Annual Report 2012/13

Innovation Funding Incentive

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Gas Distribution

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Introduction from Jeremy Bending



Welcome to the fifth and final Innovation report for Gas Distribution under the Innovation Funding Incentive for Sustainable Development (IFI).

The challenge we set ourselves was to utilise the IFI to support future delivery and culturally re-energise technical research and development in our organisation. It has been a valuable journey to re-establish research and development in our core business processes.

We have used innovation successfully to support our ambition on leading the exploration of the role of gas in the energy pathways for a low carbon future as well as facilitating renewable gas into the Gas Distribution network through biogas demonstration plants. We have also used innovation successfully in our core work delivery processes, for example flowstopping trials were completed on large diameter, medium pressure Polyethylene pipes. The successful completion of these trials now enables National Grid to maintain and intervene on these pipes by using new stopple equipment for isolation and cut out operations. The benefits are, safer working practices, no residual damage left on asset, reduces costs and improves environmental footprint.

In the 5 years since IFI commenced, we have commissioned a total of 103 projects with 40% of projects being commissioned via collaborative partnerships. The projects cover a wide spectrum of activities with predominately short to medium term delivery horizons and at various stages of the innovation project lifecycle.

During 2012/13 we re-focussed our portfolio in preparation for transition to RIIO. As a result we have closed projects or reassessed the objectives against our new priorities and challenges and have presented specific project highlights within this report. The report details each active project in the 12/13 portfolio totalling £6.3m.

Innovation is at the heart of our plans for the future. With the forthcoming appointment of Emma FitzGerald, Gas Distribution looks forward to developing into a more innovative organisation to help improve our performance and deliver exceptional services to customers.

Bend

Jeremy Bending - Director, Gas Distribution

About National Grid and Gas Distribution



National Grid

National Grid is an international electricity and gas company and one of the largest investor-owned energy companies in the world. We play a vital role in providing energy to millions of customers across Great Britain and the Northeast US in an efficient, reliable and safe manner.

National Grid own and operate the gas distribution system in the UK and comprises of four of the eight regional gas distribution networks in Great Britain.

Gas Distribution

Our network comprises of 139,600 kilometres of gas distribution pipelines and we transport gas on behalf of approximately 25 active gas shippers from the gas national transmission system to around 10.8 million consumers.

We also manage the national gas emergency number and contact centre service for all gas distribution networks and for other transporters in the UK.

Introduction

The establishment of IFI has been a key enabler to culturally re-energise technical research and development in our organization during the 5 year PCR period. Without this focus research associated with the provision of safe, reliable and secure networks would have significantly declined as it did following privatisation during the early 90's.

Throughout IFI our aim has been to balance our portfolio to improve efficiency, improve asset and energy management, and support improvements in all aspects of the environment. In conjunction with balancing our portfolio across these key themes, we have utilised the Technology Readiness Level (TRL) model as a key part of understanding the risk associated with a project, and to ensure that we balance both tactical and strategic projects within our portfolio (see figure 4.1).

Over the past five years our focus on innovation has been growing year on year in our core business processes. We have continued to build strong working relationships with suppliers, developed collaborative partnerships with research bodies, network operators and other utilities, and sought new collaborative ways of working to bring forward new innovations and technologies from around the world.

As a result of direct feedback from our stakeholders through our 'Talking Networks' sessions we have improved the ability for smaller businesses to work with us. National Grid and the other GDN's entered into a new collaborative agreement with the Energy Innovation Centre (EIC). The EIC work with Small Medium Enterprises (SMEs) to bring forward new innovations and technologies from around the world that could potentially be applied to the gas network. This partnership acts as a key enabler to source new and exciting ideas, whilst facilitating industry collaboration across the other gas network providers.

IFI Projects Activity

We have commissioned a total of 103 innovation projects and approximately 40% of projects commissioned to date have secured funding via collaborative partnership with various other organizations and other GDNs. The projects covered a wide spectrum of gas distribution activities with predominately short to medium term delivery horizons and at various stages in the innovation project lifecycle.

We have used innovation successfully to help facilitate the drive towards a low carbon economy, as well as facilitating renewable gas into the network through sources such as biogas. In partnership with Northern Gas Networks we have successfully demonstrated the use of compression to pump gas into higher pressure tiers at times of low demand and to maximise the capacity for bio methane injection into the gas network. This in turn may maximise greenhouse gas emission reductions and the continued use of the gas network for the high efficiency provision of domestic heat into the long term future.

We have also used innovation successfully in our core work delivery processes through the through the development and implementation of mobile data capture technology. Mobile data capture involves the use of mobile data apps to support data capture and storage in a field-working environment. The design, building and testing of bespoke apps has led to operational efficiencies associated with data collection, communication, compliance, and customer service activities with both our Alliance partners and Operations function.

• Total expenditure over the five years of £24.6m, breakdown as follows:



Figure 3.1 - Expenditure (£m)

The total potential benefits within our portfolio have always shown a positive net benefit overall, ranging from £900k to £9 million, over the PCR period. During the IFI period it has been important to always ensure the portfolio is balanced and potential net benefits are demonstrated to our customers.

Since IFI began in 2008/09 we have seen a steady increase in utilisation of the incentive, as the above diagram illustrates, and we expect to see this increase even further as we move forward into RIIO.

The introduction of the new stimulus package brings about increased funding opportunities, enabling us to broaden our areas of focus under NIA. This has meant that in the final year of IFI we have reassessed our priorities and challenges which we will face over the next decade.

The following highlights the broad range of challenges within our 2012/13 innovation portfolio, which we expect to change and evolve as we transition into NIA.

- Challenges within our 2012/13 innovation portfolio:

Figure 3.3 - Challenges within our Innovation portfolio (Numbers of live projects)



Internal Research and Development (Non-IFI Funded)

Although IFI has been an excellent incentive to re-energise our R&D activities, we have also continued to fund Innovation directly from our business. We have completed a number of small scale field trials throughout our network, to test various new tools and techniques, to aid efficiency in replacement and repair activities. We have also used our own resources to make improvements to our network analysis, planning tools and connection processes to accommodate biogas connections in the future.

Our intent is to continue to fund innovation from directly within our business as well as utilise the innovation funding opportunity available under RIIO-GD1 in the future.

Current Internal Capabilities

We have a dedicated innovation team that manages the strategy, funding, governance and regulatory reporting, and compliance with the Good Practice Guide for IFI funded projects.

Whilst the small central innovation team coordinates innovative activities, responsibility for sanctioning and prioritising these projects is shared with the Distribution Innovation Governance Group (DIGG), which is attended by representatives from all our functions and processes. This has served us well as the specialist knowledge, learning and output is retained within the responsible line management departments, whilst the innovation team maintains accountability for the strategic alignment of outputs and goals. This will now be reviewed as we move forward to the RIIO period.

Completed Innovation Projects

The following are examples of completed Innovation Funding Incentive (IFI) projects during 2012/13:

Internal Joint Profiling System for PE Pipes (IFI46): Completed the development and field trial demonstration of an internal measurement profile tool, with a launch and retrieve system, to provide a visual inspection of Polyethylene (PE) pipes and joints. The Laser Profiler is inserted into PE mains under 'live gas' conditions to provide a complete profile of the inside of the pipe through use of a mounted HD camera. This allows for detection of obstructions, debris, water, bends, connections, breaks or leaks, pipe dimensions and ovality, in order to make important investment decisions regarding pipe remediation. Traditionally this type of



assessment would require a large excavation, whereas this new device enables the pipe to be accessed through a small hole vertically, resulting in a 97% reduction in excavation size, thereby reducing customer impact and disruption, as well as being a critical safety management tool. This project was nominated for a Chairman's Award within National Grid.

• Air Driven Water Extraction Unit (IFI80): Developed and trialled new air driven water extraction units to extract water from gas mains. This has resulted in reduced noise levels, which are within compliance limits. The balance of the unit when full is now safer for use by field operatives and offers environmental benefits associated with reduced carbon emissions. It is anticipated that the new design units will improve response to water ingress incidents.

 Emergency Optimisation (IFI91): The trialling of a new innovative software solution has improved the overall efficiency of the emergency process by optimising resources, and providing knowledge to define business requirements for the strategic software emergency solution of the future.

- Operational & Integrity Challenges (Small Projects)
 2012/13: A range of small projects were undertaken and highlights include:
 - 'Bar Coding Solution Feasibility Study' to investigate options for the application of bar coding technology for asset tracking and stock inventory of plant, tools and equipment.
 - 'PE Material Performance for Bio Methane Entry Connection' to investigate the effects of operating all sizes of PE for use in <7barg Gas Distribution systems at 40 °C and at pressures up to 7 barg.
 - 'Numerical modelling of excavations' to develop knowledge and understanding around the stability, and mechanisms of instability, of our excavations through use of the 'Plaxis Model'.
 - 'Waste Water Analysis', to develop an on-site filter for mains waste water extraction to enable sewer disposal.

2012/13 Live Project Highlights

The projects highlighted in the following pages outline the range of Technology Readiness Levels (see figure 4.1) currently in progress and illustrate National Grid's approach to maintaining a balanced portfolio.

There are four categories highlighted:

1. Asset and Energy Management

Asset and Energy management has been, and will remain to be, a key focus area for innovation under IFI and moving forward into RIIO. We need to make sure we know where our assets are, what we want from them, get the best value from them, and be confident they are safe and reliable for our customers.

We are seeking to identify a number of innovative solutions in this area, including improved inspection techniques, improved monitoring techniques and improved maintenance and repair techniques, in order to increase the life span and recover maximum value from our assets. The following section highlights example projects in this area:

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The Gas Networks have a responsibility to replace all cast iron pipework within 30 metres of a property. The aim of this project is to research, test and develop an automated monitoring/alert system to detect fractures in larger diameter cast-iron gas mains and report them automatically to the pipeline operator. To achieve this, technology designed by project partner Syrinix that has been successfully implemented in some Water Companies, is to be trialled and developed for use on the gas network to detect mains fracture and provide an accurate location of where the fracture has occurred. This will enable the source of leak to be excavated and safely managed, as well as providing an alternative to replacement in certain high profile, urban areas.

A one stage feasibility study to assess the possible application of this technique was completed by National Grid during 2012, under IFI78. The feasibility study concluded that it will be possible to design and manufacture an acoustic technology system that can be applied to gas to successfully detect the fracture event.

Following the successful completion of the feasibility study, the project has now progressed into Stage 2, as a GDN collaborative project facilitated by the Energy Innovation Centre (EIC), which will transition into NIA under IL143. Stage 2 seeks to set up an experiment to record the signals created by real pipe fractures. Detailed analysis will then be undertaken to determine the practicalities of the proposed detection system.

Pipe Condition Assessment SystemTRL: 4-5Focus: Medium TermPositioning: StrategicTheme: Asset and Risk ManagementDeveloping pipeline condition assessment equipment

The aim of this project is to develop pipeline condition assessment equipment, capable of measuring the anisotropy within the metallic substrate to allow for detection of hairline cracks, corrosion on the inner and outer wall face, wall thickness, and inferred stresses. This will enable the pipeline owner to gain complete and accurate knowledge of the condition of the entire asset and therefore potentially predict the likelihood of the pipe failing. This may enable large diameter pipes to be categorised in such a way to prioritise for remediation including internal repair or semi structural linings.

This is a collaboratively funded project between National Grid and Wales and West Utilities (WWU). Following a successful stage 1 study during 2012 to assess the feasibility of the technique on an abandoned section of 10" Spun Iron main, the aim of the project is to further develop the capability of the equipment in a field trial environment, under NIA.



Internal main spraying of metallic mains has been available within the industry for the last 20 years. Success of the system is dependent upon a number of factors, including diameter of the main, jointing technique, length of insertion, sealing material and sealing technique. The current technique is successfully proven, however there are a number of perceived blockers to its utilisation. The objective of this project is to break these down into small incremental improvements and deliver output that could be utilised more readily.

A prototype combined internal spray and camera head has been developed, manufactured, and field trailed in a working environment which has proven the new innovative technique to be a success. This main spraying solution offers ease of use, extended range of spraying and improved spray coverage. Combination of the spray head with a camera enables a full survey to be carried out to identify and locate the potential source of leakage and ensure accurate spraying of the joint.

A future stage is planned under NIA to further enhance the capabilities of the technique, including providing a more eco-friendly solution. Improvements in internal spraying should see a number of benefits associated with increased targeted use, including reduction in costs, reduced excavation requirements necessary to resolve public reported escapes, and reduced customer impact.

2. Engineering technologies and techniques to improve Operational Performance

We have continued our drive for operational efficiency with aims to further improve the safety of our field force, minimise disruption to the public, and ultimately provide greater value to our customers.

The following section highlights example projects associated with the development of new and novel technologies and techniques within our portfolio:

Proximity Effects of Squeeze Off upon PE Joints

TRL Focus Positioning Theme : 6 : Medium Term : Tactical : Risk Management and Knowledge



Redefining the squeeze off limits of PE mains

Temporary squeeze off of Polyethylene (PE) pipe has been adopted as a routine operation; however the current squeeze-off methodology, which requires set separation distances to be maintained between fittings/joints and squeeze off positions, has never been supported by way of formal detailed stress analysis.

The aim of this project was to undergo Finite Element (FE) analysis to establish the background stresses on pipework during squeeze off operations, and to determine whether these impact upon the integrity of the pipe, particularly when in close proximity to butt fusion joints.

The project began in 2009/10 and commenced with initial research and proof of concept stages to develop a methodology, which was then subsequently validated against a range of PE pipe materials and geometries. Following the successful completion of these initial 3 stages, which showed good results around predicting the squeeze-off stresses, the project progressed into the final stage, Stage 4.

The field trial demonstrations, under Stage 4, were carried out in 2012/13 to analyse the strain gauge measurements on five different real-time squeeze-off jobs, in a live working environment. The main conclusion from the trials undertaken revealed that the stress levels were higher than expected, and that separation distances cannot be reduced, however for PE100 and PE80 can be increased.

This valuable learning will be implemented into the business by way of a policy and procedure update. The expected associated benefits of the project are the avoidance of an uncontrolled gas escape release due to a joint failure, and improved safety and security of supply to our customers.

Sealback II

TRL Focus Positioning Theme

: 4 : Short/Medium Term : Tactical : Efficiency and Customer

To develop a live mains replacement and renovation system for short length and stub end pipes that are situated in locations of engineering difficulty



The aim of this project is to develop and successfully trial an improved method to replace short lengths of metallic main in specific locations of engineering difficulty, for instance short lengths of main that connect onto its parent main in a major road junction, in a safe, efficient and practical manner.

Sealback I is being incrementally innovated to accommodate non-linear pipe, tapered pipe sections, change in pipe diameters, etc, and to have better support from camera systems.

The project began in 2012 and commenced with a feasibility study which sought to address the limitations of the Sealback I technique. This feasibility study saw the identification of an innovative solution and has now progressed to Stage 2, which will look at the development and field trial of the identified 'Sealback II' solution. This will incorporate camera technology advances, development and recommendation of an appropriate sealant, and agreement of a suitable implementation strategy and delivery method. If successful Sealback II will allow mains located in areas of engineering difficulty to be replaced via live transfer leading to a reduction in operational expenditure and risk. Also reduced environmental impact, including the requirement for landfill disposal of excavated spoil.

Cured-in-Place and Polyurethane Spray Linings >12"

TRL Focus Positioning Theme

: 4 : Medium/Long Term : Strategic : Efficiency and Customer



To develop an efficient alternative technique to Polyethylene (PE) and steel for the replacement of large diameter metallic mains

The aim of this project is to develop an efficient and cost effective replacement and remediation lining technology, as an alternative to polyethylene (PE) for larger diameter metallic mains. The scope of this project includes conducting fitness for purpose testing on Cured In-Place Pipe (CIPP) linings, laboratory and site trials, and assessment of installation practicalities, quality assurance and quality control procedures.

It is anticipated that this technology will provide a more efficient technical solution particularly in urban areas by, for example, reduced customer impact and environmental benefits associated with reduced operating footprint and use of imported materials.

This collaborative project, joint with Scotia Gas Networks (SGN), began in 2012 and commenced with development of performance specifications and best practice guides for two types of lining techniques.

Following the successful completion of Stage1, the project will progress into Stage 2 to conduct testing and auditing of selected lining systems to demonstrate these techniques, under NIA.

3. Environmental and Climate Change

Reducing our impact on the environment and the minimisation of our Business Carbon Footprint emissions remains at the forefront of our innovation activities. We recognise the changing energy landscape and the need for us to transition to a low carbon economy.

Our 2012/13 portfolio reflects the continued need for research and development in these areas in order to reduce our carbon emissions, promote energy savings, and improve environmental performance, whilst exploring opportunities for diverse fuel sources. Examples of such projects are highlighted below:



The objective of this project was to provide a study on the optimal appliance technology pathways, by property type, based on known and emerging heating technology required to meet carbon and renewable targets, highlighting the impact on consumers (cost to change and behavioural) and the impact on the gas and electricity distribution networks out to 2050.

This project output reported essential knowledge concerning the suitable technologies and processes the energy industry could adopt that will assist the UK in meeting its 2050 renewable targets, which was used to inform the DECC Heating Strategy. In order to review the options within the report a model was produced in order to analyse the recognised scenarios. This was well received by the wider energy industry and the funding participants will be able to use the model going forward as a tool in deciding what technologies it should pursue in meeting their own renewable targets.



This project seeks to reduce and optimise the energy used by National Grid, through use of novel preheating systems that have been installed and commissioned on Gas Distribution above ground installation sites. The primary benefit of which will be a reduction in National Grid's carbon emissions.

This project has successfully delivered a feasibility study, proof of concept, detailed design and site installation and commissioning, over the four years since IFI began. Two types of pre-heat technology has been installed at four National Grid sites, and during 2012/13 there has been ongoing monitoring and evaluation of the operational performance of the preheating systems, with particular focus on the winter heating seasons. Further work will continue through into 2013/14, under NIA, which includes production of pre-heater performance and Life Cycle Analysis (LCA) reports, providing baseline comparisons with National Grid's existing preheater (water bath and modular boiler) technologies. Reporting produced will enable associated recommendations to be made regarding future installation of novel pre-heating systems across our distribution network.

4. Collaboration

We believe that a process of external collaboration is essential to the delivery of a successful programme of innovation. In the final year of IFI we have set out to leverage existing and new partnerships with research groups and academia. We have also sought to collaborate with and share best practise with the wider industry, including Gas Transmission, network operators and other utilities, to maximise opportunities and share operational knowledge for the benefit of the energy industry.

We have continued to maintain relationships with numerous research organisations. For example, we have been the only network operator who has collaborated with the European Gas Research Group (GERG), gaining knowledge around improving the integrity and safety of gas distribution systems through a network of European experts. In addition we have collaborated with the Pipeline Research Council International (PRCI), an external research body, which has enabled learning around assessment, prevention and mitigation of integrity threats, such as mechanical damage and external corrosion, and the European Pipeline Research Group (EPRG), which undertakes a wide range of research directed to increase integrity and safety of gas pipelines. See IFI24 and IFI25 in the appendix for more information. Membership and involvement in these groups enables not only the opportunity to generate more innovative ideas with a wider group, but also allows for the leverage of benefits from these collaborative opportunities and the sharing of knowledge and information to the benefit of the wider energy industry.

