

October
2024

Developing networks *for the future*

Long-Term Development Plan 2024



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About Cadent

Our responsibilities and geographical reach

Cadent is the largest gas distribution company in the UK. We deliver fossil gas to 11 million homes and businesses throughout the North West, West Midlands, East Midlands, South Yorkshire, East of England and North London - helping keep consumers on our network safe and warm.

In doing this we are responsible for maintaining our network, ensuring that it operates safely and reliably for those who rely on it. We also help homes, businesses and renewable gas suppliers connect to our network.

Cadent supports the commitment to net zero emissions by 2050. We know that the fossil gas we deliver through our network today is part of the problem and not part of the solution. Low carbon heating technologies need to be deployed across our network - and beyond.

Even as a gas network we are clear that there is a significant role for both heat pumps and low carbon heat networks in the future mix. We also believe that green gases such as hydrogen will be needed if we are to be successful. This requires us to consider where there might be a role for our gas distribution network and where there might not be.

“We provide the energy our customers need to stay safe, warm and connected. Our responsibility is to look after the gas pipes so they can continue to deliver safe, reliable and low carbon energy for years to come. We are continually finding smarter and more sustainable ways to develop our networks and work closely with local communities to deliver a high quality service that our 11 million customers expect, We are proud to keep the energy flowing.”



11m

homes and businesses
connected to our network

6,155

employees helping
consumers on our network
keep safe and warm

132,396km

of pipe across our region

Welcome to our Long-Term Development Plan (LTDP) 2024

This document shares our thoughts on the future and the evolution of our network, focusing on which investments we plan to make over the coming years to keep our customers' supply safe and secure, whilst maintaining the high reliability of the network as we transition to Net Zero.

Over the past twelve months, we have made significant progress across many areas of our business. From connecting new anaerobic digestion sites that are delivering a carbon saving green gas for our customers to developing a first of a kind scenario modelling tool, that will help us develop robust plans to decarbonise the gas network. These will enable cadent to be agile and flexible in meeting the needs of our customers and communities both now and in the future.

A central part of our commitment to operating a safe, sustainable and reliable network is our Iron Mains Replacement Programme (IMRRP), a long-term initiative to replace ageing metallic gas mains with modern, durable polyethylene pipes. This programme not only enhances safety and reliability, but also significantly reduces leaks from our network. To further support the delivery of this programme, we are pioneering the development of a Strategic Innovation Fund (SIF) project, the Digital Platform for Leakage Analytics (DPLA). This platform will enable gas networks to strategically target and prioritise the pipes that leak the most, improving the safety of the network and reducing our impact on the environment.

We are constantly seeking ways to minimise risk, control costs and reduce our environmental footprint, and at Cadent we take this need to innovate seriously. A prime example of this commitment is our evolving approach to network monitoring. While sophisticated modelling has long been our cornerstone for understanding and managing potential emissions, we are now transitioning towards a future of direct observation. This means investing in and championing cutting-edge Advanced Emission Detection (AED) sensor technologies and working alongside regulators and the wider industry to drive the transition across the UK.

Our HyNet and East Coast Hydrogen pipeline projects continue to make progress, establishing the UK as a global leader in the hydrogen economy. This has now been underpinned by the UK Government's commitment to hydrogen, including the recent announcement of £22 billion of funding for carbon capture and underground storage in both clusters, which will be vital to realising the full potential of hydrogen.

I hope you find this report informative, and we welcome any feedback, including suggestions for improvement. Please share your thoughts with us at cadentgas.com/ltdp.



—
Dave Moon

Director of Asset Investment

Our Customers

Customer and stakeholder engagement

We have continued to engage with a wide range of stakeholders and customers to ensure that we support society’s changing needs.

Stakeholders previously asked us to take a leading role in helping Britain ‘build back better’ by supporting the ‘green economy’ and ‘levelling up’ agendas. We have risen to the challenge, transforming our business operations, values and purpose, investing significantly in people, processes and systems to drive a future focused culture. Customers want businesses like ours to show our expertise in sustainability and support customer who are most vulnerable. Our Force for Good strategy, which is built on the premise of making life easier, fairer and greener for our communities is creating a lasting and positive social impact, demonstrating our commitment to delivering excellence today and seeking better solutions for the future.

Strengthening and maintaining relationships with multiple stakeholder and customer groups, putting them at the heart of all we do has contributed to embedding a positive culture, allowing a proactive and continuous response to changing customer needs.

Our purpose: Keeping people warm, while protecting the planet.

Our values: We work together, we take responsibility, we drive performance, we shape the future.

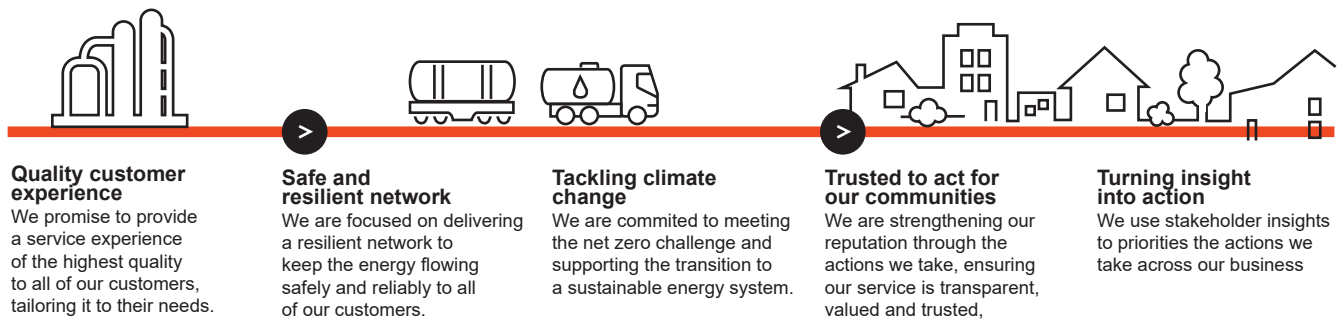


Figure 1: Our customer engagement pathway

Our stakeholder and engagement strategy

Our engagement strategy is centrally defined and regionally delivered. It is fully embedded in our business and ensures the strategic alignment of engagement activities across the whole company. It allows us to engage in a way that is tailored to our customers and stakeholders and has the following aims:

- To inform and support the delivery of our Business Plan
- To assess how we are performing against our company’s purpose, values, the strategic objectives that underpin them and whether we need to do more
- To be a key element in building trust with our customers, stakeholders, and employees

- To establish and maintain a fully engaged workforce with a clear and consistent focus
- To ensure our stakeholders are kept informed in a timely way
- To be a key enabler in helping us to anticipate changing customer/societal needs and expectations; when we consider the current uncertainty that exists around future energy policy and aligning thinking across the industry and beyond
- To gather critical insights on how we can make things fairer, easier and greener to ensure that no one is left behind in the UK's energy transition.

Our commitment to ongoing engagement

As we continue our engagement journey, we are exploring and implementing various ways to engage with our customers and stakeholders. Each year, we review our enhanced engagement strategy with stakeholders and customers to ensure it is in line with their expectations and that their insights are delivering better outcomes. Below are some of the areas where we have expanded our reach or changed how we engage.

Customer forum

Our Customer Forum continues to be an engagement channel that allows us to test our strategies and plans with a diverse group of people living across all our networks. This includes hard-to-reach audiences such as customers in fuel poverty, people with compounded vulnerabilities, future generations and those whose first language isn't English. The forum has grown to 200 informed and uninformed customers to ensure that we have a range of views from different perspectives.

