a key challenge. As the gas network infrastructure is largely underground, it is also 99.99% reliable, with unplanned outages expected only once every 40 years.



Source: Sansom, R. (2015) Decarbonising Low Grade Heat for a Low Carbon Future

Significant sums have already been invested as part of the Iron Mains Risk Reduction Programme (IMRRP) to replace old metal gas mains with modern polyethelene (PE) plastic pipes. Subject to the continuation of the IMRRP at current levels during GD2, it's envisaged the majority of the low pressure distribution network will be made up of PE pipe by 2032. While these pipes are potentially suitable for the transportation of hydrogen, research and innovation to prove it can be distributed safely will be key.

2. Greening the gas network

We believe that 'greening the gas' which passes through our network will ensure we will be transporting a sustainable fuel for homes and businesses well into the future. We know from our own research, people are satisfied using gas for heating. Therefore, if we can decarbonise the gas flowing to people's homes, this minimises disruption, saves households from expensive conversions to more expensive forms of low carbon heat in the future, and allows carbon reduction targets to be met[5].

Subject to further work on the safety case, and the continuation of the replacement of metal pipes with PE pipes under the IMRRP during GD2, we estimate that up to 30% of the gas volume could be decarbonised by the blending of either biomethane, BioSNG, or hydrogen.

2.1 Biomethane

Biomethane (or green gas) is produced by the breakdown of organic material such as food waste, manure, sewage and crops by Anaerobic Digestion (AD) in the absence of oxygen. Once cleaned up to remove contaminants, an almost pure methane gas can be injected into the gas network and used just like natural gas for heating and cooking. There are already over 90 plants connected to the gas network across Britain, over 35 of which are in our company footprint, producing enough green gas to meet the annual needs of over 170,000 homes.

By injecting biomethane into the gas network, modern domestic gas boilers can utilise 90% of the energy in the gas for heating compared to around half that if biogas is used in electricity only applications[6]. Production of biomethane utilising waste derived feedstocks is widely recognised to be environmentally beneficial. However, there are reservations about the benefits of using crops to produce biomethane because of the impacts of changes to the land use and the carbon implications arising. Achieving the top-end estimates of getting 10% of future domestic gas demand from biomethane will require interventions to secure the necessary feedstock[7].

The biomethane market has suffered from uncertainty over the levels of support available under the UK Government's Renewable Heat Incentive (RHI) scheme. We believe it's crucial government ensures there is strong and stable support for biomethane going forward to provide certainty for biomethane projects which can have lead in times in excess of 12 months. The Committee on Climate Change (CCC) said in its 2016 report to the UK Government on 'Next Steps for UK Heat Policy', that increasing volumes of biomethane injection into the gas grid is a low regret opportunity to reduce emissions now[8].

During GD2 we will continue to promote and facilitate the development of biomethane connections and work to overcome the remaining barriers to injection that will enable cost reductions. This will help ensure the injection of biomethane into our networks remains the optimum solution, while ensuring we continue to meet our obligations to run a safe and reliable network.

We believe that 'greening the gas' which passes through our network will ensure we will be transporting a sustainable fuel for homes and businesses well into the future.

2.2 BioSNG

BioSNG or Bio Substitute Natural Gas is a low carbon methane produced by the gasification of residual household waste. The waste that remains once recyclates are removed is converted into a gas, mostly made from hydrogen, carbon monoxide, carbon dioxide and methane. This is then cleaned of contaminants and refined by methanation to produce a carbon dioxide by-product and a low carbon methane interchangeable with natural gas. There is potential to convert the BioSNG process to hydrogen production.

BioSNG has the potential to increase the amount of renewable gas produced in the UK to 100TWh per year (enough to meet a third of future domestic gas demand). It has the potential to deliver several times the quantity of gas that can be generated by biomethane from Anaerobic Digestion (AD) due to the volume of potential feedstocks[9]. With approximately 20% of local authority waste going directly to landfill there are broader environmental benefits from diverting municipal waste streams[10]. It is also a local solution, for example a BioSNG plant using all the waste from the city of Coventry could make enough green gas to heat a quarter of the homes there.

As part of an NIC project, Cadent is supporting the construction of the UK's first commercial BioSNG plant in Swindon capable of heating 1,600 homes or fuelling 75 HGVs, the results of which will be shared. This will help to understand the commercial, contractual and engineering issues and provide assurance of the technology to potential investors. However, Government support for BioSNG will be crucial to allow the development of larger plants and the potential wider rollout of BioSNG across the UK.