In our first year of EIC membership a total of 29 synopses were received and 6 projects were collaboratively commissioned with the other GDN's. Examples of these recently commissioned EIC projects are as follows:

Internal Stress Corrosion Cracking – Collaborative with NGN, SGN and WWU

To develop a method to assess the threat of internal stress corrosion cracking (ISCC) in pipelines previously used to transport manufactured gas. This will enable greater understanding of the threat of ISCC to the integrity of the gas pipeline networks, and will help to deliver an improved security of supply for gas consumers.

E-Pipes – Collaborative with NGN, SGN and WWU

To progress the development of the ePIPE riser repair technique, currently used within the water industry in the United States, for the application of high risers within multi occupancy buildings in the UK. If successful this technology will prevent leaks and provide a more cost effective and less disruptive repair mechanism for gas consumers.

The widely used Technology Readiness Level (TRL) model indicates how close a technology is to becoming both technically and commercially viable and can be seen above. Level 1 relates to research with no obvious purpose more commonly known as "Blue Sky Research" and Level 9 on the TRL scale indicates products/information readily available with no development required. Currently Gas Distribution innovation activities have been focused between TRL's 2 and 8. This range ensures that the innovation money is being used for innovation activities and not purchasing existing solutions.



Figure 4.1

Finance Overview

This section of the report gives the financial information associated with the 2012/13 programme as agreed within the IFI/SD Good Practice Guide (GPG).

In year 5 there were 46 live projects, with 18 new projects started and 28 continued from year 3, and 25 projects completed. This amounted in a total spend of £6.3m, utilising 79% of the gas allowance.

Potential benefits are assessed on a project by project basis against the GPG benefit criteria and reassessed at each stage gate to ensure consumer value. Overall portfolio benefits total £17,067 positive NPV overall.

Anticipated benefits are documented against each project in Appendix 1 and are achieved by:

- Reduced Direct Costs e.g. through reduced planned capital expenditure, maintenance expenditure or efficient operations.
- Avoided Costs e.g. deferred investment, reduced failures, establishing conditions of equipment to feed capital or maintenance plans and improved ratings.
- Enhanced Risk Management e.g. understanding the application of new technology and minimising the impact of our networks on the environment.
- Strategic Knowledge e.g. working with others to address sustainability in the energy industry, maintaining awareness of new technology in the industry.



Revenue	£1593.00m
IFI Allowance	£ 7.96m
IFI Carry over	£0
External Expenditure	£ 5.422m
Internal Expenditure	£ 0.841m
Total Expenditure	£ 6.263m
Number of Active Projects	46

As we transition from IFI to NIA we are fully supportive of the RIIO-GD1 stimulus package and believe that it provides the appropriate mechanism and incentive to encourage all Gas Distribution Networks to drive innovation.

In preparation for transition we have re-assessed the objectives and challenges of our projects to ensure they add value under the new RIIO-GD1. As a result, 21 projects will transition into NIA.

During the RIIO-GD1 period we will build on our current approach to innovation. The innovation team will manage a portfolio of projects, with each project being managed and delivered by a dedicated expert project manager in the relevant business area.

We will make a step change in efforts to generate innovative ideas and we will develop a new capability within Gas Distribution to construct bids associated with the Network Innovation Competition. For example, building on the feasibility and design work that we have completed under IFI79 – BioSNG Pilot Plant Design and Demonstration.

We will ensure that we develop a culture of innovation in all our activities. We will also ensure that we have a strong framework to ensure the value of our innovation programme is aligned to our business plan objectives, and that the potential benefits are tracked, monitored and risks mitigated.

Going forward we will continue to build on the benefits we have delivered under IFI, to ensure a safe, reliable network for future generations. In addition we aim to build on this by improving our understanding of customer behaviour and the impacts of new commercial arrangements. We will embrace innovative solutions to share information with our stakeholders and inform the consumer, and to deliver enhanced industry frameworks and commercial services.

Within our Innovation Strategy we have outlined our key priorities, incorporating 5 key innovation themes which illustrate the areas that we are seeking to explore. The following diagram outlines our 5 innovation themes, linked to our priority outputs:



The following describes each of our innovation themes in turn and the business challenges that we want to address:

- Efficient and Safe Work Delivery and Removal of Risk To deliver our new mains replacement programme based on a risk removed approach, as opposed to length of iron main abandoned, and the need to progress the development of improved mains replacement technology and techniques, to minimise risk to be more efficient, safe and less disruption to the public.
- Asset Condition and Network Optimisation We need to ensure that our assets are resilient and can adapt to the consequences of climate change. We have also identified a number of specific challenges associated with major cities, particularly London, in terms of consequences of incidents and congestion.
- Transition to Low Carbon Economy & Minimise Environmental Impact The changing energy landscape and the need for us to transition to a low carbon economy means we need to continue to focus on reducing our impact on the environment and the minimisation of our Business Carbon Footprint emissions.
- Improve Customer and Stakeholder Satisfaction During RIIO-GD1 we need to consider more innovative ways to improve the service we deliver to customers such as the challenge to minimise supply loses and getting customers' supply restored as quickly as possible.
- Enhanced Industry Frameworks and Commercial Services We need to consider innovative commercial and regulatory frameworks to help us best manage future uncertanties such as volumes of biomethane connections to our networks. We will also look to develop innovative approaches to solving problems of theft of gas, encourage new capacity products, and utilise smart data and new charging methodologies.

In order to address these future challenges we will need to invest in higher risk technologies. More specifically, we will look to technologies at the early development stages of the Technology Readiness Level (TRL) scale, which by their nature carry a higher risk of evolving into a project. We will explore these technologies to determine if we are able to adopt and drive real efficiencies across our organisation.

Innovation Project Reports Content Page

- IFI4 Optimise Own Energy Use (PRIs)
- IFI10 Easy Flow Stop Systems
- IFI19 Better Load Analysis & Demand Modelling (Feasibility)
- IFI21 Improvements to the MRPS Model
- **IFI24** European Pipeline Research Group (EPRG)
- IFI25 PRCI Research Collaboration
- IFI26 The Effect of Thermal Lagging on Fiscal Metering Temperature Measurement
- IFI28 Hazard & Risk Assessment Tools for Major Gas Installations
- IFI40 AGI Condition Monitoring
- IFI43 High Pressure Temporary Repairs
- IFI46 Internal Joint Profiling System for PE Pipes
- IFI47 Alternative Sources/Scenarios for Bio-methane Injection
- **IFI50** Proximity Effects of Squeeze Off upon PE Pipe Joints
- IFI51 New Materials for Gas Distribution
- IFI52 European Gas Research Group (GERG)
- IFI62 Development of DANINT FWAVC software for New Gas Chromatograph
- IFI63 PE Asset Life Reseach
- IFI67 Pipeline Industry Research Club [PIRC]
- IFI68 Model Maintenance Improvements
- IFI69 Capacity Enhancements Using Compression
- IFI70 Development of Packaged Solution for Bio-methane Injection
- IFI71 Cured-in-Place and Polyurethane Spray Linings >12"
- IFI75 Improved Diurnal Storage Requirements Modelling
- IFI76 Mobile Data Capture Project
- IF177 Asset Health Modelling
- IFI79 Bio-SNG Pilot Plant Design and Demonstration
- IFI80 Demonstration of Air Driven Water Extraction Unit
- IFI81 Heat Economics Project
- IFI86 Domestic Heating Project
- IFI87 Pipe Condition Assessment System
- IFI88 Energy Innovation Centre
- **IFI89** 2050 Infrastructure Outlook
- IFI91 Emergency Optimisation
- IL100 Supaspray
- IL102 MEG Improvement
- IL103 Unpiggable Pipelines
- IL104 E-Pipes
- IL105 Tier One Replacement System (TORS)
- IL110 Internal Stress Corrosion Cracking
- IL117 Optical Methane Sensing System OptiSci
- IL120 Venting Controllers
- IL141 Orifice Plate Deformation
- IL142 Sealback II
- **IL143** Application of Fracture Alert Monitoring
- IL178 Improved Diurnal Storage Requirements Modelling
- IL Operational & Integrity Challenges (Small Projects) 2012/13

(IFI4) Op	timis	e Own E	nergy Us	e (PR	lls)			
	[Y	'ear: 2012/13
Project Description	The proj optimise Installat	ect targets th the energy ι ions and Offt	ie energy used used to establis akes.	l by Natio sh compa	onal Grid in non-ve any-wide best prac	hicular applications, a stice for operational Pr	aiming to re ressure Re	duce and ducing
	Exper for Cu	nditure rrent FY	Expenditu for Prev' F	ire FY	Expenditure for Next FY	Total Project Costs		Status
Internal	£	2104,135	£139,	582	£18,427			Submitted
External	£	697,363	£660,8	829	£104,697	£3,949,666	Draft	13/05/2013
laterials	£	223,335	£709,	576	£0		Final	21/05/2013
Total	£1	,024,833	£1,509,9	987	£123,124	l l	Approved	
				AI	ignment with IFI/	SD		
1 Low Ca Economy	rbon	Good Aligneen Go	ment. Viable a	alternativ	e forms of pre-hea	t with measured energy	gy savings	of lower carbor
2 Eradica Fuel Pove	ting erty							
3 Promot Energy S	ing avings	Major Align emissions.	ment. More ef	fective a	nd efficient use of	energy will lead to en	ergy saving	s and reduced
4 Safe, Re Network	eliable	Minor align lower the ris supply to co loss of gas	ment. Moving sk of supply fai onsumers. Fau supply downst	away fro ilure as v ults occu ream wil	m traditional water vater bath heaters rring due to corros I be eradicated wit	bath heater solutions are essential assets i ion that pose risks of h these new technolog	s for pre-he n ensuring fire / injury gies.	ating should security of gas at the PRI and
5 Protecti Environm	ing the ient	Minor aligni improve en potentially h	ment. Moving vironmental pe nazardous glyc	away fro erformanc ol or nor	m traditional water ce as there will be n-glycol solutions.	r bath heater solutions no need to use or disp	s for pre-he pose of larg	ating will ge quantities of
echnologic rea / issue ddressed b project	al Y	Viable alter either: - optimise the second	native heating he energy use er method of p	solutions only as a pre-heatir	s that will reduce o and when required na that is sustainab	wn energy use for pre	-heat cond	itions that
Innovation	Type	SD R	ating	Bene	efits Rating	Residual Risk	 O'	verall Score
Substitut	ion	Med	lium		21	1		20
Expected be of project	nefits	To reduce e environmer systems (m backup mod an electricit	energy consum ital and perform odular boilers dular boilers ar y supply.	nption at mance of with hea nd heat e	National Grid gas water bath heater t exchangers) requ exchanger. These	operational sites and s. Current Water Bat ire contingency arran also need to be main	offices. Imp h Heater re gements in tained and	proved eplacement the form of notably require
		Adoptio	n (Year)	Duratio	on of Benefits	Prob' of Success	Р	roject NPV
		20	13		20 yrs	75%		-£153,347
Potential for chieving	nofite	Potential to	undertake pre	heating	more economicall	y and reduced associa	ated asset	maintenance.
Project Prog	ress	Four field tr winter. This replacemer	ials on two diff s will influence at programme.	erent teo / inform	hnologies are taki National Grid's pre	ng place and will cont e heater strategy and	inue throug water bath	h the 2013/14 heater
Collab' Partr	ners				Pro	vider(s) GL Noble I	Denton, CV	VT, Bruest
				Summ	ner 2012		natio	nal grid

(IFI10) E	asy F	low Stop	System	IS								
								١	/ear: 2012/13			
Project Description	The prim	nary objective	ary objectives are to verify and demonstrate the use of stoppling flow stop equipment on PE pipes.									
	Exper for Cu	nditure rrent FY	Expendite for Prev'	ure FY	Expendi for Nex	ture t FY	Total Project Costs		Status			
Internal		£22,006	£8	,256		£0			Submitted			
External	£	114,886	£29	,428		£0	£474.189	Draft	02/05/2013			
Materials		£20,169		£0		£0	,,	Final	21/05/2013			
Total	£	157,061	£37	,684		£0		Approved				
				A	ignment w	ith IFI/S	SD					
1 Low Car Economy	rbon											
2 Eradica Fuel Pove	ting erty											
3 Promoti Energy Sa	ing avings											
✓ 4 Safe, Re Network	eliable	Good Alignn expensive ci	nent. Will en ut-out operati	able a flo ons.	w stop solu	tion tha	t will be cost effect	ive and avoid	I the need for			
5 Protecti Environm	ng the ient	Good alignm ability to reu disruption to	nent. Will rec se same loca members of	luce exca ation to ca the publi	vation sizes arry out sam c through re	and the type educed	us materials to lan of flow stop operat excavation footprir	dfill. Output ion in the futu nt.	will enable the ire. Minimises			
Technologic area / issue addressed b project	al Y	o Validation use within th	n and verifica ne UK.	tion that t	the Stopple	equipm	nent and launch pla	atforms are fit	for purpose for			
Innovation	Туре	SD Ra	iting	Bene	efits Rating		Residual Risk	0	verall Score			
Substituti	ion	Medi	um		18		-4		22			
Expected be of project	nefits	Reduced exe This will redu	cavation foot uce materials	print redu to landfil	ces potentia Il and minim	al for int iise the	terference damage disruption to mem	to other buri bers of the p	ed apparatus. ublic.			
		Adoption	ı (Year)	Duratio	on of Benef	its	Prob' of Succes	is F	Project NPV			
		201	4		5 yrs		75%		£13,212			
Potential for achieving expected be	nefits	Reduced tim excavation a diameter pip which elimin squeeze off	ne required to and reinstater be and width ates risks as technique.	o prepare ment mate can also b sociated	for a flowsto erials. Foot be reduced with induced	op oper print dir from 0.8 d stress	ation. Reduced cos mension length red 8m to 0.6m. Differ es placed on PE p	sts associate luced by 4.4r ent flow stop lipes during to	d with n for a 355mm methodology aditional			
Project Prog	ress	The operatic being made were succes equipment, s ensure that the The results of performance	ons using the and minimal ssful, one of t specifically the the completic of the PolySt e recorded at	stopple e let by dur he trials t e operation op plug as opp Interr the trials.	equipment of ring the flow ook 2 days on of the St ssembly is f nediate Pre	n PE pi stop o to comp opple T t for pu ssure S	ipes appears to be perations. Althoug blete due to issues ee completion plug rpose. Stopple operation w	satisfactory v h the Stopple with materia g. Therefore vere in line wi	with good seals e operations Is and the provider will th the			
		National Gri	d can approv	e flow sto	pping opera	ational p	products for larger	diameter pipe	elines			
Collab' Partr	ners	Pipeline Mai Transmissio	ntenance Ce n	ntre, Nati	onal Grid	Pro	vider(s) GL Nobl	e Denton				
				Summ	ner 2012			natic	nal grid			

(IFI19) B	etter	Load An	alysis & I	Dema	nd Model	llin	ig (Feasibility)	
									Year: 2012/13
Project Description	Develop modellin	a new and no	ovel demand e	estimation	n model that ca	an b	e practically utilised v	vithin <7b	ar analysis
	Exper for Cu	nditure rrent FY	Expenditu for Prev' F	re =Y	Expenditure for Next FY		Total Project Costs		Status
Internal		£92,323	£42,	143	Í	£0			Submitted
External	£	2599,590	£366,	106	5	£0	£2,490,840	Draft	03/05/2013
Materials		£0	£1,9	946	5	£0		Final	21/05/2013
Total	£	2691,913	£410,	195	5	£0		Approved	
				Ali	ignment with	IFI/S	SD		
✓ 1 Low Ca Economy	rbon	A better und o facilitate leakage o provide new gas tec	lerstanding of better pressu a baseline for hnologies and	demand re manag the unde energy i	profiles will: gement of the s erstanding of cuuses may be a	syst urrer sses	em and consequent i nt demand patterns a ssed.	mprovemo gainst whi	ents in control of
2 Eradica Fuel Pove	ting erty								
Energy S	ing avings								
✓ 4 Safe, Re Network	eliable	A better und understood. peak demar flexibility in o	lerstanding of This will lead nds and better carrying out m	demand I to a moi understa aintenan	profiles will allor re economic ar anding of off-pe ce activities.	ow t nd e eak d	he peak demand req fficient design of the demand will facilitate	uirements system to greater se	to be better meet those ecurity and
✓ 5 Protecti Environm	ing the ient	A better und and a conse	derstanding of equent improve	demand ement in	profiles will fac the control of l	cilita eaka	te better pressure ma age.	anagemen	t of the system
Technologic area / issue addressed b project	al Y	 Statistica The proc indicates an reduction in The required 	al techniques f of of concept m increase in ac demand being irements for th	or the de nodels de ccuracy d g modelle ne flow d	velopment of in eveloped based of the demand ed. ata required to	mpro d on moc dev	oved demand models these techniques usi dels over those currer relop working demand	s have been ng availat ntly in use d models l	en specified. ble data and a general have been
		o The new cunsumer b	Network Anal ehaviour and o	ysis mod current th	lel will take intc nermal effecien	aco acies	count new factors suc including appliance	ch as soci effeciency	oeconomic data, 7.
		o Provisior later stages	n of initial winte in the project.	er data fo	or Customer de	mar	nd profiles to be deve	loped and	l understood at
		o Whole ne actual dema	etwork data wi and conditions	Il also be experien	collected to en aced across the	nabl e wir	e the testing of the the transfer.	eroretical	flow against the
Innovation	Туре	SD Ra	ating	Bene	fits Rating		Residual Risk	C	Overall Score
Significa	Int	Med	ium		19		5		14
Expected be of project	ed benefits The principle benefit from this work will be knowledge acquisition that may ultimately lead to the production and replacement of the current published demand algorithms. Better identification of demand requirements at the peak condition will lead to reduced risk of supply failures.							/ lead to the ntification of es.	
		Adoption	n (Year)	Duratio	on of Benefits		Prob' of Success		Project NPV
		20	13		10 yrs		50%		-£645,004
Potential for achieving expected be	nefits	Results obta significant d decision has the learning	ained from the evelopment w s been taken to gained from th	use of th ork will b o stop the he projec	ne system did r e required to re e project, howe at to improve el	not s esol ⁱ ever eme	support the business ve the issues that we potential has been ic ents of the existing pr	case and re identifie lentified to ocess in t	indicated ed and as such a o utilise some of he areas of
				Summ	er 2012			natio	onal grid

(IFI19) Better	Load Analysis & Demand Modelling (Feas	ibility)				
		Year: 2012/13				
	customer classification and demand allocation.					
Project Progress	Stage 6 of IFI19 developed a prototype enhancement of the current network analysis system that is capable of dealing with variable diversity. This enhancement has been used with data from a number of network models to support the development of a business case for the implementation of the approach in a production environment. In addition to this, work has been undertaken to produce a design for flow metering to gather data to analyse assurance of the system.					
Collab' Partners	Provider(s)	L Noble Denton, Hyphen				
	Summer 2012	national grid				