Strategic relationships

Enhancing our relationships with partners remains a priority as our services have expanded in response to stakeholder feedback and evolving customer requirements. Our partnerships are grouped into categories: strategic, programme and project, depending on the breadth and longevity of the relationship and the associated activities. We regularly review outcomes and performance using our partnership evaluation tool to ensure that the partnership is delivering against its aims and re-categorise depending on the outputs and conclusions.

Inclusive and accessible engagement

We strive to ensure that all engagement we do is both inclusive and accessible. We use a variety of engagement methods to create opportunity for all our customers to have a voice. Our engagement has included both digital and non-digital methods such as online surveys, interviews (face to face and telephone), focus groups (online and face to face), stakeholder round tables, as well as webinars conducted via Teams and Zoom. We have also introduced ethnographic studies, during which participants complete activities over a period of time and share their feedback via a plethora of media.

If you'd like to find out more about our engagement journey, please visit [our engagement pages](#).

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 2023-24, we facilitated 9,350 new connections for our customers, a c.17% reduction from the previous year. This can be attributed to the increase in energy costs, contributing to the national cost of living crisis. In addition to this, there is an expectation that consumers have begun to explore alternative energy options whilst the uncertainty around the use of gas boilers in new homes and net zero ambitions remains as we head towards 2025. It is difficult to forecast past this date due to these challenges.

We offer a variety of services to our connection’s customers, including:

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

Our service extends beyond connecting paying customers and 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 63 households at risk of fuel poverty in 2023-24. By offering this service, we reduce fuel poor customers’ energy costs and improve their quality of life.

Gas-fired power generation

Over the last year the numbers of enquiries and quotation applications we have received for power generation sites across our networks has levelled. Power-generation continues to be an essential part of the energy resilience market providing a unique solution to immediate energy requirements during peak demands. We currently have 179 power generation sites connected to our network, generating 2272.3 MW of electricity, and a further 35 accepted projects awaiting design and build. We have continued to work with the power generation community and Utility Infrastructure Providers (UIPs) over the last 12 months, providing support throughout the lifecycle of the projects with increased focus on their design and commissioning phases.

Connection Type		East Anglia	East Midlands	North West	West Midlands	North London	Total
Power Sites	Generation	26	56	65	16	16	179

Table 1: Total Power Generation connections to our networks by area

Competitive connections

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

- **Connections to Independent Gas Transporter (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.

Account management is now fully established in the closure file process. During 2024/25 we will commence a programme of customer engagement to understand customer's needs to ensure continuous improvement.

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/services/3rd-party.

Off gas grid decarbonisation

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 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 future proofed 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 trialing 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.

Renewable energy and the environment

Our environmental performance

Shrinkage

Shrinkage is gas that leaves our network without passing through a meter. While not physically measured, it is modelled and 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 gas prior to pressure reduction (own use gas) and gas that is stolen upstream of the meter (theft of gas).

Leakage is the largest contributing factor of greenhouse gas emissions from the gas transportation network. The leakage of natural gas therefore contributes to global warming. Shrinkage gas also contributes to customers' bills and so our continued drive to decrease the environmental impact of shrinkage also delivers customer savings.



Shrinkage Assessment

To estimate emissions from our gas distribution system we use an Ofgem approved methodology and model. It includes an assessment of emissions from mains, services, and above ground assets in addition to an estimate of leakage associated with specific mains interference damage incidents. The model applies pre-determined leakage rates but is updated annually for a number of activity-based factors. The most significant of these being the changes to asset lengths associated with our mains replacement programme, and the management of the system pressures.

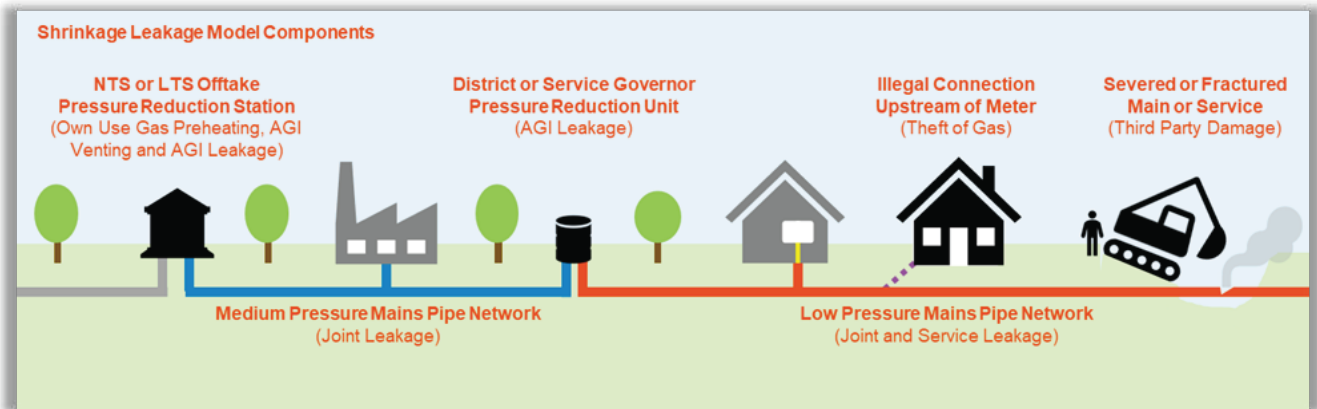


Figure 2: Shrinkage Leakage Model components

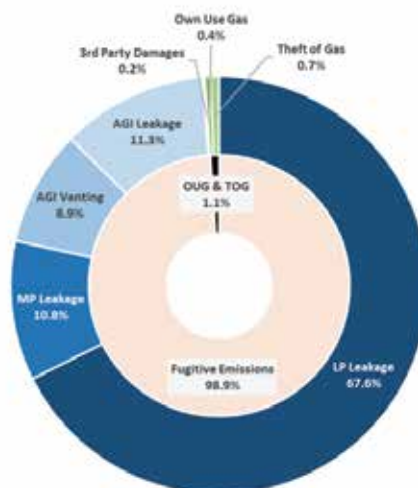
The model is continually reviewed with a view to enhancing calculation methods and improving the accuracy of the leakage assessment. At this current time, we are investigating the potential use of advanced leak detection technologies as part of the Cadent led Digital Platform for Leakage Analytics (DPLA) project. The DPLA will enrich the granularity and accuracy of our fugitive emissions reporting and allow all Distribution Networks to proactively and confidently target leak interventions. We are also reviewing the methodology used to determine our Own Use Gas volumes and are confident that accuracy improvements will be made to this calculation.

Emissions Performance

The chart below shows the split between the different leakage components, theft of gas and own use gas categories in 2023/24. We expect the mains leakage portion to continue to decrease year on year as a result of gas mains replacement activity. Own use gas and theft of gas are calculated as a factor of throughput and so will vary according to demand.

The majority (98.9%) of Cadent emissions are from Leakage, with Own Use Gas and Theft of Gas only contributing a small percentage of the total. Own Use Gas and Theft of Gas are components that account for gas that is used, but not metered, and so is estimated as part of the Distribution Network emissions assessment.

