Annual Innovation Summary 2023/24

Northern Gas Networks

A word from our CEO

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A word from our CEO

Innovation is imbedded in everything we do

As we head towards the transition to net zero in 2050, innovation continues to play a central role in everything we do at NGN.

Innovative solutions and technologies will enable us to keep pushing boundaries, explore and develop new energy sources, and improve how we better support our vulnerable customers. The Network Innovation Allowance (NIA) funding stream and Strategic Innovation Fund (SIF) that we receive from our regulator, Ofgem, are vital tools in helping us to achieve these objectives.

Over the past year, we have looked towards the future and explored the ways we can drive down the costs of alternative energy solutions and most effectively repurpose our network.

Our SIF-funded Hydrogen Cost Reduction (HyCoRe) project has enabled us to understand how we can reduce the costs of green hydrogen production, and our Network Resilience & Diversification programme has explored how we can ensure the future of our network by reusing and repurposing it to transport other services.

We have also examined how we could use vortex tubes in our pressure regulating stations (PRS), to provide a lower cost, more environmentally-friendly cooling and heating platform for our customers, and tested how we could produce community-centred energy systems in the future.

Helping the most vulnerable on our network is something we are absolutely committed to, now and moving forward, and we have continued to explore ways we can best do this.

We partnered with National Energy Action to undertake an in-depth research project to determine how we can create a comprehensive and consistent approach to building community resilience and safeguarding vulnerable customer groups in the lead up to 2050, which has resulted in six guiding principles that set out how to best serve vulnerable customers.

Further developing our Vulnerability Visualisation Tool, which allows us to get to grips with different communities' needs like never before, has been a key focus over the past 12 months too, and we've now made it more widely available to partners and charities, so they too can use the data for doing good.

As the RIIO-GD2 regulatory period continues, innovation remains more important than ever in supporting delivery of our overarching objectives: provide a safe, reliable gas service; support the transition to net zero; continue to modernise our operations and provide help to our vulnerable customers.

I hope you enjoy reading about some of the innovative projects we've delivered this year. If you'd like to find out more or have a suggestion for how we can work together, please get in touch with our innovation team.

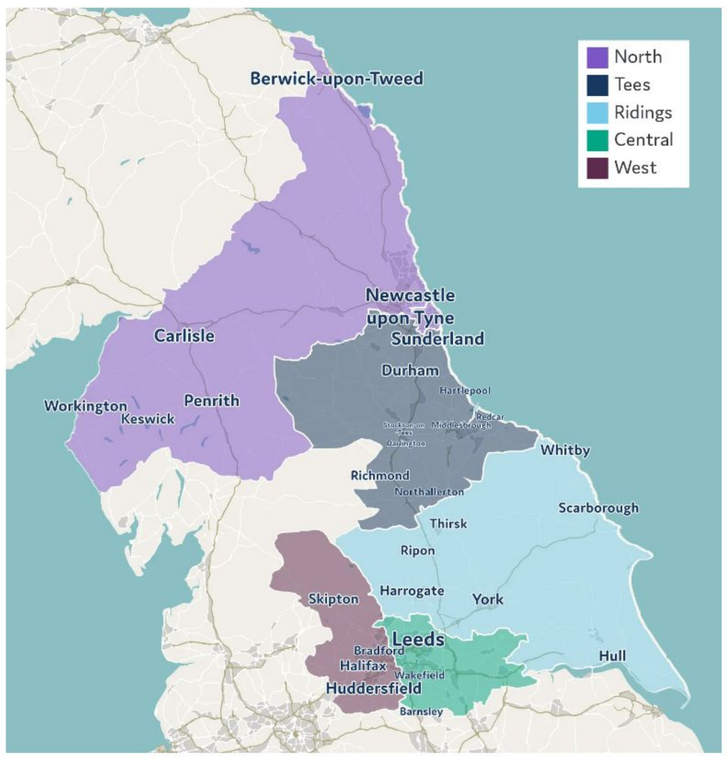
Mark Horsley

Mark Horsley
Chief Executive Officer
Northern Gas Networks

An introduction to Northern Gas Networks

View a map of our area

We are Northern Gas Networks (NGN), the gas distributor for the North of England. We keep 2.9 million homes and businesses cooking on gas, through our vast underground pipe network.



About us

We are committed to providing a safe, reliable and great value service to our customers and stakeholders, while developing new technologies to deliver forms of low carbon energy, such as hydrogen, to support a greener future.

Innovation underpins everything we do – whether we are replacing pipes, fixing gas escapes, developing low carbon energy solutions or supporting our most vulnerable customers.

2.9m

heating 2.9 million homes in our region

By thinking differently, listening to our colleagues and stakeholders, working closely with our partners and considering our communities, we are pushing the boundaries of what a utility company is capable of.

About this document

NGN receives funding from our regulator, Ofgem, which allows us to take forward innovation projects that will contribute to addressing challenges faced by vulnerable customers and facilitate the energy systems transition to a greener future.

In RIIO-1 we led successful innovation projects across both the **Network Innovation Allowance (NIA)** and **Network Innovation Competition (NIC)**.

The RIIO-2 settlement saw a continuation of NIA, with the NIC superseded by the new **Strategic Innovation Fund (SIF)**.

This report covers how we've used both our NIA and SIF funds in the 2023/24 regulatory year to undertake essential research and identify opportunities to develop new products, methodologies and services.

It also demonstrates how we have continued to build on our evolving culture of innovation at NGN, investing in market-ready solutions and developing new ways of working into our business-as-usual operations.

At the heart of all our activity is our focus to support customers in vulnerable situations, and we have increased collaboration with other gas and electricity network licensees, to ensure that all elements that may impact our customers are assessed.

Meet the Innovation team

Funding

How we fund our innovation programme

We embed innovation into every aspect of our business, and are proud to have created a culture where innovation takes centre stage.

We innovate through a wide range of funding methods, but mainly with the help of two vital funding streams, **Network Innovation Allowance (NIA)** and **Strategic Innovation Fund (SIF)**.

FUND STREAM 1

NIA

Ofgem Network Innovation Allowance

The backbone of innovation, this funding stream is allocated to a wide range of innovation projects assessed and approved by NGN, all of which have the potential to support vulnerable customers and help facilitate the transition to net zero.

This report outlines some of the exciting projects made possible by NIA funding this year. Click the link below for further project details, including progress and closure reports.

