

Gas Transmission
Annual Summary

nationalgrid

Network Innovation Allowance

2014/15

Game Changer

How Building Information Modelling (BIM)
is promising cost and carbon savings



Welcome to our annual summary for 2014/15



From cutting-edge 3D modelling to game-changing robotics, 2014/15 has been an exhilarating and rewarding year for Gas Transmission innovation. With a number of Network Innovation Allowance (NIA) projects progressing to business as usual activities, and other ventures and partnerships blossoming, we've continued our journey of embedding new learning and maximising value for our customers.

A passion to do business better continued to drive our innovation programme forward in 2014/15. Some 47 NIA projects were undertaken, utilising 87% of our NIA budget.

The NIA portfolio includes projects across all our key themes – safety, reliability, environment, strategic, system operability, and customer and connections. Big successes this year have been Building Information Modelling and Compressor Balance of Plant, which are fast becoming business as usual and already being applied to our compressor investment programme. We have also progressed with

projects under our system operability and connections themes, such as NTS Constraint Modelling and the Network Investment Stakeholder Tool.

Our successful NIC submission, the inline robotic inspection of high pressure installations (now called Project GRAID), will see NGGT design and build a revolutionary robotic inspection device. The robot that we develop during the three-year project will allow us to determine the true asset condition of buried pipes at high-pressure gas installations without the need for complex, deep excavations. This innovative



approach to asset inspection will result in savings of £60m over the next 20 years.

NGGT is working with three SMEs on this pioneering project – Premtech, Synthotech and Pipeline Integrity Engineers – who are each proven specialists in their field.

We made the most of a great opportunity for knowledge sharing and networking at the Low Carbon Networks and Innovation (LCNI) Conference in Aberdeen in October. We successfully showcased a selection of NIA and NIC projects, including a prototype display for the Composite Pipe Supports project and a presentation on Stress Concentration Tomography.

We also played a key role in the Gas Innovation Governance Group (GIGG), which issued its first GIGG Innovation

newsletter in winter 2014/15. This was a great example of focused collaboration between all five gas licensees.

We maintained strong relationships with our existing project partners and continue to seek out new suppliers through events such as Innovation in Action at the WRC and Utility Week Live, and networking tools such as LinkedIn.

Our ambition for the third year of NIA is to continue to initiate projects and to ensure that the positive outcomes and learnings from all our innovation ventures are embedded into our business as usual activities to maximise value for our customers.

John Pettigrew
Executive Director, UK
National Grid



2014/15: A YEAR OF INNOVATION

National Grid Gas Transmission is busy embedding a culture of innovation into everything it does. Here's a snapshot of our year...

INNOVATION EXCELLENCE

Gas Transmission further showcased and publicised its engineering innovation with a number of other key activities in 2014-15:

- » Innovation Showcase at NG House, Warwick, September 2014
- » NIC 2015 – call out for ideas, December 2014
- » Innovation Exhibit at Gas Transmission Operations Conferences, February 2015
- » Innovation Showcase at the Big Bang Event, March 2015
- » Innovation Exhibit at National Grid Leadership Event, March 2015
- » Annual National Grid Gas Transmission Innovation Expenditure, March 2015
- » National Grid Gas Transmission Innovation Exhibition at Utility Week Live, April 2015
- » National Grid Gas Transmission Innovation Showcase at WRc (Water Research Council) Innovation in Action, April 2015
- » PRCI Pipeline Technical Committee, May 2015

the number of
NIA projects that
were undertaken
in 2014/15

47

3,500

Poken interactions took place between delegates and the National Grid team during Utility Week Live. Poken technology allows delegates to collect digital content via smart tag touch points.



The annual Utility Week Live event was an excellent showcase for NGGT's latest innovations, with transmission team members explaining the details to delegates.



LCNI Conference – the power of ideas

Customers and stakeholders were given a glimpse of tomorrow's world when we showcased several of our pioneering innovation projects at the Low Carbon Networks and Innovation (LCNI) Conference in Aberdeen in October.