(IFI21) Im	nprov	ements	to the N		lodel				
Project Description	The key that are safety to	objective of th likely to leak a gas employe	he project is and therefor es and the	to develo e reduce t general pu	p improvement he risk of fire/e ıblic whilst also	s to th xplosi comp	ne MRPS model to on from any poter lying with HSE leg	Y efficiently ic ntial escape, gislation.	Year: 2012/13 lentify mains to enhance
L	Exper	nditure	Expendi	ture	Expenditur	e	Total Project		Status
Internal	for Cu	rrent FY £4,126	for Prev	r' FY 9,327	for Next F	/ E0	Costs		Submitted
External		£38,192	£8	1,016		£0	6776 400	Draft	02/05/2013
Materials		£0		£0		£0	2770,499	Final	21/05/2013
Total		£42,318	£9	0,343		£0		Approved	
				A	ignment with	IFI/SC)		
1 Low Car	bon								
2 Eradicat Fuel Pove	ing rty								
3 Promoti Energy Sa	ng ivings								
✓ 4 Safe, Re Network	liable	This project of age as a f cast model t changes in t from current	will investig factor with the to take acco terms of risk levels. The	ate possib he cast iro ount of fissi profile an work prop	le enhancemer n model , and t ure corrosion. 1 d the potential posed within this	nts to he inc he pr to incr s prop	the methodology i clusion of corrosion oject will also exa rease the rate of ro posal has been cos	ncluding the n information mine the imp eduction of ri sted over a 5	consideration in the spun pact of any sk and leakage year period.
✓ 5 Protectin Environme	ng the ent	The ability o methane em	f MRPS to i hissions fror t has a direc	dentify ma n the UK d ct impact o	ins before they listribution system n road closures	leak em. In and	will have a direct i addition, more ef traffic congestion	mpact on the	e level of ng of mains
Technologica area / issue addressed by project	al /	 Research Research Demonst Feasibilit Developrio Continue prioritise rem 	n into the co n into the co gration of ca y of profile f nent & testi d update of nediation	prrelation o prrelation o st iron and factors for ng of profil all profile	r link between t r link between o spun cast prof multi-occupanc e factor for the factors within th	he ag corros ile fac y buil updat ne MR	e of pit cast mains ion and fracture ra tors in live MRPS dings te of the >12" moc tPS model to accu	s and fracture ate model. del ırate profile r	e rate isk and
Innovation ⁻	Туре	SD Ra	ting	Ben	efits Rating		Residual Risk	O	verall Score
Increment	tal	Medi	um		20		-4		24
Expected ber of project	nefits	 The knowledge used to analyse the data and produce improvements to MRPS will be communicated in detail to the industry participants. This understanding will assist GDN's in defending the model robustly when challenged by the HSE. Any improvement in the way in which mains are prioritised for replacement will affect the UK incident level. This has a direct impact on improving safety but is very difficult to quantify. The ability of MRPS to identify mains before they leak will have a direct impact on the level of methane emissions from the UK distribution system. In addition, more efficient planning of mains replacement has a direct impact on road closures and traffic congestion. The MRPS is model is used to effectively replace those pipes with a higher degree of risk. By doing so, the GDN can allocate expenditure accordingly and avoid significant cost if a minor or major incident occurs. The application of a credible methodology for identifying mains at risk will contribute to mitigation 							
		Adoption	n (Year)	Duratio	on of Benefits		Prob' of Success	s P	roject NPV
Potential for		201 • MRPS hat	3 s been ende	orsed by H	5 yrs SE as a metho	d to a	25% Illow for prioritisati	on of mains i	-£621,489
expected ber	nefits	the most rec project enab this respect.	cently availables each Ga	ble data to as Distribu	tion Network to	e moc demo	dels reflect recent onstrate compliand	leakage activice with safety	vity. This y legislation in
				Sumn	ner 2012			natio	nal grid

(IFI21) Improv	ements to the MRPS Model		
			Year: 2012/13
	 Stage 5 of this project has successfully pro overall trends and in significantly more detail GDNs with a wealth of information relating to changes in data collection or definition have in changes. 	vided an updatec by month, leak ty their own data an npacted upon the	I trend analysis, both in terms of pe and GDN. This has provided the id has highlighted clearly where eir own figures and the scale of the
	 The results of carrying out the impact analy services has indicted that a significant number approach and hence the priority for replacement identification of ferrous services for replacement The GDNs remain committed to the ongoin 	rsis on an alterna r of services will ent is likely to cha ent. g development a	tive methodology for assessing be affected by the alternative ange. This should improve the correct nd improvements to the MRPS model.
Project Progress	The more detailed analysis carried out this ye	ar identified som	e anomalies in the trends in failures
	and GiBs, which were attributed to particular (GDNs over partic	ular time periods.
	The impact analysis of applying an alternative shown that the risk from the first 30m of a lon methodology and would be captured more ac applying this known change to the real popula of services will be affected by the alternative a likely to change. This should improve the corr	e methodology for g service (100m f curately by the al tion of services h approach and her ect identification	r calculating the risk from services has for example) is diluted by the current ternative methodology. The results of has indicted that a significant number nee the priority for replacement is of ferrous services for replacement.
Collab' Partners	NGN, SGN, WWU	Provider(s)	GL Noble Denton

						Y	ear: 2012/13
oject escription	EPRG is a wide ra	s a cooperati ange of resea	on of European pipe m arch directed to increa	nanufacturers and ga se integrity and safe	s transmission cor ty of gas transmiss	npanies. EPI ion pipelines	RG undertake
	Exper for Cu	nditure	Expenditure	Expenditure for Next FY	Total Project		Status
nternal		£5,244	£34,489	£0	00010		Submitted
xternal		£28,283	£45,359	£0	£785.384	Draft	02/05/2013
aterials		£0	£0	£0	2700,004	Final	21/05/2013
otal		£33,527	£79,848	£0		Approved	
			A	Nignment with IFI/S	D		
1 Low Ca	rbon						
Economy	,						
2 Eradica Fuel Pove	iting erty						
3 Promot	ing						
Energy S	avings						
4 Safe, Ro Network	eliable	Jointly funct	led pipeline research to he group also provides	o mitigate issue and opportunities for sha	risks associated w aring information o	ith the high p n best practic	oressure ce and
,		incidents w	ith other pipeline operation	ators.			
5 Protecti Environm	ing the nent						
chnologic	al	o (EPBG 1	24) DWTT Round Rob	in			
rea / issue		o (EPRG 1	27) Reliability Based A	Analysis			
roject	'y	o (EPRG 1 o (EPRG 1	30) DWTT Testing phi	ntal effects on residu losophy	iai mechanicai resi	stance of dar	naged pipes
		o (EPRG 1	34b) Development of t	ests for assessment	of long term resist	ance to adhe	sion loss in 3
		o (EPRG 1	37) Assessment of del	layed failure under co	onstant pressure	1. 1000100/	
		0 (EPRG 1 10208-2	38) Clarification of Eur	opean view towards	inline pipe standar	ds ISO3183/	2007 and EN
		o (EPRG 1 supplemen	 Hostile environmentary tests 	ntal effects on residu	al mechanical resi	stance of dar	maged pipes
		o (EPRG 1 o (EPRG 1 o (EPRG 1	41) Discrimination for42) Model of ultimate I43) Extension of FFP a	mill features using M imit state design to p and puncture resista	ILF pigs for baselin predict combined lo nce criteria to X80	e inspections ading capaci	s- Phase 1 ity of line pipe
		o (EPRG 1) o (EPRG 1)	 Revision of EPRG Assessment of beild 	guidelines on weld on ding wrinkles	defect acceptance	criteria	
		o (EPRG 1	46) Development of a	reliable model for ev	aluating the ductile	fracture prop	pagation
		o (EPRG 1	47a) Development of a	an improved model fo	or the burst strengt	h of dent-gou	ige damage
		under susta o (EPRG 1	ained internal pressure 47b) Development of a	e loading Phase 2 pa an improved model fo	rt 1 Modelling or the burst strengt	h of dent-gou	ige damage
		under susta	ained internal pressure	e loading – Phase 2 p	part 2 Experimental	ongitudinally	SAW nine on
		coupling co	ontrol		esting concept for h	ongituainany	SAW pipe ai
 o (EPRG 149) HIC Assessment of low alloy steel line pipe for sour service application Phase 2 o (EPRG 150) HIC Assessment of low alloy steel line pipe for sour service application Phase 3 o (EPRG 151) Assessment of sensitivity to hostile environments of damaged pipe, under cathod protection and internal pressure o (EPRG 152) The effect of toughness on the integrity of HFI pipe seam welds. EPRG 153 - The Definition of a Rich Gas with respect to the Arrest Toughness for Line Pipe Ste EPRG 155 – Assessment of delayed failure under constant pressure 							n Phase 2 n Phase 3 nder cathodic
							ne Pipe Steel
		EPRG 156 EPRG 157 EPRG 158 EPRG 159 EPRG 160	 Guidance for mecha DWTT for small diar Influence of inverse CO2 pipelines, fract CO2 pipelines, mair 	anised gas metal arc meter thick walled pi fracture on BDWTT ure control n project	welding of pipeline pe seamless assessment	9S	
			Sumi	mer 2012		natio	nal ari a

(IFI24) Europe	an Pipeline Res	searc	h Group (EPRO	G)			
							Year: 2012/13	
	EPRG 161 – CO2 pipel EPRG 162 – Revision c s	ines, sho of EPRG	ock tube testing weld defect gu	idelines				
Innovation Type	SD Rating	Be	enefits Rating		Residual Risk		Overall Score	
Incremental	Medium		11		-5		16	
Expected benefits of project	 Improved system integrity knowledge, Improved corrosion protection, reduced 3rd party incidents leading to less supply disruptions. Networking opportunity with other pipeline operators, sharing information and best practice. It is very difficult to articulate the proposed benefits of these high level benefits until the output of each individual project is known. Prevention of incidents will also mean the prevention of the loss of gas to atmosphere. It is extremely difficult to quantify a value of the amount of gas saved from the proposed EPRG projects if all were implemented. The primary benefit from this programme is collaboration on projects that will help to maintain the integrity of the high pressure pipelines, via developed assessment, risk and provention tools and 							
	techniques that mitigate the overall risk. Assuming the probabilit incident is assumed to	e the inte by of a high be £10m	egrity threats or gh pressure pip h, then the annu	the high eline fai al avoid	h pressure pipeline lure is approx 1 in ed cost year is £50	e network 20 years 00k.	and thus reduce	
	If the work from EPRG reduction of avoided co therefore the total avoid - Significant research le Euros in 2009 and abou of 15:1, based on the to	reduces st of £45 led cost everage b ut 300,00 otal Natic	this risk by 10% for year. The will equate to £ benefits. The to 00 Euros in 201 bonal Grid memb	6, then t e curren 90k. otal value 0, which ership c	he annual avoided It formula period ha e of projects being provides National cost of 19,684 euro	l cost is £ as two yea undertak Grid with s in 2009	455k, giving a ars to run en is 445,000 a leverage ratio	
	Adoption (Year)	Dura	ation of Benefi	ts	Prob' of Success	i	Project NPV	
	2013		2 yrs		25%		-£88,185	
Potential for achieving expected benefits	o New knowledge via programmes of work o Networking with tech of new techniques and o Networking/sharing incidents or failures tha o Understanding and a European participants.	the deliv nnical rep best prac knowled t occurre awarene This inc	ery of research presentatives fr ctice across Eu ge with technic ed i.e. Fluxys in ss of developin lude other pipe	and dev om othe rope al repres cident g resear line ope	velopment projects or companies that I sentatives from oth ch and developme rators but also pipe	from the eads to th er compa ent project e manufac	EPRG ne understanding nies concerning s proposed from cturers.	
	The importance of the P responding to current a demonstrate (for examp best practice, and learn	nowledg nd poten ble to the ing from	tial future integ HSE) that Nat incidents.	s Nation rity issue ional Gri	al Grid in mitigatin es and threats. Su id is fully informed	g and pro ch aware of emerg	-actively ness helps to ing techniques,	
	Participation in EPRG s demonstrates value for impact upon our reputa operators in Europe.	till provie money i tion nega	des National G nvested. If Na atively given the	id will a tional G at we are	significant leverag rid were to withdra e one of the larges	e benefit, w from th t gas tran	and therefore e group this may smission pipeline	
	National Grid Gas (NGG) is a member of the EPRG, which manages a programme of R&D projects the results of which NGG obtains through its membership. This project is required to ensure that: o NGG is kept informed of progress and the benefits realised in ongoing sponsored projects of the EPRG Materials and Corrosion committees; o Relevant, or potentially relevant, projects are assessed to identify best practice, emerging technologies etc. that may have an impact NGG's operations.							
	Key areas of particular	interest 1	to National Gric	are:				
	Materials o Fracture propagation for high strength steels, high toughness levels and rich gas mixtures o DWTT requirements for seamless pipe and generally increased understanding o CO2 pipeline requirements relating to fracture propagation o HFI pipe bond line Charpy toughness testing						s mixtures	
	Corrosion o Sensitivity of damag	ed pipe	to cathodic ove	r-protect	tion			
		Sun	nmer 2012			nati	onal grid	

(IFI24) Europe	ean Pipeline Research Group (EPRG)	
		Year: 2012/13
	o Long term behaviour of 3 layer polyethylene coatings	
	Design o Fitness for Purpose of X80 pipelines o Dent and gouge damage testing o Wrinkles due to bending o State of the art review of seismic assessment methods o Ground movement o EPRG weld defect guidelines	
Project Progress	The funding of the EPRG requirements comprises of two elements	nts:
Project Progress	The funding of the EPRG requirements comprises of two element 1. National Grid membership of EPRG provides information on EPRG. The relationship to this group is managed jointly by Tx a membership is shared to ensure that a consistent approach is a business and primarily a safety perspective. The projects durin EPRG 124 - DWTT Round Robin EPRG 127 - Reliability Based Analysis EPRG 129 - Hostile environmental effects on residual mechanic EPRG 130 - DWTT Testing philosophy EPRG 130 - DWTT Testing philosophy EPRG 134b - Development of tests for assessment of long term layer polyolefin external pipeline coatings EPRG 137 - Assessment of delayed failure under constant press EPRG 138 - Clarification of European view towards inline pipe s 10208-2 EPRG 139 - Hostile environmental effects on residual mechanic supplementary tests EPRG 141 - Discrimination for mill features using MLF pigs for b EPRG 142 - Model of ultimate limit state design to predict comb EPRG 143 - Extension of FFP and puncture resistance criteria to EPRG 143 - Extension of EPRG guidelines on weld defect accep EPRG 145 - Assessment of bending wrinkles EPRG 147 - Development of a reliable model for the burst s under sustained internal pressure loading - Phase 2 part 1 - Model EPRG 147a - Development of an improved model for the burst s under sustained internal pressure loading - Phase 2 part 2 - Expression of EPRG 147b - Development of an improved model for the burst s under sustained internal pressure loading - Phase 2 part 2 - Expression of EPRG 147b - Development of an improved model for the burst s under sustained internal pressure loading - Phase 2 part 2 - Expression of EPRG 150 - HIC Assessment of low alloy steel line pipe for sourd EPRG 150 - HIC Assessment of low alloy steel line pipe for sourd EPRG 151 - Assessment of low alloy steel line pipe for sourd EPRG 152 - The effect of toughness on the integrity of HFI pipe EPRG 153 - The Definition of a Rich Gas with respect to the Arrr EPRG 154 - Survey of sulphide	nts: all the projects undertaken by and GDx and the costs of the dopted between the lines of g 2011 and 2012 have included: al resistance of damaged pipes resistance to adhesion loss in 3- sure tandards ISO3183/2007 and EN al resistance of damaged pipes - baseline inspections- Phase 1 ined loading capacity of line pipes o X80 tance criteria ductile fracture propagation strength of dent-gouge damage delling strength of dent-gouge damage erimental pt for longitudinally SAW pipe and r service application Phase 2 r service application Phase 3 if damaged pipe, under cathodic seam welds est Toughness for Line Pipe Steel sure pipelines ss nt
	EPRG 160 - CO2 pipelines, main project EPRG 161 - CO2 pipelines, shock tube testing EPRG 162 - Revision of EPRG weld defect guidelines Completed projects of particular interest to National Grid include purpose, the update of the EPRG girth weld defect acceptance of	the project on X80 fitness for criteria and the definition of rich gas
	when considering fracture propagation behaviour. Ongoing work not used by National Grid, helps National Grid keep a watching I	on 3 layer PE coatings, although brief on their use.
	 Support from GL Noble Denton covering a range of expert ter 31.03.13, including: 	chnical activity in the year up to
	o Representation of NGG (by MACAW consultant, Bob Andrew Materials Committee.	vs) at up to 3 meetings of the EPRG
	Summer 2012	national grid

(IFI24) European Pipeline Research Group (EPRG)								
			Year: 2012/13					
	 Representation of NGG (by GL Noble Denton consultant, Ian Thompson) at up to 3 meeti the EPRG Corrosion Committee. Workshop to disseminate the results of Project 162 "Revision of the EPRG Weld Defect Guidelines" (Design Committee) (by MACAW consultant, Bob Andrews). Year-end review presentation and stage gate meeting 							
	 Year-end review presentation and stage gate meeting Key highlights during the year were: X80 fitness for purpose report - provides additional data for X80 damage assessment to suppor National Grid's T/PM/P/11 procedure. Workshop briefing given to National Grid on mechanised pipeline welding Review of strain based design Work being taken on rich gas definition for fracture propagation to provide a better understandir of the risk - gas supplies from LNG means more rich gas coming into the network Review meetings with GL Noble Denton Joint Technical Meeting (JTM) held between PRCI, EPRG and APIA to present significant pipeline research between the groups and to consider priority areas for future direction of research programmes for collaborative funding. Joint workshop held between Tx and GDx to share awareness of the EPRG/PRCI programmes 							
Collab' Partners	Work. BP Exploration Operating Co. Ltd. (United Kingdom Corinth Pipeworks S.A. (Greece) Corus Tubes - Energy (United Kingdom) ENI G& P (Italy) E.ON Ruhrgas AG (Germany) Europipe GmbH (Germany) Fluxys n.v. (Belgium) Gaz de France (France) N.V. Nederlandse Gasunie (The Netherlands) Salzgitter Mannesmann Großrohr GmbH (Germany) Shell Global Solutions International B.V. (The Netherlands) SNAM Rete Gas S.p.A.n (Italy) TENARIS DALMINE SPA (Italy) Total E & P (France) RAUTARUUKKI OYJ (Finland) Vallourec & Mannesmann France (France)	Provider(s)	GL Noble Denton, EPRG					

roject							Y	ear: 2012/13			
escription	The mai mechan	nain focus for National Grid is assessment, prevention and migration of integrity threats, such as anical damage and external corrosion.									
Expe for Ci		nditure rrent FY	Expenditure for Prev' FY		Expenditure for Next FY	Total Project Costs		Status			
nternal		£19,264	5	£15,162	£0			Submitted			
External		£44,077	5	£46,755	£0	£6.000.000	Draft	02/05/2013			
laterials		£0		£0	£0		Final	21/05/2013			
otal		£63,341	5	261,917	£0		Approved				
				۵	Nignment with IFI/S	SD					
1 Low Ca	rbon										
Economy											
2 Eradica Fuel Pove	ting erty										
3 Promot	ing										
Energy Sa	avings										
4 Safe, Re Network	eliable	Main focus such as me	for Nationa chanical d	al Grid Distr amage and	ibution is assessme external corrosion.	nt, prevention and Jointly funded pipe	migration of i eline research	ntegrity threats n/ sharing			
_		information	on best pr	actice / inci	dents.			J			
5 Protecti Environm	ing the nent										
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(IFI25) PRCI Research Collaboration