Read more project details here

Read NIA case studies

FUND STREAM 2

SIF

Ofgem Strategic Innovation Fund

This funding stream of £450 million is available to UK gas and electricity networks to access between 2021-2026. Unlike the NIA funding, this more targeted funding is available for projects that evidentially accelerate the transition to net zero, to help the UK become a 'Silicon Valley' of energy.

The fund has three phases to take a project from the drawing board stage to final delivery.

With each phase, the value of investment increases.

You can read about one of our SIF-funded projects later in this report

Read HyCoRe case study

FUND STREAM 3

Use it or Lose it Fund

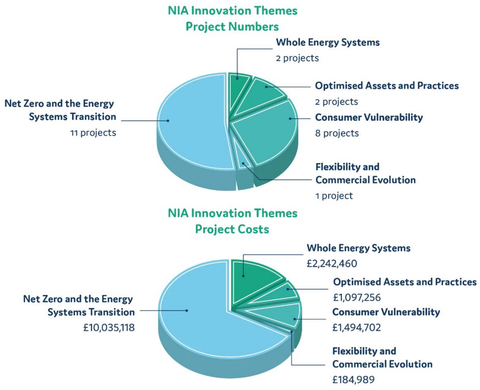
In its RIIO-2 Final Determination, Ofgem established a Net Zero and Re-opener Development Fund Use it or Lose it allowance (UIOLI). The purpose of the UIOLI is to enable Network Licensees to fund small Net Zero facilitation projects, and also to allow for early development work on projects that network companies intend to bring forward at a later stage through other RIIO-2 Net Zero-related mechanisms. NGN were awarded £4.6m under the UIOLI.

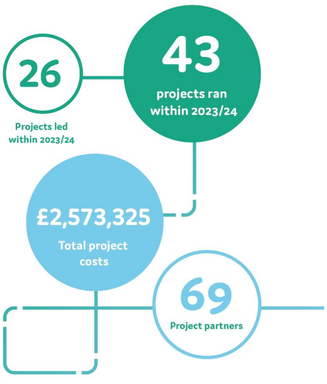
Read more about our UIOLI fund

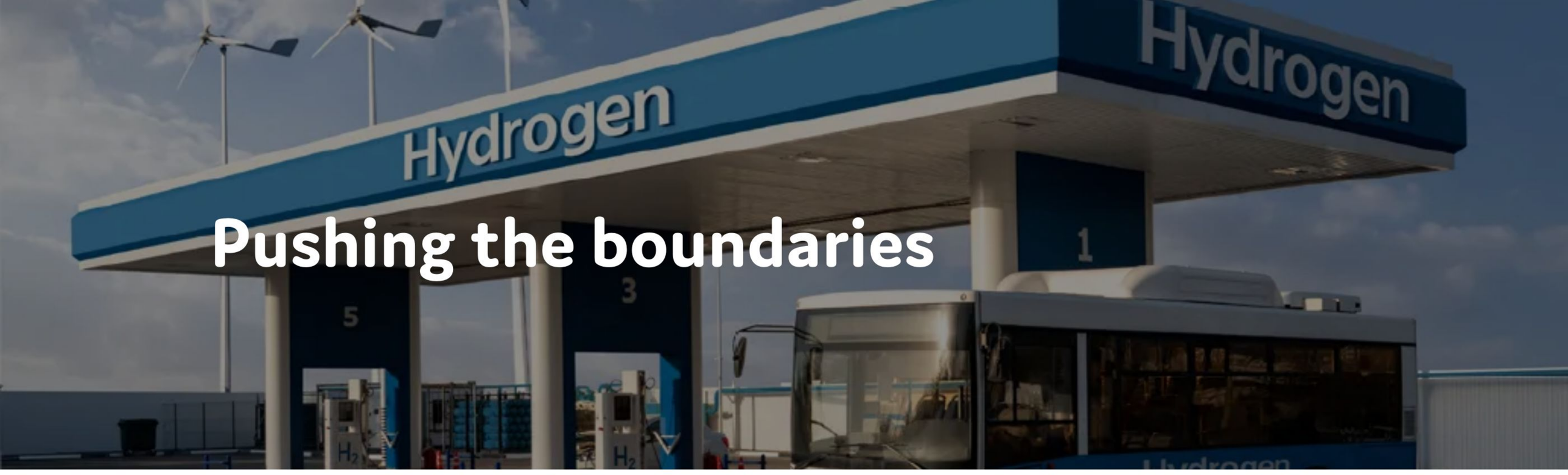
FUND STREAM 4

Additional funding

Some of our innovation portfolio is also funded through Total Expenditure (TOTEX), third-party and alternative business sources, to drive efficiencies and enable process improvements across NGN's operations, by refining and implementing products at a higher technology readiness level.







Pushing the boundaries

A culture of collaboration and innovation

£15m

We expect our innovative efforts to deliver over £15 million worth of savings for our customers

Through our pioneering projects and concepts, Northern Gas Networks is providing transformative benefits to 2.9 million homes and businesses across the North East, Northern Cumbria, and Yorkshire, while also promoting a low carbon economy.

We expect our innovative efforts to deliver over £15 million worth of savings for our customers, as well as wider social benefits during RIIO-2 (Revenue = Incentives + Innovation + Outputs).

These will keep bills low, whilst enhancing our service levels through more efficient ways of operating and maintaining high levels of customer service in the sector.

A culture of collaboration and innovation permeates our entire organisation, empowering our team to think differently and break free from traditional practices.

We want to become the leading gas distribution network for innovation, advancing innovation projects at speed and partnering with ambitious suppliers and SMEs (small and medium sized enterprises) to trial and develop new products and services that genuinely lead the way in the industry. We're pushing boundaries further than ever before to advance the most inventive, dynamic, future-ready, and sustainable ideas that will reduce customer bills and enhance the quality of our services.

Innovation is at the heart of everything we do, from supporting our most seldom-heard customers with their gas supply, to replacing pipes and reducing our carbon footprint.

