

The Voice of the Networks



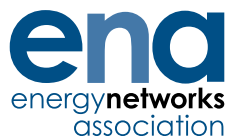
Gas Network Innovation Strategy

at a glance

March 2018



Introduction



Welcome to this ‘at a glance’ summary of the Gas Network Innovation Strategy, produced by the Energy Networks Association (ENA) Gas Innovation & Governance Group. This document is designed to provide a key-point snapshot of the work that the gas transmission and distribution networks are doing to make the UK’s gas networks fit for the future by investing in innovation.

The ENA represents the ‘wires and pipes’ transmission and distribution network operators for gas and electricity in the UK and Ireland. This strategy explains the innovation priorities being pursued by the gas network licence holders in Great Britain – Cadent, National Grid, Northern Gas Networks, SGN, and Wales & West Utilities.

Gas remains a vital part of the UK’s energy mix. By setting out our innovation plans, we aim to encourage collaboration with the wider industry on a whole range of challenges and opportunities – from how we keep our networks operating safely, through to the future of gas, and security of supply.

Find the full Gas Network Innovation Strategy at <http://www.energynetworks.org/gas/futures/gas-innovation.html>

Under Ofgem’s “RIIO” regulation model, the innovation stimulus consists of three measures:

- A Network Innovation Allowance
- A Network Innovation Competition
- * An Innovation Roll-out Mechanism

Purpose of the strategy

Innovation is already making a difference. Since 2013 we've seen:

£193m

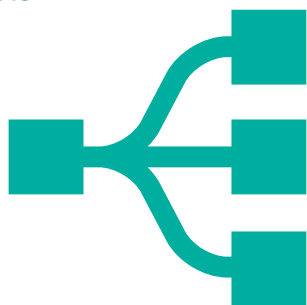
invested in innovation across the gas industry

402

Network Innovation Allowance (NIA) projects

13

Network Innovation Competition (NIC) projects



We have published the first-ever version of the Gas Network Innovation Strategy, designed to identify the most important challenges and opportunities facing our industry, which innovative projects and approaches can address.

It identifies the challenges and opportunities the gas transmission and distribution networks face in improving our efficiency and supporting the UK's commitment to decarbonise its energy system, in order to meet climate change targets.

We set out the role that our existing gas infrastructure can play in meeting demand for power, heat and transport now and in the future.

We've divided the challenges we face into seven themes, each of which is summarised in this document. At the end you will find a full list of the strategic aims we have agreed, which set out the

areas where we are particularly keen to make progress over the coming two years.

The strategy is also an opportunity for the wider industry to get involved and help to shape the future of gas and networks in the UK. We have worked closely with the GB electricity networks, and partners around the industry, to identify opportunities for collaborative projects in future,

By working together, we can drive innovation that will benefit consumers. The best way to do this is to co-ordinate our activities as networks, share our learning and avoid duplication.

Theme 1: Future of gas

22 million

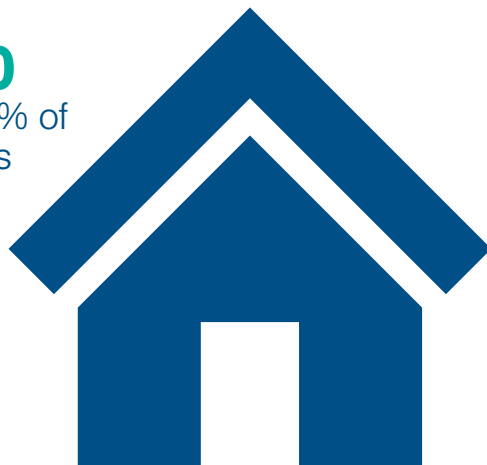
There are almost 22 million gas customers in the UK

25%

Transport generates roughly a quarter of total greenhouse gas emissions

85%

Around 85% of households use gas for heat



The gas network is at the heart of Great Britain’s energy system. It plays a vital role in transporting energy to consumers securely and cost-effectively. It’s also flexible and can adapt to support the decarbonisation of heat, transport and energy towards 2050 and beyond. So, as the nation’s energy mix changes, what does the future hold for gas? How will technology, policy and customer demands evolve, and what does that mean for network innovation?

Our innovation focuses on:

- > The need for flexible networks
- > The role for gas in heat and transport
- > Enabling the introduction of a wider range of gases
- > Integrating gas and electricity networks
- > Decarbonisation.