Year: 2012/13 demonstrates value for money invested. **Project Progress** PRCI membership is collaborative with Gas Transmission to ensure consistency of approach with National Grid Gas. During the last year, areas of particular interest to National Grid have included the continuing work on the dent/gouge mechanical damage model and also of interest is work on monitoring of third party interference threats and the performance of composite repair techniques. The PRCI work on Extended Low Flow Range Metering has been used in the scoping further National Grid test work at the flow centre at Bishop Auckland, UK. Testing is still ongoing but initial results are encouraging. The tests on CO2 Shock Tube Testing complimented work undertaken by National Grid and has helped with considering the design requirements for anthropogenic CO2 pipeline systems. **Collab' Partners** National Grid Transmission, and 34 other Provider(s) PRCI member companies with energy pipeline interests via PRCI (23 based in the USA; 5 European; 5 Canadian; 1 South American; 1 Middle-Eastern)

Project	To date	mine if eviation	na non larra	d bich	oouro motorias la	otollotiono provide -	roprocestet	o tomport
Description	To dete measure perform	rmine if existin ement for the ance.	ng non lagged purposes of f	fiscal flow	essure metering in measurement, in	stallations provide a cluding impact on th	ermowell inst	le temperature tallation
	Expe for Cu	nditure Irrent FY	Expendit for Prev'	ure FY	Expenditure for Next FY	Total Project Costs		Status Submitted
nternal		£10,890	£4	,121	£3,520			
xternal		£71,969	£40	,326	£20,000	£489,630	Draft	02/05/2013
laterials	terials £			£0	£0		Final	21/05/2013
otal		2109,211	£44	,447	£23,520		Approved	
				A	lignment with IFI	/SD		
☐ 1 Low Ca Economy	irbon /							
2 Eradica Fuel Pove	ating erty							
3 Promot Energy S	ting avings							
4 Safe, Ro Network	eliable	Mitigation a work has to	gainst the pas proceed.	ss on cos	ts to customers if	the lagging of high p	pressure mete	ering tubes
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(IFI26) The Eff	ect of Thermal Lagging on Fis	cal Meter	ing Tempera	ture
measurement				Year: 2012/13
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roject	Researc	earch and development of two Software tools for hazard and risk assessment of Major Hazard, Gas								
escription	Installati									
	Exper for Cu	nditure rrent FY	Expenditure for Prev' FY		Expenditure for Next FY	Total Project Costs		Status		
iternal		£6,219	£	5,512	£0			Submitted		
xternal		£42,450	£54	4,450	£0	£500,000	Draft	03/05/2013		
aterials		£0		£0	£0		Final	21/05/2013		
otal		£48,669	£59	9,962	£0		Approved			
				4	Alignment with IFI/S	SD				
1 Low Ca	arbon v									
2 Eradica	, ating									
Fuel Pov	erty									
3 Promot Energy S	ting Savings									
4 Safe, R	eliable	Supports N	ational Grid i	n assessi	ing the risks from its	above 7 bar pipeli	ne system an	d ensuring that		
Network		expenditure	e is appropria	tely alloca	ated.					
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echnologic ea / issue dressed b roject Innovation Incremen spected be project bieving spected be roject Prog	r enefits gress	o Ensure I methodolog assets. o Enhance SD R - Improves - Safety ma - The full co commitmer GD's ratio v Adoptio 20 Supports th Safety. Leverage a 1. An updat transmissio PIPESAFE crater dime 2. A revised the use of F 3. Annual s incident exp and associa for incident 4. A review	National Grid gies that can ad Software t ating lium National Grid unagement th ost of this pro to this is £1 will be 7.4:1. n (Year) 11 ne management nd collaborate ted version of m pipelines) we collaborate to PE slabs as a ubmissions v operience of pi ated installati frequencies s was carried s was carried	Gas Dist be justifie ools for h Ben 's unders rough ap ject will c 35k. Thi Durati Durati ion benef f the PIPE was prepa i and incli f on new he Nation un alterna vere prep peline co ons. The and igniti- se incider out, to es	tribution is using appled to HSE when assentiated and risk area for implementated and research.	propriate and up to essing the risks fro essment of Major Ha Residual Risk -3 risks els developed throus s is approximately s al Grid leverage rat Prob' of Succes 50% Pipeline Safety Re r hazard and risk as tion in 2013/14, de sequence models f a for protective slabs ational Grid to indus ion with both buried aluable resource for use in risk assessm 's high pressure pip o highlight issues.	date risk assem its high pre- azard Gas Ins azard Gas Ins Or ugh this project 2500k. Nation io of 3.7:1 an s P gulations and seessments o livered throug or pipeline fire s was develop stry database d high pressur- deriving histo- ents. elines and re The two repo- bindicator to	essment essure pipeline stallations verall Score 23 ct nal Grid's d individually Project NPV -£36,050 I Process of gas the es and rupture ped to enable es collating the re pipelines orical statistic: plated orts build on the		
echnologic ea / issue ldressed b oject nnovation Incremen cpected be project bieving cpected be roject Prog	cal by n Type ntal enefits r enefits gress	o Ensure I methodolog assets. o Enhance SD R Med - Improves - Safety ma - The full cc commitmer GD's ratio v Adoptio 20 Supports th Safety. Leverage a 1. An updat transmissio PIPESAFE crater dime 2. A revised the use of F 3. Annual s incident exp and associa for incident 4. A review installations performanc	National Grid gies that can ad Software t ating lium National Gric magement th best of this pro ot to this is £1 will be 7.4:1. n (Year) 11 ue management ted version of th PE slabs as a ubmissions v collaboration nsions based d version of th PE slabs as a ubmissions v perience of pi ated installati frequencies of gas releas s was carried b laid in previo	Gas Dist be justifie ools for h Ben 's unders rough ap ject will c 35k. Thi Durati Durati ent of risk ion benef f the PIPE was prepa a and incli d on new ne Nation un alterna vere prep peline co ons. The and igniti se incider out, to ex- pous years	tribution is using apped to HSE when assent azard and risk assent azon of pipeline plication of the modical additional for the modical additional Grid Specification of the modical Grid Specifi	propriate and up to essing the risks fro essment of Major Hi Residual Risk -3 risks els developed throus s is approximately s al Grid leverage rat Prob' of Succes 50% Pipeline Safety Re r hazard and risk as tion in 2013/14, de sequence models f a for protective slabs ational Grid to indus ion with both buried aluable resource for lase in risk assessm 's high pressure pip o highlight issues.	date risk asse m its high pre- azard Gas Ins or ugh this project 2500k. Nation io of 3.7:1 an s P gulations and seessments o livered throug or pipeline firm s was develop stry database d high pressu deriving hister ents. belines and re The two repo	essment essure pipeline stallations verall Score 23 ct nal Grid's d individually Project NPV -£36,050 I Process of gas the es and rupture ped to enable es collating the re pipelines orical statistic lated orts build on th monitor safety		

(IFI28) Hazard & Risk Assessment Tools for Major Gas Installations

			Year: 2012/13
	installations) was delivered in 2012/13 deliver improved functionality and an updated explosi the use of the package under Windows.	ed through the C on methodology	DRDER collaboration, including , as well as software modifications for
Collab' Partners	Collaborative partners for the "ORDER" group include (but are not limited to) GDF SUEZ (France) Gasunie (Netherlands) Enagas (Spain) Energinet.dk (Denmark) & Fluxys (Belgium). "PIPESAFE" group include (but not limited to) National Grid (UK) Energinet.dk (Denmark) Enagas (Spain) Fluxys (Belgium) Gasunie (Netherlands) StatoilHydro (Norway) & TransCanada PipeLines (Canada).	Provider(s)	GL Noble Denton

Summer 2012

Project Description	To revie	w and test co	ondition monitorin	g techniques for a	oove grour	nd installations (Y AGIs)	ear: 2012/13	
	Exper for Cu	nditure rrent FY	Expenditure for Prev' FY	Expendit for Next	ure T FY	otal Project Costs		Status	
Internal		£892	£79	2	£0			Submitted	
External		£8,598	£8,59	8	£0	£73.778	Draft	02/05/2013	
Materials		£0	£	0	£0		Final	21/05/2013	
Fotal		£9,490	£9,39	0	£0		Approved		
				Alignment wit	h IFI/SD				
1 Low Ca Economy	rbon '	Reduction i	in maintenance ta	ks and deferring o	f replacem	ent of PRIs or th	neir compon	ents	
2 Eradica Fuel Pove	iting erty								
☐ 3 Promot Energy S	ing avings								
4 Safe, Re Network	eliable	The system detecting m enable corr supply.	has the potentia noisture under ins rective measures	I to allow targeted ulation to identify a to be taken prior to	maintenar areas of po any leaka	nce to be perform otential significan age occurign thu	ned by It corrosion. s ensuring r	This will o loss of	
5 Protect	ing the nent								
echnologic rea / issue ddressed b roject	al y	o Detectin o Identify o Identify	ng conditions that areas of insulatio and rectify areas	would support corn n that require remo of pipe corrosion p	rosion und oval to insp rior to failu	er insulation. bect pipework. ure.			
Innovation	Туре	SD R	ating	Benefits Rating	I	Residual Risk	O	verall Score	
Substitut	ion	Mec	dium	7		-2		9	
xpected be f project	enefits	A system to AGIs.	o allow targeted n	naintenance to be	performed	by detecting mo	isture under	insulation on	
		Improved in	ntegrity of the pipe	elines and vessels	mitigating	against the pote	ntial loss of	supply.	
		20	13	0 vrs	S PI	75%	P	-£70.652	
						1070		270,002	
otential for chieving expected be	nefits	The busine	ss benefits of the	project are solely	knowledge	e acquisition.			
Project Prog	jress	The project that the tec The limitation o The nee need to vis	was stopped foll hnology could de ons include: d for frequent vis ually check for was effective solution	owing the completi tect moisture in ins ual monitoring on s ater in the detector for remote monitor	on of field ulation, th site (likely	trial, whilst the c ere were a numb to be weekly) du	lemonstratic per of limitat e to battery	n concluded ions identified life and the	
Collab' Parti	ners				Provide	er(s) GL Noble	Denton		
(IFI43) H	igh P	ressure	Tempora	ry Re	pairs				
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									Year: 2012/13
Project Description	To selec pipeline	t, test and ap network.	prove compos	site temp	orary repair sol	utions for u	use on Natio	onal Grid's h	igh pressure gas
I	Exper for Cu	nditure rrent FY	Expenditu for Prev'	ire FY	Expenditure for Next FY	e Tota	al Project Costs		Submitted
Internal		£15,921	£19,	961	£	20			Cubiniticu
External		£89,976	£89,	404	£	20	£381,606	Draft	02/05/2013
Materials		£26,991	£107,	964	£	20		Final	21/05/2013
Total	£	132,888	£217,	329	£	20		Approved	
				Ali	gnment with I	FI/SD			
1 Low Car	rbon								
✓ 2 Eradicat Fuel Pove	ting erty	Minimising t	he loss of sup	ply will li	mit the potentia	I impact u	pon vulneral	ole and need	dy consumers.
3 Promoti Energy Sa	ing avings								
✓ 4 Safe, Re Network	eliable	This type of required fot	solution could the production	d prevent n of tradit	a severe loss o ional repair fitti	of supply s ngs.	cenario whe	ere long lead	times are
5 Protecti Environm	ng the ent								
Technologica area / issue addressed b project	al y	Composite r system that techniques a	repair systems could be used are unsuitable	are curr d on pipe	ently unapprov line geometries	ed. Select s, such as l	tion, test and bends and to	d approve a ees, where e	composite repair existing
Innovation	Туре	SD Ra	ating	Bene	fits Rating	Re	sidual Risk	(Overall Score
Substituti	ion	Medi	um		15		2		13
Expected be of project	nefits	Identificatior allow an opt that can be	n and appraisa imum selectic used for emer	al of a ter on for a gi gency re	nporary high pr ven repair scer pair use or dev	ressure pip nario. Suc elopment o	peline repair cessful qual of bespoke s	techniques, ification test solution.	sufficient to t of solution(s)
		Adoption	n (Year)	Duratio	n of Benefits	Prob	o' of Succes	S	Project NPV
		201	3		1 yrs		25%		£398,398
Potential for achieving expected bei	nefits	Preparation	of a specifica	tion for a	tender event is	now requ	ired under N	IIA to realise	e benefit.
Project Prog	ress	The aim of s solutions for (FEA) to mo the second p	stage 3 was to use on Natio del the param phase of the s	test and nal Grid's teters of t tage.	verify suitabilit high pressure he repair solut	y of two po gas pipeli ions which	otential com ne network i i could then	posite tempo using finite e be subseque	orary wrap repair element analysis ently tested in
		From the FE repaired usin its original d None of the requirement analysis and both be used FEA did acc to ensure th	A it was conc ng the repair s esign. During repaired benc s of IGE/TD/1 I testing was d to temporari urately predic at it remains a	luded that system w the full s is failed of Edition s successful ly repair t the outo a robust p	at crack-like de ill not lead to fa scale testing, th during these tes 5 with no appar Il and it was co defects in benc come however prediction tool g	fects in cirn ilure provin e pressure sts, each e ent breakd ncluded th ls in high p some nece joing forwa	cumferential ded that the e was raised exceeding th down of the r nat the comp pressure pip essary adjus ard.	I (girth) weld pipeline is o to predeter e high level repair syster posite repair elines up to tments will i	s that have been operated within mined levels. test n. Overall the systems can 84bar. The need to be made
		As tests pro permanent r	ved more than ather than jus	n favoura it a tempo	ble, further wor prary repair will	k under NI be consid	IA to certify ered.	the approac	h as a
Collab' Partr	ners					Provider(s	s) GL Nobl	e Denton	
				Summ	er 2012			natio	onal grid

