

Cadent

Your Gas Network

Developing networks for the future

Long-Term Development Plan (LTDP) 2020



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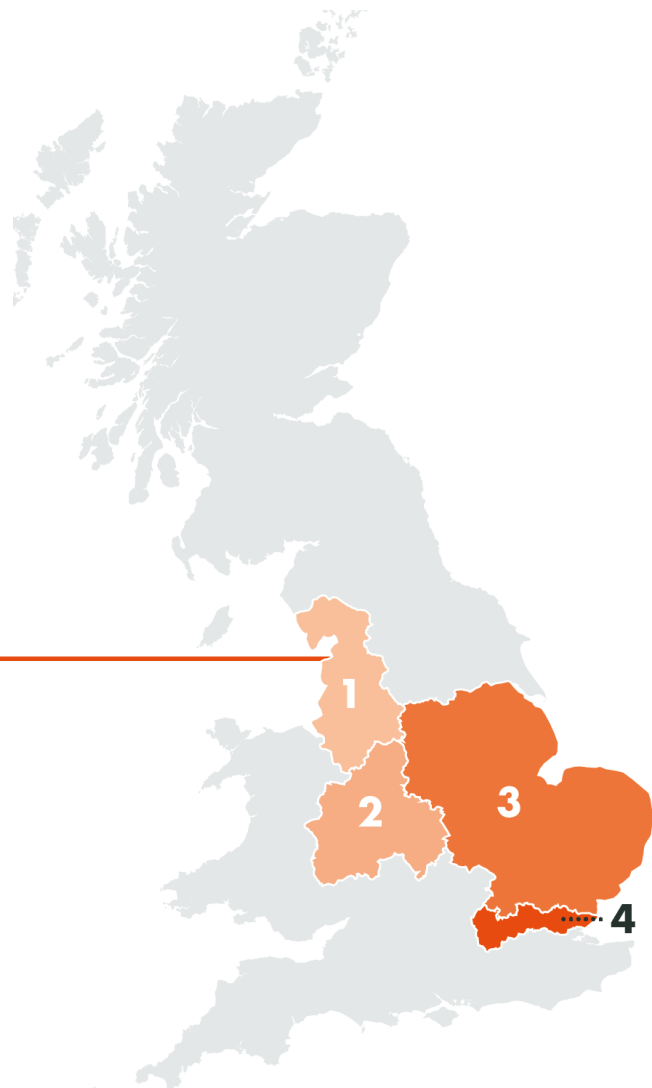
We are Cadent

Your gas network

We own, operate and maintain the largest gas distribution network in the UK, providing our customers with the energy they need to stay safe, warm and connected.

Our networks

- 1 North West
- 2 West Midlands
- 3 East of England
- 4 North London



Welcome to the LTDP 2020

Since legislation was passed last year committing the UK to becoming a net zero emitter of greenhouse gases by 2050, interest and discussion in our country's future energy needs has increased significantly.

We believe our gas network is a valuable asset and will play a huge part in delivering low-carbon energy as part of the overall energy transition required to achieve net zero. As such, we have a pivotal role in stimulating debate, developing and investing in technology, and working collaboratively with a wide range of stakeholders to shape the future.

This annual document shares our thoughts on the future and the evolution of our network to keep our customers' supply safe and secure.

Our starting point is to understand the needs of our customers and stakeholders. Over the last year we have engaged with more of our customers and stakeholders than ever before, allowing us to get closer to our communities and start to transform the services and experiences we provide. This has helped us to develop our business plan for the next regulatory period, RII0-2 (2021-2026), and is a key enabler in helping us to anticipate changing customer or societal needs and expectations. Our business plan commits us to continuing investment in our network to allow new demand to be connected, and increased volumes of low-carbon gas (e.g. biogas) to be transported. It also includes the continuation of our asset investment programme, notably the iron mains replacement programme which is improving the safety of our network, reducing our greenhouse gas emissions and getting our network one step closer to being hydrogen-ready.



While ensuring our network continues to transport natural gas safely and reliably, we are developing the technology, processes and safety case for transporting low-carbon gas. We have 35 biogas connections to our network and are investing to allow greater volumes in the future. Working with our industry, our hydrogen development work is accelerating. In addition to our work looking at blending hydrogen with natural gas at our pilot project at Keele University (HyDeploy), the capability to transport 100% hydrogen is advancing and we are progressing our HyNet project to develop integrated hydrogen/carbon capture and storage (CCS) in the North West. HyNet will decarbonise heavy industry in the Cheshire, Liverpool and Manchester regions and provide hydrogen to decarbonise domestic heat, heavy transport and flexible power generation.

It is clear that we cannot consider our gas network in isolation. The interconnectivity with the electricity system and the need for whole energy system solutions means we are working more collaboratively than ever before to ensure we understand customer demand and can respond to changing needs and patterns of energy use. This will support the increasing volume of new gas-fuelled power generation connections to our networks, which create electricity for customers and are vital to secure the electricity grid.

We're planning now to meet the needs of the future. I hope you find this report both interesting and informative. We welcome any views you have on the plan, including ideas for improvement. Please share your feedback with us at cadentgas.com/ltdp.

John Duckworth, Director of Network Strategy

Customer and stakeholder engagement

We are transforming experiences by listening to our stakeholders and delivering great outcomes.

Our vision of ‘**setting standards all of our customers love and others aspire to**’ has been developed with stakeholders, customers, colleagues and investors. We are committed to engaging to ensure we continually check that we are delivering what is relevant both now and in the future.

This year, we have engaged with more of our customers and stakeholders than ever before, allowing us to get closer to our communities and start to transform the services and experiences we provide.

Highlights of 2019/20

112

Engagement activities

1,000,000

Business insights

86%

Stakeholder satisfaction score

£5,000,000

Directly invested in engagement

1,800,000

Reached on social media
(20% increase)

845

Calls to Language Line
(44% increase)

758,000

Website visits
(74% increase)

5,347

PSR registrations
(6% increase)

How we engage

As we prepare for the next regulatory period, our stakeholder engagement strategy has been updated to reflect our new company vision and the strategic direction of the business.

Our strategy ensures we engage in a way that is tailored to our customers and stakeholders and has the following aims:

- To support the delivery of our business plan both now and in the future
- To assess how we are performing against our company vision statement and the strategic objectives that underpin our vision
- To build trust and stronger relationships with our stakeholders
- To establish and maintain a fully engaged workforce with clear and consistent focus and strong delivery plans
- To be a key enabler in helping us to anticipate changing customer or societal needs and expectations as well as shape the future

Our engagement strategy is structured against the important principle of being centrally defined and regionally delivered – empowering our local delivery teams to engage with their stakeholders in tailored and valuable ways.

Through our enhanced engagement programme, we have updated two of the strategic objectives that support the delivery of our vision: ‘improving the environment’ has become **‘tackling climate change’** and ‘trusted to act responsibly for society’ has become **‘trusted to act for our communities’**. Using precise language such as this emphasises what really matters to our stakeholders, customers, investors and colleagues. We will continue to assess how effectively we are delivering against these promises during RIIO-1 (2013-2021) and into the next price control period, RIIO-2.



Our commitment to ongoing engagement

As part of our engagement journey, we are absolutely committed to engaging both now and into RIIO-2. We have made engagement commitments in our new RIIO-2 business plan and to make sure we are ready for 1 April 2021, we are already exploring and implementing these commitments. Here are just some of the commitments we have made:

Increasing brand awareness

Through our extensive enhanced engagement programme, we identified the importance that customers and stakeholders place on ‘trust’, especially when considering what it would take for them to love the standards that we set. Their feedback has been that, to trust an organisation, they need to know it and understand it – at the moment, most of our customers do not have this knowledge of Cadent. To achieve our vision, enhancing awareness of our brand is critical. We are committing to doing this, linking in with other strategic objectives such as improving customer and community safety through ongoing safety awareness campaigns.