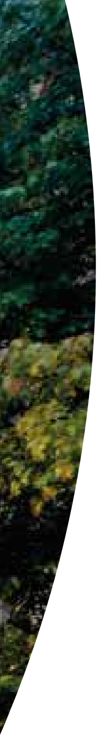
During GD2 we will work closely with our stakeholders to maximise the benefits offered by BioSNG, a potentially key source of sustainable gas that could ensure the long-term future of our network and avoid the costs to customers of moving to other low carbon forms of heat. As part of this we will work to ensure the necessary stimulus is made available.

2.3 Hydrogen

The use of hydrogen in the gas network is recognised as a potentially important part of the future energy mix. There are two ways hydrogen could be used; either blended with natural gas, or as a complete substitute for natural gas. It is thought that blending up to around 20% by volume would have no impact on customers who could continue to use their existing appliances. Further work will be needed to prove existing appliances can safely utilise blends of hydrogen for an extended period.

The use of hydrogen is not a new concept as town gas, used for heating in the UK until the 1970s, was around 50% hydrogen. Current gas quality regulations which are based on the composition of North Sea natural gas only allow 0.1% hydrogen by volume in the UK gas network[11]. The level is much higher in other countries such as Germany where it is currently blending 2% by volume and could inject hydrogen at up to 10% by volume[12].

Important work examining the conversion to 100% hydrogen was the Northern Gas Networks H21 Leeds City Gate project, which showed converting the city's medium and low pressure (<7 bar) gas network to hydrogen is technically and economically feasible.



Although hydrogen releases only one-third as much energy as natural gas when burned, due to its lower energy content, its low density (one eighth of natural gas) means increases to gas network pressures can allow for the slight difference. The low energy content means if 20% hydrogen is injected it would only be equivalent to 6% of the energy, and therefore the carbon footprint of the gas would only fall by about 7%.

Reports, including one by Imperial College have suggested conversion to 100% hydrogen networks in a limited number of locations (e.g. major cities) could be a preferable solution for policy makers to deliver climate change targets than converting many more areas for a blended hydrogen solution. This is because while a 65% blend of hydrogen would go some way to delivering the level of carbon reductions required to meet our 2050 climate change targets, it would still incur significant conversion costs[13].

Hydrogen can be produced utilising renewable electricity at times when supply exceeds demand to split water by electrolysis. Utilising the gas network to store this otherwise unused energy could avoid the need for electricity network upgrades and constraint payments currently paid to wind farms. Although electrolysis is currently very expensive and not yet suited to large scale production, it could provide a useful source of hydrogen for pilot projects, which could help reduce costs and increase its scalability.

At present, Steam Methane Reformation (SMR) has been identified as the lowest cost route to producing sufficient volumes of hydrogen. This sees hydrogen produced by the reaction of natural gas with steam. SMR produces carbon dioxide (CO_2) as a by-product so its use would therefore be very dependent on the availability of carbon capture and storage (CCS). It's a mature technology with around 500 facilities already in operation globally, including one in Teesside. Even though the cost of hydrogen from SMR is around four times cheaper than from electrolysis, the delivered cost of hydrogen would likely be 50% higher than natural gas, and increase gas consumption by a third due to the energy lost in the methane to the hydrogen conversion process.

Important work examining the conversion to 100% hydrogen was the Northern Gas Networks H21 Leeds City Gate project, which showed converting the city's medium and low pressure (<7 bar) gas network to hydrogen is technically and economically feasible. This is aided by the ongoing programme to replace old metal gas mains with modern PE plastic pipe[14]. In practical terms, there would be no need for customers to change their behaviour and the only emissions from hydrogen combustion would be oxygen and water. Near-full conversion would imply a demand for hydrogen of around 330TWh in 2050[15].

Safety is a top priority when considering hydrogen. We were involved in the Hyhouse project which assessed the safety implications of a release of hydrogen in the home[16]. It simulated the release of varied concentrations of hydrogen and natural gas into a property at different rates. Despite the differences in CV and density the risk from a release of hydrogen in the home was shown to be no greater than for natural gas.

During GD2, in collaboration with stakeholders we will continue to support the research, innovation and demonstration projects needed to develop the evidence base and safety case around the potential for blending and 100% hydrogen networks.