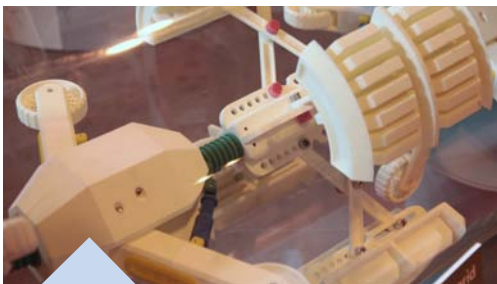
A big focus for our stand was our Building Information Modelling (BIM) project, which is all about pegging data to 3D models through the design, construction and maintenance of our assets. Stakeholders immersed themselves in the technology as they enthusiastically tested our virtual reality headsets, which allowed them to tour an above ground installation (AGI) on the National Transmission System (NTS).

Game-changing 3D concept robots, that supported our NIC GRAID bid, got visitors talking, as did a display of our Composite Pipe Supports and a presentation on Stress Concentration Tomography. It was a great opportunity to share knowledge and stimulate ideas with other network licensees and industry contacts.



22

the number of projects successfully completed in 2014/15



Rise of the robot

We made our NIC 2014 submission – In Line Robotic Inspection of High-Pressure Installations (now called Project GRAID) – in July 2014 and £5.7m of funding was awarded in November.

Our successful submission put the wheels in motion for the development of cutting edge robotic technology. By working with internal and external partners, we'll develop a robotic platform that will enter the pipelines at high-pressure installations, withstand extreme pressures, change its diameter as necessary, negotiate 90-degree bends – and ultimately give us a true picture of the asset's condition.

You can read much more about the pioneering project on pages 8 and 9, but it promises enormous cost and carbon benefits, and really raises the bar on how robotics can benefit our business and the broader energy community.



Continuing collaboration

We continued to develop collaboration projects with other network licensees this year, and played a key role at the Gas Innovation Governance Group (GIGG). This is where gas distribution and transmission network companies work together to explore which technological, operational and commercial projects are most suitable for the future needs of the gas networks.

Representatives from each of the networks (pictured above) meet every month to consider challenges that require innovative solutions, share learning and develop robust processes for collaboration. NGGT was proud to host the meeting in April.

One of our key achievements was the production of the first GIGG Innovation Newsletter in winter 2014/15. The newsletter is an example of true collaboration, with contributions from all five gas licensees and a wide distribution list across the various stakeholder groups.

£4m

the amount we spent of our Allowable Network Innovation (NIA) expenditure in 2014/15

£60m

the saving over 20 years from Project GRAID

PROJECT MILESTONES

Here are some of the important targets that projects in our portfolio have hit this year...

- Composite Pipe Support: we delivered a prototype in August 2014
- High Altitude Aerial Surveillance: this was sanctioned in September 2014
- Meter Validation Assessment Tool: stakeholder meetings were held in November 2014
- Compressor Balance of Plant: case studies were completed in January 2015
- Development of a New Design Vent Silencer: prototype tests were conducted in January 2015
- Network Engagement Stakeholder Tool: this was presented to stakeholders in March 2015



James Whiteford, Gas Network Strategy Manager, presents at the LCNI conference in Aberdeen

For more details on all the projects listed, see the [project portfolio](#) section of this publication



Our strategy in action

Gas Transmission has five clear and defined goals that are designed to help us achieve our ambition of being the world's leading gas transmission business. Our innovation portfolio, which contains 47 NIA projects and one NIC project, is balanced out to deliver benefits across each of these key areas.



Strategic

How a robust business strategy is paving the way for a successful financial performance

20%
the projected cost saving over the lifetime of an asset thanks to BIM

- Creative solutions that impact the entire business
- Providing value for customers
- Delivering sustainable financial returns

Our biggest opportunities for strong business and customer benefits lie in compressor replacement and asset health.

As we design and build these new or upgraded sites, we can take important decisions on building and maintaining them efficiently.

Our BIM (Building Information Modelling) project makes use of intelligent 3D modelling processes to reduce repeat development costs and tag critical cost and carbon data to interactive 3D models.

Building more cost-effective pipelines is also essential to our financial performance, and our Feasibility Study for Alternative Pipeline Materials is investigating potential new materials and construction technologies.



Reliability and operability

The pro-active approach to maintenance and management of assets that offers both cost and carbon saving opportunities



- Delivering energy safely, reliably and securely
- Excellence in operations
- Meeting customers' changing needs

We need to manage our assets properly to provide customers with a reliable and efficient service.

Project GRAID (left) is a groundbreaking venture that is key to determining our asset health. For the very first time, we'll work with project partners to design and build a robotic inspection device which can determine the true condition of below-ground pipework at high-pressure gas installations.