Customer engagement

We will continue to operate with an externally appointed and independent engagement group with rotating membership to ensure continued fresh challenge and insight. We will publish an annual assessment against our stakeholder engagement strategy and commitments within it. Following the success of our regional customer forums over the past two years, we are committed to keeping these forums in place. Our intention is to continue engaging on at least a quarterly basis in all regions and capture evolving areas of interest or challenge throughout the RIIO-2 period. We are committed to using the insights from ongoing engagement activities to continually improve the service levels we offer our customers. The Customer Insights Forum feeds directly into our operational and customer performance governance framework and ultimately reports to our Board.

Stakeholder engagement

In our stakeholder engagement strategy, we show how engagement is critical to the delivery of all our output commitments, with engagement strategies for each output commitment. Our commitment to engagement underpins our strategies for areas such as innovation and our support for customers in vulnerable situations, to enable successful delivery. We have repurposed our national Stakeholder Advisory Panel to create four network-aligned stakeholder groups. We trialled this through stakeholder engagement events which were very successful, and these will operate alongside and complement the national Customer Engagement Group. Where possible, we are leveraging existing groups, such as our ongoing engagement with Local Area Energy Plans.

Online presence

We are moving to digital customer and stakeholder engagement, and have secured online community partners to support our engagement plan. We used a series of pop-up events as part of our RIIO-2 engagement plan, which enabled us to engage with a wider audience, gaining valuable insights into what matters to our customers.

If you would like to find out more about our engagement journey, please visit cadentgas.com/engagement.

The role of renewable gas

Contributing towards a green economy

In the immediate future, the gas networks will play a leading role in reducing emissions through the use of renewable energy. There are several areas where we support cost-effective solutions to deliver emissions reductions, such as the growth of green biomethane plants and the use of gas in the transport sector. We support and facilitate green fuels connecting to our networks, and work with the industry to remove barriers to their continued growth.

Introducing new sources of gas into the existing gas network represents a relatively low-cost decarbonisation option, allowing us to improve the reliability of the UK's energy infrastructure.



When considering the supply of renewable gas, we consider domestic heat and transport in an effort to decarbonise the UK and meet emissions reduction targets and energy efficiency ambitions. We have highlighted the possibilities in this area in our 'Future role of gas' series of publications. In this series, we aim to promote discussions with our stakeholders and inform debate across the industry. You can read the full series at cadentgas.com/news-media/document-library.

Biogas

Biomethane is produced by fermenting organic matter, with feedstocks ranging from farm and animal waste to food and sewage waste, crops and silage. Biomethane producers can export their energy securely and recognise the associated revenues, and the production process affords a green and sustainable solution to waste management for industrial, commercial and domestic users.

We continue to engage with our customers to understand the barriers to entry that they are experiencing. This is especially important this year with COVID-19 and the risk to delivery of products to enable continued injection of biomethane into the network.

We are currently developing a strategy for the opportunities of blending methane and biomethane. This will provide a roadmap to support biomethane producers to reduce their propane injection volumes in biomethane in areas of the network that can facilitate blending. Unfortunately, the capacity to blend will not exist for all existing or future customers as it is subject to several criteria, for example the volume of gas flow in the network at the point of biomethane injection.

Customers are increasingly looking at a 'HUB' connection, where biomethane that has been produced from other sites and transported to one central location is then injected into the Cadent network. We have engaged with stakeholders and industry experts to look at the best way to support our customers.

Low-carbon gas supply



Renewable gas can be injected straight into the existing gas distribution network, and customers won't need to make any changes to their appliances for heating or cooking. Whilst renewable gases contain the same methane molecules as natural gas, they contribute a significant overall reduction in greenhouse gas emissions due to their sustainable production, along with the avoidance of methane emissions from waste feedstock. In the future, we can offset the minor emissions produced by renewable gas using carbon capture.

We sponsored a **study by Anthesis Consulting Group PLC and E4tech UK Ltd**, looking at the potential scale of bioresources available within the UK to make low carbon gas. The study showed that the potential for renewable gas from waste and biomass feedstocks could be as high as 174TWh by 2050, with a central estimate of 108TWh. This is enough renewable gas to meet over 50% of domestic gas demand or to supply all the homes in the south of England. This could be supported further by energy efficiency, imported waste and biomass, and government policy to encourage growth in the appropriate feedstocks.

This is achievable with continued support and longer-term certainty for government incentives such as the continuation or replacement of the Renewable Heat Incentive (RHI). We will work closely with government to communicate clearly the vital role gas plays in the energy mix, so that investors and the supply chain can have confidence for the long term. We will play a full role in supporting the flow on our network by investing to provide capacity where it is required and working with our colleagues across the gas networks to share best practice.

Biomethane connections

We have now successfully connected 35 biomethane sites to our network, which have the potential to heat up to 218,690 homes annually. **Figure 1** shows the breakdown of where our biomethane connections lie across our networks.

We are continuing to work with any new biogas customers to manage the potential 'rush to connect' following the delay of the revised RHI. We have welcomed the extension of the cut-off date for commissioning in light of COVID-19 impacts.

Since our first connection in 2013, we have sought and responded to customer feedback to help drive down costs and improve our processes and commercial frameworks. We are continually reviewing and refining our processes through lessons learned following project commissioning. Our aim is to make working with Cadent as seamless as possible.



Figure 1: Cadent biomethane connections

Facilitating distributed entry gas

From our day-to-day interactions with renewable gas developers, we understand that a primary issue for the networks to address is the availability of network entry capacity. Current commercial arrangements do not facilitate general reinforcements to provide entry capacity, forcing developers to find connection points where there is existing spare capacity.

Even with the current backdrop of uncertainty around the Renewable Heat Incentive, we continue to encourage increased biomethane injection into the network, demonstrated not only by the new connections but also facilitating increased capacity in plants that are already operational and connected to our network.

We are striving to access further capacity within the network through the Network Innovation Allowance (NIA)-funded project OptiNet, where we aim to unlock the true potential of an integrated network through in-grid compression and optimised pressure control. The purpose of this project is to prove the concept of a network solution that can be replicated in capacity-restricted areas to facilitate the opportunity for more injection of unconventional sources of green gas, supporting the UK's target of net zero greenhouse gas emissions by 2050.

Biomethane will play a vital part in the transition to a sustainable future, endorsed by government and fully supported by the anaerobic digestion (AD) industry. We will build on the experience that we have gained to date delivering the existing 35 biomethane connections, and continue to work collaboratively with the AD community to drive further innovation to maximise the full potential of AD to gas grid.

A changing network

The renewable gas connections to our networks are changing the role and nature of the UK energy system. To help support the growth of green energy, we have led a project with the other gas distribution networks to standardise elements of the design and commissioning process for biomethane projects. We have implemented change to several key process areas collaboratively with biomethane producers and their service providers.

To drive further change, the Gas Entry Forum has been formed to enable entry connections processes, standards, and associated commercial arrangements to be kept under review. This will help promote standardisation across the networks, remove barriers, share best practice, enable efficiencies and improvements, and respond to industry developments. Membership will encompass gas networks, AD industry association bodies, regulators and biomethane producers.

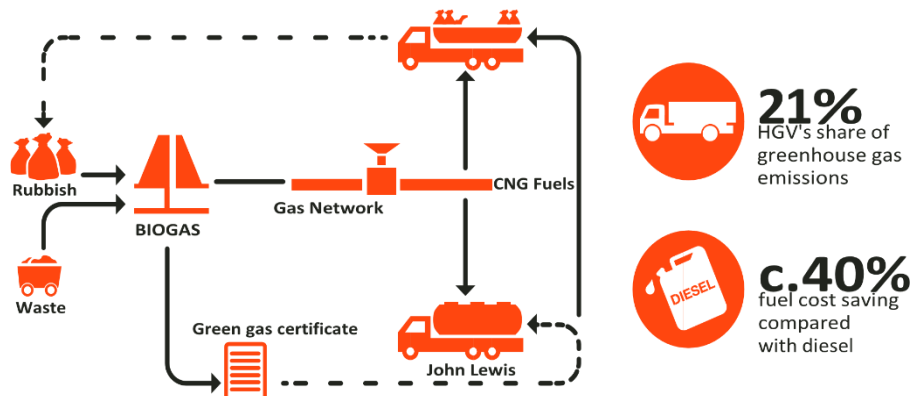
To find further information on our entry gas connection services for biomethane, or other forms of distributed gas, please visit cadentgas.com/biomethane.