RIIO-2 priorities:

- We continue to **broaden our training programmes**, streamline internal processes, foster collaborative thinking, and revolutionise practices throughout our business to ensure innovation is ingrained in everything we do
- We are **strengthening our collaboration with stakeholders** to actively involve them in our innovation efforts
- We are **investing in projects that introduce new technologies**, resulting in better outcomes for our customers and stakeholders
- We are **reducing the cost of innovation for our customers** by seeking greater financial contributions from shareholders and innovation partners, while also utilising various funding mechanisms
- We draw **insights from leading innovators across various sectors**, not just within energy, to enhance our business
- We rigorously evaluate our innovation portfolio to ensure that our **investments deliver value for money**

All case studies

NIA funded projects

SIF funded projects

Additional NIA projects

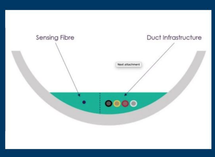
UIOLI funding

Our 6 innovation themes:

- Data and digitalisation
- Flexibility and market evolution
- Net zero and the energy system transition
- Optimised assets and practices
- Supporting consumers in vulnerable situations
- Whole Energy Systems

Case studies:

Click on the boxes below to read more about each case study.
Don't forget to look out for the 6 innovation theme icons throughout the case studies



CASE STUDY 1

Network Diversification & Resilience

Read Case Study

CASE STUDY 2

APEX

Read Case Study

CASE STUDY 3

Vulnerability Visualisation Tool

Read Case Study

CASE STUDY 4

Community Resilience

Read Case Study

CASE STUDY 5

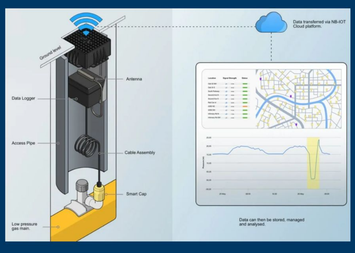
Vorte Heating Solution

Read Case Study

CASE STUDY 6

HyCoRe

Read Case Study



Additional NIA projects

Read more

Use it or lose it funding

Read Case Study

CASE STYDY 1

Network Diversification & Resilience

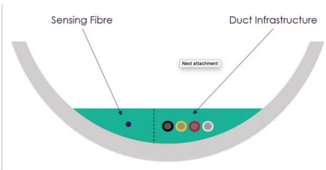
Expanding usage of the gas network

Case study: Network Diversification & Resilience

- **Project reference:** NIA_NGN_424
- **Project partner:** Analysys Mason, DNV and nuron
- **Project status:** Complete
- **Overall project value:** £184,989.00
- **Innovation theme:** Flexibility and market evolution

INNOVATION THEME:

- Data and digitalisation
- **Flexibility and market evolution**
- Net zero and the energy system transition
- Optimised assets and practices
- Supporting consumers in vulnerable situations
- Whole Energy Systems



Expanding usage of the gas network

As we transition towards net zero, the UK's energy landscape is changing and the future of gas remains uncertain.

Our gas network has been developed and maintained over many years due to vast investment from customers, paid for through their energy bills. We have a huge responsibility to ensure the network is being used in the best ways possible, both today and in a low-gas future.

One way of ensuring the future of the network and retention of consumer investment is to look at how we can reuse and repurpose our existing assets to transport other services. We partnered with nuron, Analysys Mason and DNV to see if this would be viable, first exploring the possibility of installing a ducted infrastructure into our live gas pipes to house other utility systems, including optical fibre and telecoms cables.

The project consisted of four parts:

1. Technical review: A thorough investigation to determine the best ways to install ducted infrastructure and optical fibre into and out of the gas network

2. Regulatory review: An analysis of current Ofgem licence conditions and identification of the modifications that will need to be made to these to enable us to install ducted infrastructure and other utility systems into the network in the future

3. Commercial review: A whole market review of potential suppliers and users who are likely to utilise the gas network for alternative uses to ensure it will be financially viable

4. Operational review: An exploration of how ducted services can be housed in ways that won't interfere with the day-to-day running and servicing of live gas pipes

Lewis Kirkwood

Innovation Development Manager at NGN

"This experimental project has demonstrated that our existing gas network can be effectively utilised to house and transport other utilities and systems, to meet changing needs and future energy use. It's proved we can repurpose the network in a range of exciting ways, all with minimum disruption to customers. It's also helped us look to the future and explore the possibilities open to us, which will enable us to effectively plan and adapt as we transition to net zero.

This is the first project of its kind, and we will now begin to explore a wider scope of other services we could potentially repurpose our network for, including electrical cables, synthetic fuels, heat networks and sustainable aviation fuels."

Key benefits:

- **Provided evidence that it's possible to install a ducted infrastructure into the live gas network**
- **Highlighted the different ways that the existing gas network can be used in a low-gas future**
- **Platform to explore other services and systems that could be deployed within ducted pipework in the network, including electrical cables, heat networks and synthetic fuels**
- **Determined that optical fibre monitoring systems could also be installed to help us better understand the current condition of the gas network**

CASE STYDY 2

Alternative Power for Equitable Communities (APEX)

Creating place-based community heating schemes

Case study: Alternative Power for Equitable Communities (APEX)

- **Project reference:** NIA_NGN_448
- **Project partner:** Centre for Energy Equality and LCP Delta
- **Project status:** Ongoing
- **Overall project value:** £177,000.00
- **Innovation theme:** Net zero and the energy system transition

INNOVATION THEME:

- Data and digitalisation
- Flexibility and market evolution
- **Net zero and the energy system transition**
- Optimised assets and practices
- Supporting consumers in vulnerable situations
- Whole Energy Systems

Creating place-based community heating schemes

Beginning in March 2024, this early phase exploratory project has been designed to show us how we could produce community-centred energy systems in the future.

Through a research test phase, our expert team has been investigating how to leverage the capabilities of power-to-hydrogen (PtH2) technology within three typical community settings – urban, rural and commercial/industrial - while exploring whole energy scenarios for the future gas system.

The concept revolves around harnessing excess, local renewable energy to produce hydrogen through electrolysis, to bring down energy costs, contribute to sustainable development, and move towards low-carbon, place-based community heating schemes. We want to ensure there's fairness in the transition to net zero, and that there's cost effective options for everyone. We have a responsibility to make sure everyone's covered.

We selected three representative communities in our regions and delved deep into the differences of their gas infrastructures: a national park in Northumberland to represent a rural community, the city of Leeds as an urban setting, and an industrial park in Hull as our commercial test ground.

Within each, we've been able to detail out their population densities and customer vulnerability levels, and look at what the contrasting energy demands are for each. The findings should allow us to create an archetype of gas infrastructure for each typical community, and see what alternative energy sources and methods we can implement within them.

