The Voice of the Networks

Energy Network Innovation Strategy

at a glance

March 2020

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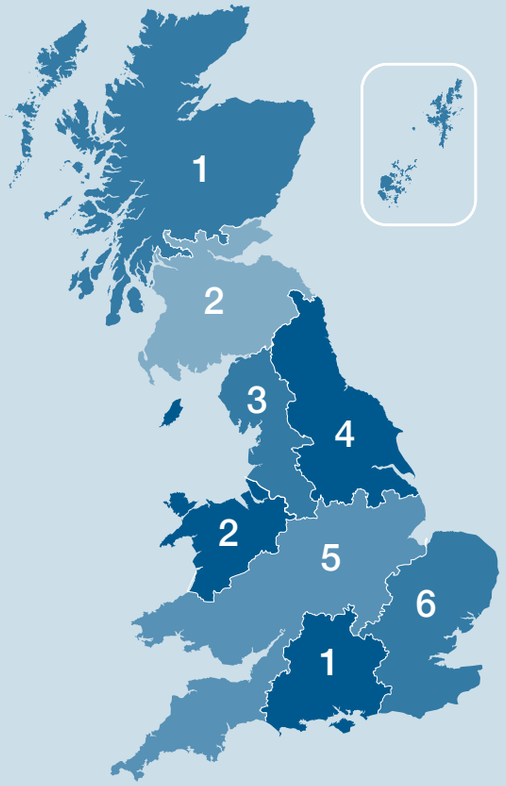
This Energy Network Innovation Strategy has been produced by Energy Networks Association (ENA) and the GB Licensed Network Operators (LNOs). ENA is our voice, representing the 'wires and pipes' transmission and distribution network operators for gas and electricity in the UK and Ireland.