Cadent Shrinkage Components by Environmental Impact



A summary of the 2023/24 Shrinkage volume performance against the prior year is shown in the table below. Across our four networks shrinkage gas losses were reduced by 35.6GWh (3.4%). Based on an assumed typical annual consumption of 12,500 kWh, this reduction is equivalent to the gas usage of approximately 2,850 domestic properties

Component		GWh	Commentary
2022/23 Shrinkage (GWh)		1,045.8 GWh	2022/23 Emissions Total
Mains and Services	▼	(41.6 GWh)	Benefits from Mains replacement
System Pressure	▲	7.5 GWh	Impact of system pressure movement
MEG Treatment	▲	6.2 GWh	Changes to gas conditioning performance
3 rd Party Damages	▼	(3.1 GWh)	Changes to 3 rd party damage volume
AGI Emissions	▼	(0.2 GWh)	Movement in AGI Venting and Leakage
Own Use Gas	▼	(2.6 GWh)	Throughput impacts on Own Use Gas
Theft of Gas	▼	(4.5 GWh)	Throughput impacts on Theft of Gas
2023/24 Shrinkage (GWh)		1,010.2 GWh	2023/24 Emissions Total

Table 2: 2023/24 Shrinkage volume performance against the prior year

Cumulative Performance

We are proud of the progress made in reducing emissions since the start of the RIIO-1 regulatory period, which was achieved from dedicated focus in three key areas:

- Delivery of the pipe replacement programme by inserting plastic into our metal pipes
- Optimisation of system pressures in the local networks
- Injection of mono-ethylene glycol (MEG) into our networks, which helps reduce leakage by swelling pipe joints

Network level cumulative performance is summarised in the table below, demonstrating latest reported performance against the outturn position prior to the start of our RIIO-1 regulatory period.

Network	2012/13	2023/24	Diff
Eastern (GWh)	517	356	-31.2%
London (GWh)	272	176	-35.5%
North West (GWh)	394	249	-36.9%
West Midlands (GWh)	328	230	-29.7%
Cadent (GWh)	1,512	1,010	-33.2%

Table 3: Network level cumulative performance

Since 2012/13, Shrinkage volume reductions of 501.6GWh (33.2%) against opening baselines have been achieved. This is the equivalent to the gas consumption of approximately 40,130 homes using the calculation approach described above.

Forecast Performance

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 23% reduction in emissions as the number of metallic mains in the network decreases.

The role of biomethane in achieving net zero

Contributing towards a green economy

Biomethane is a low carbon gas produced by purifying biogas to the point where the composition is as similar as possible to that of natural gas. This is then injected into the gas networks through an entry connection making the role of the gas networks to reduce emissions key.

We support cost-effective solutions to deliver emission reductions, through the growth of green biomethane plants, utilising gas for electricity power generation and the use of gas in the transport sector. We continue to work with the industry to remove barriers to their continued growth through innovation.

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 and maintain diversity of energy supply.

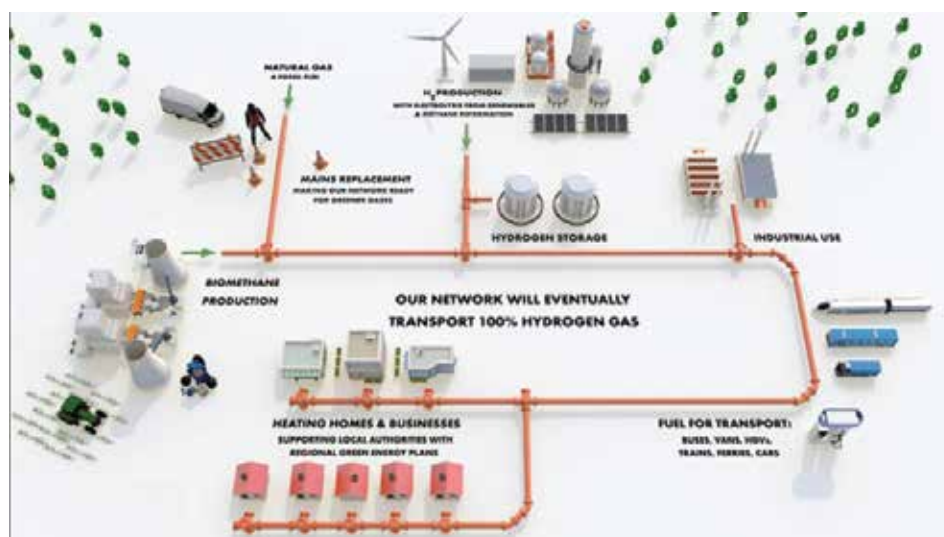


Figure 3: Introducing greener gases into our network for decarbonisation

When considering the supply of renewable gas such as biomethane, we consider domestic heat and transport to decarbonise the UK and meet emissions reduction targets and energy efficiency ambitions.

Benefits of Biomethane Injection

Biomethane is produced by fermenting organic matter, with feedstocks ranging from farm and animal waste to food and sewage waste, crops and silage. In addition to energy decarbonisation benefits, the production and injection of biomethane into the gas grid affords a green and sustainable solution to waste management for industrial, commercial and domestic users as well as providing an additional green, revenue stream.

Biomethane connections

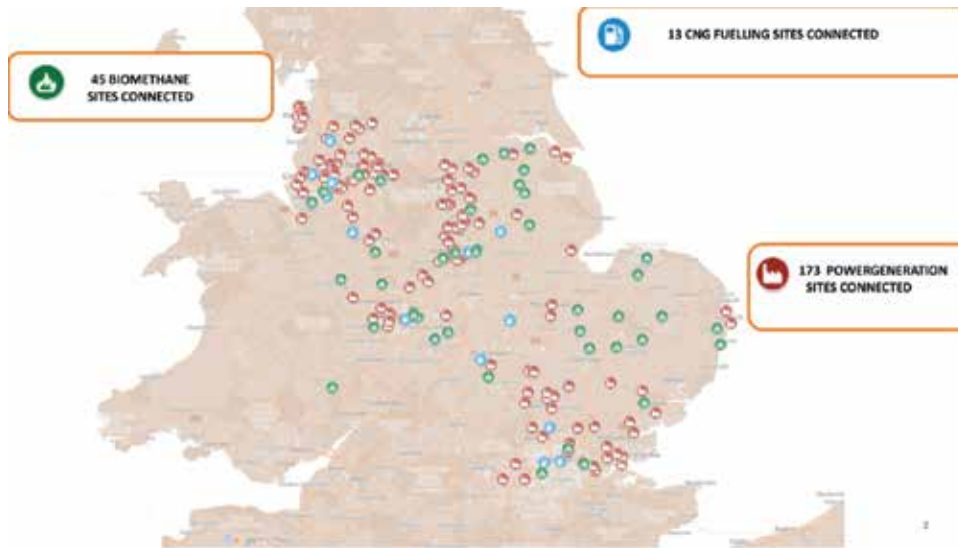


Figure 4: Connected sites on our network

We continue to engage with our customers so we can refine our processes to facilitate continued growth in the biomethane sector resulting in greater volumes of green gas production and injection into our network. Alongside this, we are developing a collaborative maintenance framework to meet our legislative obligations whilst the plant is operational and flowing biomethane into the gas grid.

We have successfully connected 45 biomethane sites to our network, which have the potential to heat up to 302,124 homes annually.

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. We are encouraged that we have seen an increase in enquiries from our customers for connection of plants, with 10 accepted offers with a gas to grid date confirmed for 2025/26. We continue to work with Industry and the UK government to open further potential growth through the conversion of existing anaerobic digestion (AD) plants to Gas to Grid from Combined Heat and Power (CHP) as these assets come to their natural end of life.

Biomethane will play a vital part in the transition to a sustainable future, endorsed by the government and fully supported by the AD industry. We will build on the experience that we have gained to date delivering the 45 biomethane plants connected and continue to work collaboratively with the AD community to drive further innovation to maximise the full potential of AD to gas grid.