This phase of the project, funded by the NIA, will be complete by summer 2024. The data will help us to make solid recommendations on how hydrogen can integrate with community energy systems in line with the UK's vision of a just transition to net zero. We will then submit into competition funding to get funding for the next stage, which will involve live network trials.

Key benefits:

- **Optimises existing gas distribution infrastructure and introduces new ways to adapt and thrive in a sustainable energy landscape**
- **Produces a more resilient network through renewable energy storage capabilities, which means lower risk of grid failures and a more reliable energy supply for all consumers**
- **Utilises surplus local renewable energy and redistributes it as hydrogen, drastically reducing the carbon footprint of community heating systems and making communities healthier and more sustainable**
- **The project will explore how we can reduce reliance on conventional energy sources, with the aim of reducing pressure on energy bills for consumers**

CASE STUDY 3

Vulnerability Visualisation Tool

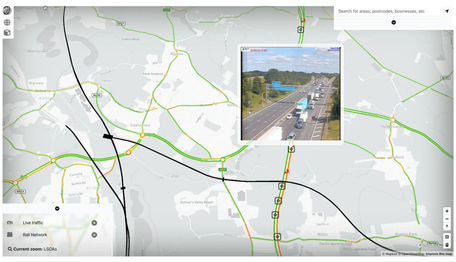
A roadmap to real social change

Case study: Vulnerability Visualisation Tool

- **Project reference:** NIA_NGN_422
- **Project partner:** Egnida Innovation
- **Project status:** Complete
- **Overall project value:** £129,360.00
- **Innovation theme:** Data and digitalisation

INNOVATION THEME:

- **Data and digitalisation**
- Flexibility and market evolution
- Net zero and the energy system transition
- Optimised assets and practices
- Supporting consumers in vulnerable situations
- Whole Energy Systems



A roadmap to real social change

Following its inception in 2021, the NGN Vulnerability Visualisation Tool has continued to go from strength to strength thanks to funding from the NIA, and is now used far and wide as a single point of contact for vulnerability data in the UK.

Through our intricate online map of vulnerable customers – where they're located, what challenges they face, what services they have access to - we've been able to get to grips with different communities' needs like never before. That's allowed us to tailor our services and products to suit them better, creating meaningful social change as a result.

Phase two of our intuitive Vulnerability Visualisation Tool has been about making it more widely available to partners and charities, so they too can use the data for doing good. We've seen an extraordinary increase in the tool's usage across the energy sector and beyond this year, and our mission to continue its development, bring in more partners, add to the amount of data available in the system, and start creating machine learning models on the map is now complete.

Steve Dacre

Innovation Vulnerability Lead at NGN

"During phase 2, we've made huge progress with the technicalities of the tool, which has in turn, made our care for vulnerable customers even more effective. We have helped to identify areas with the highest need for fuel poverty intervention, for example, and used the data to inform a number of future energy planning projects. There are infinite combinations of data which will each tell a story about customer vulnerability in a given area, providing a single version of truth when it comes to the health and needs of the population we serve."

A key development on the project in this period has been our partnership with Google. Demand for the tool has been so high, we needed more user capacity and to be able to host and share even more data in a GDPR-compliant way. We moved the entire application over to Google's Cloud Platform, which has given us all the power of Google's security models, together with their incredibly fast data storage and data exchange platform. The result is a best-in-class data sharing and access platform powering the visualisation tool.

Phase 2 has seen a massive leap forward in both the technical abilities of the tool and the potential that it now offers for collaboration and insights. Phase 3 will be about taking this further, using machine learning and generative AI to make interacting with the data and the tool even easier.

Key benefits:

- **One central source of truth - avoids duplication of effort across the industry and results in better data alignment**
- **Over 100 datasets and counting - pulling information about health, education, environment, energy, finance and local services, which can be overlaid to create a compelling case for supporting vulnerable people**
- **Easy to use and adopt - overlaying datasets at the touch of a button to build a picture of social issues experienced across regions, and instant visualisations to target vulnerability budgets far more effectively**
- **Quicker, better, more targeted support for vulnerable customers and their different needs**
- **Free for communities and third sector organisations to use to improve their services**

CASE STUDY 4

Community Resilience

Supporting vulnerable communities

Case study:
Community Resilience

- **Project reference:** NIA_NGN_357
- **Project partner:** National Energy Action
- **Project status:** Complete
- **Overall project value:** £88,657.00
- **Innovation theme:** Supporting consumers in vulnerable situations

INNOVATION THEME:

- Data and digitalisation
- Flexibility and market evolution
- Net zero and the energy system transition
- Optimised assets and practices
- **Supporting consumers in vulnerable situations**
- Whole Energy Systems

Supporting vulnerable communities

As we prepare for a challenging energy systems transition in the lead up to 2050, it's important that we create a comprehensive and consistent approach to building community resilience and safeguarding vulnerable customer groups.

To help us do this, we partnered with National Energy Action (NEA) to undertake a cross-utility review that considered the range of support currently being provided, which organisations provide this support, and what good practice means for community resilience and consumer safeguarding, both now and during the future energy transition.

We conducted a large-scale piece of research, which included interviews, roundtables and workshops with a wide range of vulnerable customers and stakeholders, to identify the short and long-term risks to community and customer resilience, and to determine how we best manage and mitigate these risks.

Using the results of the research, we created a set of six guiding principles, which set out how to best serve vulnerable customers. Each guiding principle comes with its own set of best practice guidelines, which can be used by utility companies and service providers across the UK, enabling them to empower vulnerable customers and build community resilience.

Steve Dacre
Innovation Vulnerability Lead at NGN

"There's a real climate of vulnerability at the moment, which has been made worse by the cost-of-living crisis. This piece of research and the resulting guidelines will enable us and other businesses to adopt a best-in-class approach when working with vulnerable customers, ensuring we provide the support they need.

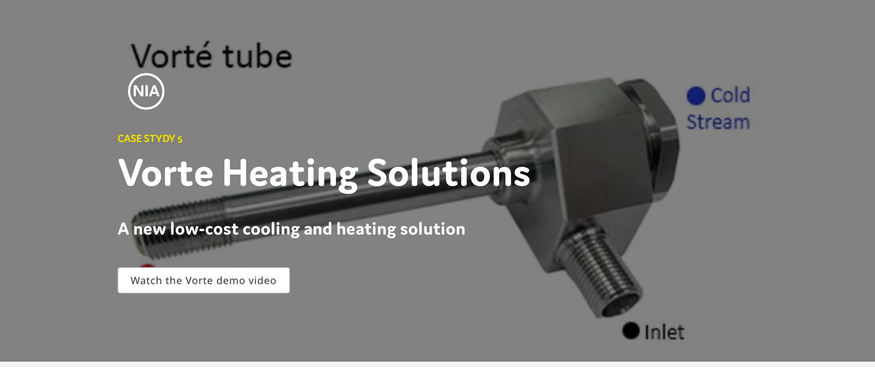
"We're now implementing these guidelines into our day-to-day operations, and working alongside NEA to engage with other businesses to encourage them to adopt them too."