Electricity distribution

1 Scottish & Southern Electricity Networks

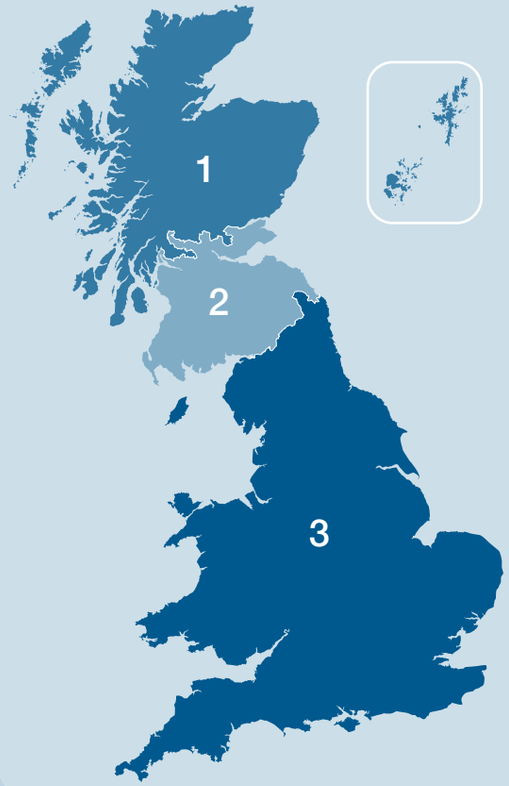
2 SP ENERGY NETWORKS

3 electricity north west

4 NORTHERN POWERGRID

5 WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

6 UK Power Networks



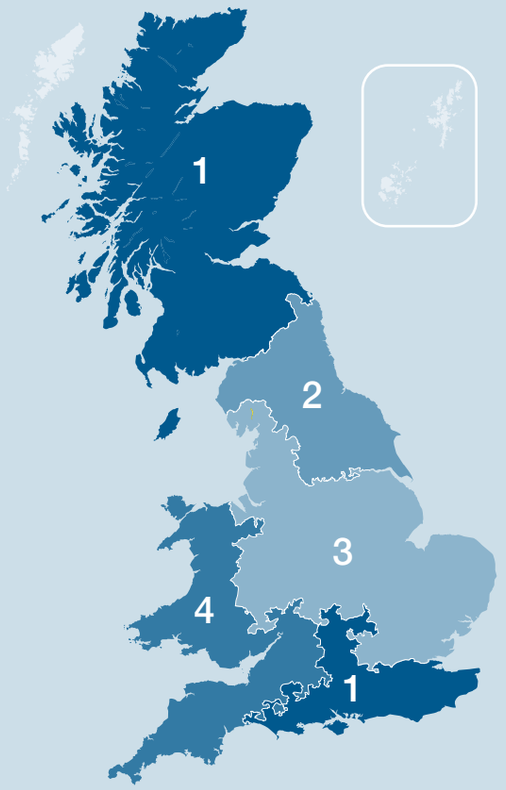
Electricity transmission

1 Scottish & Southern Electricity Networks

2 SP ENERGY NETWORKS

3 nationalgrid

System operation:
nationalgridESO



Gas distribution

1 SGN Your gas. Our network.

2 Northern Gas Networks

3 Cadent Your Gas Network

4 WALES&WEST UTILITIES

Gas transmission

1 nationalgrid

Introduction

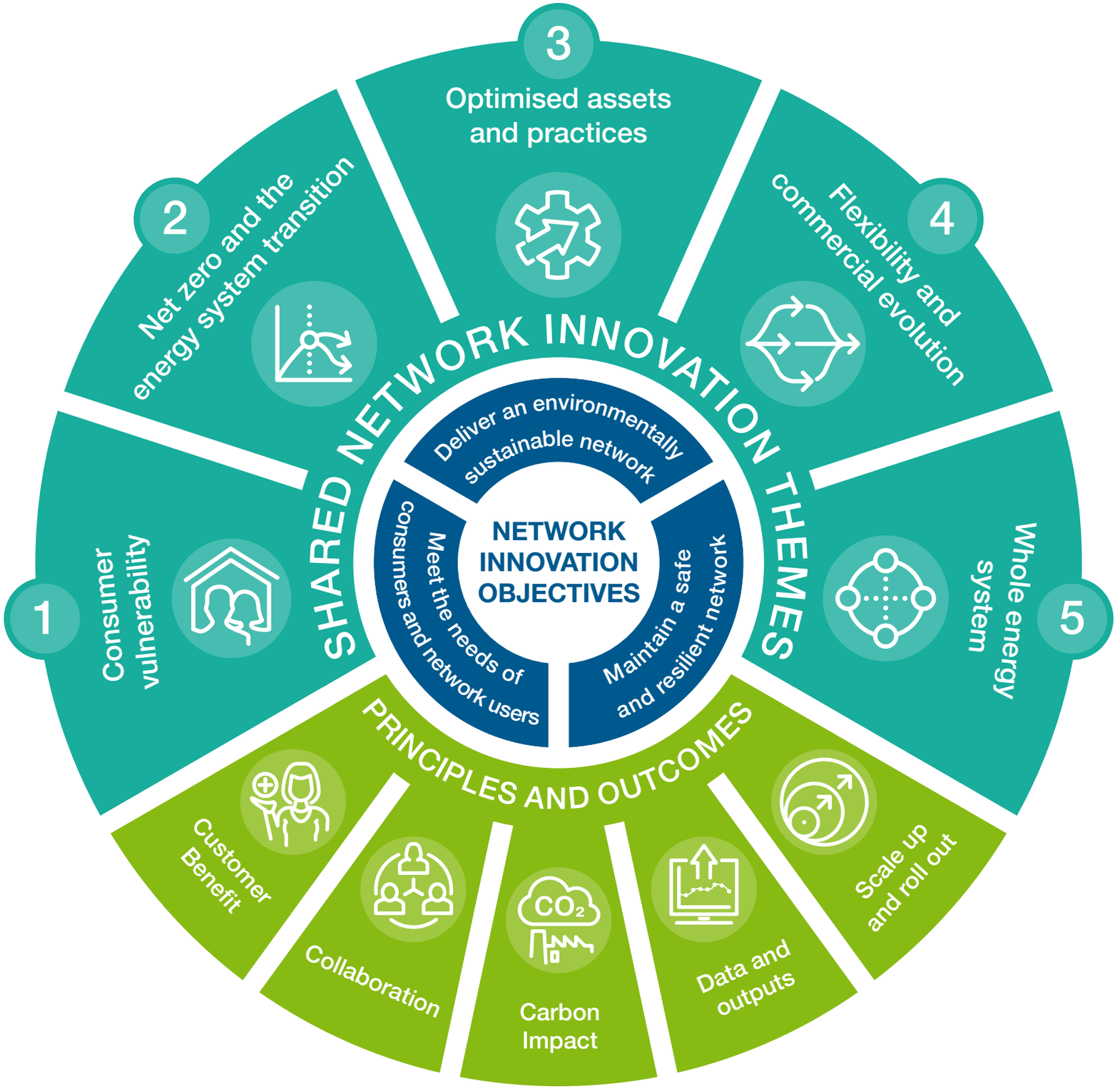
We are pleased to present this joint electricity and gas Energy Network Innovation Strategy. This document sets out for you, our stakeholders, what our high-level ambitions and priorities are for network innovation.

