Shaping a more sustainable future

The gas network is at the centre of the energy system and will play an important role in the transition to a low carbon society.

As the largest gas distribution business in the UK, we have a responsibility to provide leadership with Government and regulators and work with other distribution networks and relevant stakeholders to help set the right policy frameworks to ensure that low carbon gas plays an important part in the future energy system.

We have a major role to play in the delivery of low-carbon fuels, now and into the future. We are undertaking important research and demonstration projects to support the transition to a sustainable energy system, in the home, for industry, and for transport. These innovative projects mean we are well positioned to play a key role within the changing energy landscape.

As a business, the biggest impact we have on the environment is leakage from the networks we operate, excavation waste, vehicle emissions and waste from our direct activities. We have successfully implemented several initiatives to address these issues and are committed to meeting our environmental targets.

Shaping a more sustainable future

Providing leadership through the energy transition

Gas is an extremely important part of the UK's energy landscape. Consequently it's difficult to anticipate a time when gas does not play a significant role in meeting society's energy needs.

We will continue to engage with Government, regulators and a broad range of stakeholders supported by robust research and carefully focused demonstration projects to ensure the importance of gas to society, now, and into the future is fully understood.

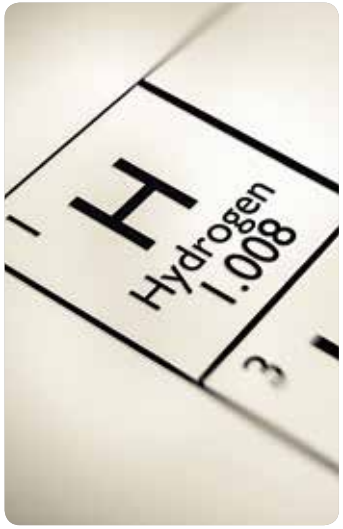
We have published a series of documents on the Future Role of Gas, including its role in the provision of heat and fuel for transport. We have taken the lead in engaging Government, regulators and other key stakeholder groups, to ensure that policy decisions recognise the importance of gas.

Our gas networks are at the centre of this energy transition, and we must play a leading role, through our own activities, and move towards a low carbon future.

We support the Energy Networks Association ('ENA') Gas Decarbonisation Pathways Project (for further detail see our Annual Report and Accounts 2018/19), a major industry initiative to build a low cost, low carbon network and develop new technologies that make the most of renewable gas and hydrogen. It will help coordinate network activity and support policy making for decarbonised gas.

We are also taking action by developing projects and partnerships at scale to demonstrate that this future is realistic and deliverable, and provides a route to decarbonisation, at lower cost and with less disruption to customers and communities.

To find out more visit
www.cadentgas.com/innovation/projects/the-future-role-of-gas



Finding alternatives to natural gas

As part of the process to decarbonise the energy system, there are clear opportunities to exploit alternatives to natural gas. Hydrogen represents a highly credible low-carbon alternative fuel, and we have led a number of projects to understand its potential. We have used our scale and leverage to build awareness and a range of partnerships working towards real, workable solutions, developing supporting technologies that can lower emissions now and providing evidence to inform policy and future investment decisions.

The HyDeploy project (see case study) is providing evidence that substantial percentages of hydrogen can be blended with methane, reducing its carbon intensity, without having to change any customer equipment.

Once the safety case is proven for blending, it is technically feasible to inject hydrogen across the UK gas distribution system. This would reduce carbon emissions, enable a significant gearing up of the hydrogen supply chain, and the exploration of new energy system solutions, such as hydrogen power generation.

We will continue to support the Government's climate change commitments, upgrading and developing the gas distribution network to transport low carbon fuels.

Committed to decarbonising heat and transport

We lead the gas networks in supporting growth of the UK biomethane sector – turning food, farm and other wastes into a gas to fuel homes and HGVs.

We now have 32 biomethane producing plants on our networks, with volumes entering our network equivalent to the heating demands of as many as 110,000 homes. Acting on stakeholder feedback, we held a series of workshops and events to facilitate the standardisation of gas distribution network processes. We coordinated a very successful biomethane engagement day in March, with plans for another later in 2019.

32

Biomethane connections to the end of 2018/19

7

CNG fuelling stations

HyDeploy

Case study:

Collaborating with our partners: HyDeploy

HyDeploy is a collaborative project led by Cadent in partnership with Northern Gas Networks, Progressive Energy, ITM Power, the Health & Safety Executive and Keele University, funded through Ofgem's Network Innovation Programme, to demonstrate the steps required to develop a hydrogen fuel network.