RIO Plan	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25
Sites connected	1	10	22	28	29	32	35	36	38	42	44	45
TWh Max Flow	0.07	0.64	1.44	1.78	2.03	2.38	2.52	2.62	2.80	3.08	3.35	3.47

Table 4: Total Biomethane connections and TWh production

Biomethane supply

Renewable gases like biomethane 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. When combined with carbon capture use and storage (CCUS) technology it also has a potential role to play in providing 'negative emissions'.

Facilitating distributed entry gas

Entry capacity remains a challenge for the growth of the renewable gas sector in some areas of the gas networks. We have been working on an innovative project partnering with Wales & West Utilities (WWU), tackling this barrier to connect for customers head on through the Optinet Project with a reverse compression solution and optimised pressure control. The purpose of this project is to prove the concept of network solutions, unlocking of capacity in the lower pressure tiers of the network through compression to the higher-pressure tiers and a 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.

The project has successfully completed the smart pressure control trial and the compressor has now been installed within our East Midlands network with final commission of the asset planned in for November 2024.

This solution could also benefit already connected biomethane plants by enabling them to reach the maximum continuous flow rate, 365 days of the year, when currently they are restricted during summer months due to network constraints.

Along with compression to reverse the flow of gas we are upgrading 10 of our offtake metering systems in the next 2 years to give us greater control over the amount of natural gas we take onto the network, ensuring biomethane is the priority fuel used. Smart pressure control to be utilized where we have compression and as a stand-alone solution for some parts of the network which allows the network to react in real time keeping pressures low enough for the biomethane sites to inject but high enough to reach the extremities of the network ensuring security of supply.

A changing network

The renewable gas connections to our networks are changing the role and nature of the UK energy system. We continue to work collaboratively with the AD community and the Gas Distribution Networks (GDNs) through the 'Customer Entry Forum', to drive standardisation and growth of green energy for biomethane connections.

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

Enabling cleaner transport

On the road to a zero-emission future

Decarbonising our fleet will be a major step towards meeting our net zero target. We have proactively moved away from fossil fuel vehicles to electric vehicles where practicable, e.g., our company vehicles and company cars, and are exploring ways to limit the carbon emissions from the rest of the fleet.

This includes a range of solutions including biomethane and hydrogen fuel cells.



Figure 5: Example units from our zero-emission fleet

Decarbonising transport

We have been exploring two primary routes to power these vehicles: biomethane (via compressed/liquefied natural gas – CNG/LNG) and hydrogen (via fuel cell electric vehicles - FCEVs), each at different levels of market readiness. We see an important role for both biomethane (in the short to mid-term) and hydrogen (in the mid to long-term) in delivering the fastest decarbonisation of transport possible. This was supported by the Government Hydrogen Strategy update in August 2023. Emerging evidence demonstrates the important role for biomethane in delivering emission reductions from HGVs throughout the 2020s and early 2030s, as shown within our Green Gas Transport Pathway report.

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 with new demand from a new sector
- The potential for our gas networks to form the backbone of national filling station infrastructure (the Zemo Partnership WTT report found that network-transported 100% hydrogen provides the most efficient, lowest emission distribution pathway).

Hydrogen future

Looking longer-term, hydrogen has significant potential to decarbonise sectors that have proven highly difficult to electrify, such as heavy transport. This presents a great opportunity for the existing gas network to add major value to the decarbonisation of transport if a reliable, accessible, and economical refueling infrastructure is developed, as was identified in our NIA-funded Hydrogen Grid to Vehicle (HG2V) work.

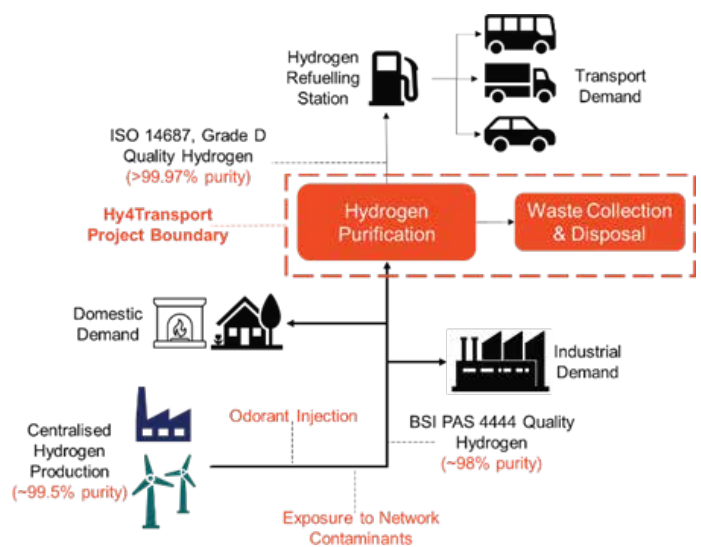


Figure 6: Hy4Transport Concept Diagram & Project Boundary

Our Hy4Transport project evolved from this and delivered essential evidence of the technical and commercial viability of purifying grid-supplied hydrogen, so that it can be used for FCEVs. The ambition was that the project could link the decarbonisation of both heat and transport in a way that may prove to be more efficient, and economically favourable than alternative options, further stimulating the growth of hydrogen production and demand.

In 2022 we were awarded £296k of funding by the Department for Energy Security and Net Zero (DESNZ) to conduct a full 8-month Feasibility Study, with our final report published in March 2023. Since then, we have supported National Gas Transmission’s similar ‘HyNTS Deblending’ project, which was successfully awarded £9.9m of SIF funding for a full Beta-phase demonstration over 3 years, which started in September 2023. This project, based at the Future Grid site in Spadeadam, will physically demonstrate the deblending & purification of hydrogen (from gas supplied by high pressure transmission pipelines) for utilisation in FCEVs across the UK transport sector.

Biomethane vehicles

Each 100% biomethane-powered HGV typically saves up to 84% (typically 130-150 tonnes per year) of CO₂, compared to the same vehicle powered by Euro VI diesel (a standard diesel blend).

We are actively decarbonising our own fleet, converting our HGVs to bio-CNG, which will reduce our greenhouse gas emissions by more than 500 tonnes/year. We are also operating a number of CNG vans in our Northwest and West Midlands networks to understand how these will reduce the emissions associated with roadside working.

We currently have one site in build at Doncaster which is due to connect Autumn 2024. This will be a public access site owned and operated by CNG Fuels. We have a further 2 accepted sites within the East Midlands Network. In June 2024 Scania UK launched a new three-axle (6x2) CNG truck which increases the addressable market to include the preferred vehicle class of UK fleet operators.

Network	East Anglia	East Midlands	North West	West Midlands	North London	Total
CNG Fueling Stations	1	4	2	5	1	13

Table 5: Total Power Generation connections to our networks by area



Figure 7: Cadent CNG Fueling Landscape

There are roughly 437,000 HGV's on the roads today in the UK and only 1-2% are fuelled by CNG. This market is now rapidly growing and is expected to expand over the next year due to the increase in market availability of the 6 x 2 tractor. In addition to the thirteen connected fuelling stations shown in the table above, we have a further three CNG fuelling sites in East Midlands in progress.

Many big brand companies are increasing their CNG fleet. John Lewis has 160 CNG lorries in its fleet at present and is aiming to phase out all 600 of its diesel lorries by 2028.

Delivery company Evri has placed an order for a further 70 CNG lorries which will bring the total number of these in their fleet to 160. They estimate that, collectively, these 160 vehicles will reduce its annual CO2 footprint by some 24,000 tonnes annually.