Innovation projects allow us to better understand how to integrate new technologies and practices into our energy networks, which is essential in our transition to a net zero future.

This ‘at a glance’ document summarises the separate electricity and gas network innovation strategies, which are available on our website. These were developed through an extensive stakeholder engagement process and build on the original strategies published in 2018.

Both strategies hang around five key principles and five themes, which reflect our three overarching objectives. The principles and outcomes apply to all innovation activity, from inception through to roll out. The shared network innovation themes are the priority innovation areas identified with our stakeholders. These provide us with a shared strategic direction, help innovators understand how they can work with us and provide a means of categorising and tracking investment.

Objectives, themes and principles



How to get involved

We are keen to work with a wide range of innovators. A key purpose of this strategy is to help you to better understand what we are looking for and how to get involved.

The high-level guide below maps out the key stages in getting an innovation project off the ground and indicates which areas of this strategy can help. It also signposts you to further resources and collaboration portals.

1

Principles

Get a sense of how we work by looking at our principles (page 5).

2

Innovation themes

Understand our priority themes for innovation and where your ideas fit in by reading about our innovation themes (pages 6–10).

3

Local or national?

If your idea can be applied anywhere, go through one of the national services (see right).

If it is specific to a transmission, system or local distribution operator, make contact directly.

- Innovation websites
- Innovation strategies
- Events
- Newsletters
- Innovation calls/ competitions

4

Funding opportunities

Sign up for information about funding opportunities.

5

Develop proposal

Identify partners, develop and submit your project proposal.

Network Innovation Collaboration Portal

- Share information
- Find partners
- Propose new project ideas for all network companies to consider

EIC hub

- Access the latest opport-unities from some member network companies
- Connect with a global community of innovators
- Search for funding and access support resources

Smarter Networks Portal

- Sharing learning
- Collaborate on new projects

Innovation Funding Service

- Online application and collaboration tool
- Information on all active funding competitions

Innovator Support Portal

- Funding finder tool
- Connect with innovators and experts

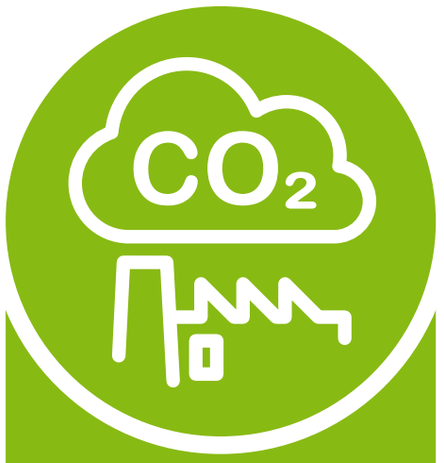
Principles of network innovation

Customer benefit

Customer benefit should be at the centre of all network innovation activity. Benefits will range from efficiency savings and a better customer experience to societal benefits, such as the accelerated decarbonisation of our energy system.

Collaboration

Network innovation activity should provide shared learning, avoid duplication and increase collaboration between network companies and the wider energy sector. Network innovation should also be joined up with wider UK energy innovation programmes.



Carbon impact

Innovation activities should have a positive impact on achieving the UK's net zero emissions target whenever possible. Therefore, the potential carbon impact of an innovation project should be considered.

Data and outputs

The outputs of network innovation activity should be made available to all interested parties in a consistent and accessible format.

Scale up and rollout

A key objective of network innovation activity should be to deliver transformational change, taking viable initiatives forward to business as usual deployment and to identify methods to scale up and roll out new practices, processes and technologies.

THEME 01

Consumer vulnerability

Exploring how best to support the needs of consumers in vulnerable circumstances today and in the future, ensuring that everyone can experience the benefits of the energy transition and any adverse effects of change is minimised.

Vulnerable consumers are those significantly less able to protect their interests in the energy market and/or are more likely to suffer detriment. Vulnerability can take different forms and can change over time. Causes include, but are not limited to:

- Financial
- Technological
- Locational
- Demographical
- Health and wellbeing.

It is often those consumers in vulnerable circumstances that are most likely to find it difficult to engage with changing technologies and benefits. There is a risk that the energy transition could put them at a greater disadvantage.

Innovation allows us to explore how best to support the needs of consumers in vulnerable circumstances and to take a more inclusive approach. This could take the form of new services, data and management practices, technologies or partnerships.