A major part of the HyDeploy project (in which a blend of up to 20% hydrogen and natural gas is being tested in 100 domestic homes) has been to assure safety before we start delivering the blended gas. Working with our partners Progressive Energy and the Health and Safety Executive, we have safety tested every single gas appliance in 100 homes. In addition to the gas safety checks, we have also tested all 130 appliances with bottled hydrogen. All appliances passed this test which is strong initial evidence that customers will not need to replace their gas appliances should a hydrogen blend be made available more widely.

The energy networks will play a vital role in supporting the Government as they gather the evidence for strategic decisions to be taken. A lot of the technical work to show the capability of the gas network to support the transition is already in train. Getting real feedback based on actual experiences through large-scale trials will provide the strong evidence base required.

We play a central role in filling that evidence gap, and undertaking activities to prepare the gas network for a low-emission future.

HyDeploy is a major step forward for our industry and, working with partners, we are looking at further investments, such as our Carbon Capture HyNet project in the North West to ensure the industry continues to play a vital role in reducing carbon in the UK's energy mix.

Aerial photo of Keele University

Shaping a more sustainable future

Case study:

Accelerating clean growth: HyNet

We identified a critical need to decarbonise heavy industry after engaging with a number of organisations.

Further engagement with stakeholders highlighted the potential value of incorporating hydrogen in transport fuel. Clean air is a top priority for many of our regional stakeholders, including the Metro Mayors in the North West. This requires clean, low-carbon energy sources for low-emission vehicles, including trains and shipping.

We have been working with local partners to develop the HyNet project, designed to provide hydrogen at scale for heavy industry. HyNet was launched in May 2018 at an event attended by over 100 stakeholders and we continue to work closely with our partners with the aim of being operational in the mid 2020s.

Hydrogen will be produced from natural gas using the steam reforming process which produces CO_2 as a by-product. The resulting carbon dioxide ('CO_2') will be captured and together with CO_2 from local industry, which is already available, sent by pipeline for storage offshore in the nearby Liverpool Bay depleted gas fields Following on from our work on this project, in July 2018 we were the only gas distribution network invited to provide evidence to the Department for Business, Energy & Industrial Strategy ('BEIS') select committee investigating carbon capture technology.

Case study:

Decarbonising transport

A clear opportunity exists to help reduce emissions and achieve cleaner air in our cities by using gas as the fuel of choice for heavy goods vehicles and buses in the UK.

Our partnership with CNG Fuels delivered the first commercial high pressure compressed natural gas ('CNG') refuelling station at Leyland in Lancashire which has been operating since 2016, supporting HGV fleets for Waitrose, John Lewis and others, significantly reducing their transport emissions.

The latest facility opened in January 2019 in partnership with GasRec in Hatfield will support Ocado's growing fleet of 29 gas powered HGVs. Using conventional fossil fuel CNG from this station, Ocado have reported a 29% CO_2 emission reduction compared with its diesel fuelled HGVs, alongside a 12 pence per km cost saving.

The fuel dispensed at the facility which will support up to 80 vehicles is offset by government certified renewable biomethane under the Renewable Transport Fuel Obligation ('RTFO') which allows Ocado to achieve a greater CO_2 reduction than with fossil gas alone. CO_2 emissions reductions of up to 84% will be delivered by vehicles running on renewable CNG fuel.

We are both facilitating this growing use of CNG as an HGV fuel and building a station in Birmingham. GasRec expect to invest in two more directly connected filling stations over the next 12 months. Nottingham City Council is driving the growth of the world's largest gas fuelled double decker bus fleet through filling facilities directly connected to our gas network.

We are also exploring a range of technologies including investing in 3 new CNG Iveco vans which incorporate a split-drive power take off system that enables the vehicle to generate electrical power and pneumatic air. These vehicles produce lower engine emissions and are being used to support our street work operations.

Shaping a more sustainable future

Improving the environment

Managing the environment is about more than just reducing risk and minimising our impact. Best practice environmental solutions drive efficiency, save money and preserve natural resources.

We are now in our 21st year of having our environmental management system certified to the international standard ISO14001. Over the past 21 years, we have dramatically reduced our impact on the environment, by managing our waste and reducing greenhouse gas emissions.