The UK's first public hydrogen filling station opened at the start of 2017 at services on the M25

3. Building the gas network

3.1 CNG in transport

Approximately 25% of greenhouse gas (GHG) emissions come from transport. Around a quarter of this is produced by HGVs and buses, a disproportionately high figure considering these vehicle types account for only about 1.5% of all UK road traffic.

We believe gas could be the fuel of choice for HGVs and buses in the UK, which would support CO2 reduction targets and provide cleaner air in cities. The gas network could form the backbone of a national filling station infrastructure providing a clean, quiet and cheap alternative to diesel. CNG filling stations are best fed from the local transmission system (LTS) because this is the most cost-effective pressure for the running costs of the compressors.

There are an increasing number of gas powered HGVs and buses on the UK road network and an increasing number of buses. The largest fleet of gas buses in the UK have benefitted from a refuelling station connected to our Southern network in Reading. Double-decker biomethane buses benefit from the refuelling station as well as single-decker buses and taxis.

A CNG filling station connected to Cadent's network in Lancashire is capable of fuelling over 500 HGVs a day with CNG directly from the high-pressure LTS. Both stations supply 'virtual' biomethane, having certificates to use the same volume being injected elsewhere into the gas network system. A recent analysis showed HGVs refuelling at the Lancashire site emitted 84% less CO2 and up to 99% less nitrogen oxides than an equivalent diesel truck.

3.2 Hydrogen in transport

There could also be an important role for hydrogen as a future transport fuel as it produces no harmful emissions, emitting only water vapour. We were a partner in the Aberdeen Hydrogen Bus Project which demonstrated 10 hydrogen buses. Currently the largest in Europe, this is part of an initiative aiming to commercialise hydrogen fuel cell buses. The project helped demonstrate both the viability of a hydrogen bus fleet and the proof of concept of a hydrogen production and refuelling station. Toyota and other car manufacturers are also investing in hydrogen technology and the UK's first public hydrogen filling station opened at the start of 2017 at services on the M25.

3.3 Extending the network to new communities

Extending the gas networks to new communities could allow industry to benefit from a more secure and affordable form of energy. It could also reduce carbon emissions from industry that previously relied on higher carbon fuel such as oil or solid fuels. This could help stimulate economic growth, with benefits for employment, inward economic investment and industry expansion. It could also help lift previously off-gas grid communities out of fuel poverty. We believe there could be a significant opportunity to tie-up gas network extension projects with the roll-out of other provisions such as superfast broadband.

We have identified some potential opportunities to extend our gas network in Scotland and are looking to commission a market study to assess the viability of schemes. This will include a significant programme of stakeholder engagement to understand the views of a broad range of stakeholders and the demand for these extensions.

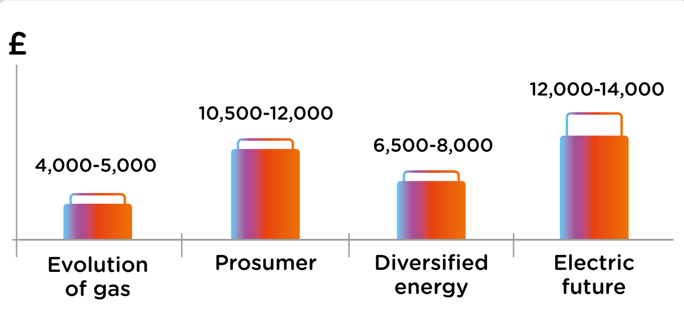
We believe gas could be the fuel of choice for HGVs and buses in the UK.

4. Future scenarios

Research commissioned by the Energy Networks Association (ENA) and carried out by KPMG found that injection of renewable gas into the grid, such as biomethane and hydrogen, offers significant cost savings against alternative low carbon heating sources[17]. It was also shown to be the most practical option in terms of technical feasibility and importantly, the most acceptable to customers and society.

The study looked at four possible pathways the heat sector could be decarbonised; evolution of gas networks and green gas; prosumer (self-generating energy solutions); diversified energy sources with different technologies used across the country; and electric future with a switch to electric heating technologies like heat pumps. The scenario with lower carbon gas as the main heating fuel for most customers offers the lowest cost pathway compared with an all-electric future. This could potentially save individual households up to £10,000 up to 2050.

As part of our work on the future of gas for GD2 and beyond, we have developed three scenarios for the longer term vision of networks which we have set out as follows:



Incremental cost per consumer up to 2050

4.1 Centralised hydrogen

In this scenario, gas remains the heating fuel for most customers. A significant proportion of customers convert to hydrogen gas derived from natural gas with the carbon captured and stored. The remaining customers remain supplied by a blend of methane with a rising proportion from low carbon sources such as biomethane and bioSNG.