By understanding our assets better, we'll be able to better focus our excavation and pipe replacement work, and extend the life of assets that are proven to be in good condition. Also on asset health, our project Vibration Measurement and Mitigation is trialling new sensor technologies that will improve our vibration monitoring activities – and do it at a reduced cost.





- Engaging with customers and communities
- Reflecting the needs of stakeholders
- Providing maximum value for what we deliver

As we work towards modernising the UK's gas infrastructure, our activities affect our stakeholders and the communities where we work.

We believe the best way forward is to engage with the people who are touched by our business and involve them in our decision-making.

Our Network Engagement Stakeholder Tool, for example, helps stakeholders better visualise problem scenarios. This helps us to explain the issues we face more clearly and get them properly on board when we need to make investment decisions.

Our project Industrial and Commercial Gas and Electric Scenario Modelling, meanwhile, is using the best available techniques to provide better analysis of the sector and deliver enhanced scenarios of how the future might look.



Commercial

How better communication with customers and key players is driving forward commercial success



Safety

'Safety first' is more than just a mantra – it's at the forefront of everything we do

- Safety is our number one priority
- Managing a safe and environmentally responsible network
- Exceeding safety and environmental legislation

Third-party damage is the biggest threat to our high-pressure gas pipeline network.

A ruptured pipe is a huge source of danger to any member of the public or person working nearby, so we're continually seeking innovative solutions to reduce the risk.

45% the target for reduction of Scope 1 and 2 greenhouse gas emissions by 2020



Sustainability

Going even greener – embedding sustainable practices to ensure a brighter future for all

- Sustainability in decision-making
- Respecting the interests of communities
- Committed to targets for reducing gas emissions

We're committed to embedding sustainable practices into everything we do in Gas Transmission – and our work on compressor replacement provides a rich opportunity to do that.

Our Balance of Plant project is all about making greener decisions when we design

and build these sites. Effectively, it provides people internally and externally with a suite of tools and documents to choose the best compressor ancillary equipment, which has the least impact on the environment and also reduces visual impact and noise pollution.

Another way we're going greener is with our project Renewable Power on Remote Installations. We're aiming to find alternative, more environmentally friendly, cost-effective ways – such as solar and wind – of powering gas sites in remote locations.

Our project High Altitude Aerial Surveillance promises a host of safety and cost-saving benefits. Helicopters have long been the preferred method for performing aerial patrols of our pipelines. This project aims to allow for a transition from helicopters to new, fixed-wing aircraft (right) that fly higher and faster.

These new machines will drive cost efficiencies and reduce the risk of third-party damage through a system of automated threat.



A new era in robotic innovation

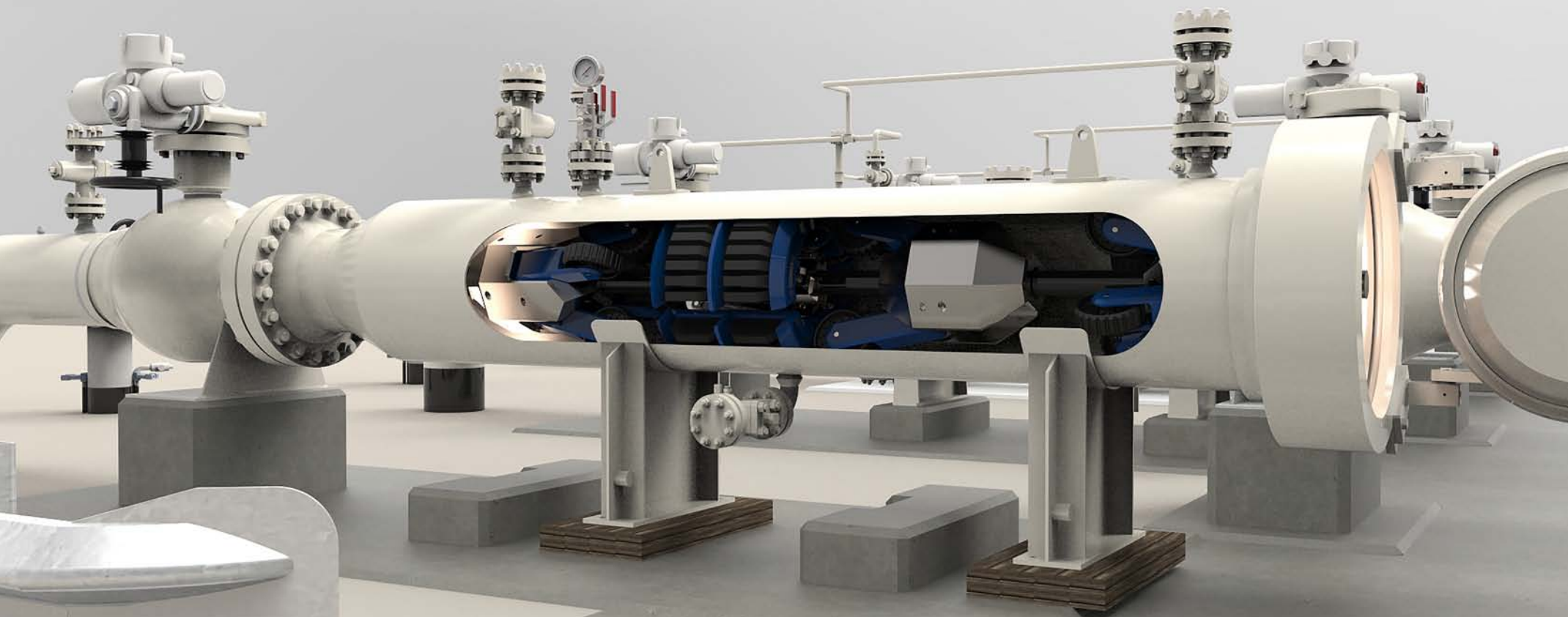
For the very first time, we're developing a robot to inspect the condition of buried pipework in our high-pressure gas installations. It's an ambitious venture that will save more than 2,000 tonnes of carbon per year.