Dr Jamie-Leigh Rosenburgh
Insights and Impact Manager at NEA

"Understanding the multiple, complex and intersectional ways in which customers can experience vulnerability is essential if we are to ensure that the transition to net zero is fair, just and inclusive for all. This research, and the guidelines it has developed, will be a key tool in enabling utility networks and their partners to consistently and meaningfully embed a vulnerability-first perspective into their strategic planning and practical delivery – both now and in the future."

Key benefits:

- **A robust set of guidelines outlining how to best serve vulnerable customers, which can be used by organisations across multiple sectors**
- **Direct engagement with vulnerable customers has enabled us to understand the complex range of difficulties they face and determine the ways we can best support and empower them**
- **Embedding the guiding principles into our day-to-day operations will improve our service offering and enable us to support vulnerable customers more effectively**



CASE STYDY 5

Vorte Heating Solutions

A new low-cost cooling and heating solution

Watch the Vorte demo video

Case study: Vorte Heating Solution

- **Project reference:** NIA_NGN_431
- **Project partner:** VORTÉ
- **Project status:** Complete
- **Overall project value:** £74,500.00
- **Innovation theme:** Optimised assets and practices

INNOVATION THEME:

Data and digitalisation

Flexibility and market evolution

Net zero and the energy system transition

Optimised assets and practices

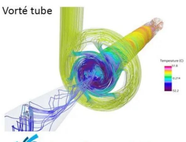
Supporting consumers in vulnerable situations

Whole Energy Systems

Vorté tube

VORTÉ TECHNOLOGIES

Vorté tube



VORTÉ TECHNOLOGIES

VORTÉ TECHNOLOGIES

A new low-cost cooling and heating solution

This groundbreaking project was conceptualised by NGN to investigate how vortex tubes could be used in our pressure regulating stations (PRS), to provide a lower cost, more environmentally friendly cooling and heating platform for our customers.

We needed to develop our understanding of an alternate heating solution that reduces spending and drastically cuts down emissions from pressure regulating stations. Way beyond anything previously delivered in the UK before, the theoretical project used Computational Fluid Dynamics modelling to see how vortex tubes react with different measures of velocity, pressure and temperatures within our PRS, which pre-heat and regulate energy before going into people's homes.

The benefit of using vortex tubes is that they only use gaseous compositions or ambient air to generate desired temperatures - meaning fewer emissions, and a significant reduction in operational costs the benefits of which can be passed on to our customers.

We currently use industrial-scale water bath heaters and boilers, powered by methane from the grid, or electricity to pre-heat our gas so it doesn't damage our infrastructure if temperatures drop. Vortex tubes use no external energy and need no third-party requirements, meaning a much smaller footprint and less maintenance as there's no replacement parts to fix.

The solution will provide a more reliable and resilient network, with a reduction in maintenance. This feasibility project has provided vital new knowledge into the system requirements, capability and viability of deploying this gas heating innovation, concluding that it is a real option for the future.

The next step is to secure significant funding to take the project to real life testing, along with other technologies.

Key benefits:

- **Increased network resilience**
- **Decarbonisation of gas distribution**
- **Potential to reduce supply interruptions**
- **Aligns with UK Net Zero ambitions**
- **Potential to drive down gas/electricity bill prices by reducing network operating costs**

Vorte demo video:

VORTÉ TECHNOLOGIES

SIF

CASE STYDY 6

HyCoRe

Identifying ways to reduce the cost of green hydrogen

Case study: HyCoRe

- **Project reference:** 10079341
- **Project partner:** ARUP, Carbon Trust, Kinewell Energy, Lhyfe, National Gas, Newcastle University, Northern Powergrid, OREC and UNASYS
- **Project status:** Complete
- **Overall project value:** £593,133.00
- **Innovation theme:** Whole Energy Systems

INNOVATION THEME:

- Data and digitalisation
- Flexibility and market evolution
- Net zero and the energy system transition
- Optimised assets and practices
- Supporting consumers in vulnerable situations
- **Whole Energy Systems**

Identifying ways to reduce the cost of green hydrogen

The transition to net zero will require huge upfront investment, and a key focus area for us is identifying how we can develop reliable sources of green energy at the lowest possible cost for customers.

We're exploring the role hydrogen can play in reducing this initial investment, and our SIF-funded Hydrogen Cost Reduction (HyCoRe) project has helped us to understand the current cost of hydrogen production, and the ways we can bring those costs down using renewable energy.

We've examined the best way of using excess wind from offshore windfarms to generate green hydrogen, determined the optimal UK locations for green hydrogen production facilities and scrutinised how assets in those areas could be utilised to provide best value.

David Lynch

Future Energy Strategy Manager at NGN

"HyCoRe has generated a huge amount of evidence and intelligence to help us drive down the cost of green hydrogen production, whilst also demonstrating how hydrogen can be integrated into the existing energy network to help reduce the capital expenditure required to support the transition to net zero in 2050.

We have completed the Discovery and Alpha phases of the project and established the areas most suited to green hydrogen production. Our consortium is currently working to continue this programme with the intention of submitting a future project proposal through SIF."