To deliver this we need to build our understanding around the costs and scalability of the production of hydrogen and pre-combustion CCS as well as the effect on our network and appliances. We need to continue investing in the network to replace the existing metal pipes and we need to establish the regulatory and market frameworks that would ensure this can be delivered at least cost and in the most equitable manner.

4.2 Decentralised networks

In this scenario, there's a greater regionalisation for the provision of heat. Some new developments may be fully electrified or using district heating, dense urban areas may be fully converted to 100% hydrogen while less dense regions may be connected to a blend of gases through the existing network.

For many areas converted to 100% hydrogen, district heating or electricity, the network may still be there, but as an insurance policy, rather than a primary supply of energy.

4.3 Status quo

In this scenario, we would expect the networks to continue to run on methane with a similar geographic spread and marginally more customers connected than today. The number of new connections would be somewhat balanced out by some early adopters switching to other forms of low carbon energy. This scenario could rely on a diminished green ambition at government level but could also open opportunities to enable the utilisation of our network to provide a cheaper and quieter alternative to diesel for transport.

In this scenario, we'd see the networks becoming leaner organisations following the anticipated end of the IMRRP in 2032. This would be due to the reduced levels of investment as the IMRRP in its current form ends and much lower levels of maintenance than today are required. Plastic polyethylene low and medium pressure gas networks won't suffer from gas escapes as current iron pipes do.

The scenario with lower carbon gas as the main heating fuel for most customers could potentially save individual households up to £10,000 up to 2050.

5. Towards GD2 and beyond

5.1 Rest of GD1 – Opening the blend

One of the priorities for the remainder of the current price control (RIIO-GD1) will be to get the Gas Safety (Management) Regulations (GSMR) changed to reflect the findings of our 'Opening up the Gas Market' project in Oban[18]. This change will be crucial to allow for any future blended solutions. We have recommended the Upper Wobbe limit in GB is increased from 51.40MJ/m^3 to 53.25MJ/m^3. To allow this to happen we're working on the creation of a new more flexible IGEM governed standard which would remove gas quality requirements from GSMR. This will make it easier to make further changes to gas quality in the future.

A further issue to be overcome is whether customers could be more accurately billed for the energy content of the gas they receive, which is currently based on a single average calorific value (CV) for each Local Distribution Zone (LDZ). The gas entered from different sources into the networks rarely mixes with other entry points, having a specific zone of influence. Now, biomethane which has a lower CV must be enriched with high carbon propane to meet the target CV.

Our real-time networks NIC project will look at how we can better model the energy of the gas within our network as to help overcome this issue. Cadent is also undertaking an NIC project called Future Billing Methodology in this space looking at how customers could be billed more accurately based on the actual CV of gas they receive. Initial analysis suggests this could bring cumulative savings to 2050 in the region of £170m-£300m[19].

An NIC project we are looking to undertake before the end of GD1 is to demonstrate a 100% hydrogen network in Scotland, which the Scottish Government has welcomed. We are currently undertaking feasibility studies for three sites, seeking to select the most economic and viable location to construct a purpose built 100% hydrogen network. Each site will be scalable and will look to utilise the hydrogen infrastructure in place for other applications including hydrogen vehicles and Combined Heat and Power (CHP) applications.

In parallel, we are collaborating with the other networks on evaluating network features that would be effected by repurposing of the network to 100% hydrogen. The focus is entirely on the network aspects, not the generation or the carbon capture at this stage.

5.2 GD2 – Building the blend

To ensure all the options in terms of future utilisation of our network remain open, continuation of the IMRRP at current levels throughout GD2 will be key. This will result in the majority of the low pressure distribution network being made up of plastic polyethylene pipe by 2032.

We believe a key objective during the GD2 price control period will be to further develop the blend of lower carbon gas within our networks which will allow customers to be supplied with low carbon energy without the need for new appliances or additional gas network investment. In GD2 we would envisage BioSNG will be injected at scale along with greater quantities of biomethane, subject to the required government support being available.