	- ·								••••••••••••••••••••••••••••••••••••••
escription	I o demo industry - visual - reprod	onstrate if the engineering s inspection lucing the inte	internal weld standards; th ernal profile	d profile of is will be c to enable o	completed by a co	nts (both bi ombination ist accepta	of: ble param	ectrofusion joi	ints) meet gas
	Expe	nditure	Expendit	ture	Expenditure	Total I	Project		Status
	for Cu	rrent FY	for Prev	'FY	for Next FY	Co	osts		Submitted
nternal		£4,916	£	3,921	£0				
xternal		£20,090	£33	3,180	£0	£	455,912	Draft	03/05/2013
aterials		£0		£0	£0			Final	21/05/2013
otal		£25,006	£37	7,101	£0			Approved	
				Ali	ignment with IFI	/SD			
[]] 1 Low Ca Economy	irbon /								
2 Eradica Fuel Pove	iting erty								
3 Promot Energy S	ing avings								
4 Safe, Re Network	eliable	Good alignn and electrof	nent as this v usion) to be	will provide undertake	a methodology on without the nee	of determin d to undert	ing the inf ake multip	egrity of PE j	joints (both bu ns
5 Protecti	ing the	Minor alignn	nent as the i	ise of the r	a any tool will room	It loss avea	votiona a	mnared with	current
Environn echnologic rea / issue ddressed b	nent al	To design a internal joint	profile meas s covering:		device linked with	a camera	within PE	pipe systems	s for measurin
Environm echnologic rea / issue ddressed b roject	nent cal by	To design a internal joint - LP/MP/IF - All PE pi - The follo instrumental acceptable	profile meas s covering: P pressure ti pe diameters wing existing tion for other entry system	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de	levice linked with y up to 4bar, but mm up to and ind ges, 11, 17.6 & 2 ich are currently signed and deve	a camera with the pot cluding 630 1, plus the under deve loped.	within PE tential to i mm potential to lopment,	pipe systems ncrease to 10 to modify the e.g, 26 & 33	s for measuring Obar - subject to
Environm echnologic rea / issue ddressed b roject Innovation	nent cal by Type	practice. To design a internal joint - LP/MP/IF - All PE pi - The follo instrumenta acceptable of SD Ra	profile meas s covering: ^D pressure ti pe diameters wing existing tion for other entry system atting	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de Bene	levice linked with y up to 4bar, but ' mm up to and ind ges, 11, 17.6 & 2 ich are currently signed and deve	a camera with the pol cluding 630 1, plus the under deve loped. Resid	within PE tential to i mm potential t lopment,	pipe systems ncrease to 10 to modify the e.g, 26 & 33	s for measurin Dbar - subject to verall Score
Environm echnologic rea / issue ddressed b roject Innovation Significa	nent al by Type ant	To design a internal joint - LP/MP/IF - All PE pi - The follo instrumenta acceptable o SD Ra Medi	profile meas s covering: P pressure ti pe diameters wing existing tion for other entry system ating um	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de Bene	device linked with y up to 4bar, but mm up to and ind ges, 11, 17.6 & 2 ich are currently signed and deve fits Rating	a camera with the pot cluding 630 1, plus the under deve loped. Resid	within PE tential to i mm potential to lopment, lual Risk	pipe systems ncrease to 10 to modify the e.g, 26 & 33	s for measuring Obar - subject to verall Score 12
Environm echnologic rea / issue ddressed b roject Innovation Significa xpected be f project	nent cal cy Type ant enefits	practice. To design a internal joint - LP/MP/IF - All PE pi - The follo instrumental acceptable of SD Ra Medi This device minimise the for a single of appearance	profile meas s covering: P pressure tip pe diameters wing existing tion for other entry system ating um could enable potential of excavation a and accurat	surement c ers, initially s from 125 g SDR rang r SDRs wh is being de Bene e more acc f interferen nd improve e measure	levice linked with y up to 4bar, but of mm up to and ind ges, 11, 17.6 & 2 ich are currently esigned and deve efits Rating 13 curate identification ce damage. Rece ed decision making ement of both but	a camera with the pot cluding 630 1, plus the under deve loped.	within PE tential to i mm potential to lopment, lual Risk 1 ant to othe ational coso ondition jo ofusion jo	pipe systems ncrease to 10 to modify the e.g, 26 & 33 Or er 3rd party e. st and envirou bints by interr	s for measurin Dbar - subject to verall Score 12 xcavators to nmental issues nal visual
Environm echnologic rea / issue ddressed b roject Innovation Significa xpected be project	ant Type ant enefits	To design a internal joint - LP/MP/IF - All PE pi - The follo instrumenta acceptable of SD Ra Medi This device minimise the for a single of appearance Adoption	profile meas s covering: P pressure tis pe diameters wing existing tion for other entry system ating um could enable excavation a and accurat n (Year)	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de Bene Bene c more acco f interferen nd improve te measure Duratio	levice linked with y up to 4bar, but mm up to and ind ges, 11, 17.6 & 2 ich are currently signed and deve fits Rating 13 curate identification ce damage. Rece ed decision making ment of both but	a camera v with the pot cluding 630 1, plus the under deve loped. Resid under of PE pla luced opera ing on the c t and electr Prob' o	within PE tential to i mm potential to lopment, lual Risk 1 ant to othe ational cos ondition jo ofusion jo	pipe systems ncrease to 10 to modify the e.g, 26 & 33 Or er 3rd party e. st and environ pints by interr pints. s P	s for measurin Obar - subject to verall Score 12 xcavators to nmental issues nal visual
Environm echnologic rea / issue ddressed b roject Innovation Significa xpected be f project	Type ant enefits	practice. To design a internal joint - LP/MP/IF - All PE pi - The follo instrumental acceptable of SD Ra Medi This device minimise the for a single of appearance Adoptior 201	profile meas s covering: P pressure tip pe diameters wing existing tion for other entry system ating um could enable potential of excavation a and accurat (Year)	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de Bene Bene c more acco f interferen nd improve e measure Duratio	levice linked with y up to 4bar, but y mm up to and ind ges, 11, 17.6 & 2 ich are currently signed and deve fits Rating 13 curate identification ce damage. Rece ed decision making ment of both but on of Benefits 11 yrs	a camera with the pol cluding 630 1, plus the under deve loped. Resid under deve loped. Resid under deve loped. Resid under deve loped. Resid	within PE tential to i mm potential to lopment, lual Risk 1 ant to othe ational coso ondition jo ofusion jo ofusion jo f Succes 75%	pipe systems ncrease to 10 to modify the e.g, 26 & 33 Or er 3rd party e. st and environ bints by interr bints. s P	s for measurin Dbar - subject to verall Score 12 xcavators to nmental issues hal visual Project NPV £621,914
Environm echnologic rea / issue ddressed b roject Innovation Significa xpected be f project otential for chieving xpected be	Type ant enefits	To design a internal joint - LP/MP/IF - All PE pi - The follo instrumental acceptable of SD Ra Medi This device minimise the for a single of appearance Adoption 201 The benefits will impleme	profile meas s covering: P pressure tis pe diameters wing existing tion for other entry system ating could enable e potential of excavation a and accurat n (Year)	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de Bene Bene f interferen nd improve e measure Duratio realised o en made w	levice linked with y up to 4bar, but mm up to and inc ges, 11, 17.6 & 2 ich are currently signed and deve effits Rating 13 curate identification ce damage. Rec ed decision making ement of both but on of Benefits 11 yrs nce the decision which is expected	a camera with the pot cluding 630 1, plus the under deve loped. Resid Resid uced opera on of PE pla huced opera Prob' o 7 on which a in 2013.	within PE tential to i mm potential to lopment, lual Risk 1 ant to othe ational cos ondition jo ofusion jo ofusion jo f Succes 75%	pipe systems ncrease to 10 to modify the e.g, 26 & 33 Or er 3rd party e. st and environ bints by interr ints. s P nd specialist	s for measurin Dbar - subject to verall Score 12 xcavators to nmental issues hal visual Project NPV £621,914 business unit
Environm echnologic rea / issue ddressed b roject Innovation Significa xpected be f project otential for chieving xpected be roject Prog	Type ant enefits gress	practice. To design a internal joint - LP/MP/IF - All PE pi - The folio instrumentai acceptable of SD Ra Medi This device minimise the for a single of appearance Adoption 201 The benefits will implement The laser pr bores of PE obstacles ca prevented fu	profile meass s covering: P pressure tip pe diameters wing existing tion for other entry system ating um could enable e potential of excavation a and accurat h (Year) 3 s will only be ented has be ofile measur pipes was to an generally urther progre	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de Bene more acc f interferen nd improve e more acc f interferen nd improve measure Duratio	levice linked with y up to 4bar, but mm up to and inc ges, 11, 17.6 & 2 ich are currently signed and deve fits Rating 13 curate identification ce damage. Rece ed decision making ent of both but on of Benefits 11 yrs nce the decision which is expected vice linked with a year. The system me with no proble	a camera v with the pot cluding 630 1, plus the under deve loped. Resid uced opera- ng on the c t and electr Prob' o on which a in 2013. camera for n can opera- ems, during	within PE tential to i mm potential to lopment, lual Risk 1 ant to othe ational co- ondition je of Succes 75% ctivities at measurir ate inside the field	pipe systems ncrease to 10 to modify the e.g, 26 & 33 Or er 3rd party e. st and envirou bints by interr ints. s P nd specialist a pipeline, w trial only stee	s for measurin Dbar - subject to verall Score 12 xcavators to nmental issue hal visual Project NPV £621,914 business unit the profiles and reld beads ance profices hav
Environm echnologic rea / issue ddressed b roject Innovation Significa xpected be f project otential for chieving xpected be roject Prog	ry Type ant enefits gress	ractice. To design a internal joint - LP/MP/IF - All PE pi - The follo instrumental acceptable of SD Ra Medi This device minimise the for a single of appearance Adoption 201 The benefits will impleme The laser pr bores of PE obstacles ca prevented fu o The syste effects. o With the the biggest of suggested s	profile meass s covering: P pressure tip pe diameters wing existing tion for other entry system atting um could enable e potential of excavation a and accurat n (Year) 3 s will only be ofile measur pipes was tr an generally urther progre em has beer scissor lift m risk to the pr imple recover	surement c ers, initially s from 125 g SDR rang r SDRs wh s being de Bene more acco f interferen nd improve e measure Duratio realised o en made w rement dev rialled this be overcor ss: n tested in nechanism ofiler is a p ery plan ha	levice linked with y up to 4bar, but mm up to and inc ges, 11, 17.6 & 2 ich are currently esigned and deve efits Rating 13 curate identification ce damage. Rec ed decision making ement of both but on of Benefits 11 yrs nce the decision which is expected vice linked with a year. The system me with no proble an explosive and using electrical power failure. Ana is been drawn to	a camera o with the pot cluding 630 1, plus the under deve loped. Resid Resid Resid uced opera ng on the c t and electr Prob' o o n which a in 2013. camera for n can opera ems, during non explos power to mo alysis of the enable the	within PE ential to i mm potential to lopment, lual Risk 1 ant to othe ational cos ondition jo ofusion jo f Succes 75% ctivities at measurinate inside the field sive atmos pove the las e risk has device to	pipe systems ncrease to 10 to modify the e.g, 26 & 33 Or er 3rd party e. st and environ bints by interr bints. s P nd specialist ng internal join a pipeline, w trial only stee sphere with n ser system u been underta be removed.	s for measurin Dbar - subject to verall Score 12 xcavators to nmental issue: nal visual Project NPV £621,914 business unit nt profiles and reld beads and p inclines hav to adverse p and down, aken and a

(IFI47) A	lterna	ative Sou	rces/Scer	nario	s for Bio-n	nethane	Injectio	on	
								Y	/ear: 2012/13
Project Description	To demo to demo network	onstrate the sanstrate the ov nstrate the ov for LTS and I	afe injection of l rerall feasibility P systems.	biometh of small	ane into the UK scale "renewab	gas grid from e" additions t	biogas so o the Natio	urces othe onal Grid (er than sewage Gas Distribution
	Exper for Cu	nditure rrent FY	Expenditure for Prev' F	e Y	Expenditure for Next FY	Total Pro Cost	oject Is		Status
Internal		£15,970	£15,3	56	£0				Submitted
External		£19,725	£160,00	00	£0	£1,53	88,943	Draft	03/05/2013
Materials		£70,059	-£17,00	00	£0			Final	21/05/2013
Total	£	2105,754	£158,3	56	£0		A	pproved	
				Ali	gnment with IF	/SD			
1 Low Car Economy	rbon	Strong Align disruptive &	ment Injection economic solut	of bio-m tion for c	ethane into the decarbonising he	gas network p at in the UK.	provides the	e only larg	ge scale, non-
2 Eradicat Fuel Pove	ting erty								
3 Promoti Energy Sa	ng avings								
✓ 4 Safe, Re Network	eliable	Minor Alignr met with ren enhance en	nent. National newable gas and ergy/security of	Grid hav d therefo supply	ve established th ore this represer within the UK.	at up to 50% ts a potentiall	of resident y significar	tial gas de nt source	emand can be of fuel that will
✓ 5 Protecti Environm	ng the ent	Strong Align should demo in the most	iment. Biogas p onstrate the inje efficient way an	promise ection of d thus c	s to deliver subs this gas into the lelivering the gre	tantial enviror gas distribut atest environ	nmental be ion networl mental ber	enefits. Th k enabling nefit.	nis project g it to be used
Technologica area / issue addressed by project	al Y	Conceptual o Conceptu o Identify th tier comp o Identify lo regulator	Design for the I ual Design for the he specific gas bliant with GS(M ower cost, fit for y changes that	P syste he LTS s quality r I)R requ r purpos would b	m to inject bio-m system to inject monitoring equip irements e, equipment fo be required to im	ethane from I bio-methane f ment for each each pressu plement them	Foodstocks from pig slu n pressure re tier and	s and was urry the	te
Innovation	Туре	SD Ra	ating	Bene	fits Rating	Residua	al Risk	0	verall Score
Incremen	tal	Signifi	icant		14	4			10
Expected ber of project	nefits	Develop kno for the press prevent biog from the tria to be identifi This project to be used in	weledge of best sure tiers identif gas being injecte I is anticipated ied. should demons n the most effic	industry fied. Th ed and r to enabl strate the ient way	y practice on the is project should reaching its full p le effective solut e injection of this y and thus delive	injection of b also identify otential. This ons to those gas into the ring the great	iomethane any on-goi i informatic barriers, es gas distrib est enviror	into the g ng barrier on combin specially e ution netwo mental be	rid in the UK s that may ed with data economic ones, work enabling it enefit.
		Adoption	n (Year)	Duratio	n of Benefits	Prob' of S	Success	P	Project NPV
		201	4		0 yrs	509	%		£1,451,681
Potential for achieving expected ber	nefits	The knowled business no of bio metha live during 2 expected.	dge gained durin w has a comme ane that will prov 013 the docume	ng the c ercial off vide a vi ented ei	ourse of this pro fering for custom iable return on the nvironmental be	ject has inforr ers who can i neir investmer nefits have no	med the dir inject appro nt. As the s t yet been	rection of oximately site is anti realised b	IFI: 70, the 300m ³ per hour icipated to go but are still
Project Prog	ress	The project complete the connection p Stage two e Natural Gas established a Bio metha enable futur	was carried out e detailed desig point into the inf nabled NG to id Site configurat to generate a s ne Packaged S e unconvention	over 2 s on and the termediate lentify constant ions and cope of colution and al Gas S	stages, the first nen subsequentl ate pressure net osts associated d site lay outs. F works for NG Pr and bring some Sources connect	being a feasib y build and co work at the Ac with an install rom this point ocurement to economies of ions with a vie	ility study a ommission dnams Bre ation that f sufficient progress a scale to th ew to reduce	and the se a bio met wery in Su followed e experience a framewo he required cing barrie	econd was to hane injection uffolk stablished e was ork contract for d equipment to ers to entry
				Summ	er 2012			natio	nal grid

(IFI47) Alterna	tive Sources/Scenarios for Bio-methan	e Injection
		Year: 2012/13
	associated with cost.	
	Whilst the majority of the work was completed in February 201 commissioned primarily due to the proposed clean up technolo party to enable efficient injection into the gas network, it is anti in 2013 and the required commissioning will enable demonstration to the Network.	2 the site is still yet to be ogy had to be changed by the third icipated that the site will go live in later ation of safe injection of bio methane
Collab' Partners	Provider(s)	Mouchel, Willows, Oribital
	Summer 2012	national grid