5 focus areas

These are the five focus areas that stakeholders have identified as a shared set of near-term priorities for both gas and electricity:

1. Understand and remove barriers to adopting new technologies and services for vulnerable consumers
2. Facilitate building resilient local communities
3. Support the fuel poor and improve affordability for consumers
4. Explore how to reduce the financial impact of net zero on vulnerable consumers
5. Improve engagement and visibility between vulnerable consumers and the networks.

THEME 02

Net zero and the energy transition

Facilitating and accelerating the UK's transition to net zero greenhouse gas emissions before 2050.

The transition to net zero greenhouse gas emissions will require:

- A transition to low carbon gases
- The significant decarbonisation of heat
- Even greater levels of low and zero carbon electricity generation
- The decarbonisation of transport, including significant levels of electrification
- An increase in flexibility in our wider energy system, for example through smart technologies and services
- An increase in energy efficiency and changes in demand and customer behaviour
- New ways of understanding and managing system stability
- A whole energy system approach.

This creates both opportunities and challenges for the electricity networks. Having more low carbon technologies and distributed generation connected to our networks means that we need to be much smarter in how we manage them. We will need new ways of accessing flexibility to support the variable output from renewables, as well as improving our practices of active network management and grid interconnection.

For the gas networks, we need to investigate, trial and deploy low carbon, safe and cost-effective alternatives to natural gas and prepare our networks to deliver it.

Changes in demand patterns from the decarbonisation of heat and transport alongside increases in energy efficiency also need to be managed in smart and cost-effective ways.

We recognise the importance of cross-vector coordination and planning to efficiently manage the interactions between electricity, gas, heat, transport and waste in the energy transition.

We need to be ready to facilitate the transition to net zero and accelerate it wherever possible.

5 focus areas

These are the five research areas that stakeholders have identified as the near-term priorities for electricity and for gas:

Electricity

1. Facilitate the adoption of flexibility and smart systems
2. Facilitate and enable the electrification of heat and transport
3. Facilitate the efficient connection of low and zero carbon electricity generation
4. Understand the operational impact of long duration reserve services on the network
5. Contribute to a UK-wide methodology for calculating the cost of carbon.

Gas

1. Actively develop hydrogen and green gas ready networks
2. Enable the transition to low carbon heating and transport
3. Develop market solutions to enable the energy transition
4. Ensure resilience and reliability through the energy transition
5. Develop the best network solutions for supplying a wider range of gases.

THEME 03

Optimised assets and practices

Developing and implementing industry leading techniques for optimising assets and practices for energy networks.

Optimising assets and practices includes improving our:

- Capability
- Resilience
- Reliability
- Safety
- Security
- Health
- Environmental impact
- Digitalisation strategy.

Many of the activities in this area are considered business as usual, however innovation will accelerate improvements and enable more unconventional approaches to be tested.

Continuous improvement is required to ensure we are delivering value for money for our consumers and can proactively respond to changes in the energy system. Rapid decarbonisation, changing demand and generation patterns, digitalisation, changing weather patterns, an aging workforce and managing new security threats are just some of the issues we are responding to.

Investing in our infrastructure, preparing our networks for change and adapting our practices and processes to meet these changes is vital if we are to continue to deliver an effective gas network and service.

Network innovation enables us to test and improve new technologies, optimise our operational and management practices and focus on the people that keep our networks safe, secure and reliable every day.

5 focus areas

These are the five focus areas that stakeholders have identified as a shared set of near-term priorities for both gas and electricity:

1. Improve the visibility of consumers and their behaviour
2. Enable digitalisation for network and system optimisation
3. Reduce and mitigate unplanned outages, supply interruptions and wider disruptions
4. Minimise the impact of networks on the environment
5. Ensure future skill requirements and workforce resilience.

THEME 04

Flexibility and commercial evolution

Developing and testing innovative solutions to increase the flexibility, transparency and efficiency of the energy system, enabling information to be more open and networks to be more responsive to change.

Our energy system is evolving as we continue to decentralise our electricity generation and decarbonise the way we supply and use energy. This is driving the need for increasing levels of flexibility and adaptability in our networks to cope with peaks in demand or generation.

More and more distributed energy resource (DER) is becoming flexible, which means the ability to control or schedule demand and/or generation. These technologies can provide 'flexibility services' to us to help solve congestion issues on our electricity networks and release additional capacity, which then allows connection of more low carbon technologies.

Flexibility markets are one of the evolving commercial arrangements that enable customers to interact with us and sell flexibility services. Other commercial arrangements, including linking with national energy markets, will need to be explored to ensure customers can interact with us to support the operation of a smart network.