NGGT has been embracing robotic technology for a number of years. Project GRAID, which was awarded £5.7m of Ofgem funding through the Gas Network Innovation Competition (NIC), is all about going even further and taking a brave technological leap forward. It will solve a very challenging problem for our business – how to get accurate information about the condition of pipework in our high-pressure gas installations.

UNDERSTANDING OUR ASSETS

We know that some of our gas transmission infrastructure is coming to the end of its design life, which means potentially replacing a number of our installations. However, up to now, we haven't been able to see inside these pipes since they were installed – which in some cases is as long as 50 years ago.

If we can develop the technology to do that, we'll better understand our assets and how they're performing, which means we can potentially extend their life. That's good for us as an organisation, and good for UK gas consumers as well, as we'll reduce the need for expensive, uncertain excavations that also use a lot of carbon.



GAS TRANSMISSION: PROJECT GRAID

The three-year venture will see NGGT – along with three supporting SMEs – design and build a robotic inspection device which can negotiate its way through this high-pressure environment and determine the true condition of the assets. It's estimated that the device could save £60m over 20 years.

COLLABORATION IS KEY

We've partnered with some of the brightest minds in the sector – three SMEs with exceptional track records in delivering robotic innovation:

- Synthotech Ltd is responsible for the physical robotic platform
- Premtech Ltd will map the sites, create a navigation system for the robot to follow while underground and design the launch and retrieval device, and testing facility
- Pipeline Integrity Engineers (PIE) will have a technical strategy for the project and interrogate the inspection data.

THE CHALLENGE AHEAD

Premtech Director Ian Butt is convinced that strong collaboration will see the project succeed. "It's going to achieve what NGGT wants and will be a catalyst for many more great things," he said.

Synthotech's work at stage one has been to determine the robot's scope and

exclusions – or what the platform does and doesn't need to do. It's called the alpha design phase and will see them come up with a range of concepts on how the robot should look and the sensors it will be equipped with. They'll then use new technologies, such as 3D printing and subtractive manufacture, to make a scale concept model, which will demonstrate how they plan to navigate the pipework.

Synthotech's Innovations Director, Wez Little, is excited by the journey ahead. "It's something that has never been done before," he said. "We're looking for it to be able to travel distances of about 100 metres, negotiating two 90-degree bends – and then be able to carry out visual inspections of the pipework and wall thickness assessment."

A COMPLETE JIGSAW

PIE's director, Gary Senior, is delighted to be bringing his company's expertise to the table.

"Our role is from a technical governance perspective to examine and scrutinise what the other partners are completing so that it makes a complete jigsaw at the end," said Gary.