							v	oar: 2012/13
Project	To unde	erstand the lo	ads imposed (upon PE	Pipes when they a	re squeezed off and	to use this ir	nformation to
Description	better u	nderstand the	e requirements	for sepa	aration distances b	etween squeeze off	equipment a	nd joints.
	Exper for Cu	nditure	Expenditu	Jre	Expenditure	Total Project		Status
Internal		£2,000		2517	£3,520	COSIS		Submitted
External		£17,689	£5	,614	£20,000	0050 045	Draft	02/05/2013
Materials		£0		£0	£0	£230,345	Final	21/05/2013
Fotal		£19,689	£6	,131	£23,520		Approved	
				ΔΙ	ianment with IFI/	SD		
☐ 1 Low Ca Economy	rbon							
2 Eradica Fuel Pove	ting erty							
☐ 3 Promot Energy Sa	ing avings							
4 Safe, Re Network	eliable	Good Align operations	ment. Project and this maint	will mitig	ate against the ris	k of joint/fittings fail rs.	ures during so	queeze-off
5 Protecti Environm	ing the nent							
addressed b project	y		Dura dina la dia an					
-		o Explore o Explore o To unde verify the P	Proximity issuertake basic te ost Squeeze-	les when les when sting of s Off Yield	soil restraints is p joints contain defe amples of PE mat Strength	resent ects erial that have been	subjected to	Squeeze-Off to
Innovation	Туре	o Explore o Explore o To unde verify the P	Proximity issu Proximity issuentake basic te lost Squeeze- lating	ies when ies when sting of s Off Yield Bene	soil restraints is p joints contain defe amples of PE mat Strength efits Rating	resent ects erial that have been Residual Risk	subjected to	Squeeze-Off to
Innovation	Type ntal	o Explore o Explore o To unde verify the P SD R Mec	Proximity issu Proximity issu entake basic te ost Squeeze- lating lium	ies when sting of s Off Yield Bene	soil restraints is p joints contain defe amples of PE mat Strength efits Rating 19	resent ects erial that have been Residual Risk 1	subjected to	Squeeze-Off to verall Score 18
Innovation Incremer Expected be of project	Type ntal mefits	o Explore o Explore o To unde verify the P SD R Mec This projec loads impo- whether an and also m	ating twill provide e sed during PE y modification aintain supplie	es when les when sting of s Off Yield Bene essential I squeeze s are req es during	soil restraints is p joints contain defe amples of PE mat Strength efits Rating 19 consuledge and un- coff operations. T uired to its working flowstop operatior	resent erial that have been Residual Risk 1 derstanding via valid his informed positio g practices to ensure is.	a subjected to Ov dated FEA req n will then de e that their PE	Squeeze-Off to verall Score 18 garding the termine E pipes are safe
Innovation Incremer Expected be of project	Type ntal	o Explore o Explore o To unde verify the P SD R Mec This projec loads impos whether an and also m Adoptio	Proximity issu Proximity issu entake basic te ost Squeeze- ating dium t will provide e sed during PE y modification aintain supplie n (Year)	Bend Bessential I squeeze s are req bes during Duratio	soil restraints is p joints contain defe amples of PE mat Strength 19 chowledge and un- conf operations. T uired to its working flowstop operation on of Benefits	resent ects erial that have been Residual Risk 1 derstanding via valid his informed positio g practices to ensure is. Prob' of Succes	a subjected to Or dated FEA reg n will then de e that their PE ss P	Squeeze-Off to verall Score 18 garding the termine E pipes are safe Project NPV
Innovation Incremer Expected be of project	Type ntal mefits	o Explore o Explore o To unde verify the P SD R Mec This projec loads impo whether an and also m Adoptio	rroximity issu Proximity issu rrtake basic te ost Squeeze- ating dium t will provide e sed during PE y modification aintain supplie n (Year) 13	es when les when sting of s Off Yield Bend essential I squeeze s are req es during Duratio	soil restraints is p joints contain defe amples of PE mat Strength efits Rating 19 knowledge and un- off operations. T uired to its working flowstop operation on of Benefits 5 yrs	resent ects erial that have been Residual Risk 1 derstanding via valid his informed positio g practices to ensure s. Prob' of Succes 75%	a subjected to Or dated FEA reg n will then de e that their PE	Squeeze-Off to verall Score 18 garding the termine pipes are safe Project NPV £941,371
Innovation Incremen Expected be of project Potential for achieving expected be	Type ntal mefits	o Explore o Explore o To unde verify the P SD R Mec This projec loads impo- whether an and also m Adoptio 20 Benefits wil	Proximity issu Proximity issu Protake basic te ost Squeeze- lating dium t will provide e sed during PE y modification aintain supplie n (Year) 13 II be realised f	es when les when sting of s Off Yield Bene essential I squeeze s are req es during Duratio	soil restraints is p joints contain defe amples of PE mat Strength efits Rating 19 knowledge and un- off operations. T uired to its working flowstop operation on of Benefits 5 yrs mplementation of	resent ects erial that have been Residual Risk 1 derstanding via valid his informed positio g practices to ensure s. Prob' of Succes 75% the new Policy docu	a subjected to	Squeeze-Off to verall Score 18 garding the termine E pipes are safe Project NPV £941,371
Innovation Incremen Expected be of project Potential for achieving expected be Project Prog	Type ntal mefits nefits yress	o Explore o Explore o To unde verify the P SD R Mec This projec loads impo- whether an and also m Adoptio 20 Benefits will The scope operations. the revised stress level	Proximity issu Proximity issu Proximity issu entake basic te ost Squeeze- lating dium t will provide e sed during PE y modification aintain supplie n (Year) 13 Il be realised f of this stage v Six tests wer delivery times s were higher	es when les when sting of s Off Yield Bend essential I squeeze s are req es during Duratio ollowing i was to rec re original scales. T than exp	soil restraints is p joints contain defe amples of PE mat Strength efits Rating 19 knowledge and un- off operations. T uired to its working flowstop operation on of Benefits 5 yrs mplementation of cord the backgrour ly planned and fro The main conclusion ected.	resent ects erial that have been Residual Risk 1 derstanding via valid his informed positio g practices to ensure is. Prob' of Succes 75% the new Policy docu the new Policy docu	a subjected to Or dated FEA reg n will then de that their PE is P umentation. PE pipes durir uccessfully co dertaken reve	Squeeze-Off to verall Score 18 garding the termine pipes are safe Project NPV £941,371
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Determine me teasoluty of appying specific novel materials to gas distribution that will overcome the scription intar National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so there is a strain the second strain the second strain the second strain strain for the second strain the second strain the second strain strain for the second strain the second strain the second strain strain for the second strain the second strain the second strain strain strain the second strain the second strain the second strain the second strain strain the second strain thesesecon the second strain strain strain strain strain	Letermine the teasoning of appying specific novel materials to gas distribution that will overcome the escription instruction diffuciles associated with reinforcement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement of mains in and around London, so that National Grid can design and construct the mains replacement programme from 2013. Status Submitted escription Corrent FV Corrent FV Expenditure tor Prev FY Total Project Costs Status Submitted external £186,756 £121,138 £00 £766,729 Draft 03005/2013 itatical £221,139 £00 £00 Approved 21/06/2013 itatical £221,139 £130,631 £00 Approved 21/06/2013 itatical £22,637 £130,631 £00 Approved 21/06/2013 itatical £22,637 £130,631 £00 Approved 21/06/2013 itatical £22,637 £130,631 £00 Approved 21/06/2013 itatical £26,676 £100,671 Approved 21/06/2013	roject	n., ·					1	Land of	•	
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aterials £21,133 £0 £0 Final 21/05/2013 btal £226,237 £130,631 £0 Approved Improved Impr	aterials £21,133 £0 £0 Final 21/05/2013 bial £226,237 £130,631 £0 Approved Approved Alignment with IFI/SD 1 Low Carbon Economy Alignment with IFI/SD 1 Low Carbon Economy Strong alignment. Currently there is no practical pipe material to meet the requirements of the London Strategy replacement programme for future years. Strong alignment. In the absence of any innovative material and faced with no alternative, steel would have to be used typically by not trenchless techniques. This would cause major traffic congestion, additional excavation and waste materials Environment Strong alignment. In the absence of any innovative material and faced with no alternative, steel would have to be used typically by not trenchless techniques. This would cause major traffic congestion, additional excavation and waste materials ethological ear / issue For operation O Risk assessments for laying such pipes in close proximity to buildings o Simplified table or matrix specifying building proximity distances associated with PE material by SDRs and PE pipe generation. present range host pipe material and jointing method. Innovation Type SD Rating Benefits Rating Residual Risk Overall Score Significant 25 1 24 project SD Rating Benefits Rating Prob' of Success Pr	xternal	£	2185,756	£12 ⁻	1,138	£	0	786,729	Draft	03/05/2013
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Alignment with IFI/SD 1 Low Carbon Economy 2 Eradicating Fuel Poverty 3 Promoting Energy Savings 4 Safe, Reliable Network 5 Protecting the Environment 5 Protecting the Environment 2 Eradicating fuel coverty 3 Lange diameter pipes other than PE/ST that meet Gas Industry standards and procedures of up to Congestion. additional excavation and waste materials 2 Exploration 0 Nilty to connect the working basis 2 Asing Benefits Environment Decinological Early connect to evisiting gas distribution systems 0 Ability to connect the working basis	Alignment with IFI/SD 1 Low Carbon Economy	otal	£	2226,237	£130	0,631	£	D		Approved	
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Adoption (real) Duration of Benefits Prob of Success Project NFV 2013 18 yrs 75% £847,953 As a result of the physical testing and risk model rerun a revised proximity table has been produced. Case study quantative risk assessments have been undertaken to enable the impact of societal risk to be taken into account. roject Progress The key technical challenge during the year was to obtain information on the resilience of large diameter PE to damage incurred by typical plant as there was little or no actual damages to PE pip >315mm PE from records. Detailed tests were carried out with JCB on 500/630mm PE pipe and have been used to update the PE proximity risk model. The effect of societal risk compared to individual risk has also been addressed on large diameter pipes laid in urban areas. ollab' Partners Provider(s) PB Rune, GL Noble Denton, Radiu	Adoption (real) Duration of Benefits Prob of Success Project NFV 2013 18 yrs 75% £847,953 As a result of the physical testing and risk model rerun a revised proximity table has been produced. Case study quantative risk assessments have been undertaken to enable the impact of societal risk to be taken into account. roject Progress The key technical challenge during the year was to obtain information on the resilience of large diameter PE to damage incurred by typical plant as there was little or no actual damages to PE pip >315mm PE from records. Detailed tests were carried out with JCB on 500/630mm PE pipe and have been used to update the PE proximity risk model. The effect of societal risk compared to individual risk has also been addressed on large diameter pipes laid in urban areas. ollab' Partners Provider(s) PB Rune, GL Noble Denton, Radiu	Innovation Significar spected ber project	Type nt nefits	SD Ra Signifi Develop an waste mater	ating icant alternative to rials in urban	Bene o steel and areas.	fits Rating 25 provide enviror	Resic	l ual Risk 1 efits by rec	O ducing excav	verall Score 24 rations and
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ollab' Partners Provider(s) PB Rune, GL Noble Denton, Radiu	Individual risk has also been addressed of raige dameter pipes late in ubar areas. Provider(s) PB Rune, GL Noble Denton, Radiu	Innovation Significau spected ber project otential for chieving spected ben roject Progr	Type nt nefits nefits ress	SD Ra Signifi Develop an waste mater This support Adoption 201 As a result of produced. Of societal risk The key tech diameter PE >315mm PE	ating alternative to rials in urban ts our Londo n (Year) 13 of the physic Case study of to be taken hnical challe to damage from record	Bene o steel and areas. n strategy. Duratio	fits Rating 25 provide enviror n of Benefits 18 yrs Ind risk model r risk assessmen nt. the year was to y typical plant a d tests were ca	Prob' c Prob' c Prob' c erun a revise s have beer o obtain infor s there was rried out with	f Success f Success 75% ed proximi n undertak mation on little or no	O ducing excav	24 24 Project NPV £847,953 been the impact of ce of large ages to PE pip PE pipe and
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		nnovation Significar spected ber project otential for chieving spected ben roject Progr	Type nt nefits nefits ress	SD Ra Signifi Develop an waste mater This support Adoption 201 As a result of produced. Of societal risk The key tech diameter PE >315mm PE have been u individual risk	ating icant alternative to rials in urban ts our Londo n (Year) 13 of the physic Case study of to be taken hnical challe to damage from record used to upda sk has also b	Bene o steel and areas. n strategy. Duratio al testing a uantative r into accou nge during incurred b ds. Detaile te the PE p been addre	fits Rating 25 provide environ n of Benefits 18 yrs Ind risk model r risk assessmen nt. the year was to y typical plant a d tests were ca proximity risk m ssed on large d	Prob' c Prob'	f Success f Success f Success 75% ed proximi n undertak mation or little or no n JCB on s fect of soo s laid in u PB Rune	O ducing excav s F en to enable the resilience actual dama 500/630mm l cietal risk con rban areas. , GL Noble F	24 24 Project NPV £847,953 been the impact of ce of large ages to PE pip PE pipe and mpared to Denton, Badiu
		Innovation Significan spected ber project otential for chieving spected ben roject Progr	Type nt nefits ress ers	SD Ra Signifi Develop an waste mater This support Adoption 201 As a result of produced. Of societal risk The key tech diameter PE >315mm PE have been u individual ris	ating icant alternative to rials in urban ts our Londo n (Year) 13 of the physic Case study of to be taken hnical challe to damage from record used to upda sk has also b	Bene o steel and areas. n strategy. Duratio al testing a uantative r into accou nge during incurred by ds. Detailed te the PE p been addre	fits Rating 25 provide enviror n of Benefits 18 yrs nd risk model r risk assessmen nt. the year was tc y typical plant a d tests were ca proximity risk m ssed on large d F	Prob' c Prob'	f Success f Success f Success 75% ed proximi n undertak mation or little or no n JCB on s fect of soo s laid in u PB Rune	O ducing excav s F en to enable the resilience actual dama 500/630mm l cietal risk con rban areas. , GL Noble I	24 24 24 Project NPV £847,953 been the impact of 26 of large ages to PE pip PE pipe and mpared to Denton, Radiu
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		nnovation Significa opected ber project stential for hieving pected ben oject Progr	Type nt nefits nefits ress ers	SD Ra Signifi Develop an waste mater This support Adoptior 201 As a result of produced. Of societal risk The key tech diameter PE >315mm PE have been u individual ris	ating icant alternative to rials in urban ts our Londo n (Year) 13 of the physic Case study of to be taken hnical challe to damage from record ised to upda sk has also b	Bene o steel and areas. n strategy. Duratio al testing a uantative r into accou nge during incurred b ds. Detaile te the PE p een addre	fits Rating 25 provide enviror n of Benefits 18 yrs und risk model r risk assessmen nt. the year was to y typical plant a d tests were ca proximity risk m ssed on large d	Prob' c Prob' c Prob' c Prob' c Prob' c Prob' c Prob' c Prob' c Provider (s)	I al Risk 1 efits by red f Success 75% a undertak mation or little or no n JCB on 9 fect of soo s laid in u PB Rune	O ducing excav s F en to enable the resilient actual dama 500/630mm I bietal risk con rban areas. , GL Noble I	verall Score 24 rations and Project NPV £847,953 been the impact of ce of large ages to PE pip PE pipe and mpared to Denton, Radiu
		Innovation Significau xpected ber f project otential for chieving xpected ben roject Progr ollab' Partne	Type nt nefits ress ers	SD Ra Signifi Develop an waste mater This support Adoptior 201 As a result of produced. Of societal risk The key tech diameter PE >315mm PE have been u individual rist	ating icant alternative to rials in urban ts our Londo n (Year) 13 of the physic Case study of to be taken hnical challe to damage from record used to upda sk has also b	Bene o steel and areas. n strategy. Duratio al testing a uantative r into accou nge during incurred by ds. Detaile te the PE p been addre	fits Rating 25 provide environ n of Benefits 18 yrs nd risk model r risk assessmen nt. the year was to y typical plant a d tests were ca proximity risk m ssed on large d F	Prob' of Provider (s)	f Success f Success f Success f Success r5% ed proximi n undertak mation or little or no n JCB on s fect of soc s laid in u PB Rune	O ducing excav s F ducing excav s F ducing excav s F ducing excav s F ducing excav s F ducing excav s F ducing excav	verall Score 24 rations and Project NPV £847,953 been the impact o ce of large ages to PE pip PE pipe and mpared to Denton, Radiu

(IFI52) E	urope	ean Gas	Researcl	h Grou	up (GEI	RG)			
								۲	'ear: 2012/13
Project Description	GERG is increase Distribut	s a cooperatic integrity and tions stream c	on of Europea safety of gas of GERG and	n Gas Uti distributi seeks to g	ilities. Its m on systems gain signific	embers . Natio cant leve	undertake a wide r nal Grid is an active erage by collaborat	range of rese e partner with ing in joint re	arch directed to hin the search projects.
	Expe for Cu	nditure	Expenditu	ire FY	Expendi for Nex	ture t FY	Total Project Costs		Status
Internal		£7,046	£9,	677		£0			Submitted
External		£38,780	£85,	247		£0	£750.000	Draft	02/05/2013
Materials		£0		£0		£0		Final	21/05/2013
Total		£45,826	£94,	924		£0		Approved	
				Ali	ignment w	ith IFI/S	SD.		
✓ 1 Low Ca	rbon	Minor alignn	nent. Develop	oment of I	best of bree	ed meth	ane emission meth	odologies.	
2 Eradica	ting								
3 Promot	ing avings								
✓ 4 Safe, Re Network	eliable	Good Alignn Gas in Soils	nent,. Jointly	funded re	esearch/ sh	aring in	formation on best p	practice NDT	of joints and
5 Protect	ing the nent								
area / issue addressed b project	y	o The dyna o Bench m o Evaluatic o Reducing o Innovativ	amics of gas t arking of met on of nano tec g gas losses a e testing of P	racking in hane emi hnologies as a resul E to defin	n soils ission meth s in gas dis t of operatione the tende	odologie tribution on of the ency for	es i systems e system slow crack growth		
Innovation	Туре	SD Ra	ating	Bene	efits Rating		Residual Risk	0	verall Score
Incremer	ntal	Medi	um		7		-2		9
Expected be of project	nefits	- Improved k concernimg	nowledge in the dynamics	all project of gas tr	t areas. Th acking whe	e Gas iı n dispe	n Soils project will i rsed in soils	nform the bu	siness
		Adoption	n (Year)	Duratio	on of Benef	its	Prob' of Succes	s F	Project NPV
		201	3		0 yrs		25%		-£94,924
Potential for achieving expected be	nefits	Gas in Soils Benefits rem Admissable Significant a uncertainty a	: nain on track. Hydrogen: Idvances have and hence be	e been ma nefits are	ade to unde	erstand deferre	the impacts of hydr	rogen but the	ere remains
Project Prog	iress	Soils: Laboratory of models. Further tests these test in	controlled test s in a open fie Germany du	s have be Id enviror ring 2013	een comple nment have	ted at G been p	GDF Suez offices to	validate ma ations made	thematical to undertake
		Admissable Better under gas turbines	Hydrogen: rstanding of the and resident	ne impact ial appliar	of hydroge nces.	n mixtu	res particularly on (CNG vehicles	s, compressors,
Collab' Partı	ners	Alliander N. Danish Gas DVGW e.V.	V. Technology (Centre,		Prov	vider(s) GDF Sue	ez, GERG	
				Summ	er 2012			natio	nal grid

(IFI52) European Gas Research Group (GERG)

Year: 2012/13

Enagas Energinet Eni S.p.A E.ON Ruhrgas E.ON Gas Storage GmbH Euromot EUTurbines Fluxys Gas Natural Gasum Oy GdF SUEZ Italgas DNV Kema Kiwa Gas Technology Naturgas Energla Group Open Grid Europe Shell Global Solutions International Siemens Energy Sector Snam Rete Gas S.p.A SVGW Statoil ASA Wintershall



(IFI62) Development of DANINT FWAVC software for New Gas Chromatograph

	Exper for Cu	nditure	Expenditu	re -v	Expenditure	Total Projec	t	Status
ternal		£5,783		£0	£0	COSIS		Submittee
ternal		£6,550		£0	£0	£305.0	54 Draf	t 02/05/201
aterials		£13,640		£0	£0	2000,0	Fina	21/05/201
tal		£25,973		£0	£0		Approved	
				Aliç	gnment with IFI	SD		
1 Low Ca Economy	rbon	Minor aligni in fewer vis	ment. Lower ir its to sites.	stallation	and maintenanc	e costs for direct	ed CV measur	ement resultir
2 Eradica Fuel Pove	ting erty							
3 Promot Energy Sa	ing avings							
4 Safe, Ro Network	eliable	Good Align regulatory r	ment. Accurate equirements.	e and relia	able monitoring c	f throughput in a	ccordance with	n Ofgem
	na the	Lower cons	umption of bot	tle gases.				
Environm Environm echnologic ea / issue Idressed b oject	al y	o Site Acc non-directe o To deve term resilier o Develop Processor o	eptance Testin d site. lop and mainta nce testing of t ment of a stan card) and the M	ig of outpi in a labor he develo dard Ofge lodel 500	ut from stage 1 ir atory system tha ped software and compliant App & 700 Danalyze	nstalled at Holfor t replicates the in d approved hardw plication configur	d, a FWACV constalled facilitie vare can be ca ation for the 23	onfigured and s such that lor rried out. 350A (new
5 Protecti Environm echnologic ea / issue ldressed b oject	ient al y	 o Site Acc non-directe o To deve term resilier o Develop Processor o o Specialis ~ DANGO of this, or OC_ ~ Invalid co 1 alarm to b ~ Alternativ ~ omni alar come from, ~ Provide E backward c modbus to of ~ Developm '94 Gross a are included ~ Consider consider conguter a ~ Provision ~ Some wa via DANviei ~ Would likk ~ modul likk 	reptance Testin d site. lop and mainta nce testing of t ment of a stan- card) and the M st Investigation collects zero cc gdata could se mposition valu be generated if es to OC_gdat ms not tied to f consider the g thernet capabi ompatibility) communicate w nent version of nd Detailed ve d with the DAN Windows appr to identify clea different 'cycle s regards RBD of P&T from a y of trapping ill w screen e onscreen ind	ing of outpute he develo dard Ofge lodel 500 is to impro- omposition anse check es should compone a flow streau leneration lity for On change to with omni. GasVLe (rsions. Th INT suite. oach to re rly incorre times' be ? Il streams egal entric	ut from stage 1 ir atory system that ped software and em compliant App & 700 Danalyze ove hardware/sof n with no Danalyze sk data sent to the of separate alar nni(s) as well as o OC_gdata to at (currently not gen lesse need to be a eplace the Notep ect configurations tween chromatop in use on chrom es would be usef at calibration is ir fail (DE douistion	astalled at Holfor t replicates the in d approved hardwind plication configur tware performan er alarm. DANG e flow computer. the flow computer is are outside spectra reams) so difficu m files whilst pre- chromatograph of the enable ether merally released) enabled in the var ad-style configur graph data and the atograph. ul. Config.exe ar	d, a FWACV or installed facilitie vare can be ca ation for the 23 ce: O could be cha (see above po icified alarm ra It to know whe serving backw. iontroller etc (w et modbus/TC has AGA8 cald rious spreadsh ation files or ch nat collected fro at collected fro that collected fro that collected fro	onfigured and s such that lou rried out. 350A (new anged to trap int) – A Syste nge re they have ard compatibil whilst retaining P or serial culations for '9 reet tools, which neck option for om the flow are Ok as inpu-
brotecti Environm echnologic rea / issue ddressed b roject	ent al y	o Site Acc non-directe o To deve term resilier o Develop Processor o o Specialis ~ DANGO o this, or OC_ ~ Invalid co 1 alarm to b ~ Alternativ ~ omni alar come from, ~ Provide E backward c modbus to ~ Developm '94 Gross a are included ~ Consider application ~ Consider application ~ Some wa via DANvier ~ Would lik results if the as a Cal Fa	reptance Testin d site. lop and mainta nce testing of t ment of a stam- card) and the M st Investigation collects zero co gdata could se mposition valu be generated if es to OC_gdat ms not tied to consider the g thernet capabi ompatibility) communicate w nent version of nd Detailed ve d with the DAN Windows appr to identify clea different 'cycle s regards RBD of P&T from a y of trapping ill w screen e onscreen ind e cal fails. Cou ill in the DANIN	in a labor he develo dard Ofge lodel 500 is to impro- omposition ense chece es should compone a ilow streau jeneration lity for On change to with omni. GasVLe (rsions. Th INT suite. oach to re rly incorre times' be ? Il streams egal entrice ication tha It window	ut from stage 1 ir atory system that ped software and em compliant App & 700 Danalyze by hardware/soft n with no Danalyze chardware/soft n with no Danalyze chardware/soft n with no Danalyze chardware/soft not be sent to the not be sent to the not be sent to the ent concentrations in (Danalyzer st not (Danalyzer st of separate alar not(s) as well as of C_gdata to at conc_gdata to at conc_gdata to at concentrations there need to be a eplace the Notep ect configurations tween chromato is in use on chrom es would be usef at calibration is ir fail (RF deviatio v (this is a chang	nstalled at Holfor t replicates the in d approved hards plication configur tware performan zer alarm. DANG e flow computer is are outside spe reams) so difficu m files whilst pre chromatograph o ble enable ethern herally released) enabled in the val ad-style configur graph data and the atograph. ul. Config.exe ar h progress and p n alarm in the 23 e to DANview)	d, a FWACV constalled facilitie vare can be ca ation for the 23 ce: O could be cha (see above po cified alarm ra It to know whe serving backw. controller etc (w et modbus/TC has AGA8 cald rious spreadsh ation files or ch hat collected fro that collected fro that collected fro that collected fro that collected fro that controller)	onfigured and s such that loo rried out. 50A (new anged to trap int) – A Syste nge re they have ard compatibil whilst retaining P or serial culations for '9 eet tools, which neck option for om the flow are Ok as inpu- hat gives the be interpreter