68%

Reduction in GHG emissions compared to our 1990 baseline

>95%

Of excavated spoil diverted from landfill

>250,000tn

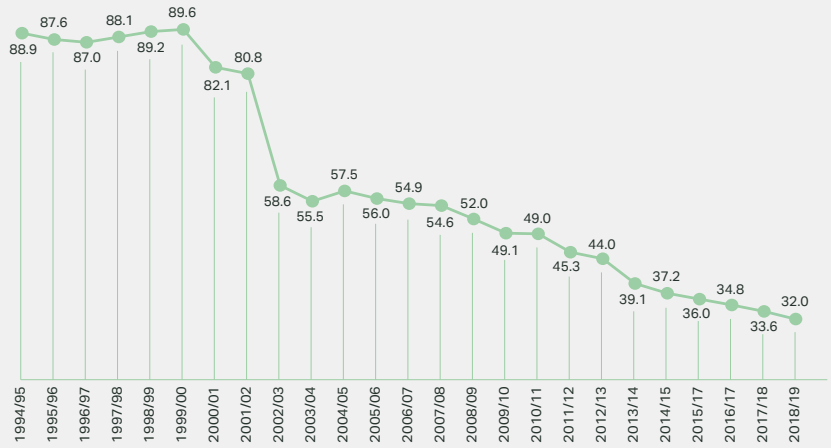
Reduction in annual emissions since 2012/13

Lowering our greenhouse gas ('GHG') emissions

We have publicly committed to medium and long-term targets to reduce our GHG emissions and have successfully exceeded our 2020 target ahead of schedule (cutting emissions by 68% vs the 2020 target of 45%).

Our emissions reductions programmes, especially replacing and repairing leaks on our distribution pipelines, mean we are on track to achieve our longer-term target ahead of schedule to reduce GHG emissions by 80% (from 1990 levels) by 2050.

Percentage of greenhouse gas emissions



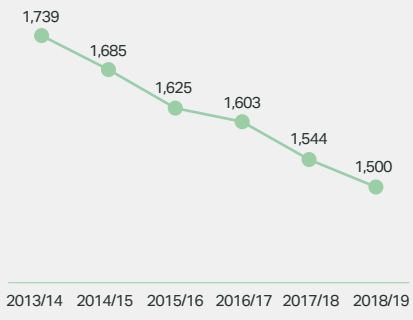
Reducing leakage from our network

The majority of our GHG emissions are from leakage – the gas that is lost during the operation of the gas network. Across our networks however, the amount of energy we lose as a result of these losses is less than 0.5% of the total we transport.

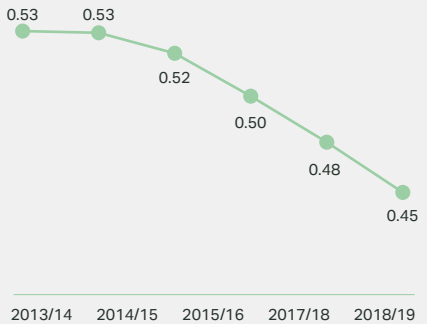
Our mains replacement programme delivers our greatest reduction in greenhouse gas emissions. Since 2013/14 we have replaced over 10,000 km of metallic pipe with polyethylene ('PE'). This has delivered a reduction of over 250,000 tonnes CO_2e per year, the equivalent of taking more than 100,000 vehicles off the road.

We are actively engaging with government departments and Ofgem to explore how to carry out our mains replacement work faster over the remaining years of the programme to deliver even greater reductions in emissions.

Leakage CO_2 equivalent (kT)*



Leakage intensity %, energy leaked compared to total delivered



NOTE: *Leakage here refers to gas lost from the gas distribution network – this can either be due to leaks, gas lost in the course of our repair/maintenance operations, or illegal connections to our network.

Diverting our waste from landfill

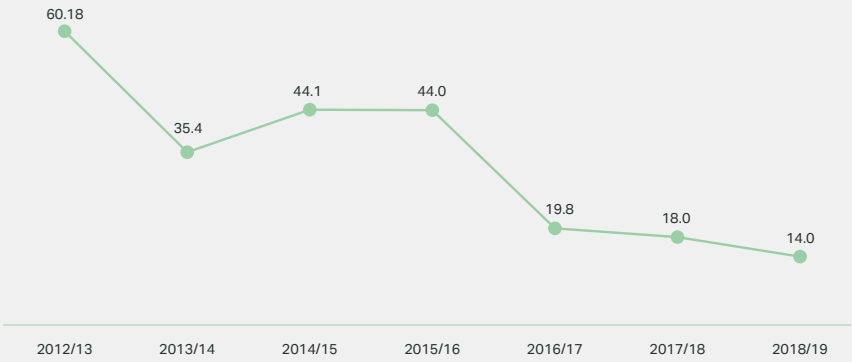
In 1990, over 90% of the waste we produced was sent to landfill. At the end of 2017/18, that came down to 20%, but it is still not good enough. So we introduced a waste management strategy in 2018 with three goals:

- zero avoidable* waste to landfill by 2021;
- zero single use plastics in our offices and depots; and
- zero avoidable* plastic in our supply chain by 2025.