The gas network is seeing a significant number of smaller, decentralised gas fired power generation sites seeking to connect, to provide some of this flexibility. Adapting operational forecasting to align with an increasing number of flexible generators will be key to meeting both the peak and annual demand for gas.

Gas networks are also seeing an increasing number of green gas projects being developed, directly injecting biomethane into the gas distribution network. The supply and use of hydrogen will also require networks to adapt and meet the challenges of new markets and the commercial arrangements that will sit behind them.

Network innovation can therefore enable us to improve and future-proof existing commercial arrangements, trial the impact of emerging markets and commercial products on our network and develop new marketplaces.

5 focus areas

These are the five research areas that stakeholders have identified as the near-term priorities for electricity and for gas:

Electricity

1. Enable domestic flexibility, local energy markets, EVs and smart charging
2. Trial and implement innovative arrangements to support network management and flexibility
3. Maximise the opportunities of smart meters, data and network charging reforms
4. Identify regulatory barriers and make recommendations for reform
5. Develop flexible connection arrangements and mechanisms to inform how customers generate and use electricity.

Gas

1. Develop commercial arrangements for connecting and supplying hydrogen
2. Maximise the commercial opportunities for connecting green gas and carbon capture and storage (CCS)
3. Develop understanding of potential impacts of flexibility on gas networks
4. Trial and implement innovative arrangements to support network management and flexibility
5. Support the modernisation of gas metering and billing methodologies.

THEME 05

Whole energy system

Enabling joined up and efficient approaches across multiple aspects of the energy system around planning, forecasting, design, construction, operation, maintenance and data.

A whole energy system approach requires us to look beyond our own networks and develop our understanding of how we interact with and impact on the wider energy system.

There are multiple aspects to the energy system and different ways of applying whole energy system thinking. These can include thinking across:

- Electricity and gas networks
- Transmission and distribution networks
- Transport, buildings, power and industry sectors
- Water, waste and telecommunications utilities
- Networks, generators and consumers
- Local energy systems, cities and regions.

Decisions and actions taken in one part of the system increasingly have impacts for the wider system. Therefore we need to coordinate around planning, forecasting, design, construction, operation, maintenance and data to identify potential problems and the best and most cost-effective solutions.

Rapid decarbonisation of our energy system will change the demand and generation patterns on both the gas and electricity networks.

We need to better understand the interaction between gas and electricity networks through joint forecasting and planning. It is also important that we work with cities and regional bodies to reflect local needs and differences in approach.

The increase in use of flexibility resources must also be optimised on a system-wide basis, which means greater coordination between distribution and transmission networks.

A big part of a whole energy system approach is transparency and openness. We understand that by sharing more operational information, data, investment plans and innovation ideas, we can enable greater coordination as well as new innovations to come forward.

5 focus areas

These are the five focus areas that stakeholders have identified as a shared set of near-term priorities for both gas and electricity:

1. Collaborate on enabling the growth and operation of emerging low carbon solutions
2. Develop whole system coordinated cost benefit analysis
3. Join up approaches to regional network planning and forecasting
4. Improve access to and visibility of energy network data
5. Coordinate the operation of a whole energy system.

Next steps

In the next two years we are committed to continued opening up of network innovation to a wider range of innovators who can bring new skills and thinking to transforming the energy system.

We asked stakeholders what we could do to engage companies and people in network innovation and received a list of ideas, including:

- Sharing information at events
- Producing a guide to network innovation
- Liaising directly with potential innovators
- Using trade associations and other umbrella organisations to share information
- Running workshops, deep dives and hackathons
- Reporting on deployment of successful ideas
- Improving consistency in application processes between network companies
- Producing webinars to share learning
- Better use of social media for latest updates.

We have taken on board the feedback and will be reviewing our engagement channels, both through ENA and within our individual companies.

Our commitments

Between 2020 and 2022, we are committed to providing guidance and information around how to engage with network innovation, by:

1. Reviewing our engagement methods and channels
2. Hosting the annual dissemination conference
3. Updating the Smarter Networks Portal and the Network Innovation Collaboration Portal
4. Issuing a joint call for proposals for the Network Innovation Competition (NIC)
5. Reporting on network innovation benefits.

We will review and update this strategy again in 2022. At that stage we will check with you, our stakeholders, that the principles and innovation themes are the right ones. We will also work towards combining the gas and electricity innovation strategies to reflect a more holistic, whole energy system approach to innovation.

If you have any questions or would like to discuss the innovation strategy in more detail, please get in touch: innovation@energynetworks.org

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