(IFI62) Develo Chromatogra	pment of DANIN	T FWAVC soft	ware for N	lew Gas					
j					Year: 2012/13				
Expected benefits of project	 Environmental benefits pollution from vehicles h If this solution is approve Model 700 solution will b of injecting other gas sou This project is being fun Transmission. This prove 	via less visits to site b owever, it is very diffic ed by Ofgem there will be more cost effective t urces. Inded equally between vides a good leverage	by operational st ult to quantify th be two solutions that the Model 5 the Gas Distribu- ratio of 1:5 for each	aff will obviously e benefit. s available for O 00, and will also ition operators a ach funding part	r contribute to less perators to use. This enhance the viability and National Grid icipant.				
	Adoption (Year)	Duration of Benefi	ts Prob' o	f Success	Project NPV				
	2016	5 yrs	Ę	50%	-£89,622				
Potential for achieving expected benefits	The anticipated output w	ill be environmental im	provements and	d network perfor	mance.				
Project Progress	Stage 2 commenced in C DANINT 12C and 12D so	January 2013. The out oftware and additional	put of which will configuration re	be: Resilience 7 quirements.	Testing of the new				
Collab' Partners	NGN, SGN, WWU, National Grid Provider(s) Energy Innovation Centre, GL Noble Transmission Denton								

(IFI63) P	E Ass	set Life F	leseach						
								١	'ear: 2012/13
roject escription	To deve existing life of th	lop methodol PE network, i e PE network	ogies, techniqu dentifies poter and identifies	ues and c ntial threa possible	decision suppo ats to the integ strategies and	rt tools rity of F I policie	that establish the pipes and join the pipes and join the pipes and solution the pipes and solution the pipe soluting sol	ne current co nts, assesses eplacement.	ndition of the s the residual
	Expe	nditure	Expenditu	re	Expenditure	; ;	Total Project	-	Status
nternal		£36,395	£26,5	566	£53,12	29	Cosis		Submitted
xternal	5	2300,312	£217,	766	£295,59	98	£1,340,948	Draft	02/05/2013
aterials		£1,270	£12,9	987	5	20		Final	21/05/2013
otal	5	2337,977	£257,:	319	£348,72	27		Approved	
_				Ali	gnment with	IFI/SD			
1 Low Ca Economy	rbon	Strong align of 50years. avoiding ma	ment. The avo The work is ex jor constructio	oidance o pected to on activity	f wholesale PE o allow asset li ⁷ .	E replace fe to be	ement in future extended for m	years based any decades	on design life thereby
2 Eradica Fuel Pove	iting erty								
[]] 3 Promot Energy S	ing avings								
4 Safe, Re Network	eliable	Strong align allow condit undertaken.	ment. The prir ion assessme This may lead	ncipal obj nt and ris d to targe	ectives of this k managemen ted replaceme	work a t of PE nt whei	re to provide too mains and serv re risk dictates.	ls and methorice assets to	odologies to be
5 Protect	ing the nent								
ddressed b roject	у	coupons). o Developi assessment o Introduci of pipes and o Developi systems.	nent of chemic and residual I ng new test m I joints. ng a PE mater	cal and p life predic ethods to rials data	hysical charac ction from sma qualify the lor base and softw	terisatio II samp ng term vare too	on methods of d les. service perform ols for predicting	letermining c nance of reco g the residual	ondition wered sections life of PE
Innovation	Туре	SD Ra	ating	Bene	fits Rating		Residual Risk	0	verall Score
Significa	ant	Signif	icant		25		2		23
xpected be f project	enefits	- New test n new PE pro confidence	nethods for PE ducts. Unders as is currently	integrity standing t the case	and life that n he risks posed for metallic ma	nay be I by the ains.	used to provide PE asset to at	improved tes least the sam	sts to specify ne level of
		Adoption	n (Year)	Duratio	n of Benefits	Р	rob' of Succes	s F	Project NPV
		201	4		10 yrs		50%		£131,204
otential for chieving xpected be	nefits	Benefits ren material has types.	nain on track. a long life an	General of the foc	confidence has us of the projec	s grown ct shifts	that in general towards joints	the early Ald and/or specif	yl A PE ic material
roject Prog	jress	Conducted a - Statistical - Definition of - Impact of s - Compatibil - Accelerate	a review of ava analysis of fail of sample extra squeeze off on ity of early and d deterioration	ailable tes lures, lea action pro n early PE d modern n testing	sts and the dev k data ogramme materials materials	velopme	ent of novel test	s:	
		Obtaining o	oportunistic sa	imples as	and when PE	pipes a	are cut out has l	been a challe	enge.
ollab' Partı	ners	SGN				Provid	er(s) MACAW	, Radius	
				Summ	er 2012			natio	nal grid

(IFI67) P	ipelin	e Indust	ry Researc	ch C	lub [PIR	C]			
Project Description	Assessr	nent, preventi	on and investiga	ation of	PE threats a	nd opj	portunities via colla	۲ aborative res	ear: 2012/13
	Exper for Cu	nditure rrent FY	Expenditure for Prev' FY	,	Expenditu for Next F	re Y	Total Project Costs		Status Submitted
Internal		£1,593	£4,54	8		£0			
External		£10,000	£10,00	0	£4,	167	£170,000	Draft	02/05/2013
Materials		£0	£	0		£0		Final	21/05/2013
Total		11,593 ±14,548 ±4,16/							
_		[Ali	gnment with	IFI/S	D		
_ 1 Low Ca Economy	rbon								
2 Eradica Fuel Pove	ting erty								
☐ 3 Promot Energy S	ing avings								
✓ 4 Safe, Re Network	eliable	PIRC under pipes. The g with other 8	akes jointly func roup also provic other Water Cor	ded pip les opp mpanie	eline researc oortunities for es	h to m sharir	itigate issues and ng information on b	risks associa best practice	ated with PE and incidents
5 Protecti Environm	ing the ient								
addressed b project	у	o Built Fusi sacrificing q savings to th o Coil Strai rounding coi joint quality ; o Rehabilit Rolldown, S o NDT of ft NDT results reliable reas 5) Large Dia ends) are ex- prevent prob Year 2: In Year 2 the o Harnessi o Microway o Butt Fusi o Coil Strai o Conditior o New Tec	on weighing usin uality, in collabo ne Industry. ghtener a modu led pipe in the p and safety for re ation Guidance a wagelining and f usion joints - est obtained from th surance. ameter EF Coup caggerated in lar obtems occurring e following proje- ing Standards to re NDT of PE BF on Welding of P of Electrofusion ghtener n Assessment of hnology Awaren	Ig force ration v lar unit roccess latively a critic: Polyfle: ablishr he field olers (> ger dia in the f cts will Optim F and E Fittings f Large ess	with equipme with equipme with equipme with equipme with can be low cost. al assessmer x, with practic nent of specific with mechar 630mm) Vari meter fittings ield. progress/cor ise Procurem EF Joints Diameter Iro	educe nt mar e attac venefit it of va al gui ic pas ical te ous jo . Exov ntinue:	hufacturers, thereb ched to a coil traile s would be signific arious rehabilitation dance and advice soffailure criteria fo esting where appro- inting issues (inclu- va conduct approva	r straightenin ant improver n techniques, to minimize a r the welds b priate, ultima ding Reversi al testing and	and without rery real cost ag and re- ment in both including avoidable risks. y correlation of titely providing on of pipe analysis to
Innovation	Туре	SD Ra	iting	Bene	fits Rating		Residual Risk	0	verall Score
Incremer	ntal	Medi	um		13		-7		20
Expected be of project	nefits	Improved sy The primary integrity of F actively eng	stem integrity. benefit from this PE pipes and der aged at an Indus	s progr monstr stry lev	amme is colla ate to the HS el.	aborat E and	ion on projects tha other stakeholder	t will help to s that Nation	maintain the al Grid is
		Significant re	esearch leverage	e bene	fits.				
				Summ	er 2012			natio	nal grid

(IFI67) Pipeline Industry Research Club [PIRC]									
	Adoption (Year)	Duration of Benefits	s Prol	o' of Success	Year: 2012/13 Project NPV				
	2014	8 yrs		25%	£36,405				
Potential for achieving expected benefits	Benefits as stated. This remains high based on the successful work delivered to date.								
Project Progress	NDT of fusion joints: Further field trials and sit refined the specific pass, work now is look at maki Core & Vac Evaluation of the Core & with a laser pipe profiler. size. New Product Developmen Development of a new ty during electrofusion of a From the work programm test IGN items have bee	te audits have taken pla /failure criteria following ng the equipment intrins Vac technique to fit a r This could result in sign ope of shear mixing clan PE joint. The aim of this ne for Year 2, the coil s n completed pending th	ce within th destructive sically safe repair clamp ificant ben p to promo s work is to traightener e final outpo	e Water Industry testing of welds for deployment in o using long hand efits mainly due the better molecu enhance joint qu site trial and sec ut. All other item	 A. This has further The main focus of the n the Gas Industry. dle tooling in conjunction to reduced excavation alar mixing of molten PE ality. cond issue of pressure are in progress and 				
Collab' Partners	are expected to deliver in United Utilities, Thames Trent Water, Yorkshire V Northern Ireland Water, Bristol Water, Sutton and & Northumbrian Water. The current membership confirmed but is likely to	h line with their anticipat Water, Severn Vater, Veolia Water, South West Water, d East Surrey Water for 10/11 is to be exceed 8.	ed timeline Provider(s. s) EXOVA Poly	/mer				

-						Y	'ear: 2012/13			
roject escription	To deve to mode systems	lop enhancements and efficiency improvements to the model maintenance applications that are used and analyse gas distribution systems with the aim to enable better integration with the business s proposed under the GDFO programme.								
	Expe for Cu	nditure Irrent FY	Expenditure for Prev' FY	Expenditure for Next FY	Total Project Costs		Status			
nternal		£10,678	£6,515	£0			Submitted			
xternal		£43,479	£54,621	£0	£151,508	Draft	02/05/2013			
aterials		£0	£0	£0		Final	21/05/2013			
otal		£54,157	£61,136	£0		Approved				
				Alignment with IF	/SD					
1 Low Ca	rbon									
2 Eradica Fuel Pove	iting erty	Good Aligni decisions fo models and customers.	ment. The network or the business, the reality removing th	analysis models are swifter updates will r e probability of loss o	used to make operati emove the potential c of supply and thus pro	ional and str lisparity betv tecting vene	ategic veen the erable			
3 Promot Energy Sa	ing avings									
4 Safe, Ro Network	eliable	Good Alignment. The network analysis models are used to make operational and strategic decisions for the business, the swifter updates will remove the potential disparity between the models and reality removing the probability of loss of supply and ensuring that these models align reality.								
5 Protecti Environm	ing the nent									
echnologic rea / issue ddressed b roject	eal Dy	 New GB Develop Develop New Pip New upc New Upc Prototyp 	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie late functionality for date the underlying e Export to ArcFM	e & Update functiona ovides the ability to in ovide the ability to 'du ed From GIS r the underlying GBN GBNA network files Designer	lity ndependently process rag and drop' node nu A network files to holo to hold the unique GIS	pipe attribut mbers d the PON/A S Node IDs.	te changes sset ID.			
echnologic rea / issue ddressed b roject Innovation	al Py Type	o New GB o Develop o Develop o New Pip o New upo o New Upo o Prototyp	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie date functionality foi date the underlying e Export to ArcFM ating	e & Update functiona ovides the ability to in ovide the ability to 'du ed From GIS the underlying GBN GBNA network files Designer	lity ndependently process ag and drop' node nu A network files to hold to hold the unique GIS Residual Risk	pipe attribut mbers d the PON/A S Node IDs.	te changes sset ID. verall Score			
echnologic rea / issue ddressed b roject Innovation	xal by Type ntal	o New GB o Develop o Develop o New Pip o New upo o New Upo o Prototyp SD Ra	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie date functionality for date the underlying e Export to ArcFM ating E ium	e & Update functiona ovides the ability to in ovide the ability to 'du ed From GIS the underlying GBN GBNA network files Designer tenefits Rating 12	lity adependently process rag and drop' node nu A network files to hold to hold the unique GIS Residual Risk 2	pipe attribut mbers d the PON/A S Node IDs. Or	te changes sset ID. verall Score 10			
echnologic rea / issue ddressed b roject Innovation Incremer xpected be f project	al by Type ntal enefits	o New GB o Develop o Develop o New Pip o New Upo o Prototyp SD R Med	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie date functionality for date the underlying e Export to ArcFM ating E ium E ed enhancements v ich in turn will reduce an expected incre	e & Update functiona ovides the ability to in ovide the ability to or ovide the ability to or or de From GIS the underlying GBN GBNA network files Designer tenefits Rating 12 vill greatly reduce the ce the potential for er ase in both efficient w	lity adependently process ag and drop' node nu A network files to hok to hold the unique GIS Residual Risk 2 manual effort require rors occurring in the r vorking and quality of	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network	te changes sset ID. verall Score 10 in and update els. Therefore models.			
echnologic ea / issue dressed b roject Innovation Incremer xpected be i project	al vy Type ntal enefits	o New GB o Develop o Develop o New Pip o New upo o Prototyp SD R Med The propos models, wh there will be	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie late functionality for date the underlying e Export to ArcFM ating E ium E ed enhancements v ich in turn will reduce an expected incre	e & Update functiona ovides the ability to ir ovide the ability to 'de de From GIS the underlying GBN GBNA network files Designer tenefits Rating 12 vill greatly reduce the se the potential for er ase in both efficient v ation of Benefits	lity Independently process ag and drop' node nu A network files to hold to hold the unique GIS Residual Risk 2 manual effort require rors occurring in the r vorking and quality of Prob' of Success	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network	te changes sset ID. verall Score 10 in and update els. Therefore models. Project NPV			
echnologic rea / issue Idressed b roject	al by Type ntal enefits	o New GB o Develop o Develop o New Pip o New Upo o Prototyp SD R Med The propos models, wh there will be Adoption	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie date functionality for date the underlying e Export to ArcFM ating E ium Ed enhancements we ich in turn will reduce an expected incre n (Year) Dur 14	e & Update functiona ovides the ability to in ovide the ability to 'du ed From GIS the underlying GBN GBNA network files Designer tenefits Rating 12 vill greatly reduce the ce the potential for er asse in both efficient v ation of Benefits 3 yrs	lity independently process rag and drop' node nu A network files to hold to hold the unique GIS Residual Risk 2 e manual effort require rors occurring in the r vorking and quality of Prob' of Success 75%	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network s P	te changes sset ID. verall Score 10 in and update els. Therefore models. Project NPV £1,341,533			
echnologic rea / issue ddressed b roject Innovation Incremen xpected be f project otential for chieving xpected be	ry Type Intal enefits	 New GB Develop Develop New Pip New Upo New Upo Prototyp SD R: Med The propose models, wh there will be Adoption 20 o Vital cha o Avoidane o Reduction	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie date functionality for date the underlying e Export to ArcFM ating E ium E ed enhancements v ich in turn will reduce an expected incre n (Year) Dur 14 Dur 14 Dur the presented to ce of unnecessary of on in time spent upon	e & Update functiona ovides the ability to ir ovide the ability to 'due ed From GIS • the underlying GBN GBNA network files Designer • the underlying GBN 12 • the user for ential for er ase in both efficient v ation of Benefits 3 yrs • the user for quick de wasted effort in cross dating models.	lity independently process rag and drop' node nu A network files to hold to hold the unique GIS Residual Risk 2 manual effort require rors occurring in the r vorking and quality of Prob' of Success 75% cision making checking data within	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network s P	te changes sset ID. verall Score 10 in and update els. Therefore models. Project NPV £1,341,533 hance model.			
echnologic rea / issue ddressed b roject Innovation Incremer xpected be f project otential for chieving xpected be roject Prog	Type Type ntal enefits gress	 New GB Develop Develop New Pip New Upo New Upo Prototyp SD Ray Med The propose models, where will be Adoption 20 O Vital charao O Vital charao O Avoidance Software was improvementation Software was improvementation Software was <td>NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie date functionality for date the underlying e Export to ArcFM ating E ium E ed enhancements with an expected incre n (Year) Dur 14 Dur 14 Dur as successfully dep nts such as an implication</td> <td>e & Update functiona ovides the ability to ir ovide the ability to 'du ed From GIS • the underlying GBN GBNA network files Designer • the underlying GBN 12 • the userfise Rating 12 • the potential for er ase in both efficient v ation of Benefits 3 yrs • the user for quick de wasted effort in cross dating models. • loyed during 2012 wi oved approach to ha</td> <td>lity Independently process ag and drop' node nu A network files to hold to hold the unique GIS Residual Risk 2 manual effort require rors occurring in the r vorking and quality of Prob' of Success 75% cision making checking data within hich provided user pro ndling negative/positi tomatically associate</td> <td>pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network s P s the mainten press and pervention ve node num nodes with a</td> <td>te changes sset ID. verall Score 10 in and update els. Therefore models. Project NPV £1,341,533 hance model. erformance hber changes an LFZ.</td>	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie date functionality for date the underlying e Export to ArcFM ating E ium E ed enhancements with an expected incre n (Year) Dur 14 Dur 14 Dur as successfully dep nts such as an implication	e & Update functiona ovides the ability to ir ovide the ability to 'du ed From GIS • the underlying GBN GBNA network files Designer • the underlying GBN 12 • the userfise Rating 12 • the potential for er ase in both efficient v ation of Benefits 3 yrs • the user for quick de wasted effort in cross dating models. • loyed during 2012 wi oved approach to ha	lity Independently process ag and drop' node nu A network files to hold to hold the unique GIS Residual Risk 2 manual effort require rors occurring in the r vorking and quality of Prob' of Success 75% cision making checking data within hich provided user pro ndling negative/positi tomatically associate	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network s P s the mainten press and pervention ve node num nodes with a	te changes sset ID. verall Score 10 in and update els. Therefore models. Project NPV £1,341,533 hance model. erformance hber changes an LFZ.			
Innovation Innovation Incremer Expected be of project	Type ntal enefits gress	 New GB Develop Develop New Pip New Upo New Upo Prototyp SD R: Med The propos models, wh there will be address of the propos models, wh there will be address of the proposed of the propose	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie late functionality for date the underlying e Export to ArcFM ating E ium Ed enhancements we ich in turn will reduce an expected incre n (Year) Dur 14 Dur 14 Dur 14 Dur 14 Dur 14 Dur 14 Dur 14 Dur 14 Dur 15 successfully dep pts successfully dep	e & Update functiona ovides the ability to ir ovides the ability to id ed From GIS the underlying GBN GBNA network files Designer tenefits Rating 12 vill greatly reduce the cethe potential for er ase in both efficient v ation of Benefits 3 yrs the user for quick de wasted effort in cross lating models.	lity Independently process In ag and drop' node nu A network files to hold to hold the unique GIS International effort require rors occurring in the r vorking and quality of International effort Success 75% Cision making checking data within Inich provided user pro ndling negative/positi	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network s P s the mainten secess and per ye node num	te changes sset ID. verall Score 10 in and updat els. Therefo models. Project NPV £1,341,533 hance model			
echnologic rea / issue ddressed b roject Innovation Incremer xpected be f project 'otential for chieving xpected be 'roject Prog	al by Type ntal enefits gress ners	 New GB Develop Develop New Pip New upc New upc New Upo Prototyp SD R: Med The propos models, wh there will be Adoption 20 o Vital cha o Avoidano o Reductic Software was improvementianed source	NA/LINAS Compar a prototype that pr a prototype that pr e Attributes Supplie late functionality for date the underlying e Export to ArcFM ating E ium ed enhancements v ich in turn will reduce an expected incre n (Year) Dur 14 Dur 14 Dur as successfully dep nts such as an implichange information	e & Update functiona ovides the ability to in ovide the ability to 'de ed From GIS the underlying GBN GBNA network files Designer 12 vill greatly reduce the te the potential for er ase in both efficient w ation of Benefits 3 yrs the user for quick de wasted effort in cross dating models. loyed during 2012 will oved approach to ha a and the ability to au	lity Independently process ag and drop' node nu A network files to hold to hold the unique GIS Residual Risk 2 Residual Risk 2 manual effort require rors occurring in the r vorking and quality of Prob' of Success 75% Cision making checking data within hich provided user pro ndling negative/positi- tomatically associate ovider(s) GL Noble	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network s P f the mainten pocess and pervention ve node num nodes with a Denton	te changes sset ID. verall Score 10 in and update els. Therefor models. Project NPV £1,341,533 hance model. erformance nber changes an LFZ.			
echnologic rea / issue ddressed b roject Innovation Incremer Expected be f project Potential for chieving xpected be Project Prog Collab' Partr	al yy Type ntal enefits gress ners	 New GB Develop Develop New Pip New Upo New Upo Prototyp SD Ri Med The proposide proposide the proposide set of the proposide set o	NA/LINAS Compar a prototype that pr e a prototype that pr e Attributes Supplie late functionality for date the underlying e Export to ArcFM ating E ium ed enhancements we ich in turn will reduce an expected incre n (Year) Dur 14 Dur 14 Dur as successfully dep nts such as an imprichange information	e & Update functiona ovides the ability to ir ovides the ability to id ovide the ability to 'd ed From GIS the underlying GBN GBNA network files Designer tenefits Rating 12 vill greatly reduce the ce the potential for er ase in both efficient v ation of Benefits 3 yrs the user for quick de wasted effort in cross lating models. loyed during 2012 wh oved approach to ha a and the ability to au	lity Independently process In a g and drop' node nu A network files to hold to hold the unique GIS Intervention and a state of the end of the unique GIS Intervention and a state of the end of the en	pipe attribut mbers d the PON/A S Node IDs. Or ed to maintai network mod the network s P the mainten ocess and pervention ve node num nodes with a	te changes sset ID. verall Score 10 in and update els. Thereford models. Project NPV £1,341,533 hance model. erformance nber changes an LFZ.			