Key benefits:

- **Identified the optimal locations and configurations for on-and-offshore hydrogen development, which will reduce the cost of green hydrogen production**
- **Established how existing regulatory and licencing frameworks need to be amended to enable green hydrogen production**
- **Gained valuable insights into supply chain markets, which will enable us to effectively forward plan the development of green hydrogen production systems**

Additional NIA projects

Our 6 innovation themes:

- Data and digitalisation
- Flexibility and market evolution
- Net zero and the energy system transition
- Optimised assets and practices
- Supporting consumers in vulnerable situations
- Whole Energy Systems

301 - H21 Failure modes and permeation testing of PE

- **Project reference:** NIA_NGN_301
- **Project partner:** SGN, Cadent, WWU, Radius Systems
- **Project budget:** £435,326.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

302 - H21 Wider Impact of Hydrogen

- **Project reference:** NIA_NGN_302
- **Project partner:** Cadent, SGN, WWU
- **Project budget:** £208,334
- **Innovation theme:** Net zero and the energy system transition

Read more >

337 - Biomethane Study

- **Project reference:** NIA_NGN_337
- **Project partner:** WWU, CNG Services, EIC
- **Project budget:** £66,611.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

348 - H21 Occupied Trials Phase 1 Safety Case

- **Project reference:** NIA_NGN_348
- **Project partner:** Pipeline Integrity Engineers
- **Project budget:** £45,600.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

308 - Common future End states and Transition pathways

- **Project reference:** NIA_CADo073
- **Project partner:** WWU, SGN, National Grid, ERM
- **Project budget:** £195,000.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

300 - Customer Vulnerability Impact Assessment

- **Project reference:** NIA_WWU_2_06
- **Project partner:** All Gas Distribution Networks, All DNOs
- **Project budget:** £35,451.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

304 - Hydrogen Village Consumer Research

- **Project reference:** NIA_CADo074
- **Project partner:** SGN, WWU, BritainThinks, Savanta
- **Project budget:** £419,000.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

303 - IoT Pressure Sensor Pilot

- **Project reference:** NIA_NGN_303
- **Project partner:** Rendo Systems
- **Project budget:** £179,300.00
- **Innovation theme:** Optimised Assets and Practices

Read more >

338 - Streetscore 2

- **Project reference:** NIA_NGN_338
- **Project partner:** Steer Energy, Cadent, WWU, SGN, SSEN, NPg
- **Project budget:** £318,719.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

345 - InTEGReI: CEV Energy Efficiency

- **Project reference:** NIA_NGN_345
- **Project partner:** Newcastle University, National Energy Action, EIC
- **Project budget:** £1,055,214.00
- **Innovation theme:** Whole Energy Systems

Read more >

334 - Improving Carbon Monoxide Awareness

- **Project reference:** NIA_NGN_334
- **Project partner:** SGN, Frazer Nash Consultancy, IGEM
- **Project budget:** £130,649.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

346 - H21 ATEX Equipment and SR/19 IA

- **Project reference:** NGN0_NIA_346
- **Project partner:** Cadent, SGN, WWU, NGGT
- **Project budget:** £381,000.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

401 - Hydrogen Blending Func Spec Infra T1

- **Project reference:** NIA_CADo076
- **Project partner:** SGN, WWU
- **Project budget:** £211,808.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

359 - Project Helix

- **Project reference:** NIA_NGN_359
- **Project partner:** Cadent
- **Project budget:** £100,100.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

388 - Interventions for Hydrogen

- **Project reference:** NIA3_SGN0015
- **Project partner:** Cadent, WWU, DNV
- **Project budget:** £276,547.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

379 - Hydrogen Skills Competencies

- **Project reference:** NIA_NGGT1085
- **Project partner:** Cadent, NGN, WWU, SGN
- **Project budget:** £410,786.00
- **Innovation theme:** Whole Energy Systems

Read more >

407 - Data Quality AI Tool

- **Project reference:** NIA_NGN_407
- **Project partner:** IV AgilityWorks
- **Project budget:** £105,996.00
- **Innovation theme:** Optimised Assets and Practices

Read more >

395 - Digital Exclusion

- **Project reference:** NIA_CADo088
- **Project partner:** Energy Systems Catapult, NGGT
- **Project budget:** £62,887.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

414 - HVT Legislation and Reg Analysis

- **Project reference:** NIA_NGN_414
- **Project partner:** WWU, Cadent, SGN, XoServe
- **Project budget:** £500,000.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

415 - Supporting Vulnerable Customers During Power Cuts

- **Project reference:** NIA_NGN_415
- **Project partner:** Northern Powergrid
- **Project budget:** £48,500.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

344 - Ignition Consequence

- **Project reference:** NIA_NGN_344
- **Project partner:** NGGT, SGN, WWU, Cadent, DNV
- **Project budget:** £3,815,765.33
- **Innovation theme:** Net zero and the energy system transition

Read more >

360 - Off Grid Communities

- **Project reference:** NIA_NGN_360
- **Project partner:** NPg
- **Project budget:** £174,891.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

416 - History of Gas

- **Project reference:** NIA_WWU_2_17
- **Project partner:** WWU
- **Project budget:** £18,666
- **Innovation theme:** Net zero and the energy system transition

Read more >

420 - Visualising the Opportunity for Pipeline Hydrogen for Mobility Applications

- **Project reference:** NIA_NGN_420
- **Project partner:** ERM, TPI
- **Project budget:** £106,700.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

350 - Smart Gas Pressure Sensor

- **Project reference:** NIA_NGN_350
- **Project partner:** DeltaQ
- **Project budget:** £198,960.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

421 - Domestic Hydrogen Detector Research

- **Project reference:** NIA_NGN_421
- **Project partner:** Cadent, SGN, WWU
- **Project budget:** £181,554.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

425 - Hydrogen Ready Components Phase 2

- **Project reference:** NIA_NGN_216
- **Project partner:** Cadent, HSE
- **Project budget:** £201,488
- **Innovation theme:** Net zero and the energy system transition

Read more >

390 - Gas Control System - Impact Assessment

- **Project reference:** NIA_WWU_02_27
- **Project partner:** WPRO, WWU
- **Project budget:** £311,737.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

391 - Low to no power heating

- **Project reference:** NIA_NGN_391
- **Project partner:** LNO Limited, SSEN, LKPN
- **Project budget:** £179,400.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

434 - Dispersion of Helium

- **Project reference:** NIA_CADo097
- **Project partner:** Cadent, WWU, SGN
- **Project budget:** £62,062.67
- **Innovation theme:** Net zero and the energy system transition

Read more >

437 - GB QRA

- **Project reference:** NIA_CADo096
- **Project partner:** Cadent, SGN, DNV
- **Project budget:** £356,625.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

428 - Home shield (URS)

- **Project reference:** NIA_CADo095
- **Project partner:** Uis, WWU, Cadent
- **Project budget:** £186,668.00
- **Innovation theme:** Supporting consumer in vulnerable situations

Read more >

444 - Biomethane & H2 Interactions

- **Project reference:** NIA_WWU_02_58
- **Project partner:** AFUR, WWU,NGT,Cadent, SGN
- **Project budget:** £141,821.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