Enabling cleaner transport

Reducing emissions from freight

Heavy goods vehicles (HGVs), lorries and buses can all be fuelled using natural gas, using the existing gas network to create the network of filling stations to make this a reality. Gas is a clean, quiet and cheap alternative to diesel, a suitable alternative to reduce emissions from transport. Looking ahead, using certified renewable gas for transport could deliver CO₂ emission savings of up to 84% compared to diesel. As an example of our commitment to decarbonising transport, we supported Nottingham City Council to launch the world's largest gas-fuelled double decker bus fleet with 53 buses, saving 3,500 tonnes of CO₂ annually.

The number of natural gas filling stations connected to our networks to supply HGVs has started to grow, with ten now fully operational including Hatfield (in partnership with GasRec), which is supporting Ocado's growing fleet of 29 gas-powered vehicles, and one in Warrington with CNG Fuels, which will be the largest CNG refuelling station in Europe. We are pleased to announce that we are actively supporting the development of CNG Fuels' large-scale, public access refuelling station at our National Distribution Centre in Birmingham, to reduce emissions from our own vehicles and other fleet operators in the area.



The benefits from leveraging our gas networks to support the transport sector include:

- Supporting UK CO₂ emissions reduction and cleaner air in cities
- Maximising the use and benefit of our gas networks
- The potential for our gas networks to form the backbone of a national filling station infrastructure.



On the road to a zero emission future

We recognise the government and industry focus on replacing UK cars with electric vehicles as a positive step. However, around 21% of transport emissions come from buses, heavy goods vehicles and other vehicles involved in delivering the goods and raw materials needed by our economy. Air quality continues to be a concern, particularly in our cities, so addressing emissions from freight will make a real difference. We have been exploring a range of options to achieve this, including hydrogen fuel cells and using natural gas to power vehicles. Each biomethane-powered HGV typically saves 130-150 tonnes per year of CO₂ when using 100% biomethane, compared to the same vehicle powered by Euro VI diesel, running on a standard diesel blend.



We are actively decarbonising our own fleet, converting our heavy goods vehicles to bio-compressed natural gas (bio-CNG), which will reduce our greenhouse gas emissions by more than 500 tonnes per year. We are also operating three CNG vans in our North West and West Midlands networks to understand how these will reduce the emissions associated with roadside working. We are completing operational trials of electric vans and hydrogen cars in North London fleet, exploring the potential to use electric motorcycles for our first responder riders, and with plans to make every one of our 1,100 first call operative vans zero emission by 2026.

The Warrington bio-CNG refuelling station located adjacent to the M62, which is owned and operated by CNG Fuels and connected to our network, is the largest bio-CNG station in Europe. The facility can refuel 12 trucks simultaneously from ten dispensers, and is capable of dispensing more than 300GWh of biomethane per year, which equates to a reduction in greenhouse gas emissions of 100,000 tonnes per year. In order to meet the increased gas demand, we carried out key reinforcements to the local gas network.

There is an important role for biomethane and hydrogen in delivering the fastest decarbonisation of transport possible. Emerging evidence demonstrates the important role for biomethane in delivering emission reductions from heavy goods vehicles in the 2020s and early 2030s. Electricity and hydrogen use should be supported across all vehicle types and biomethane should be supported for long haul trucks, enabling the sector to achieve significant additional/incremental emission reductions by 2030.

Key signposts (2020 – 2025) which will support the transition to a zero-emission transport future include:

- The sale of CNG and liquefied natural gas (LNG) trucks accelerates to between 7,000 and 12,000 per year in 2025 (13-23% of sales).
- The number of CNG and LNG stations expands rapidly, resulting in between 50 and 100 stations providing national coverage by 2025.
- The first 100-200 hydrogen trucks are tested in commercial operation.
- Planning and funding are completed for the first industrial hydrogen production site with CCS.
- The first trial of hydrogen distribution by dedicated pipeline.
- A commercially viable pathway for the purification of hydrogen from existing gas pipelines is understood.

Transitioning the energy networks to net zero

The critical role of gas in decarbonisation

The gas networks are critical to the decarbonisation of UK energy. Gas provides scale and seasonal storage which other technologies cannot match, at a significantly lower overall cost to customers.

As our energy system evolves to meet the challenge of decarbonisation, we are responding and developing our vision for a low-carbon future which focuses on repurposing the network to use 100% hydrogen. In the short term, biomethane connections are increasing the volume of 'green gas' in the networks, with the medium term focusing on hydrogen blending as a major step in reducing carbon emissions on our journey towards full hydrogen networks.

Supporting the energy transition

"Our gas network is a valuable asset. In the future, it will be used to deliver low-carbon energy to communities as part of a whole system transition to net zero."

Dr Angela Needle, Director of Strategy, Cadent

The UK's ambition to become net zero by 2050 has fundamentally changed the way society thinks about energy.

Across the country, local authorities, large energy users, homes and businesses are considering what this ambition means for them in outlining their own transition plans. We are doing the same in two main ways:

- How we operate a low carbon business in the way we serve our customers
- How we lead the decarbonisation of the UK energy system by supporting the use of low and zero carbon gases such as biogas and hydrogen

We strongly believe that in the future, there will be a more diverse energy system which will both provide customer choice and drive the pace of emissions reductions. We see a continued need for a gas distribution system to provide future green gases for industrial use, power generation, balancing of energy supply, heavy transport, and heating for homes and buildings (particularly to meet peak demands).

There has been a significant increase in pace and interest in hydrogen as an energy vector and we are pleased with the progress that is being made, and the coordinated effort in demonstrating the importance of hydrogen in decarbonising the UK.



Working with our industry

Tackling the net zero challenge requires collaboration across the energy industry. Through the Energy Networks Association (ENA), we are working with our fellow UK gas network companies to transition from being energy distributors today to the technology enablers and market-makers for energy tomorrow. The ENA's Gas Goes Green programme is at the heart of that transition.

Launched in April this year, the programme brings together the engineering expertise of Britain's five gas network companies with the wider energy industry, policymakers, and academics, to tackle the technical challenges associated with shifting our energy system away from natural gas so that it can allow us all to reap the benefits of a world-leading zero carbon gas grid delivering hydrogen and biomethane.

Gas Goes Green is following a Pathway to Net Zero, which sets out the steps that gas network companies and government need to make to turn this vision into reality. That Pathway has been developed by not only independent consultants, but in public consultation with the energy industry, government, consumer groups and academics, with the final outputs peer-reviewed by Imperial College. In its first year, the programme has set out the investment gas networks are seeking to deliver in innovation projects through a Zero Carbon Commitment, the role they are already playing in reducing methane emissions by replacing old iron mains pipes with new hydrogen-ready plastic pipes, and the technical, safety and operational evidence needed for government to make the necessary policy decisions to start blending increasing amounts of hydrogen into the gas grid.

By following this Pathway, Britain could save up to £13 billion a year by 2050 when compared with the alternative of replacing gas with electricity. Research from the programme has shown that Britain's energy billpayers will begin to see a financial return on investment in building a hydrogen economy in the early 2040s, well before we reach our crucial net zero target.

With the postponed COP26 UN Climate Change Conference being held in Glasgow next year, the world's attention will be on what Britain is doing to reach its ambitious net zero goal. Britain's gas networks are playing their part in pushing forward to provide us all with the solutions we need to play our collective part in tackling the climate emergency.

HyDeploy – 20% blending for domestic gas

HyDeploy is the UK's first live pilot to inject zero carbon hydrogen into a gas network to heat homes and businesses. The HyDeploy demonstration is injecting up to 20% of hydrogen into Keele University's existing natural gas network, feeding 100 homes and 30 faculty buildings.