An NIC project we are looking to undertake before the end of GD1 is to demonstrate a 100% hydrogen network in Scotland, which the Scottish Government has welcomed

We would expect to see hydrogen added to that blend provided there is the evidence to show it can be distributed and utilised safely. The results of the HyDeploy NIC project Cadent is undertaking to blend 10-20% hydrogen on Keele University's private gas network, are due to be shared in 2020. The results of the BEIS study to test domestic and industrial hydrogen appliances are expected in 2019

We believe network extension projects are likely to form a key part of our strategy for GD2 for our Scotland network and are considering several potential projects to allow homes, businesses and industry to benefit from an affordable form of energy compared to the high carbon alternatives they currently rely on. With 90% of homes already connected in our Southern network footprint, opportunities for large extension projects are more limited, however, recent engagement has suggested connections to the gas network are a key component of developments such as the new garden city at Ebbsfleet, Kent.

5.3 GD3 – Deploying cost effectively

We'd anticipate the start of GD3 would see a move towards the end of the IMRRP in its current form, with the low pressure networks almost completely comprised of plastic polyethylene. However, there will still be a population of large diameter metallic mains, steel mains and possible services within the network and further investment may be required outside the IMRRP. Current and future innovation projects will be key to better understanding the potential requirements.

Should the evidence base develop to demonstrate the viability of 100% hydrogen networks across the supply chain, we would expect enabling decisions from Ofgem and Government to allow the gas distribution networks to include plans to facilitate the conversion of the first cities as part of GD3 business plans.

In a status quo environment, with no hydrogen conversion, we would start to see from 2032/33 a decline in our revenue profile. This would however be gradual due to the nature of how gas mains replacement is funded, over 45 years. Over the longer-term it is thought in a status quo environment by GD5, the gas network element of an average gas bill would fall by around a quarter from around £130 today, assuming no reduction in customers[20].

We believe the gas network can be key to delivering the least-cost, lowest impact future energy solution for GB customers

‘No regrets’ policy and regulatory decisions are needed to keep all the 2050 options open

6. Stakeholder engagement

Stakeholder input will be crucial to help shape our final proposals in terms of future scenarios for GD2 and looking ahead to GD3. Initial engagement with our stakeholders on their thoughts relating to the future of the gas network showed that 83% felt we should be looking to increase the amount of green gas transported within gas networks.

As we seek to develop our plans for GD2 and beyond, we are undertaking an iterative programme of engagement with our stakeholders to ensure their views inform and influence our proposals, and ultimately deliver real benefits to gas customers. This includes more targeted engagement with our stakeholders including the creation of a future of gas expert stakeholder panel. Our stakeholder advisory panels meets with our leadership team quarterly to inform our engagement in this area.

We have been clear we believe that solving the energy trilemma of affordability, security and sustainability is just part of the challenge and that more work is needed to understand the impact on customers, not just in terms of costs but also disruption if the whole of the current housing stock has to be retrofitted with a different energy supply. We recognise some of our stakeholders will not yet be aware of some of the future options even though they could cause them significant disruption and cost.

7. Conclusions

We believe the gas network can be key to delivering the least-cost, lowest impact future energy solution for GB customers. Choosing a pathway now which could rule out a future for the gas network up to and beyond 2050, is a significant risk and so all options must be kept open. The optimal solution, or mix of solutions, is not yet known and the priority must be to inform the development of real cost options.

‘No regrets’ policy and regulatory decisions are needed to keep all the 2050 options open, and to provide a platform for investment and innovation in areas such as biomethane and hydrogen. To achieve the required trajectory, innovation and infrastructure must be considered in the next network price control period.

We believe the priorities for the rest of GD1 and into GD2 will be to build on the successful outcome of our ‘opening up the gas market project’ in Oban and look to open the blend of low carbon gas gases in the network, with the possible rollout of BioSNG and a change in regulations to allow for the blending of hydrogen.

A key part of GD2 will be to build the evidence base, and to unlock and enable the large-scale deployment of multiple gas sources in GD3. In all scenarios for GD3 we see a role for blended networks. We believe the work in GD2 around the potential conversion to hydrogen during this period will help inform the potential roll-out during GD3.

Glossary

BioSNG demonstration plant – a Cadent innovation project to demonstrate the first UK commercial BioSNG plant in Swindon producing a grid quality renewable form of gas from the gasification of household waste. http://gogreengas.com/

Calorific Value (CV) – is a measurement of the amount of energy contained in gas. Gas transporters have an obligation to ensure gas has a CV between 37.5 MJ/m^3 to 43.0 MJ/m^3. Customers are billed based on the average CV for each Local Distribution Zone (LDZ).