We are already making progress and have signed up to HRH Prince of Wales' 'Waste to Wealth' Commitments.

* We use the TEEP (technically, environmentally and economically practicable) test to determine which wastes we can divert from landfill.

Waste to landfill (%)



Shaping a more sustainable future

Phasing out single-use plastic

One of the biggest challenges in meeting our waste management targets is making sure we segregate our waste effectively to allow higher levels of recovery and recycling. In 2018/19, we reduced the amount of waste we sent to landfill to 14%, and expect to reduce it further to 10% next year.

We have successfully phased out all plastic water cups and hot food containers; and introduced the sale of reusable travel mugs. In April 2019, we removed all non-reusable cups across our sites.

Minimising waste from our worksites

Our mains replacement programme – digging up and replacing thousands of kilometres of old gas pipes – has the potential to create significant amounts of waste.

We have regulatory targets to ensure that we send no more than 10% of excavated spoil wastes to landfill, and import no more that 30% virgin aggregate for backfill. We regularly beat these targets by:

- using low dig and no-dig techniques;
- inserting new plastic pipe into old metallic services;
- using vacuum excavation; and
- working with partners in the recycled aggregates sectors.

We have reduced waste volumes significantly over the past five years for our mains replacement programme and routinely divert more than 95% of our waste from landfill.

Limiting our carbon footprint

GHG emissions include our business carbon footprint ('BCF') together with our energy use in offices, vans and company cars.

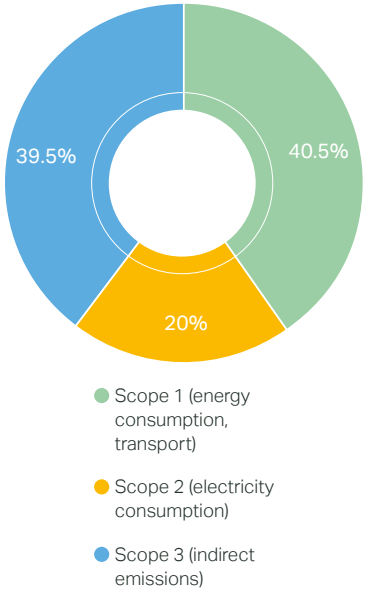
In 2018/19 we reduced energy consumption in our offices and depots by 9% and over 90% of the electricity we use to light and power our offices and depots is from certified renewable sources, contributing to further reductions in our business carbon footprint.

We have reduced our average emissions from our company car fleet from 106g/km to 94 g/km over the course of 2018/19 by:

- procuring efficient vehicles for our fleet;
- having a cap on company car emissions;
- offering 'green' incentives to company car users, which are taken up by 90% of drivers; and
- operating a no-idling policy for our vans at worksites.

Overall, we have reduced our business carbon footprint by over 23% since 2013.

Business carbon footprint



23%

Reduction in our business carbon footprint since 2013

Going beyond compliance

While we focus on waste and emissions, we have set ourselves challenging standards of environmental performance across all our sites. This is our Compliance Plus target.

In 2017/18, we introduced a monitor of baseline and improvement against a 52-point checklist, including oil storage, drainage plans, and emergency response.

We have made significant strides in reducing our impact on the environment, and continually strive to do better.

Case study:

Winning awards for a greener fleet

This year we won a Gas Industry Innovation Award for our Sustainable Vehicle Auxiliary Power System. Partnering with Clayton Power UK, we took the initiative to add hybrid vehicles to our fleet to drastically reduce emissions and running costs within the gas industry.

Clayton Power UK's Easipower LPS system is a lightweight, compact lithium battery-based power solution, which charges while the vehicle is being driven to site. Once on-site, the unit can be used to power compressors and other equipment, without the need for engine idling. It can even be removed and mobilised where required. Should the charge level drop below set parameters, the vehicle will automatically start to top-up the charge rapidly; all without having the key in the ignition.

Compatible with old and new vehicle technology, the LPS improves the working environment for employees and customers, by eliminating the noise pollution and unhealthy fumes caused by engine-driven generators.

The equipment is installed in 75 vehicles and will be rolled out in our fleet, especially where air quality and emissions are a concern.

We have already seen a 15% reduction in standing fuel consumption and a 30% reduction in CO_2 emissions. As early adopters of this innovative technology we are helping to lead change in the industry, embedding this clean technology and raising standards.