Backed by Ofgem's Network Innovation Competition (NIC), the £7 million project is led by Cadent in partnership with Northern Gas Networks (NGN), Keele University, the Health and Safety Executive (HSE) Science Division, integrated hydrogen energy systems manufacturer ITM Power, and independent clean energy company Progressive Energy.



The purpose of the HyDeploy trial is to show that hydrogen can be blended with natural gas as a first step and used in the same way customers currently use natural gas. The 20% volume blend means that customers can continue to use their gas supply as normal, without any changes being needed to gas appliances or pipework, while still cutting carbon emissions. If a 20% hydrogen blend was rolled out across the country it could save approximately 6 million tonnes of carbon dioxide emissions every year.

We began blending hydrogen into the network at the end of October 2019. Cadent, NGN and Ofgem are funding a further two trials on public gas networks, in Winlaton, near Newcastle later in 2020, and in the North West of England in 2021. For the West Midlands this project has provided a unique opportunity to engage, prepare and train our engineers to operate a blended or full hydrogen network, which will be critical skills on our pathway to decarbonisation.

The ability to blend hydrogen and to operate the network will be critical capabilities supporting our HyNet project, where we plan to inject hydrogen at scale into the North West network.

Innovating to deliver net zero

We are working with companies across the industry to ensure efficient and coordinated development for the benefit of customers. This includes national organisations such as the ENA, the Energy Utilities Alliance (EUA), and the Confederation of British Industry (CBI), to provide a common perspective to government and regional and local authorities to help plan their energy transition.

Net zero requires us to think differently about what we do. We are investing in research and innovation into how the use of hydrogen will impact not only the way we go about doing the work we do today in a safe way, but also how the transition will affect customers and the decisions they make.

Industrial decarbonisation is a great opportunity, typically because it is difficult for some industrial customers to operate on electricity, due to the amount of energy required or requiring a flame for their processes. We are developing an industrial cluster in the North West through HyNet, which will enable rapid decarbonisation of industry through the production of hydrogen and the capture and storage of CO₂.

HyNet – 100% hydrogen with CCS

HyNet is our integrated hydrogen and CCS project in the North West which will decarbonise heavy industry in the Cheshire, Liverpool and Manchester regions and provide hydrogen to decarbonise domestic heat and heavy transport. It is being funded by Ofgem’s Network Innovation Allowance (NIA).

By making use of existing oil and gas infrastructure for CO₂ transport and storage and using existing captured CO₂ from a fertiliser plant as the anchor source, it represents a low-cost route to initial deployment of CCS in the UK.

The proposed CO₂ storage facilities are operated by ENI, the Italian oil and gas company in Liverpool Bay, and represent some of the best storage opportunities on the UK Continental Shelf.

Initial CO₂ capture will serve several major industrial emitters in the region, including the Ince Fertiliser Plant and Stanlow Oil Refinery. This will be followed by the supply of low-carbon hydrogen via a new dedicated hydrogen pipeline to industry, transport, power and into the existing gas network as a blend by 2026. We



estimate that the HyNet project will deliver regional gross social benefit across the project lifetime of £14 billion, and will see the creation of 4,500 highly skilled jobs per annum. Creating the first hydrogen economy will bring inward investment both into the North West and the UK and provide a platform to provide clean gas to a diverse set of customers.

Pathways to hydrogen in our homes

This year has seen a significant change of pace in innovation around hydrogen in homes. The Department for Business, Energy & Industrial Strategy (BEIS) continues with its **Hy4Heat** project which is exploring many aspects of home hydrogen use in terms of its impact on appliances, metering and safety. Appliance manufacturers such as Worcester Bosch have launched their own hydrogen-ready boilers.

Planning the future transition

The gas network provides the foundations of a pre-laid infrastructure for the delivery of hydrogen to all types of customers. By replacing our metal mains with plastic ones, we are making our networks more hydrogen-ready as each year passes and getting them ready for their potential transition. The first areas to target will be our industrial clusters and where networks are ready to receive hydrogen, based on production volumes and the suitability of the network that is close by.

By promoting the use of hydrogen in several applications across the UK, we are also helping others to see the wider potential benefits to the economy, through job creation and the opportunity to create a hydrogen economy to make the UK a world leader in this area.

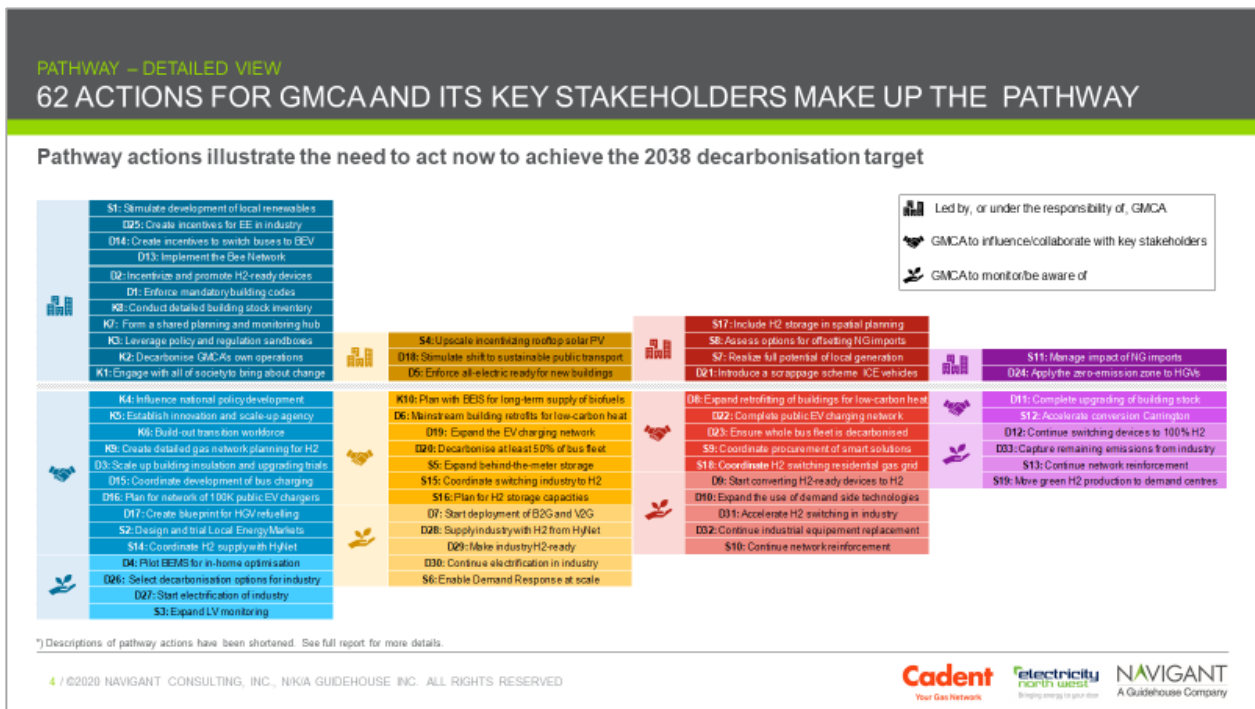
Taking a whole energy system approach

Collaboration between gas and electricity network operators

As the energy networks face increasing challenges from decarbonisation and our journey to net zero, coordination between electricity and gas network operators grows increasingly important.

Extracting the most value from the electricity and gas network infrastructures can be achieved by developing and implementing initiatives that optimise their collective utilisation. This approach will deliver the least cost, least disruptive solutions our customers and stakeholders require urgently to meet our carbon emission reduction ambitions.

We have been championing a whole energy system approach for a number of years, and a great example of this has been the publication of the Decarbonisation Pathway for Greater Manchester, which we produced in partnership with Electricity North West. This provided a powerful, coherent pathway for the local electricity and gas networks to enable Greater Manchester’s 2038 net zero objective.