Network innovation projects can help to clarify the options in decarbonising the gas we use in heating, power and transport.

40 NIA projects

5 NIC projects

£49m Project value

Theme 2: Safety and emergency

“Third-party damage to underground services of all types continues to be a source of danger and financial loss to workers, members of the public, utility companies and contractors.”

Health and Safety Executive

58
NIA projects

£10m
project value



As an industry we have committed to minimise the risks associated with operating the gas network for our stakeholders and society. Our shared aim is to ensure the provision of a safe network in compliance with Health and Safety Executive (HSE) standards and improve asset knowledge.

We face many challenges, including how to manage the risk of ageing assets and how to protect pipelines from damage by third parties. As the age profile of our workforce changes we must also maintain safety competence and pass on expertise effectively to a new generation of gas engineers.

Our innovation focuses on:

- > Impact of accidental damage to the network
- > Managing aging assets including the avoidance and prevention of damage
- > Damage detection
- > Safety competence
- > Gas composition and safety management
- > Collaboration with electricity networks.

We can trial new ways to make our pipelines safer for our workers, customers and society as a whole.

Theme 3: Reliability and maintenance

99.999%

The current gas network provides 99.999% supply reliability

“As the network ages, innovation is helping to keep it safe, secure and reliable.”

**Gas Network
Innovation Strategy**



Britain’s gas network has been serving customers since the Victorian age, and continues to evolve to meet new reliability and maintenance challenges. For example, we must deal with the effects of ageing assets and examine the potential of new materials to transform the way we operate. As smart systems are increasingly adopted, how should our network management adapt to a digital future? And how can gas and electricity networks work more closely to improve reliability and maintenance?

Our innovation focuses on:

- > The effects of an ageing network
- > The potential of new materials and corrosion protection
- > Integration of gas and electricity networks for improved reliability and maintenance
- > Impact of smart systems and a digital future for network management and control
- > Operational improvement.

We aim to continually improve network reliability and minimise the cost and disruption of maintenance programmes.

145 NIA projects

1 NIC project

£42m Project value

Theme 4: Repair

“The techniques we use to locate and repair our networks will need to adapt to new technologies.”

**Gas Network
Innovation Strategy**



Much of the metallic gas distribution network is being replaced with plastic. However, under current plans, parts of the network will remain metallic after this programme finishes in 2032. We need repair technologies that can solve issues with legacy metallic pipe on the distribution and transmission networks. Alongside this, the technology we use must also be able to repair new plastic in an efficient and cost-effective way, causing as little disruption as possible. We want to make sure our pipes stay in great condition for future generations and carry out repairs in an innovative and efficient way.

Our innovation focuses on:

- > The importance of asset data
- > Integration with electricity networks
- > Minimally invasive techniques
- > Security of supply
- > Polymer repairs.

Network innovation can help us improve efficiency and reduce the cost to customers of repairing the range of materials in our pipelines.

45 NIA projects

2 NIC projects

£23m Project value

Theme 5: Distribution mains replacement



80 years

Polyethylene plastic (PE) has a design life of 80 years and is central to the replacement strategy

2032

All iron mains of diameter less than or equal to eight inches (20 centimetres) that are within 30 metres of a property will be replaced over a 30-year period, ending in 2032

The gas distribution network is complex and has a 200-year history. The Iron Mains Risk Reduction Programme (IMRRP – also known as the ‘30/30 Programme’) began in 2002. It has accelerated work to replace old mains with polyethylene plastic (PE). It is a huge task. The programme sees around 3,200km of pipe replaced across Great Britain each year. We continue to review our mains replacement and network riser strategies, and look to innovation to improve efficiency, reduce disruption and lower costs.

Our innovation focuses on:

- > Prioritising mains replacement
- > Construction techniques
- > Operational challenges
- > New materials
- > Robotics and digitalisation
- > Alternatives to replacement.

Innovation can help the IMRRP deliver a safer, future-proofed network.

65 NIA projects

£28m Project value

Theme 6: Environment and low carbon

45%

Use of renewable gas is on the rise. The 2017 figure was an increase of 45% over the same period in 2016

90

The total number of biomethane plants in the UK, injecting green gas directly into our networks



Improving our environmental performance is more important than ever. We must think both locally and globally as we manage the impact of the gas network on the environment. There are many issues to consider – ranging from gas leakage and venting during field operations, to dealing with contamination during decommissioning and how we remediate legacy gas industry sites. Sustainability is fundamental to the future of the gas network and reducing environmental impact and costs.