Royal Mail is also expanding its use of these with an addition of 29 CNG lorries to its fleet.



Figure 8: Logistics company utilising CNG vehicles

Not only are logistics companies using CNG vehicles for their delivery fleet but there is also a growing market with bus companies.

Nottingham Transport has the largest bio-gas bus fleet in the world with 167 double deck buses and as these buses use bio-methane it means they produce 3.5 million kg less CO2 per year.

Electrification of our fleet

Towards the end of 2019 we commenced operational trials of electric vans (EVs) for our North London First Call Operative (FCO) fleet. Expanding from this, we have now rolled out EVs across all four of our networks - and we intend to replace our entire FCO fleet (of around 1,100 vans) with EVs by 2026, in line with our Environmental Action Plan.

As at March 2024, we had 472 electric FCO vans in operation. We have learned many lessons, during the roll out, which has put us in the best place to deliver on our promises and approach the full roll out in an informed and structured manner, drawing from advising partners such as Cenex.

We are also exploring options on how to replace around 2,500 commercial vehicles to other low or zero emissions, such as plug in hybrids to replace diesel LCVs.



Figure 9: EV charging point

Shaping the future

Transitioning the energy networks to net zero

Our focus remains on enabling an effective transition of our gas networks to green gases

Over the past 12 months there has been significant activity across the energy policy landscape, with the Energy Bill approved into law, which includes important policies to support both carbon capture and storage and a hydrogen production subsidy. It also introduced the creation of a National Energy System Operator (NESO) with a strategic energy planning role. The government also announced that homes would not be forced onto electric heating, with an approximate 20% needing alternative solutions, thus paving the way for alternatives such as hydrogen. They also confirmed their support for blending hydrogen into the gas network, to enable hydrogen production at scale. This outcome is a direct result of the key enabling project under our HyDeploy programme, that has looked specifically at the safety and technical potential for blending hydrogen.

Blending facilitates the start of the UK's hydrogen economy

We have continued to champion the role of hydrogen as a blend into our gas networks, as we believe it will have an immediate positive impact in reducing the carbon emissions from domestic heating, without the need to make significant changes to infrastructure.

In late 2023, the UK Government set out their 'minded to position' on blending hydrogen into our gas networks. The policy decision whilst favourable, is subject to blending being safe, which will be determined by the Health and Safety Executive (HSE) upon reviewing the evidence that has been generated from our HyDeploy2 project. HyDeploy 2 is a project we have delivered in conjunction with Northern Gas networks, where we have completed trials on both private and public networks to determine how the pipe and component materials performed and how the residents found the experience. The project received positive support locally. The project team have spent 23/24 exploring the impact of hydrogen blends on industrial and commercial customers' heating appliances and developing the resultant evidence for submission to the HSE for their formal assessment. The project team are now ready to submit the final evidence to the HSE and respond to any queries once DESNZ and the HSE reveal the agreed timescales for this review.

Demonstrating a safe transition to hydrogen

Over the past 12 months we have continued to deliver projects that help develop evidence in support of hydrogen conversion, including continuing to lead the End User Safety Evidence programme, which forms part of the Government's Hydrogen for Heat programme led on by the Department of Energy Security and Net Zero (DESNZ). The evidence will be submitted to the HSE later this year for their review and recommendation to the government, in support of their Heat policy decision (anticipated in 2026).

Planning new hydrogen infrastructure

Our hydrogen regional development programme has made huge progress this year, with hydrogen for industry and power generation being clearly supported by the UK Government. The purpose of this programme is to establish where the first hydrogen production, hydrogen storage and industrial demand will be and how Cadent can facilitate in connecting these with pipeline infrastructure. The regional programme has now established a series of projects that helps us to engage with stakeholders. This programme is largely funded through an Ofgem allowance and consists of the regional projects called HyNet, East Coast Hydrogen, Capital Hydrogen, East Midlands Hydrogen and Hydrogen Valley.

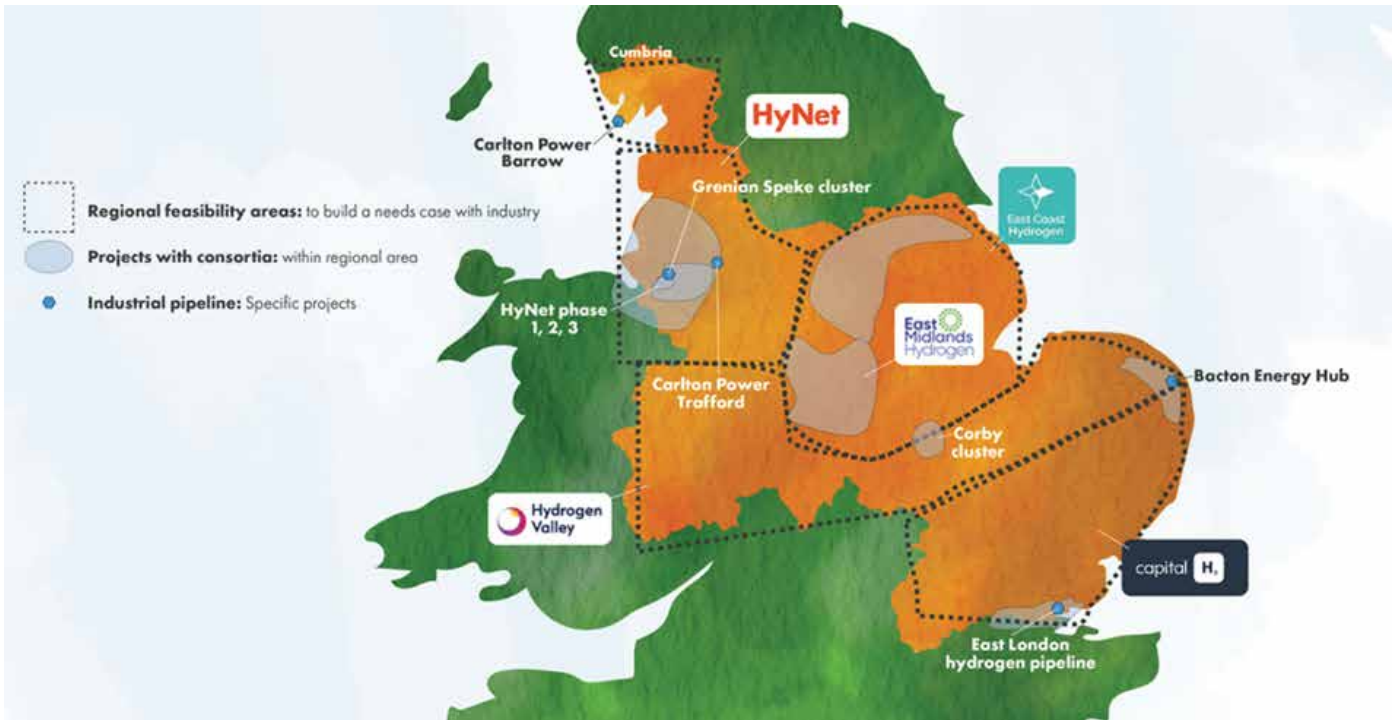


Figure 10: Hydrogen Infrastructure Projects

Industrial Decarbonisation

HyNet continues to be the UK’s flagship industrial decarbonisation project incorporating the full value chain of the future hydrogen economy. It includes hydrogen production, carbon capture and storage, hydrogen pipelines, hydrogen storage and the fuel switching of industry and power generation. The HyNet project is split into several phases and relies upon a series of supportive business models. Over the year the first hydrogen production plant has been supported, along with the CO2 infrastructure. We will bid for the hydrogen pipeline and hydrogen storage into a competitive process later this year. Throughout the year, we have continued to lead the development of the detailed design and consenting for the hydrogen pipeline.