- Read the **report summary**
- Read the **full report**

Local authority engagement for whole energy system solutions

We want to continue with this type of local area energy planning, and welcome contacts from regional bodies that may be keen to pursue a similar approach for their geography. We would also be interested in supporting whole system solutions for off gas grid communities, where extending the gas grid to provide access to low and zero carbon gases may be a credible option. Whole energy system planning for such communities can ensure robust, efficient, sustainable solutions with minimal disruption are identified to decarbonise their complete future energy needs, including both heat and transport.

We are also actively supporting the ENA's Open Networks project, to explore whole system solutions facilitating local authority growth ambitions. How this will be taken forward is still under development, but the ambition is to provide a higher value efficient service to local authorities by providing a one stop shop for whole system optioneering. We would be very pleased to hear views from any local authority that would like to find out more and help shape the future services provided by the gas and electricity networks in this area.

Another great illustration of the value of whole system cooperation is the connection of gas-fuelled power generation sites. Whilst renewable power generation will take an increasing proportion of the electricity demand, secure, reliable, dispatchable power generation is required for when intermittent renewables are not available. Gas-fuelled powered generation is playing an increasingly vital role in this sector, which is pushing up peak gas demands in certain areas of our networks. We welcome early conversations from parties seeking to connect power generation onto our network, so we can ensure we can provide the necessary capacity efficiently and within the required timescales. You can share your thoughts with us at cadentgas.com/ltdp.

Billing in a low-carbon world: Future Billing Methodology

Ensuring accurate billing with a revised future methodology

As the UK prepares for a future where a range of sources provides us with low carbon energy, it is crucial that the way customers are billed keeps pace with this.

With 84% of UK homes currently heated by gas, we want to help customers move to low-carbon energy, through hydrogen and other green gases, in a way that's affordable and convenient.

As with all innovation, we have a technical challenge to overcome: each gas has a different calorific value or 'strength', so current regulations mean that the gases must be processed to meet billing standards. This can even include adding carbon back into the process, which is not consistent with our low carbon ambition. With the Future Billing Methodology project, we aim to remove the need for this processing by creating a way to measure the blend of gases we are likely to use in the future. If we succeed with this project, we can deliver low-carbon gas to customers and pave the way for larger carbon reductions.

We have installed sensors which are gathering data across Cambridge and South of Scunthorpe, and we are preparing to share with the industry the results from this project. This will allow us to explore different options for billing and recommend the best solutions for customers.



Our environmental performance

Cadent shrinkage

Shrinkage is gas that leaves our network without passing through a meter. It is estimated using an Ofgem approved methodology. Shrinkage includes gas that leaks or is vented from our system (leakage), gas that is used for our operational purposes, for example preheating prior to pressure reduction (own use gas) and gas that is stolen upstream of the meter (theft of gas).

The largest contributing factor to a gas transportation network's greenhouse gas emissions is leakage, therefore the leakage of natural gas contributes to global warming. Shrinkage gas also contributes to customers' bills and therefore any reduction in emissions will decrease our environmental impact and deliver customer savings.



Calculating shrinkage

To estimate leakage from our gas distribution system, we assess the emissions from mains, services and above ground assets in addition to an estimate of leakage associated with specific mains interference damage incidents.

RIIO-1 performance

We are proud of the progress made in reducing emissions during the current regulatory period. We have focused on three key areas:

1. Delivery of the mains replacement programme
2. Optimisation of system pressures
3. Injection of monoethylene glycol into our networks, which helps reduce leakage by swelling pipe joints.

Based on an assumed typical annual consumption of 12,500kWh for a domestic customer, the reduction in emissions is equivalent to the typical gas usage of approximately 120,500 domestic properties.

Table 1 overleaf shows our performance by network over RIIO-1 for carbon reduction.

	Opening	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
East of Eng. (tCO ₂ e)	634,058	586,228	570,399	551,152	551,554	539,511	513,319	502,479
London (tCO ₂ e)	333,586	315,189	306,356	299,330	293,255	279,087	263,075	252,668
N. West (tCO ₂ e)	482,209	453,775	436,541	417,966	406,161	394,292	376,361	364,708
W. Mids. (tCO ₂ e)	402,265	383,869	371,343	355,439	352,412	343,691	332,451	316,784
Cadent (tCO₂e)	1,853,118	1,737,835	1,684,638	1,623,887	1,603,382	1,556,575	1,489,206	1,436,639
Cumulative % Reduction		(6.2)	(9.1)	(12.4)	(13.5)	(16.0)	(19.6)	(22.5)

Table 1: Carbon reduction performance for RIIO-1

Mains replacement

The biggest reduction in our year-on-year emissions is from the delivery of our mains replacement programme which replaces ageing metallic pipes with polyethylene. The benefit from this is enduring – once the metallic pipe has been replaced, the environmental benefit is continual.

Average system pressures

We have introduced bespoke operating strategies for our largest networks; these strategies include specific settings to ensure pressure compliance whilst running the networks in the most efficient manner to reduce leakage.

Monoethylene glycol injection

In some of our networks we still have a large percentage of iron mains that have lead and yarn joints. We treat these joints, which can dry out and cause leaks, using monoethylene glycol, which reduces the rate at which gas leaks from them by swelling the joint.

Future emissions

Our emissions will mostly be influenced in the future by the progression of the mains replacement programme. Over the coming ten years we anticipate a 30% reduction in emissions as the number of metallic mains in the network decreases. Based on an assumed typical annual consumption of 12,500kWh for a domestic customer, we expect the reduction in enduring emissions for the next ten-year period to be equivalent to the typical gas usage of approximately 152,500 domestic properties.

Facilitating connections to our networks

We are continually assessing the service we provide to customers who want to connect to the gas grid to receive a safe and reliable gas supply.

Connections

In 2019-20, we facilitated 16,600 new connections for our customers. We envisage this figure to rise in the medium term until at least 2025; it is difficult to forecast past this date with the uncertainty around the use of fossil fuel boilers in new homes and net zero ambitions.

We offer a variety of services to our connections customers, including:

- Household connections and alterations
- Business-to-business connections and alterations, including more complex projects.

Our service extends beyond connecting paying customers; we recognise the importance of supporting fuel poor customers. Living in a cold home can have much wider impacts than just financial ones, affecting areas such as the physical and mental health of families, and educational attainment of children. We offer free and discounted connections under the Fuel Poor Network Extension Scheme (subject to eligibility criteria) and connected over 2,700 households at risk of fuel poverty in 2019-20. By offering this service, we reduce fuel poor customers' energy costs and improve their quality of life.

Gas-fuelled power generation

We continue to see an increase in the number of enquiries and quotation applications for power generation sites across our networks. We currently have 94 power generation sites connected to our network, generating 1375MW of electricity, and a further 127 sites in progress.

Over the last 18 months we have been leading on engagement with the other gas distribution networks (GDNs) to drive improvements and efficiencies in our processes to support the commercial and operational requirements of power generation connectors.

In January 2020 we hosted a Distributed Power Generation Workshop supported by the other GDNs. The event was attended by Utility Infrastructure Providers (UIPs), Independent Gas Transporters (IGTs), shippers, and power generation developers. Feedback from the day was very positive and the power generation community said they had found the day informative and worthwhile, and would welcome these becoming regular events. The workshop created the opportunity to showcase the improvements we have made to our processes and provided a forum for our power generation community to give us feedback.

Competitive connections

We also process competitive connections within the industry, such as:

- **Connections to IGT networks:** These independent networks are connected to ours, but the IGT owns and operates the network.
- **UIP connections:** A UIP is responsible for designing and constructing the network, which will then be owned and operated by Cadent or an IGT.

Our connections team is continuously improving our service to customers. We recognise that understanding our customers' needs will allow us to evolve our proposition to meet and exceed expectations.

Detailed information on all our connections services, including contact details, incentives for fuel poor areas, charges, and terms and conditions, can be found at cadentgas.com/get-connected.

Off gas grid decarbonisation

Government is considering how to reduce carbon emissions from high-carbon domestic heating systems such as oil and coal. We believe that in some circumstances, where the gas network is nearby, extending the gas grid to a community represents the lowest cost pathway for the residents. Gas is an attractive option which minimises disruption compared to the alternatives. We commissioned a report to assess the wider socio-economic benefits of switching from oil or coal to gas, and this showed a minimum net present value of over £6,000, with a much higher amount when switching from the more polluting fuels.