433 - Hazardous Areas Impact Mitigation

- **Project reference:** NIA3_SGN0041
- **Project partner:** Steer Energy, Cadent, SGN
- **Project budget:** £66,324.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

440 - H2 Ignition Risk

- **Project reference:** NIA3_SGN0044
- **Project partner:** SGN, NGT
- **Project budget:** £72,267
- **Innovation theme:** Net zero and the energy system transition

Read more >

443 - HVT Appliance Development Phase 1

- **Project reference:** NIA_CADo100
- **Project partner:** Arup, Kiwa Energy, Cadent, WWU, SGN
- **Project budget:** £162,000.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

423 - HyBreak

- **Project reference:** NIA_NGN_423
- **Project partner:** Cadent, NGN, ONI, Bobr Limited
- **Project budget:** £260,133.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

439 - Emissions Mitigations

- **Project reference:** NIA_WWU_02_40
- **Project partner:** Steer Energy Solutions, WWU
- **Project budget:** £137,939.00
- **Innovation theme:** Net zero and the energy system transition

Read more >

432 - MASIP

- **Project reference:** NIA_NGN_432
- **Project partner:** Sustainable Pipeline Systems
- **Project budget:** £37,500.00
- **Innovation theme:** Optimised assets and practices

Read more >

Use It Or Lose It (UIOLI) Fund

Overview of NGN Futures projects

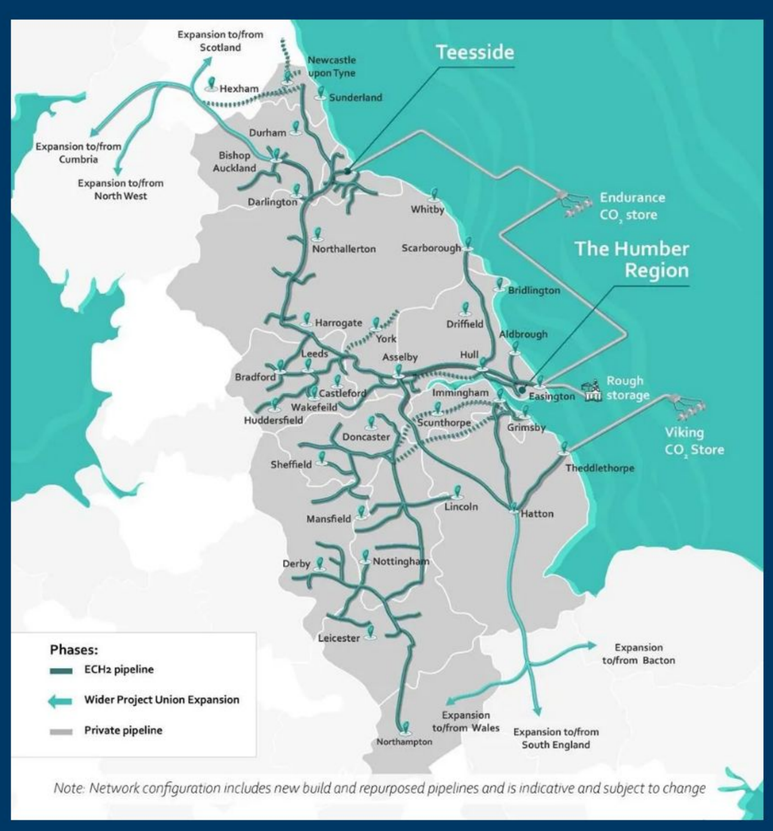
In 2023/24 NGN has allocated its UIOLI across a number of projects which predominately focused on understanding the role that gas would play in helping to achieve the UK Net Zero emissions targets.

We have also focused on developing a strategy and roadmap for energy futures that considers the impact of changes across the whole energy system. This will help to ensure that we deploy the UIOLI in its most effective manner.

In our strategy analysis we identified a range of actions that NGN could implement to prepare the business for potential future scenarios, which differ by importance, urgency, cost and progress to date as shown by the figure below.

Any steps taken will prioritise the 'low regrets' actions which are relevant in multiple future scenarios

East Coast Hydrogen



East Coast Hydrogen is a 15-year infrastructure project led by NGN, Cadent, and National Grid, and supported by a consortium of partners across the hydrogen value chain.

The project will establish connections among hydrogen supply, demand, and storage locations using a combination of repurposed and new pipelines. The project will create a regional hydrogen backbone capable of delivering hydrogen to industrial and commercial users across the east coast of northern England to underpin their decarbonisation goals.

During RIIO-2, we completed the Pre-FEED study which included a technical feasibility assessment and route design optioneering. The Pre-FEED analysis highlights that hydrogen is one of the most viable decarbonisation options for Britain's industries and businesses and highlights the magnitude of potential hydrogen market through primary conversations with our consumers, producers and storge providers. It will be the first major step in the conversion of our national gas networks to hydrogen and will act as a blueprint for subsequent conversions across the UK. The project also demonstrates the innovation, engineering capabilities and economic opportunity in the North, and creates tens of thousands of highly skilled green jobs in the future hydrogen economy.

NGN plans to invest more of its UIOLI in 2024/25 to progress the East Coast Hydrogen project to generate evidence to support an application for additional funding to commence the project build through the Net Zero Pre-construction and Small Net Zero Projects Re-opener later in RIIO-2.

Costing the carbon commitment

The aim of the Costing the Carbon Commitment project was to identify cost optimal pathways to decarbonising the UK energy system by 2050, adhering to the UK Government carbon budgets. The project was funded using UIOLI and brought together stakeholders from across the UK's energy value chain.

The project identified principal factors driving the cost of different credible decarbonisation routes and provided recommendations on the low regrets interventions that should be prioritised by policy and decision makers to enable fair transition to clean energy systems. We've identified that the costing the carbon commitment project could evolve into creating a whole systems energy model capable of serving the needs of regional strategic energy planning.