Darren Elsom, National Grid's Head of Network Engineering, Gas Transmission Asset Management, added: "It's great to see some real momentum now as we move into this project. It will help us to really understand where best to invest our money, while keeping our network safe, which is great for our customers, stakeholders and the wider industry."

Five facts about Project GRAID

- 1 It will develop a robot that can enter our buried pipework at high-pressure installations
- 2 The robot will be able to collect accurate information about the condition of the pipes
- 3 This will reduce the need for expensive excavations that also use a lot of carbon
- 4 It will help us make informed decisions on where best to invest our money
- 5 The robot will be able to travel around 100m and negotiate 90-degree bends to make visual and wall thickness inspection

£60m

the amount NGGT will potentially save over 20 years

100 BARG

the extreme pressure that the robot will be able to withstand



PROJECT: NETWORK INVESTMENT STAKEHOLDER ENGAGEMENT

Connecting with our customers

Our Network Investment Stakeholder Engagement project looked at developing a new tool to improve the way we communicate our investment decisions on the National Transmission System.

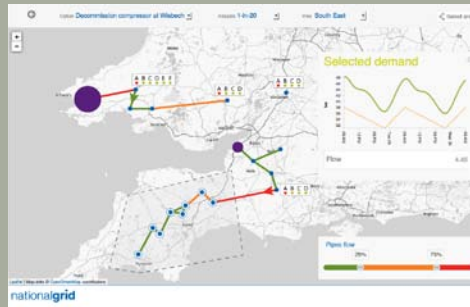
EFFICIENT SOLUTIONS

It aimed to create a better way of visualising problem scenarios, so that stakeholders could understand the issues more clearly when decisions needed to be taken to reinforce the network.

“We wanted customers and stakeholders to be able to be more involved in the process, so they would understand the scenarios we were considering, and also provide their input so we could come up with the most efficient solutions,” said project lead James Whiteford.

TWO-WAY COMMUNICATION

The new tool allows NGGT to bring these scenarios to life in all sorts of ways, such as showing the geographical supply and demand distribution for particular scenarios on a map of Britain or graphical representations of where gas is coming in and where it’s leaving the network. It provides a clear, visual starting point for effective two-way communication with customers.



The new tool was used extremely successfully at a key external stakeholder event for the Industrial Emissions Directive. NGGT needs to make considerable investment as a result of the directive and the event gave the team a chance to use the tool to spark discussion.

“Stakeholders told us the tool had helped them understand the problem and that they’d like to see it used more.”

PROJECT: COMPRESSOR BALANCE OF PLANT ENVIRONMENTAL STUDY

A greener generation of compressor sites

Our compressor stations play the vital role of keeping gas flowing through the national transmission system.

In line with new legislation on industrial emissions, we’re currently following a programme of designing and building new or upgraded sites. So it’s an opportunity to take greener decisions about the equipment we use.

Our Balance of Plant project set out to develop a tool that enabled people designing our sites to choose more environmentally friendly solutions when they were selecting compressor ancillary equipment.

The suite of guidance documents encompasses a software decision support tool and 11 written guides on themes such as valves, generators, lighting, gas seal technologies and venting.

“In the past, we’ve concentrated on the bigger pieces of equipment and the main parts of the process,” said project lead Neil Dawson. “But we realised there was an opportunity to make further improvements by looking at the ancillary components that make the process work.”

The team pulled out all the stops to deliver the new tools promptly, which allowed them to be implemented in time for the latest round of projects in the programme.

They’re set to deliver a whole host of benefits, including identifying innovative



options that hadn’t been previously considered, whole life cost savings brought about by using more efficient equipment, and potential reductions in CO₂ and other emissions.

“The real success is that we’ve completed the guidance in time for it to be used in the next wave of projects,” said Neil. “These projects are in the design phase now, so they’re using our tools to design a new generation of sites.”



Taking 3D modelling into the next dimension

Building Information Modelling (BIM) is one of the most important innovations in NGGT. It proposes substantial cost and carbon savings and has the potential to have a far-reaching impact for the business and the wider industry.

BIM is a major step change in the way construction projects are designed and built – and how the asset is managed and maintained. It's a move away from traditional 2D CAD drawings to easily visualised 3D designs. But it moves beyond a simple software solution by providing access to data-rich, intelligent 3D models, which contain all the critical data about the asset.

Our first year of BIM saw us apply this intelligent 3D modelling process to a specific construction project – Feeder 9, where the application of BIM avoided potentially £1m of construction delays through early visualisation and clash detection.