There is therefore strong evidence that switching from oil or coal to natural gas achieves significant benefits, including carbon emissions reductions, and these would be further improved by renewable gases. Indeed, the new heating systems could be futureproofed to accommodate a future switch to hydrogen.

With this clear benefit, our future plans include stepping up the support we can provide for off gas grid communities seeking to connect to our network. We are also trialling gas network extension, to demonstrate the added value and provide the evidence needed to influence regulatory changes and ensure such extensions become business as usual.

We would welcome feedback on such an approach, particularly from any off gas grid areas where extending the main gas network may be supported. You can share your feedback with us at cadentgas.com/ltdp.

A culture of innovation

Driving change through curiosity

By embracing innovation, we are finding the most up-to-date tools, techniques and practices to keep gas flowing safely, reliably and with minimal disruption to customers. We have moved from a process-driven structure to a regional customer-focused structure, striving to create an innovation ecosystem to address issues at a local level and share best practice throughout our networks.

We believe we can respond in an agile way to the changing needs of the communities we serve. We work collaboratively with the other gas distribution networks on specific projects and share learning and best practice from our day-to-day work. We recognise that working together ensures the maximum benefit to customers, by enabling all parties to embrace new, value-adding technology and ways of working.

In March 2020, we joined with Britain's gas and electricity network companies to set out our latest vision for innovation projects and priorities as part of our collective network innovation strategies. The documents, which include the **Gas Network Innovation Strategy**, set out the principles that energy network companies will adhere to as they commission a new generation of innovation projects up and down the country, helping Britain reduce its carbon emissions between now and 2050, reduce costs and deliver better services to customers.

This year, the documents have been joined by a new whole system Energy Networks Strategy, which will help find new ways for Britain's gas and electricity grid infrastructure to work together in a more integrated way, as the country looks towards an expansion of zero carbon technologies across a range of different sectors.

Looking ahead to RIIO-2, we will be focusing on and securing NIA funding on innovation that addresses opportunities around customer vulnerability and the energy system transition. We have access to an extensive community of innovators through our relationship with the **Energy Innovation Centre (EIC)**, which allows us to bring forward new innovations and technologies from small to medium enterprises around the world, which we can apply to the gas networks to transform the way we operate.

Innovating for today

This year, we have taken many ideas to the point where we can use them in our day-to-day customer operations, while learning from our industry peers and sharing best practice to realise benefits to customers across the UK.



Easy Assist Emergency Control Valve (ECV)

Our Easy Assist ECV project is putting customers with mobility challenges at the forefront of our thinking, with a simple, accessible technology solution.

We have identified a large population of our customers on the Priority Services Register (PSR) who would find it difficult to turn off their gas supply in the event of an emergency. This is due to limited mobility or hand movement.

Our proposed solution is a mechanical device that can be retrofitted over the existing ECV, with a single push button which could be extended from the device. The device would then turn the ECV to the 'off' position. We carried out initial scoping of requirements with support from emergency engineers and call handlers in our Customer Centre. Working with the EIC and Oxford Product Design, we have developed concept designs and created initial models, which we are thoroughly testing for user acceptance with engineers and customers. Once we have identified the necessary changes, we will work at pace to manufacture the product and bring it to market. This technology has the potential to transform the way our customers access their gas supply.

Bonded Saddle



Bonded Saddle is a technology solution which gives quick and easy access to large diameter pipes, reducing time and disruption on-site when carrying out essential upgrades to our network.

This project builds on the existing 'bond and bolt' technique developed by SGN and ALH Systems, allowing us to drill into gas pipes by exposing just the top, rather than the whole, of the pipe.

Since last year's report, we have successfully used numerous Bonded Saddles across our networks for business as usual activity.

We have delivered formal training to our operational teams in how to safely and efficiently install the technology, along with several of our service partners. We have installed over 100 saddles to date, with benefits realised of up to 60% savings in excavation volumes per installation and cost savings of approximately 20% per job. From interest generated from other utility businesses, we are actively engaging with these organisations, sharing the benefits and learnings.

Top Tee Siphon Adaptor



We initiated our Top Tee Siphon Adaptor project to tackle the issue of water entering gas pipes and disrupting customers' gas supplies.

When water enters gas pipes, it can leave customers without gas for several days. Common industry solutions are often time-consuming and keep customers off gas until the water is removed. The Top Tee Siphon Adaptor (TTSA) was adapted from a concept imagined by one of our own engineers, supported by the technical expertise of Gas Leakage Solutions. The result is an easy-to-use, flexible technology that is the first of its kind to be used on a UK gas network.

Since last year, the TTSA has proven its worth on a live, large-scale gas incident in Wirksworth, Derbyshire, demonstrating its ability to benefit gas customers across the UK. We are now distributing the equipment to teams across our networks, with formal training in place to ensure we can deploy at pace.

Demand forecast

Demand forecast across our four gas distribution networks for the next ten years

Appraisal of scenarios

Our demand scenarios are based on planning assumptions that we have derived from market observations and stakeholder engagement. The scenarios consider the need to reduce our carbon emissions, which is critical to meeting the UK’s decarbonisation targets by 2050. They also include the views of specialist consultancies and data collected from National Grid’s **Future Energy Scenarios (FES)** consultation process.

The FES consultation involves market participants, including suppliers, customers and stakeholder groups. It provides important feedback on the impact of market developments.

Demand overview

The latest peak gas demand forecast shows minimal change over the next ten years. All forecasts are based on annual demands, which are then converted into peak demands.

In a world that is constantly changing, we are continually challenging and reviewing the way we forecast to ensure it remains appropriately robust and accurate.

Forecast demand

This year’s projection for future demand is similar to the previous year’s forecast. This has seen an increase in peak demand, with a slight overall reduction over the ten-year period. The increase is partly due to additional peaking electricity generation plants connecting to our network, requiring capacity at peak gas demand times. Other factors include the change in how peaks have been calculated, incorporating experience from the Beast from the East in March 2018.

In 2018, Ofgem requested that networks across transmission, distribution, gas and electricity agree a common set of factors and assumptions for developing their core view of the future.

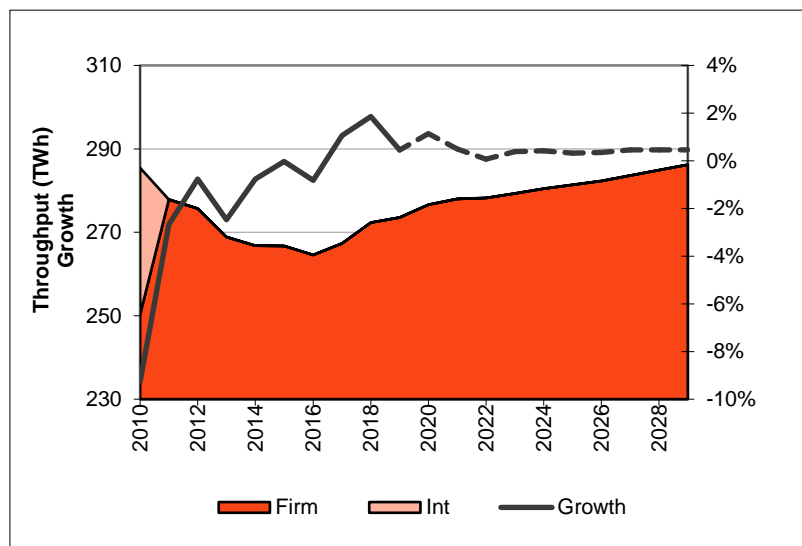


Figure 2: Aggregate Cadent LDZ Historical & Forecast Annual Demand

As part of this review, we debated the key areas that will affect and drive behaviours in gas demand over the next ten years.

The outcome was an unprecedented level of collaboration and knowledge sharing, which has resulted in greater understanding and agreement on the common factors and assumptions affecting each network's demand forecast. This has reinforced the stance we take in all key areas, providing a strong basis on which to review and agree the position for our demand forecast.