We are also developing the technical feasibility for a pipeline in the Capital Hydrogen region, which explores how hydrogen demand in London is served. We have also made progress in completing the feasibility of the East Coast Hydrogen region and launched a hydrogen hub in the East Midlands, called ‘East Midlands Hydrogen’. Many industries are now providing us with their future hydrogen demand forecasts. These include manufacturing companies, such as food, cars, bricks, pharmaceuticals, and steel, that all need hydrogen to enable the decarbonisation of their operations.

The 2026 heat policy decision by government will clarify the extent to which hydrogen for domestic and commercial heating will be supported. This decision will drive whether or not we will be expected to convert towns and later entire network regions to hydrogen through the re-purposing of existing pipelines. Should hydrogen for heating not be supported, we may still be required to convert sections of our network to hydrogen, to enable deeper decarbonisation in the industrial, commercial and power generation sectors.



Figure 11: Example of high energy consumer seeking to use Hydrogen in the future: Pilkington's glass - the raw materials entering the furnace

What's next?

We will continue to develop the evidence in support of hydrogen's role for heating and submit to the HSE this year, in support of their assessment and recommendations to the Government to inform the heat policy decision. We will also continue to support the government's ambitions for net zero, working with the new NESO to progress the required hydrogen infrastructure in support of industrial decarbonisation.

A culture of innovation

We strive to deliver innovation and recognise the changing landscape of future energy across the world. Our priorities have not fundamentally changed in the last year and we continue to drive and support the UK’s energy transition. The Network Innovation Allowance (NIA) and Strategic Innovation Fund (SIF) provide regulated funding opportunities which we aim to maximise. If a ‘good idea’ can provide benefits to the business, our customers, and align with our strategy, then our network innovation leads will take these ideas forward.

Innovations in the following areas have progressed significantly in the past year with a few examples detailed below:

- **Supporting customers in vulnerable situations**
- **Improving operational efficiency**
- **Supporting the UK’s energy transition**

Supporting customers in vulnerable situations

We put our customers at the heart of everything we do. We are committed to doing the right thing and we work hard to ensure our customers and their loved ones are kept safe, warm and independent in their homes.

Easy Key

Working together with Oxford Gas Products (OGP) The EasyKey was progressed as a result of our EasyAssist project. It was determined that if a customer has access issues turning off the ECV, then they will also be unlikely to open up the gas meter box with a standard key.



Figure 12: EasyKey

EasyKey is very much about supporting accessibility as well as dexterity.

The design means that a small addition is added to the existing meter box door – a bit like a collar, which means that issues making it difficult to operate a typical gas meter box key are eradicated, because it’s much easier to click the new key into place.

There’s also an option to leave it there in situ, but also remove it, by pressing the large button in the middle.

Low Power Hot Water

Low Power Hot Water is a project we started in April 2022 with Haydale Ltd. The project aims to achieve an alternative solution to current hot water and heating appliances provided when a customer in a vulnerable situation is off gas and there is a health or PSR need where hot water is required for hygiene reasons. This project is working to remove risk, where market ready products currently require someone potentially in ill-health or of older age, to carry hot water to an appliance, whereas this product sees cold tap water being poured into the device in situ and then the water heats.



This potential solution will enable many customers in vulnerable situations to be able to heat water to an optimum temperature for hygiene, allowing them to wash and clean in their home whilst their hot water is impacted by a gas outage. The solution will also be cost effective to run, ensuring that customers are not impacted by further energy costs.

The project, which we completed in November 2023, successfully designed two 3D prototypes that could be used in the kitchen and the bathroom. The kitchen unit would allow our customers to keep hygienic by allowing them to clean their dishes, as well as wash their hands, and the shower unit would allow our customers to keep clean, whilst they are in an off-gas situation.

Figure 16: Low Power Hot Water prototype

With the development being successful, we are now pursuing an opportunity to further progress the project. This will involve creating two workable prototypes that could be used in an operational environment and ensuring that the materials used in manufacturing the devices are recyclable and environmentally friendly.

Improving operational efficiency

Our localised teams proactively work to meet the objectives of improving efficiency within their respective networks through the deployment of innovative solutions.

Hilti Breaker

The Hilti Cordless Breaker is a powerful and lightweight battery-powered tool for use on concrete, tarmac and other demolition work. The breaker tool weighs 21.4kg, just under 10kg lighter than current breakers used, and is much slimmer than comparable battery-powered breakers. The breaker is ideal for medium-scale and controlled demolition jobs where handling, tool control and mobility are most important for productivity. The breaker has been assessed and approved to be used in scenarios where it may be hard to gain access — cordless improves accessibility issues — and where it has been confirmed that it is a non-gaseous atmosphere. The Hilti Breaker offers a significant reduction in hand arm vibrations (HAVS) for users when compared to incumbent instruments. For breaking up concrete and other demolition work the Hilti Breaker will not replace pneumatic breakers as a standard issue item, however, will provide a different solution in situations where it is difficult to and onboard van power cannot be used. Total body weight 7.4kg + 3.68kg with batteries. The tool is equipped with an Active Vibration Reduction (AVR) system which reduces vibration noticeably.

Smart Methane Detector

The Smart Methane Detector is a self-monitoring methane detection device designed to be used in situations of failing but gas tight pipework and other areas that are at risk of leak age. The Smart Methane Detector is a revolutionary safety device that offers the ability to provide more frequent leakage checks in and around customer properties or specific sites minimising the need of physical checks. The Smart Methane Detector provides capabilities to monitor gas assets 24/7, providing assurance that the asset is in safe condition.

One of the most notable outcomes of the Smart Methane Detector is the commitment to customer safety. With this device, GDNs are now able to monitor failing pipework, which is planned for replacement, much more frequently whilst also reducing disruption to customers. Traditional methods meant that customers would experience an engineer coming to their home or property once a week or month to check pipework which has the potential to cause distress and customer dissatisfaction.

Digital Platform for Leakage Analytics - Strategic Innovation Fund (SIF) Project

This potential solution will enable many customers in vulnerable situations to be able to heat water to an optimum temperature for hygiene, allowing them to wash and clean in their home whilst their hot water is impacted by a gas outage. The solution will also be cost effective to run, ensuring that customers are not impacted by further energy costs.

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What are the benefits of DPLA?

- **Environmental impacts** - Key quantifiably evidenced benefits from DPLA implementation will be the 1) avoided gas loss and 2) avoided greenhouse gas emissions.
- **Cost reductions in operating the network and wider** - Net cumulative discounted financial energy system benefits cross GB of up to £2.86 billion by 2050 for our core modelled scenario in the Alpha phase. The benefits are dominated by the cost of avoided emissions (~90% of the £2.86B), given the high GWP of the gases whose leakage is being minimised.
- **Cost savings for network services users** – The avoided volume losses could feed through as direct customer benefit by decreasing the cost of shrinkage and leakage gas which is passed on from GDNs to consumers' bills.
- **Economic benefits to users and any other parts of the supply chain, broader (UK) economy** – Improved certainty on operating conditions and modelled outlooks, resulting in gas shippers having to build less risk into their pricing strategies. This will lead to a narrower spread of prices which can feed through to consumer bills.
- **Impacts on government priorities** - The estimated decrease in methane emissions from pipes and AGIs between 2020 to 2030 via DPLA is up to 58%, which supports the government priority to tackle methane emissions as a Participant of the Global Methane Pledge which was committed to at COP 26 in November 2021.
- **Expected regional or wider energy supply resilience benefits** - In future, the platform could be developed to perform predictive leak prevention as well as leak detection. This would further improve energy supply resilience by minimising system losses.