Future Billing Methodology – an NIC project being undertaken by Cadent to explore the potential options for customers to be billed more accurately based on the actual CV of gas they receive. This could help promote the distribution of more low carbon gas such as biomethane which developers have to blend with high carbon propane to meet current standards. Initial analysis suggests this could bring cumulative savings to 2050 in the region of £170m-£300m. http://futurebillingmethodology.com/

H21 Leeds City Gate – a study undertaken by NGN with the aim of determining the feasibility, from both a technical and economic viewpoint of converting the gas network in Leeds to 100% hydrogen. http://www.northerngasnetworks.co.uk/archives/document/h21-leeds-city-gate

HyDeploy - NIC project Cadent is undertaking will look to demonstrate on Keele University's private network that natural gas containing 10-20% hydrogen can be distributed and utilised safely. The results of this project, which will be shared, are due in 2020. http://www.smarternetworks.org/Files/HyDeploy_170418133639.pdf

Opening up the Gas Market – an NIC project undertaken by SGN in Oban that demonstrated the Gas Safety (Management) Regulations could be safely widened to allow a wider range of gases to be safely used in the GB gas network. This could deliver some £350m annual savings for the gas industry from the avoidance of processing to meet current specifications based on North Sea gas. We are working on the legislative changes to allow this wider range of gases to be used across Britain. https://www.sgn.co.uk/Oban/

Real time networks – an SGN NIC project underway to demonstrate a more flexible gas network through the installation of innovative sensor technologies in our network in Medway, north Kent. The measurement of energy content, flow, pressure, temperature in real time will enable us to understand how we can manage different sources of gases in the network optimally, with respect to network modelling and future billing. https://www.sgn.co.uk/real-time-networks/

Wobbe Index – is an indicator of the interchangeability of fuel gases such as natural gas when combusted. The UK has a Wobbe Index range of 47.20 - 51.41 MJ/m3 with the outcomes of our opening up the gas market project looking to increase it to 53.25MJ/m^3.

References

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/190149/16_04-DECC-The_Future_of_Heating_Accessible-10.pdf
[2] https://policyexchange.org.uk/wp-content/uploads/2016/11/PEXJ4810_Too_hot_to_handle_09_16-V2-WEB.pdf
[3] http://www.gov.scot/Resource/0051/00513466.pdf
[4] https://www.ofgem.gov.uk/system/files/docs/2017/02/riio-gd1_annual_report_2015-16_0.pdf
[5] https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwjlj_XI0Z7TAhVGfhoKHfxuDr4QFggiMAA&url=http%3A%2F%2Fgeography.exeter.ac.uk%2Fstaff_profile_images%2FHoggett2011_Heat_in_Homes.pdf&usg=AFQjCNHZrobctTT9AW9TO0yjM9tEdpyAhQ&bvm=bv.152180690,d.d2s
[6] Biomethane into the Gas Network: A Guide for Producers
[7] http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=45609
[8] https://www.theccc.org.uk/wp-content/uploads/2016/10/Next-steps-for-UK-heat-policy-Committee-on-Climate-Change-October-2016.pdf
[9] http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=45609
[10] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/577716/FINAL_Stats_Notice_Nov_2016.pdf
[11] http://www.legislation.gov.uk/uksi/1996/551/contents/made
[12] http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=45609
[13] http://www.imperial.ac.uk/media/imperial-college/research-centres-and-groups/icept/Heat-infrastructure-paper.pdf
[14] http://www.northerngasnetworks.co.uk/wp-content/uploads/2016/07/H21-Report-Interactive-PDF-July-2016.pdf
[15] https://www.theccc.org.uk/wp-content/uploads/2016/10/Next-steps-for-UK-heat-policy-Committee-on-Climate-Change-October-2016.pdf
[16] https://www.kiwa.co.uk/uploadedFiles/About_Us/GaC/Hy%20House%20Report.pdf
[17] http://www.energynetworks.org/assets/files/gas/futures/KPMG%20Future%20of%20Gas%20Main%20report%20plus%20appendices%20FINAL.pdf
[18] https://www.sgn.co.uk/uploadedFiles/Marketing/Pages/Publications/Docs-Innovation-Oban/SGN_Gas_Market_Report_Full-report-2016-170116.pdf
[19] http://futurebillingmethodology.com/faqs/
[20] http://www.northerngasnetworks.co.uk/wp-content/uploads/2016/07/H21-Report-Interactive-PDF-July-2016.pdf

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Your gas. Our network.

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If you smell gas or are worried about gas safety, call the National Gas Emergency Service on 0800 111 999