The FES 2020 document provides four scenarios in total, with a five-year forecast. The scenarios provide guidance based on the underlying assumptions for each scenario, whereas the forecast indicates the expected demand based on these assumptions.

This year, we have used the five-year demand forecast provided as we believe this represents the most realistic view of the shorter-term evolution of the energy system and is influenced less by the modelling assumptions regarding the longer-term decarbonisation choices.

The four future energy scenarios are summarised in **Figure 3** below:

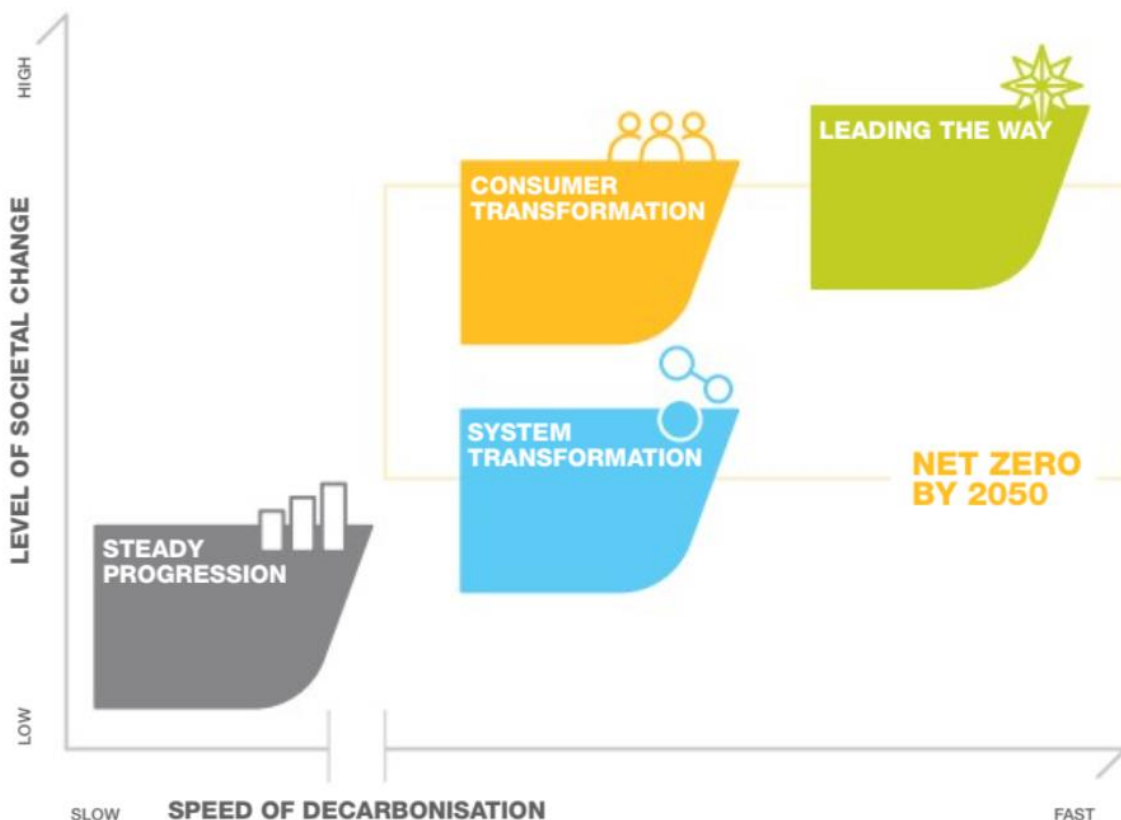


Figure 3: Future energy scenarios

Figure 4 below shows what needs to be achieved and by when for each scenario.



Figure 4: Actions to achieve future energy scenarios

Forecast comparison and accuracy

Read our full [demand forecast](#).

The forecast is broken down as follows:

- Appendix A1 contains demand forecast information at a local level through to 2029/30.
- Appendix A2 splits demand forecast by load categories.
- Appendix A3 includes:
 - A comparison of the actual demands during 2019 with the forecasts published in our 2019 Long-Term Development Plan
 - Maximum and minimum demand days and forecasts for winter and summer 2019/20.

Future demand factors

We have seen annual demand fall because of energy efficiency measures employed in homes and industry, along with milder winters. The assumptions made about the impact of energy efficiency measures on gas demand continue to be reviewed as the easier measures are completed, which leaves the more costly and difficult ones to address.

We do not yet know what the longer-term impact of the COVID-19 pandemic will be on demand, and we are monitoring the situation.

Our forecast demand includes alternative technologies such as air source heat pumps, which will reduce customers' use of gas. We also include gas-efficient appliance technologies like gas-sourced heat pumps and combined heat and power, which reduce carbon intensity. These new and emerging technologies can help us be flexible as we meet our domestic peak heat demand and reduce pressure on the electricity grid. New hybrid appliances powered by renewable electricity could transfer to gas at peak times, or at other times when there is not enough renewable electricity.

Other developments include smart technologies that can switch from electricity to gas depending on changes in the price of electricity, and smart appliances that can choose the cheapest or lowest-carbon fuel. Combining all these technologies is the best way to make the most of renewables across both energy supplies. It will also maximise the use of the network and associated assets that customers have already funded.

New technology and the way gas is used across the year and at peak times is changing, and this will continue as new technologies become the norm and behaviours evolve. This is leading to a clear distinction between our view on annual demands versus peak demand. Gas used across the seasons is likely to continue to decline, but the original relationships that the gas industry has built from experience are beginning to be less relevant. Through numerous innovation projects run by the gas networks, we are looking to understand the evolving relationships between peak and annual demands, and to consider whether we take a whole new approach to how we forecast future demand.

Investing in our networks

We invest heavily in our networks to maintain their integrity and to provide enough capacity for peak demand periods, ensuring we meet our customers' needs.

Investment implications

Our average annual investment across our four regulatory networks over the current regulatory period set by Ofgem is £650 million. Approximately 70% of this investment relates to our gas mains replacement programme, which we have a legislative commitment to deliver with our safety regulator HSE by 2032. This investment programme has considerably reduced the safety risk on our networks since it started in 2001. We continue to invest in reinforcing and increasing the capacity of our networks where required to respond to local authority strategic development proposals and demand from our customers in biomethane connections.

Our networks are designed and operated to meet peak capacity requirement to satisfy our 1 in 20-year demand license obligation (1 March 2018, Beast from the East as an example); however, we are focused on reducing overall consumption of gas, emissions and leakage to reduce our carbon footprint and ultimately costs to our customers. We also drive efficiencies in asset performance through asset investment decisions to introduce smart technology and updating our asset base with more efficient models.

Maintaining the integrity of our networks

We maintain the integrity of our networks by monitoring performance and targeting those assets whose age, current condition, performance and future expected deterioration or obsolescence pose the greatest risk to the safe and effective operation of our networks.

Both live and retrospective performance data for all critical network assets is reviewed regularly by our technical engineering and control centre teams. The purpose of any live data monitoring is to ensure on-day demand and supply within our networks is sufficient, and to identify any alarms/faults which require investigation. Through retrospective asset data monitoring, we seek to identify variances, patterns, trends or cycles in historic asset performance. A statistical framework, using historical data, is used to establish performance warnings, tolerances and action limits.

By monitoring the performance and health of our assets, we can ensure that we balance inspection, maintenance and capital expenditure to maximise the efficient operating life of our assets with a focus on enabling a sustainable and future-ready gas infrastructure.

Monetised risk

Our Gas Transporter Licence requires GDNs to have a common Network Asset Risk Metric Methodology (NARM). NARMs are an evolution from RIIO-1 Network Output Measures and relate to the risk of asset failure. Through our asset management activities, such as replacement or refurbishment, we ensure that the risk to customers is maintained within reasonable bounds. The purpose of this approach is to track delivery of agreed risk reduction measures through the regulatory period.