Supporting the UK's energy transition

Over the past year we have continued to deliver research projects focused on the provision of evidence to support the government's decision making over the role of hydrogen, both as a blend into our networks and for use in heating.

As part of this work, we have supported the Department of Energy and Net Zero (DESNZ) with a programme looking at End User Safety Evidence (EUSE). This work has been, undertaken in collaboration with all the Gas Distribution Networks (GDNs) and National Gas Transmission and has consisted of a programme of circa 19 projects, focusing on hydrogen applications downstream of the Emergency Control Valve (ECV). The research was initially to support the hydrogen village trials, however in the absence of a trial, the evidence is now forming part of the evidence being submitted to the Health and Safety Executive (HSE) in support of the use of 100% hydrogen in our networks. The policy decision on hydrogen's use for heating is anticipated in 2026, with the HSE on track to review the evidence from ours and other GDNs research in the year leading up to this.



Further information on these and other exciting projects can be found in our [Annual Innovation Summary](#).

Taking a whole energy system approach

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 costly and least disruptive solutions that our customers and stakeholders urgently require to meet our carbon emission reduction ambitions.

Through the work we have completed on a joint basis with our electricity colleagues, we have seen the value in presenting a shared solution, championed by both networks. This undoubtedly helps regional bodies establish robust actionable plans with low and no regrets investments at the right time. This is enabling significant progress to decarbonise in the short term, whilst longer term policy driven solutions are developed.

To support this work, we have continued to enhance our regional development and net zero planning capability to manage the complex stakeholder relationships, to communicate the future role of the gas network, and provide joined-up and collaborative solutions.

Local authority engagement for whole energy system solutions

We continue to actively support local area energy planning, and welcome contacts from regional bodies and current and future major energy users that may be keen to pursue a similar approach to identify credible net zero solutions in their geography, including hydrogen. 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 and more attractive option compared to the alternative whole community solutions. 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 believe the energy system of the future will build on the strengths of the networks we have today, to minimise the requirements for new infrastructure, and maximise the value of the assets consumers have invested in over many decades. We can do this by working closely with local bodies to deliver optimised decarbonisation plans that can identify practical and deliverable solutions.

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.



Figure 14: Cadent's pipeline network



Regional Energy Strategic Plans

Ofgem have continued to develop their thinking on Regional strategic planning and how Regional Energy Strategic Plans (RESPs) will be produced, working with the electricity and gas networks and Local and Regional bodies.

As part of the development work Ofgem have confirmed the National Energy System Operator will undertake the role of the Regional Energy Strategic Planner producing 11 RESPs over the UK. Cadent touches on 8 or the 9 RESP areas across England with only the Southeast RESP not impacting our territory.

Whilst we are some way away from detailed conclusions, which will be produced by the NESO, this new process will require the NESO to play a new role in place-based planning, coordinating and monitoring local needs, and feeding them into wider infrastructure planning.

We are working with our energy system colleagues to engage with Ofgem and the new NESO organisation to shape and then implement these emerging proposals. We still expect the energy networks to maintain a close and supportive relationship with Local Authorities that are actively managing decarbonisation strategies in their regions. These relationships will be particularly important as we can provide support and guidance on the impact of the new RESP processes.

Supporting energy system resilience

Another great illustration of the value of whole system cooperation is the connection of gas-fuelled power generation sites to support the electricity system. 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, and to provide other power system support services. Gas-fuelled power generation can play a vital role in this sector, which increase peak gas demands.

In a future hydrogen economy, we would expect this whole system interaction to continued and even accelerate, as the need for dispatchable power generation will still exist.

We also expect the increasing levels of intermittent renewable power generation to utilise the production of hydrogen through electrolysis as a cost-effective longer-term form of energy storage. Such hydrogen can be put to many uses, and subject to the establishment of a supporting commercial and regulatory framework, could be blended with methane at points on our gas network.

We welcome early conversations from parties seeking to connect onto our network, so we can ensure we can provide the necessary capacity efficiently and within the required timescales.

Demand forecast

Demand forecast across our gas distribution networks for the next decade.

Appraisal of scenarios

Our demand scenarios are based on planning assumptions 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.

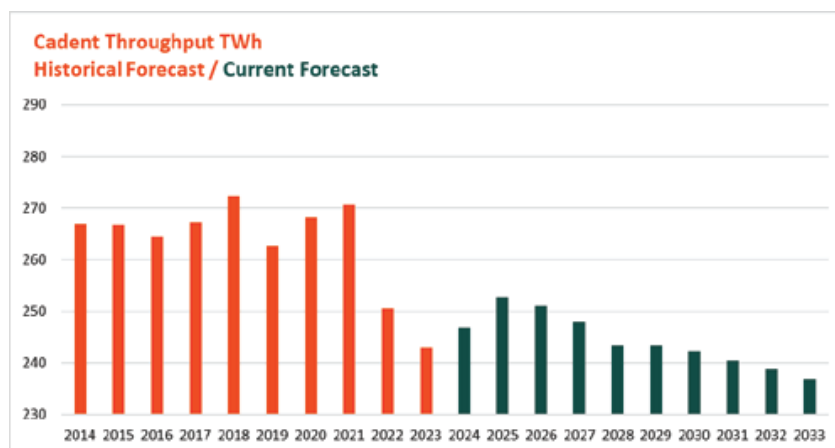
Demand overview

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 going to be slightly higher than the previous year’s forecast. This has largely been due to the impacts of the high energy prices last year. It is forecast that residential demand will bounce back over the next couple of years followed by the commercial demand which recovers slightly slower than the residential. There is predicted to be a slight decrease in industrial demands in the later part of the ten-year forecast as the government target announcements for the use of hydrogen in industrial clusters.



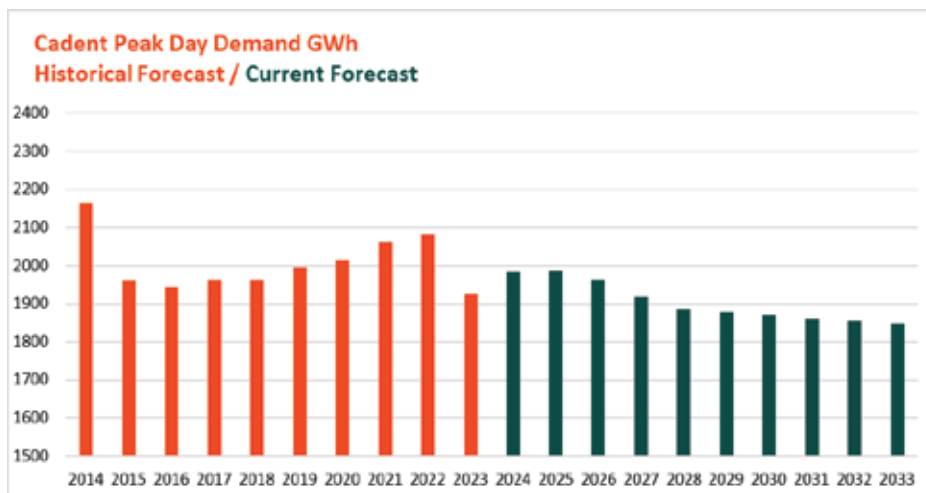
Graph 1: Annual throughput – 10 year historical and 10-year forecast

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. 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 2024 document provides four scenarios in total which was based on the 2023 scenarios as it was agreed that there wasn’t enough change to warrant new scenarios. The FES team have concentrated on making improvement processes this year and have also supplied us with an updated 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 Central Forecast provided by National Grid ESO as we both believe that 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.