Phase two of BIM is called Investigation into Enhanced Techniques. Off the back of our findings in year one, we wanted to show how it's possible to unlock further savings in terms of whole life cost and carbon. We were also keen to explore how it could benefit the business in other ways – and the wider gas community.

The project team believes that BIM could be applied across our electrical and security projects, so there's huge scope to see its benefits on an even bigger stage.

THIS YEAR'S ACHIEVEMENTS IN BIM:

1 Importing the 3D models that we've created of buildings, above ground installations and other assets into gaming software called Unity and using Oculus Rift to create immersive Virtual Reality training environments. This is an example of how we're making further use of the models we generate to benefit the wider business, support training and development.

2 The technology brings additional benefits in terms of stakeholder engagement, and we'll be using it to enhance the traditional design and review process by encouraging interactive reviews with our project stakeholders. There's also the potential for remote collaboration on projects and with training, which will cut travel and other costs, reducing our carbon footprint.

3 Laser scanning, which was trialled as a smarter way of surveying sites during phase one, is now available for use across the business. It can be applied to surveys for both gas transmission and distribution's above

ground installations as well as electrical substations. The technique reduces the ambiguity of site records and reduces the need for repeat visits to potentially hazardous site environments.

4 The prototype BIM bank was launched, which provides a portal for information, best practice and model resource for Gas Transmission projects. The portal encourages those working at the design stage to strive for optimum design based on cost, carbon and safety rather than just technically assured designs.

5 BIM will help us cut our carbon footprint, and another element of the project, called life cycle and carbon-costing functionality, is set to help us meet our carbon reduction targets in 2020 and 2050.

6 The development of BIM virtual reality headsets means colleagues can walk around our assets and installations, practice critical operations and build their confidence and expertise in a safe and forgiving virtual world.



PROJECT: BRANCH CONNECTIONS

Q&A: Stress test



Project lead Rob Bood discusses the successful completion of a project that expands the number of manufacturers who can supply branch connection fittings. This will improve lead times and deliver significant cost savings.

Q. What was the aim of the project?

A. A number of manufacturers are producing Welded-In Contour Insert fittings for use as branch connections to replace the conventional sweepolet design. These alternative fittings are faster to install and require less welding. But before we could adopt them, there had to be clear evidence about their mechanical viability, which is what we addressed with this project.

Q. What did you learn?

A. The study established the range of geometries over which the stress concentration factors (SCFs) for sweepolets could be applied directly to the alternative design of fitting. We found that the valid range of geometries covered the sizes that are most likely to be used on our Gas Transmission system. This therefore broadened out the range of potential suppliers that we could use for branch connections.

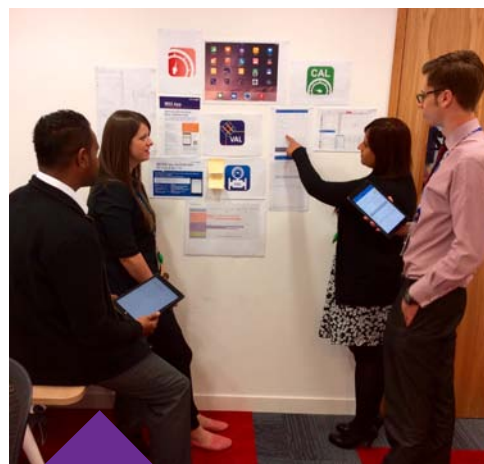
Q. So what are the benefits of this?

A. Previously, we could only go to one manufacturer, whereas now we can go to several. We can confidently order their fittings and know we'll be able to do stress analysis on them. With our old manufacturer, we might be looking at a six-month lead time on the fittings, which could hold up projects and incur costs. This should be reduced by having more options. Another benefit is that this type of fitting requires less welding, which delivers savings in terms of cost and time.

Q. When will it be rolled out as business as usual?

A. An important part of projects like these is having manufacturers quality tested to check their processes are up to the standards we expect. With all of that documentation in place, we're very close to transitioning into business as usual.

PROJECT: METER VALIDATION ASSESSMENT TOOL



Ambitious meter venture unites the gas community

A uniquely innovative project, which brings Gas Transmission together with the UK's gas distribution companies and other meter asset owners to achieve a common goal, is well on its way to success.