Risk values are represented in monetary terms as a 'common currency' for comparison between different asset groups and failure modes. This common currency for the statement of asset risk is referred to as monetised risk. The core principle is that 'risk' is the product of probability of failure of an asset – the consequence that such a failure could lead to, and the cost (monetary value) associated with those consequences. The combination of these factors derives a statement of monetised risk for an asset base.

Asset data

We recognise the importance of asset data in the management of assets. Our Asset Data Strategy outlines how we will improve confidence in the quality of our asset data and define a holistic view of critical asset data, combining stock, location, health/condition and risk, ultimately enabling better asset management decisions for our customers. We have now implemented a dedicated asset data team who own the delivery of this strategy and will continually drive improvements in our asset data across our four regulatory networks.

Creating local asset investment decisions

By implementing a new dedicated local asset investment team in each of our four regulatory networks, we will drive efficiencies as part of the localised rolling five-year Network Asset Management Programmes for RIIO-2. These teams will establish close working relationships across the network, internally and externally, to ensure delivery across all our assets whilst implementing refined systems, processes and revised monitoring regimes.

This approach will proactively target replacement of mains to reduce leakage, enable hydrogen readiness and support other network-specific and Cadent-wide initiatives, such as connecting gas-fuelled power generation sites. Our central asset strategy team will provide the consistent asset management framework for each local network to work from, and will define the longer-term asset strategies for low-carbon gas alternatives.

Upgrading our networks for the long term

Our operating model gives us an opportunity to take a long-term strategic view on our replacement requirements for the next ten years to the end of the 30:30 programme. (All iron pipes with a diameter less than or equal to 8 inches within 30 metres of a property are to be replaced with plastic over a 30-year timeframe.) We will also consider future net zero scenarios.

Through network alignment, we have brought our design team together with our strategic planning team, providing us with the capability to take a holistic view of replacement planned work. By investing in modelling tools and the accuracy of the network models, we are creating a model of the future gas network to the end of the 30:30 programme. We are also considering low-carbon alternatives (including hydrogen) to assess the potential requirements for a net zero gas network – and this will influence our overall strategy for asset investments.

We will increase our mains replacement by insertion, through proactive management of our operating pressures and identifying general reinforcements to bolster network capacity. A whole network approach will create regional opportunities to help drive down costs for our customers into the future. Higher insertion rates will also mean less disruption in footpaths and roads for our customers and local authorities.

We are committed to reducing leakage by identifying HSE policy mains with high leakage rates, and will prioritise these for mains replacement over the RIIO-2 period. Using our cost benefit analysis model, we will

identify non-policy mains for replacement or remediation using innovative tools and techniques such as ULC Robotics' **Cast Iron Joint Sealing Robot (CISBOT)**. This not only benefits the environment by reducing our methane emissions, but also benefits our customers by reducing emergency work and interruptions.

By the end of the 30:30 programme, our distribution networks will predominantly consist of plastic pipe, which can carry a wider range of gases including hydrogen. As these pipes also require significantly lower maintenance than existing materials, they will deliver a low-cost, low-carbon network which will play a central role in the UK's future energy system. You can see 'heat maps' of our planned gas mains replacement activities from now until the end of the programme in Appendix B – G.

- **Appendix B: East of England network**
- **Appendix C: North London network**
- **Appendix D: Greater London**
- **Appendix E: North West network**
- **Appendix F: Greater Manchester**
- **Appendix G: West Midlands network**

Reinforcing our networks

Due to growth in housing and the rise in gas-fuelled power generation sites over the medium term, network capacity requirements are constantly changing. Housing developments on the extremities of our networks have continued to rise during recent years, with the fastest growth in the East networks. On average, we have carried out 500 reinforcement projects across Cadent per annum over the last five years, ranging from 1 metre to 20.1 kilometres of new pipe being laid.

To ensure greatest value for our customers, we balance proactive reinforcements with optimising pressures to manage the integrity of the network and ensure we maintain supply to our residential, commercial and industrial customers.

As the working pattern during 2020 has shifted due to COVID-19, we will monitor and review our reinforcement approach in order to anticipate and manage any long-term impacts of an increased number of people working from home. This will ensure that there is an enduring continuity of service as we monitor the potential changes on the demand profiles in our networks.

East of England: The Silverstone and Towcester development on our medium pressure system is our largest project and will see us laying up to 20.1 kilometres of pipe by 2021.

North London: Due to refurbishment of historical buildings and new large-scale developments, we are carrying out general reinforcements which are typically road crossings.

North West: There has been a rise in applications for power generation sites in this area and we are taking a balanced approach of either pressure increases, or pipe laying to secure the network.

West Midlands: The main area for growth which requires reinforcement is in the Warwickshire area.

Supporting customers in multi occupancy buildings

We aim to carry out inspections on the gas infrastructure supplying medium and high-rise buildings. Our work done to date has enabled us to build a sound foundation for these core assets.

We support district heating schemes, which can save costs for customers by providing communal heat from a single central heating system. This can be especially effective in low, medium and high-rise buildings.

We will continue to help communities in multi occupancy buildings explore the best use of energy, and we are planning further specific stakeholder and customer engagement on this matter. We would welcome feedback on this proposal and would be especially interested to hear from anyone involved in regional district heating schemes. You can share your feedback with us at cadentgas.com/ltdp.

Closing statement

Thank you for reading our Long-Term Development Plan 2020. We hope you found the report interesting and informative.

We've given you an insight into:

- Our enhanced approach to customer and stakeholder engagement
- How we are helping the UK achieve its decarbonisation targets to achieve net zero
- Demand forecast for our networks
- The developments we are making to our connections processes
- How we are driving change through innovation
- The investments we are making to enhance our networks.

Our development plans are driven by our ambition to set the standards that our customers love, and others aspire to. We will continue to develop our plans based on customer and stakeholder feedback. Don't forget to share your feedback at cadentgas.com/ltdp if you would like your views to be taken into consideration.

Further reading

Please follow the links below if you would like to find out more.

- cadentgas.com/get-connected
 - Further information if you are interested in connecting to our network.
- cadentgas.com/digging-safely
 - How to dig and work safely close to our gas assets.
- cadentgas.com/news-media/document-library
 - Information and research carried out/commissioned by Cadent, about the future role of gas in the UK energy system.
- fes.nationalgrid.com
 - National Grid's full Future Energy Scenarios documents and supporting information.
- www.ofgem.gov.uk
 - Homepage for the Office for Gas and Electricity Markets (Ofgem).
- www.gov.uk/government/organisations/department-for-business-energy-and-industrialstrategy
 - The Department for Business, Energy & Industrial Strategy – the government department responsible for business, industrial strategy, science, and innovation with energy and climate change policy.
- www.energynetworks.org
 - Homepage of the Energy Networks Association (ENA), the organisation that represents electricity and gas network operators. They influence decision makers about regulation, cost and safety matters and facilitate best practice and collaboration across energy industries.
- www.eua.org.uk
 - Energy & Utilities Alliance (EUA), a not-for-profit trade association that provides a leading industry voice to help shape future policy direction within the energy sector.
- www.gov.uk/government/organisations/office-for-low-emission-vehicles
 - The Office for Low Emission Vehicles works across government to support the early market development, manufacture and use for ultra-low emission vehicles.
- www.gasgovernance.co.uk
 - Home of the Joint Office of Gas Transporters. This site contains information about the Uniform Network Code and its ongoing developments.

Regulatory basis for document

This statement is produced for the purpose of and in accordance with Cadent Gas Ltd obligations in Standard Special Condition D3¹ of its DN Gas Transporters Licence and section O4.1 of the Transportation Principal Document of the Uniform Network Code in reliance on information supplied pursuant to section O of the Transportation Principal Document of the Uniform Network Code. Section O1.3 of the Transportation Principal Document of the Uniform Network Code applies to any estimate, forecast or other information contained in this statement.

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Standard Special Condition D3 requires that a statement, published annually, shall provide a ten-year forecast of Distribution Network Transportation Activity concerning likely use of the pipeline network and system developments that can be used by companies, who are contemplating connecting to our system or entering into transport arrangements, to identify and evaluate opportunities.

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