Graph 2: Peak hour demand - 10 year historical and 10-year forecast

For the last five years we have used Falling Short scenario to determine our ten year forecast.

Forecast comparison and accuracy

The forecast is broken down as follows:

Appendix A1

contains demand forecast information at a local level through to 2033.

- A comparison of actual demands during 2023 with the forecasts in our LTDP
- Maximum and minimum demand days and forecasts for winter and summer 2023/24

Future demand factors

We have seen annual demand increases in 2022/23 as described above, then there is a gradual decrease over the 10-year period because of energy efficiency measures employed in homes and industry. 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.

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 continue to 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 regulatory networks over the current regulatory period set by Ofgem is over half a billion pounds. The majority 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 2002.

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 (1st March 2018, Beast from the East as an example) and we are focused on reducing 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 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 network asset engineers, integrity engineers (technical) and our Energy Control Centre (ECC) colleagues.

The purpose of any live data monitoring is to ensure on-day demand and supply within our networks is enough, and to identify any alarms/faults which require investigation. This also helps us to produce more accurate, granular trends.

Retrospective asset data monitoring seeks to identify variances, patterns, trends or cycles in historic asset performance.

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.



Figure 15: Asset monitoring and maintenance

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. Our dedicated Asset Data Team 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 dedicated local Investment Planning teams in each of our four regulatory networks, we will drive efficiencies as part of the localised five-year Network Asset Management Plans (NAMPs) 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 activities related to different asset classes such as pipelines, MOBs, mechanical assets, replacement of mains to reduce leakage, identify efficient asset health related investment, enable hydrogen-readiness and support other network-specific and company-wide initiatives, such as connecting gas-fueled power generation sites. Our central Asset Investment team will provide the consistent asset management framework for each local network to work from and will define the longer-term asset strategies to support our low carbon ambitions.

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 eleven years to the end of the 30:30 program in 2032 (all tier 1 iron pipes 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 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. Within our central team, we are also considering low-carbon alternatives (including hydrogen) and will assess the potential requirements for a net zero gas network, and this will influence our overall strategy for asset investments.

Our efficient mains replacement programme helps reduce costs to our customers by managing our network pressures and identifying reinforcement opportunities to drive increased insertion rates.

From a pressure management perspective, we are reviewing our governors to test what is feasible from a pressure elevation perspective, which will enable further mains insertion without the need for physical pipe reinforcement – this supports our ability to manage the impact on customers through optimising the physical operation of our network.

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.

This not only benefits the environment by reducing our methane emissions, but also benefits our customers by reducing emergency work and interruptions as well as increasing their safety.



Figure 16: Pipeline maintenance

This holistic approach considers all impacts on the local communities and local authorities to prioritise the mains for replacement under the 30:30 programme, including incorporating mains with low pressure due to water ingress or that are a part of the future hydrogen initiative. Early engagement with the local authorities is enabling a collaborative approach to manage the work activities within the highways limiting the impact on communities.

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 below how our networks will become hydrogen ready from our mains replacement programme from 2021 through to 2032. The darker the green the more plastic they are.



Figure 17: Plastic % of low-pressure networks from 2021 to 2032 across Local Authorities

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 Eastern networks.

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.

We will continue to monitor and review our reinforcement approach in order to 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.

- **Eastern Network:** There is an ever-increasing number of power generation sites looking to connect along with a large amount of new domestic homes requesting connections.
- **North London:** Due to refurbishment of historical buildings and new large-scale developments, we are carrying out general reinforcements which are typically road crossings. There is ongoing consideration of the Capital Hydrogen project which will support decarbonisation of some of the network's largest energy consumers.
- Adoption of Advanced Leak Detection Management has continued in our London network and contributed to replacement/refurbishment of pipes with high methane emissions. We continue to utilize the data from our proactive vehicle-based surveying to support optimization of our mains replacement programme. As part of the DPLA (Digital Platform for Leakage Analytics) innovation project, a range of technologies are being assessed to support the ambition of a cross-industry application in significantly reducing methane emissions from gas networks.
- **Northwest:** There has been a notable rise in applications for Power Generation sites in NW, which have led to a number of New Large Load Connections being progressed. These sizeable and atypical demands only add to the NW's already industrial and commercial load heavy network. In conjunction with such requests, we also continue to see smaller but significant development applications at the extremity of our networks - largely resulting in mains lay solutions as well as governor installations to provide adequate capacity. Efficiencies are maximised through a robust optioneering and approvals process, ensuring capital spend is fully justified.
- **West Midlands:** Reinforcements are going ahead across many parts of the area to increase capacity. Areas of particular investment include Congleton and Tamworth which includes a new low pressure (LP) to medium pressure (MP) governor due to growth in these towns. Over 6km of LP reinforcement is planned, as well as MP reinforcement in Wolverhampton to allow for a power generation site.



Figure 18: West Midlands team performing essential mains replacement works

Supporting customers in multi occupancy buildings (MOBs)

We 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. In addition, we build a robust investment plan to replace our MOB infrastructure in line with the outputs from the inspections to ensure we deliver a safe and reliable gas supply.

We have the Energy Exchange Programme where we look at removing gas from buildings where it would not be financially viable for us to replace the infrastructure, offering the affected residents compensation.

In addition, 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 MOBs to 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.

We have ensured we are replacing MOBs in conjunction with the mains replacement programme to minimise customer and local community impacts.

Our inspection programme in the medium term will expand to include multi occupancy commercial structures as well as sites with large services. We expect these inspections will drive some investment requirements to ensure our network continues to deliver a safe and reliable supply.

Closing statement

Thank you for reading our Long-Term Development Plan 2024. We hope you found the report interesting and informative.

We've given you an insight into:

- Our enhanced approach to customer and stakeholder engagement
- The developments we are making to our connections processes
- Our performance in the environmental emissions space
- How we are helping the UK achieve its decarbonisation targets
- How we are driving change through innovation
- Demand forecast for our networks
- 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.

- <https://cadentgas.com/future-of-gas/our-green-print>
Our Green Print - Future Heat for Everyone
- 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.
- <https://www.nationalgrideso.com/future-energy/future-energy-scenarios>
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).
- <https://www.gov.uk/government/organisations/department-for-energy-security-and-net-zero/about>
Department for Energy Security & Net Zero– the government department responsible for securing our long-term energy supply, bringing down bills and halving inflation.
- 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.
- <https://www.gov.uk/government/organisations/office-for-zero-emission-vehicles>
The Office for Zero Emission Vehicles (OZEV) is a team working across government to support the transition to zero emission vehicles (ZEVs).
- 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.
- https://cadentgas.com/getmedia/7e80b7d6-9530-4c3a-9303-4306b078f4d9/2024_Future-of-the-GasNetwork_vFinal_1.pdf
Future of gas networks – our latest thought leadership publication, detailing how the gas network will play a crucial role in the energy transition by enabling the delivery of net zero.

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.

**Cadent Gas Ltd Pilot Way Ansty Park Coventry
CV7 9JU
Registered in England and Wales No. 10080864
cadentgas.com**