Quentin Mabbutt is the project lead on an ambitious venture to develop a tool that will unify the entire meter validation process for Gas Transmission and the four distribution companies. It could save up to £20m in unaccounted for gas (UAG) and improve the way Gas Transmission manages data supplied from the networks and other Transmission meter asset owners.

So why is this important? Well, all Transmission measurement forms the basis of the multi-million pound fiscal shipper to shipper undertakings. These financial

transactions then filter down to every gas customer. All Transmission meter owners, including the distribution companies are responsible for validating their meters to ensure they are operating within the acceptable tolerances to minimise incorrect cost allocation.

It's National Grid's responsibility to ensure – for the wider gas community – that these measurements are validated correctly. However, up to now, we've been hampered by the fact that distribution companies provide the validation information in a variety of different ways.

"We decided it would be a much better idea if we provided them with a common platform – essentially a tablet-based 'app' – to provide the relevant validation data to us," said Quentin.

"This Measurement Validation Assessment Tool will be free to anyone involved in validating measurements."

The tool will provide a more transparent picture of metering validation to the gas community and show that National Grid is keeping a close eye on the UK's transmission meter assets. It will also help with the on-going management of UAG, which is gas that has not been correctly apportioned as a result of meters not performing to their best. One of the key achievements of the project has been the team's close collaboration with the distribution companies.

"This app, because it's been developed directly by NGGT, has received both support and engagement," said Quentin. "And because we're liaising with stakeholders and keeping them updated, they feel part of the process."

The tool, which will be tablet-based, with sister software for laptops, is well on its way to initial product release.



PROJECT: PIPELINE DAMAGE MEASUREMENT USING HANDHELD LASER SCANNERS

Laser technology offers accurate results and safer solution for technicians

Laser scanning offers improvements in accuracy, speed, simplicity of use and recording of damage. Risks faced by our network technicians will also be reduced, thanks to a successful project that proved laser scanners are effective in measuring pipeline damage.

The project demonstrated that using handheld laser scanners to assess issues – such as corrosion, gouges or dents in pipes – can improve accuracy of results, while significantly reducing the time technicians need to spend in potentially dangerous excavations.

Up to now, technicians took measurements using laborious traditional methods, including bridging bars, micrometers and tape measures. Handheld laser technology, however, simplifies the process. Technicians put magnetic markers

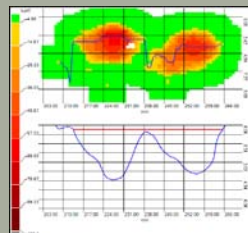
around the damaged area and then, at the push of a button, scan it for length and depth.

“Current methods are extremely time consuming,” said Welding Engineer and project lead James Gilliver. “If you take a complex bit of damage, it could take upwards of half a day for a technician to take all the measurements. We’ve shown that measuring by laser scanning can take 90 per cent less time.”

As well as the clear safety gains, the technology promises cost benefits in terms of reduced time needed on site and more accurate results.

James said: “Because we have greater confidence in the results, we could justify having a slightly less conservative defect assessment criteria during maintenance work. Accurate results also feed better into expert level assessments, where there may be an unusual piece of damage to assess.”

The successful project is now transitioning into business as usual, where the benefits can begin to be felt by everyone in Gas Transmission.



The handheld scanner (far left) and an example of a reading it takes to measure pipeline damage

PROJECT: GAS AND ELECTRIC SCENARIO MODELLING

Q&A: Forward thinking

Project lead Stephen Marland explains how a new tool for modelling future scenarios allows National Grid Gas and Electricity to make more confident investment decisions and improves dialogue with stakeholders.

Q. Can you tell us about the project?

A. We run a series of scenarios each year which predict how the energy market will look from today until 2050. These are then used to underpin investment decisions that are made on the network, such as asset investment and maintenance processes.

The way we’ve modelled in the past has been through regression models, but over time we’ve become less confident in them. This project aimed to take the best available techniques for developing scenarios, collating best available data and developing new information to account for various market trends (such as the economy, technology and social drivers), to provide better analysis and enhanced scenarios.

programme. So if we’re confident that the output from our models is robust, our investment decisions will be robust – and we can have better conversations with our stakeholders.

Q. Where are you now with the project?

A. We’ve not only finished the project, we’ve embedded it into our annual process. So this year’s publication of our future energy scenarios will be driven by the output from this project. We’ve learned something new here and it’s now a core part of our process. We’ve also been engaging regularly with Ofgem and they’re very interested in the approach we’ve taken.