Our innovation focuses on:

- > The emissions challenge
- > Decommissioning assets
- > Energy efficiency in homes
- > Sustainable reinstatement
- > The potential for biomethane
- > Contaminated assets
- > Collaboration with electricity networks.

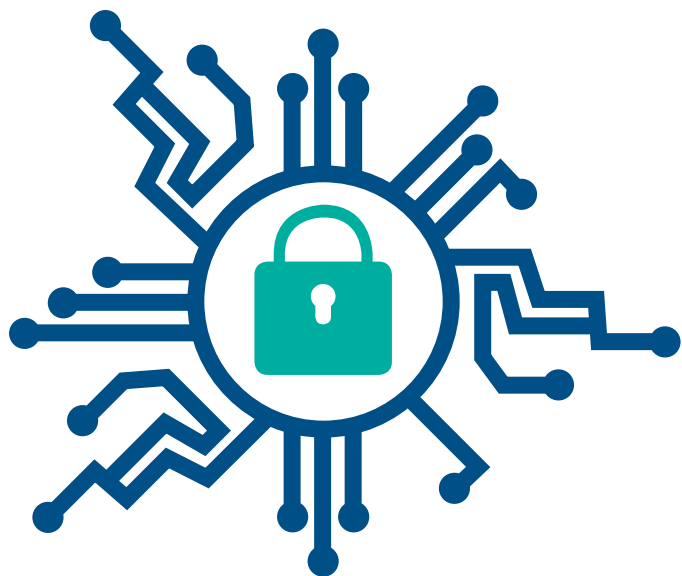
We are working to reduce carbon emissions and minimise our environmental impact.

49 NIA projects

5 NIC projects

£39m Project value

Theme 7: Security – a new focus



32

The number of countries with offensive cyber-attack capabilities, a five-fold increase in less than 10 years.

Cyber and information security are increasingly crucial issues for businesses and network operators are no exception. We are moving towards a smart energy future with more connectivity. These changes mean that the way we protect our networks must change too. We will face increasingly sophisticated threats in the years ahead and innovation will be vital to preserve and enhance both our physical and cyber security.

Our innovation focuses on:

- > How challenges are evolving
- > The role of technology in protecting systems
- > Challenges for security innovation
- > An evolving cyber threat
- > The importance of incident management
- > Site and asset security
- > Collaboration with electricity networks.

As a new area of focus, network innovation can help us improve security and mitigate threats to the network.

Next steps: our strategic aims

We will review progress against this strategy and our strategic aims by April 2020.



We have set out a series of strategic aims that will establish the focus for our gas network innovation efforts. They are:

1. Work with Ofgem to agree an appropriate solution for measuring benefits from innovation as part of Regulatory Reporting, following proposals in Ofgem's 2017 Network Innovation Review.
2. Build on existing gas network innovation projects around decarbonised gas – to support the formation and delivery of government policy on heat decarbonisation.
3. Develop projects that support low-cost, highly integrated networks/systems – to enable low emission journeys for a variety of vehicles.
4. Continue to use innovation to explore the potential and demonstrate the safety of using a wider range of gases in UK networks – to support decarbonisation, minimise costs to consumers and enhance security of supply.
5. Support the delivering of a low carbon, integrated, cost-effective energy system by increasing collaboration on gas and electricity network innovation projects, –building on existing initiatives such as the Low Carbon Network Innovation (LCNI) conference.
6. Use innovation to reduce the safety risks associated with essential activities.
7. Look to unlock the potential for smart systems, cognitive computing and automation in asset management strategies through innovation.
8. Use innovation to reduce the number of excavations we make in maintaining and extending the gas network.
9. Use innovation projects to find new ways to increase the proportion of our gas supplies that come from renewable sources.

How to get involved

We welcome fresh thinking and new ideas for innovation projects. For example, we launch public calls for ideas for the Network Innovation Competition each year, and use events like the Low Carbon Network Innovation conference to engage with stakeholders and discuss both current and future projects.

This document is designed to help potential partners identify new ideas which could fit within either the NIA or the NIC funding schemes.

If you have an idea, you can visit ENA's Network Innovation Collaboration Portal to submit it for the networks to consider at **www.nicollaborationportal.org/**

If you have any questions or would like to discuss the innovation strategy in more detail, please get in touch at: **gas@energynetworks.org**
Please use 'Gas Network Innovation Strategy' in the subject field.