Delivering Innovation

Allowing innovation to thrive at NGN

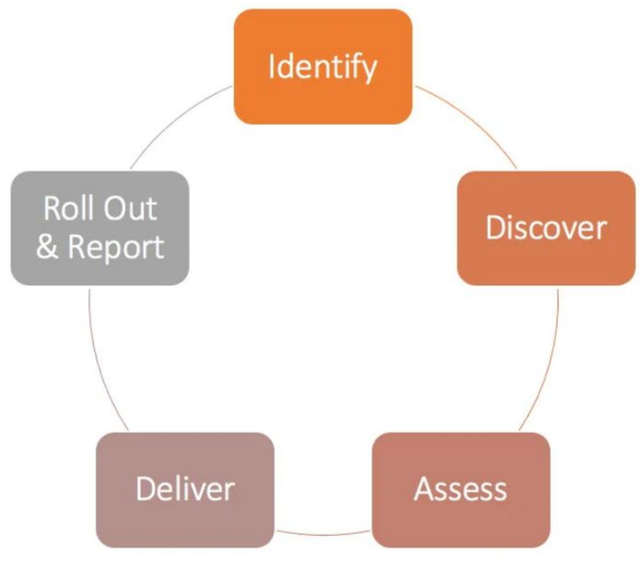
Alongside having the right culture and capabilities amongst our people, it is paramount that we have rigorous governance in place to allow innovation to thrive within NGN, maximising the benefits it can deliver.

We've spent time during this period reviewing our innovation processes and project management to ensure we can deliver genuinely effective innovation projects across the entire business.

This has led to creation of a more efficient 5-step process which has:

- **Increased engagement and validation with key stakeholders**
- **Additional review/approval touch points**
- **Formalisation of new role requirements**
- **Acceleration of go/no go decision**

The 5-step process:



We've split innovation activities into Strategic, Tactical and Regulatory to ensure compliant management of the industry-led innovation process.

We are operating a robust innovation framework in line with Ofgem governance, upholding the strategic, tactical and regulatory requirements we have as a team.

1 Strategic activity

Strategic activity enables engagement, dissemination and partnership working to ensure that the tactical innovation portfolio remains agile and directed to provide evidence to enable the energy systems transition

2 Tactical activity

Tactical activity is required to on a daily/weekly/monthly/annual basis to ensure that key process elements are undertaken, and tight control is in place

3 Regulatory Licence

Regulatory Licence conditions and governance are the foundation that dictate requirements that must be upheld to utilise the various innovation funding mechanisms

Benefits tracking

A social return on investment

Social, environmental and economic return on investment has never been more important, and with ever evolving regulatory requirements, consumer needs and rapid innovation in the energy sector, we have to be able to effectively track and realise the benefits of innovation projects.

To overcome the limits of traditional reporting, NGN recently introduced a more robust system to track the wider benefits of our innovation projects, with qualitative and quantitative metrics such as social and relationship capital, human capital and natural capital on the menu, alongside more traditional dimensions such as monetary benefits.

The new end-to-end framework allows a more integrated, realistic and actionable assessment of how value is created over time from our innovation projects, justifying their existence and future development, and showing the real impact we're having within our communities and beyond.

Working together to deliver a greener, fairer future

A shared strategy for achieving net zero

Whole systems thinking encompasses all forms of energy production and network activity, and will ensure that all utility companies embrace a joined-up to approach to achieving net zero in the UK.

Over the past 12 months, we have attended numerous industry conferences and events with other gas distribution networks (GDNs) and utility companies to strengthen relationships and explore the ways we can best work together to create a greener, fairer future.

We have purchased a joint exhibition stand with the other UK GDNs, which will allow us to attend events together and work collaboratively to address issues, identify solutions and answer attendee questions.

Through attendance at events like Innovation Zero and Utility Week Live, we have met and spoken to a wide range of stakeholders and Government representatives, about immediate and longer-term environmental priorities, which has informed our thinking and will shape our future approach.

Over the past seven years, we have also developed a strong collaboration with the Energy Innovation Centre (EIC), a not-for-profit organisation that brings industry and innovation together. The organisation acts as a conduit to over 7,000 SMEs, which provides us with further opportunities to collaborate with companies across multiple sectors.

Planning for the future

Our Energy Networks Innovation Strategy has recently been updated to highlight the progress we've made so far and how we'll move forward in the coming years. We are also in the planning process for the next network price control framework, and have increased both internal and external engagement to help shape our future strategy.

Matthieu Michel

Operations Director at EIC

"The NGN and EIC Partnership continues to flourish. NGN was the first gas distribution network to join the EIC Partnership in 2012 and it now benefits from access to an evolving global innovation community of over 10,000 innovators. The EIC facilitates cross-sector collaboration and supports the end-to-end innovation process, whilst continuously improving the support available to innovators. This enables NGN to leverage established processes and resources to accelerate the deployment of innovation.

"Highlights from the past year include five innovation challenges being advertised to innovators, several innovation projects being started, solutions transitioning into business as usual, plus additional support resources developed in response to direct feedback from innovators, including a Procurement Guide and Innovation Deployment Guidance."

What's next for innovation at NGN?

In collaboration with colleagues, customers and stakeholders, we are developing our innovation strategy as part of our five-year business plan for GD3, with emphasis on how we can continue to decarbonise the sector to achieve net zero and support more customers in vulnerable circumstances.

We are focusing on five core work streams:

- **Whole energy systems**, looking at how we can support a fair transition to alternative energy supply
- **Sustainable communities**, which will involve working closely with local communities and local authorities to identify and develop the plans and technologies required to deliver a fair transition
- **Customer vulnerability**, exploring how we can support our customers with specific needs and how we can use emerging technologies to improve our services to them
- Looking at how we can safely and effectively **repurpose our gas network** to support the transition to hydrogen
- **Embracing advanced technology**, leaving behind more traditional methods to achieve better business results and customer benefits (using AI and Machine Learning for example to simplify data collection)

We have an unbeatable track record of taking large-scale innovation projects and products from ideation to completion, transforming how our industry behaves and operates. Many of these projects began with NIA funding, and we are always eager to partner with other businesses and SMEs to create innovative solutions and products that will shape the future of the energy market. Please get in touch if you'd like to discuss an idea.

Each innovation project is inspired by Ofgem's push for efficiency and the need to provide evidence for better, safer services. We've enhanced our operational capabilities, further integrated innovation into our business, and shifted away from conventional operational efficiency and gas innovation projects. Our focus for this next period is on future-oriented data and digitisation projects, ensuring that all customers, especially those who are vulnerable, are supported as we start to transition to a new energy system.

Northern Gas Networks

Get in touch

If you're an innovator with great ideas and want to work with NGN, we'd love to hear from you.

To work with us on future strategic innovation funding opportunities: **SIF@northerngas.co.uk**

To work with us on innovation projects or opportunities: **innovation@northerngas.co.uk**

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