Q. What are the main benefits of the project?

A. The major benefits are around confidence. The future is exceptionally unpredictable. Annual scenarios help us have a discussion with our stakeholders about what could happen in the future. They also underpin National Grid’s network development



For more details on all the projects listed see the [project portfolio](#) section of this publication



Project portfolio

The 2014/15 portfolio consisted of 47 projects.
Click on the reference number to find out more.

» Safety

NIA_NGGT0004	Development of a Risk Based Asset Management Tool
NIA_NGGT0008	Develop Novel Mitigation Method for High Frequency Main Pipework Vibration
NIA_NGGT0023	Development of AGI Safe
NIA_NGGT0045	Acoustic Emission Measurements in Valve Leakage Detection and Quantification
NIA_NGGT0051	Wireless Gas Detection Assessment
NIA_NGGT0054	Pipeline Damage Measurement using Handheld Laser Scanners
NIA_NGGT0055	Above Ground Installation Integrity Decision Support Tool
NIA_NGGT0064	High Altitude Aerial Surveillance (HAAS)
NIA_NGGT0065	Pipeline and Farm Equipment Loading Review
NIA_NGGT0068	Risk Assessment Methodologies 2014
NIA_NGGD0019	Pipeline Failure Rate Determination Due To Inland Natural Landsliding
NIA_NGGD0022	Study of Crater Formation Threshold During Gas Leakage on High-Pressure Pipes

» Reliability

NIA_NGGT0009	Removable Composite Transition Pieces (CTP)
NIA_NGGT0010	Backup DC Drive Electronic Starter
NIA_NGGT0011	Composite Pipe Supports
NIA_NGGT0033	Hot Tap Buried Sample Probe
NIA_NGGT0034	External Contamination Detection & Measurement at Entry Points
NIA_NGGT0038	Novel Vibration Measurement Technologies
NIA_NGGT0040	Metering and Gas Quality Training Simulator
NIA_NGGT0043	MiniLog Stray Current Monitoring Devices for Cathodic Protection Re-Life
NIA_NGGT0044	SCT Pipeline Inspection System
NIA_NGGT0049	Investigation into the use of Constrained-layer Damping
NIA_NGGT0060	Gas Generator Preservation Assessment
NIA_NGGT0067	Sensitivity and Specificity of Stress Concentration Tomography (ICASE Award)
NIA_NGGT0069	Pipeline Installation Techniques
NIA_NGGD0007	Development of DANINT FWAVC software for New Gas Chromatograph



» *Environmental*

NIA_NGGT0012	Development of a New Design Vent Silencer
NIA_NGGT0017	Heat in the Soil Form – Assessment of Heat In Soil Caused by Buried Infrastructure
NIA_NGGT0037	Compressor Balance of Plant Environmental Study
NIA_NGGT0047	Resource and Asset Reuse Toolkit
NIA_NGGT0053	Pipeline Noise Mitigation
NIA_NGGT0059	Renewable Power Trial and Demonstration

» *Commercial*

NIA_NGGT0014	Daily Gas Demand Forecasting
NIA_NGGT0050	Network Investment Stakeholder Engagement
NIA_NGGT0066	Meter Validation Assessment Tool (MVAT)

» *Strategic*

NIA_NGGT0035	Investigation of Flow Physics in Gas Pipe Network
NIA_NGGT0048	Feasibility Study for Alternative Pipeline Materials
NIA_NGGT0056	Feasibility Study of Onsite Non-Welded Interlocking Pipe Construction
NIA_NGGT0057	Building Information Modelling (BIM) – Investigation into Enhanced Techniques
NIA_NGGT0058	Variable Envelope Compressor Economic Study (VECES)
NIA_NGGT0061	PRCI – Pipeline Research Council International 2014
NIA_NGGT0062	EPRG – European Pipeline Research Group – 2014
NIA_NGGT0063	Robotics for Internal Inspection of High-Pressure Gas Pipes
NIA_NGET0135	Enhanced Sensor Development (ICASE Award)

» *System operability*

NIA_NGET0144	Integrated Electricity and Gas Transmission Network Operating Model (ICASE Award)
NIA_NGGT0022	National Transmission System (NTS) Constraint Modelling
NIA_NGET0114	Industrial and Commercial Gas and Electric Scenario Modelling



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