(IFI69) C	apaci	ity Enhar	cement	s Usin	g Compr	ess	sion			
								•	Year: 2012/13	
Project Description	To demo demand	onstrate the fe I, and hence to	asibility of the maximise th	e use of c le capacit	compression to y for biometha	pum ane in	np gas into higher p njection into the gas	oressure tier s networks	s at times of low	
L	Exper for Cu	nditure	Expenditu	ire FY	Expenditur	e v	Total Project		Status	
Internal		£7,793	£23,	238		£0	00313		Submitted	
External		£67,756	£87,	500		£0	C401 520	Draft	02/05/2013	
Materials		£2,714 £0 £0		Final	21/05/2013					
Total		£78,263	£110,	738		£0		Approved		
					anment with	IFI/S	D			
✓ 1 Low Car	rbon	Successful i	ntegration of	compress	sion into the a	as ne	twork at strategic lo	ocations will	enable GDNs	
Economy		to accept bio	omethane into	their net	works at many	y mor	re locations than at	present, as	capacity is	
2 Eradicat	tina	UITER CONSTR	amed by the i	ack of yea		uema				
Fuel Pove	erty									
3 Promoti Energy Sa	ng avings									
✓ 4 Safe, Re Network	eliable	The introduc networks, ar	The introduction of biomethane at a multiplicity of locations will provide additional resilience for gas networks, and also facilitate the long-term continued use of all gas networks							
✓ 5 Protecti Environm	ng the ent	The additional quantities of biomethane injection that will be facilitated by the development of intra- network compression will reduce the proportion of fossil gas in the gas network and hence reduce greenhouse gas emissions from gas utilisation								
area / issue addressed by project	у	 Confirm, by means of simulation model, the steady-state and transient operating characteristic a compressor installed at a PRS to pump gas from one pressure tier to a higher tier. Quantify operational constraints, gas flow metrics, site and equipment pressure settings, safe operating envelopes, consequences of breaching limits Review and quantify plant performance characteristics, reaction times, and start-up/shut-down reliabilities Derive site or network-specific sensitivities to clarify key considerations when designing explic site requirements Define the technical, commercial and regulatory requirements for a field trial project. 						tings, safe p/shut-down gning explicit ct.		
Innovation	Туре	SD Ra	ting	Bene	fits Rating		Residual Risk	C	verall Score	
Substituti	on	Signifi	cant		13		-4		17	
Expected ber of project	nefits	 The output will provide significant knowledge benefits for the funding parties via firstly the development and testing of the Simulation Model (to be owned by National Grid and NGN) and then subsequently via the design and testing from the field trial installation. It is estimated that compression could be required in relation to around 40% of potential biomethane injection sites, which would otherwise not connect to the gas network. Additional biomethane injection should enhance the resilience of the gas network, and secure its long-term future in an environment when there will be increasing pressure to reduce the use of fossil gas. It is difficult to quantify the environment benefit here given that installation and injections rates may vary from site to site and it is also difficult to predict the number of connections that may be requested in the future. 								
		the funding t	to parties to re	espond a	ccordingly with	nin the	e appropriate stanc	lards of serv	vice.	
		Adoption	(Year)	Duratio	n of Benefits		Prob' of Success	s I	Project NPV	
Potential for achieving		Z01 Knowledge k	oenefits have	been rea	lised.		10%		-2000,191	
expected ber Project Prog	netits ress	The project i	s a collabora	tion betwe	een NGN, NG	G and	d CNG Services. F	Progress this	s year:	
				Summ	er 2012			natic	onal grid	

(IFI69) Capad	city Enhancements	Using Compression				
			Year: 2012/13			
	 Completion of site instal Completion of network to with results confirming there Completion of a simulate operational functionality of to Validation of the comput 	lation of all components specified in rials to test the safety and security e is no additional risk to the network d biomethane grid injection pilot tri- the equipment ter model in respect of steady state	n the design of supply functions of the equipment, k or connected consumers. al to successfully prove the conditions and transient flows			
The output from this project will influence how we provide a bio-methane connection se user and with full adoption of the knowledge will be incorporated into our business durir months.						
Collab' Partners	NGN	Provider(s)	CNG Services, NGN			

Project Description	To deve intermed	evelop an integrated packaged solution to allow bio-methane producers to connect to the network in the mediate, medium and high pressure tiers.									
	Expe for Cu	nditure Irrent FY	Expenditure for Prev' F	e Expenditure for Next FY	Total Project Costs		Status Submitted				
nternal		£52,287	£9,30)1 £54,38	36						
xternal	£	2153,148	£77,0	74 £164,82	£799,143	Draft	03/05/2013				
laterials	£	237,924	1	£0 £50,20	00	Final	21/05/2013				
otal	£	2443,359	£86,3	75 £269,40	99	Approved					
				Alignment with I	FI/SD						
] 1 Low Ca Economy	rbon										
2 Eradica Fuel Pove	ting erty										
3 Promot Energy S	ing avings										
4 Safe, Re Network	eliable	Good Alignment. Bio-methane is a renewable energy that cuts the dependency on fossil fin helping to ensure security of supply for the future whilst using and thus sustaining the exist energy infrastructure.									
5 Protecti Environm	ing the Strong Alignment. The project forms a fundamental part of National Grid's target to integ sources of renewable gas into the network, which will thus contribute towards the UK gov target of 15% of the UK's energy to be from renewable sources by 2020						ntegrate government				
echnologic rea / issue ddressed b roject	al Y	o Greater o It is pos meets exist	process integrat sible that new ec ing standards, C	ion leading to a more a quipment may be incor GS(M)R, and National (streamlined approach. porated into the packa Grid engineering polici	ged solution es.	providing that				
Innovation	Туре	SD R	ating	Benefits Rating	Residual Risk	0	verall Score				
Incremer	ntal	Mec	lium	9	-1		10				
xpected be f project	enefits	Essential knowledge to modularise the connection and installation process for a bio-methane connection.									
		Adoptio	n (Year)	Duration of Benefits	Prob' of Succes	s F	Project NPV				
		20	13	0 yrs	50%		-£753,505				
Potential for achieving expected be	nefits	The continu demonstrat barriers to e efficiencies that have h the Intellec: 3rd party ov designs for	ued progression es National Gric entry for custom in delivering the ad there designs tual Property rite wnership model assurance.	of establishing a frame 's support of renewabl ers. The Stockport pro innovation of package appraised by Nationa s to such designs and where National Grid wi	ework for Bio Methane e gas connections and oject will offer opportur ed skid designs to cust I Grid for use on the F this has enabled the r II be afforded the oppo	Injection faci I the focus or ities to demo comers. Tho ramework ha narket to dev ortunity to rev	lity contracts removing nstrate the se companies ve maintained elop towards a iew such				
Project Prog	iress	The project framework agreement	has seen comp agreement has l in conjunction w	letion of stage 1 and n been used and the first ith the framework cont	nove into Stage 2 durir t company has been is ract process	ng this year. T sued such co	The developed				
		The packag factory and surrounding is expected	ged Solution has the factory build control philoso that the solution	progressed to the point process has started workies. The civils design will be completed in t	nt of all long lead items vith some design clarif ns and telemetry desig he Summer 2014.	s have been i ications still b ins have bee	received at being required n completed. I				
					Provider(c) GL Nobl	e Denton Te	abaiaa				
Collab' Partr	ners					e Benton, Te	chnica				

(IFI71) C	ured-	in-Place	and Poly	/ureth	ane Spray	/ Li	nings >12"	,		
								Y	'ear: 2012/13	
Project Description	The over repair/re approva- testing of quality c	rall aim is to demonstrate that CIP and PU spray linings are 'fit for purpose' as a permanent ehabilitation technique for gas distribution mains, so supporting future Health and Safety Executive I for the techniques as an alternative to pipeline replacement. This will include conducting mechanical on linings, laboratory and site trials and auditing of installation practicalities, quality assurance and control procedures.								
	Exper	nditure	Expenditure		Expenditure		Total Project		Status	
	for Cu	rrent FY £10 917	for Prev' F	=Y 829	for Next FY	n	Costs		Submitted	
Internal		£89.565	£36.0	098	£	0 0		Draft	02/05/2013	
External		£0		£0	£	0	£261,559	Final	21/05/2013	
Total	ç	100.482	£38.9	927		- D		Approved		
lotai		.100,102	200,0							
	rhon	Strong align	mont Utilisati	All on of thin	gnment with IF		or PE that are e	acier to trans	port and install	
Economy		Strong align			ner wan solution	15 00			port and install	
2 Eradica	ting									
	erty									
Energy S	avings									
✓ 4 Safe, R Network	eliable	Strong alignment. Leads to a significant improvement in large diameter replacement								
✓ 5 Protect Environn	ing the nent	Strong alignment. Reduction in excavation due to reduced pipe entries and ability to replace longer lengths.								
Technologic area / issue addressed b project	cal Dy	 Development of lining technologies that are able to withstand pipe fracture and provide a sy that enables the carrier pipe to be deemed 'permanently replaced' Development of liner thickness measurement devices Development of technologies to transport and/or deliver product in long lengths of buried pipe to be deemed by the second se						ovide a system buried pipe		
Innovation	Туре	SD Ra	iting	Benet	fits Rating		Residual Risk	O	verall Score	
Increme	ntal	Signifi	cant		7		0		7	
Expected be of project	enefits	- This initial business of	stage of this p the potential b	project is t penefits.	o validate the p	proof	of concept which	will also will	inform the	
		Adoption	ı (Year)	Duration	n of Benefits		Prob' of Succes	s P	Project NPV	
		201	3		0 yrs		25%		-£261,559	
Potential for achieving expected be	nefits	During Stag following wo Set up a s Review ar Write a pe Industry. Ensure th deployed sy Develop C Undertake Auditing	e 1 of this proj rk elements w steering group nd assessmen erformance sp at a thorough stems. CIP and PU pr e trials and tes	iect it is a rould be re that will p to f availa ecification evaluation oducts as sting of pre	nticipated that i equired: brovide clear gu able and/or eme n and best prac n and framewor s required. oducts.	n orc uidan erging tice (der to achieve the ce of project prog g CIP and PU lini guide for both CIF ethod for assessin	e expected be gress. ng technolog P and PU linir ng the relative	enefits, the ies. ngs in the Gas e risk of	
Project Prog	gress	The project	outputs are:							
		 Performan February 20 Performan February 20 Best prac 	nce Specificat 13; nce Specificat 13; tice guide for r	ion for Re ion for Re renovation	enovation of Gas enovation of Gas n of gas mains i	s Ma s Ma usinę	ins with a Cured- ins with an In Siti g cured-in-place li	in-Place Line u Spray Linin iners and spr	er, UC9191.04, g, UC9240.03, ay lining,	
				Summe	er 2012			natio	nal grid	

(IFI71) Cured-	in-Place and Polyurethane Spray	Linings >12"
		Year: 2012/13
	UC9239.02, February 2013, and; • Use of Cured-in-Place and Polyurethane Spray I Gas Mains, Final Report, UC8972.03, February 20	inings for Permanent Repair of Large Diameter 13.
	The duration of the Stage 1 project was extended b review and comment on the CIP liner and PU spray	by two months to allow lining manufacturers to Ining performance specifications.
	The outputs from Stage 1 provide a solid platform of manufacturers and material suppliers to start the di purpose' for use within the UK gas industry. Therefis progressed forward to Stage 2, which would test under controlled conditions, a range of available Cl generic approach as 'fit for purpose' as a rehabilitation.	on which to progress to Stage 2, allowing evelopment of lining solutions that will be 'fit for ore, the lead GDN has proposed that this project and validate against these Stage 1 documents, P lining solutions with the goal of establishing the tion technique for iron gas mains up to 2 bar.
	It is anticipated that the CIP performance specifica this stage, and that the tests may identify a develop acceptance. Furthermore, the test programme will liner, and installation practice together with the eva activities (e.g. flow stopping, connections, jointing a	tion and best practice guide will be refined during oment gap for certain technologies ahead of their look to embrace the lining materials, the installed luation of a range of routine maintenance and repair).
Collab' Partners	NGN, SGN, WWU	rovider(s) WRc
	Summer 2012	national grid

(IFI75) In	nprov	ed Diurr	nal Storaç	ge Re	quireme	nts	Modelling	Ŷ	' ear: 2012/13	
Project Description	ldentify storage	and consider the application of new modelling techniques and methodologies for predicting diurnal needs for the Gas Distribution Networks to support both investment and operational planning activities.								
I	Expe	nditure	Expenditu	re	Expenditu	ire	Total Project		Status	
Internal		£3,944	£3,4	466	IOI NEXLI	£0	COSIS		Submitted	
External		£10,833	£10,8	833		£0	£65.000	Draft	02/05/2013	
Materials		£0		£0		£0	200,000	Final	21/05/2013	
Total		£14,777	£14,2	299		£0		Approved		
				AI	ignment witl	h IFI/S	D			
☐ 1 Low Car Economy	rbon									
2 Eradica Fuel Pove	ting erty									
3 Promoti Energy Sa	ing avings									
4 Safe, Re Network	eliable	The key ber ensure GDN compliance	nefit of this res Ns are able to r	earch is make eff	in improved of ficient investment	diurnal nents c	storage requireme or flex bookings to o	nt modelling demonstrate	capability to regulatory	
5 Protecti Environm	ng the ent									
Technologic area / issue addressed b project	al Y	o Validate able to mak	whether impro e efficient inve	ved diur stments	rnal storage re or flex booking	equirer	nent modelling cap demonstrate regula	ability will er atory complia	ance.	
Innovation	Туре	SD R	ating	Bene	efits Rating		Residual Risk	0	verall Score	
Incremen	ıtal	Med	ium							
Expected be of project	nefits	The main storage req satisfies ag o Whethe o Through - The main ensure GDN compliance requiremen Identificatio identificatio project has information A full benefit Feasibility S	benefit from th uirement and v reed requirement r through devent the development benefit of this p vs are able mand i.e. each net t. n of diurnal ston n and review o the potential to available to Sy t analysis will h	e study vould inv ents: lopment ent of a proposal ke effici work has orage rec f possibl deliver /stem O poe under	undertaken in vestigate the n of SSM, or new tool perf l is in improve ent investmer s to demonstr quirement fac le solutions fo better networ peration, enal	the fir most a aps lin d dium nts or f ate its tors in or deve k plan ole mo the pr	st stage will be to lappropriate method nked into 'Forecast nal storage requirer lex bookings in der ability to identify ar this feasibility stud lopment of new too ning performance, re efficient use of co	ook at all the for delivering er1' technolo ment modelli nonstrating i nd meet the y and the co pls/technique and by impro- diurnal storage	e drivers for g a tool which ogy. ng capability to egulatory 1 in 20 storage nsequent is in a future IFI oving the ge. beyond the	
		Adoptio	n (Year)	Duratio	on of Benefit	s	Prob' of Success	s P	roject NPV	
		20	12		0 yrs		25%		-£65,000	
Potential for achieving expected be	nefits	The key bei modelling c	nefit of this res apability over a	earch is a range d	an improvem of input scena	ent to trios.	a GDN's diurnal st	orage require	ement	
Project Prog	ress	In 2011 a co SSM is still operating re and system	ollaborative con using appropri gime and prov operation requ	mmissio ate metl vides suf uirement	ned by WWU hodologies, is ficient informats for day/wee	l, Scoti able t ation to k-ahea	ia and National Gri o take into account o inform both long t ad diurnal storage p	d Gas to ass changes in erm planning planning. Th	ess whether the LDZ/NTS g requirements le feasibility	
				Sumn	<i>ter 2012</i>			natio	nal grid	

	capturing the joint development to t	he modelling of diurnal sto	brage was and any new work will
b' Partners	SGN, WWU	Provider(s)	GL Noble Denton
			notionaler

								Y	/ear: 2012/13
Project Description	This pro applicati commur	ect aims to le ons to re-eng lication, comp	everage the lo jineer the Gas pliance and ci	ow cost ar s Alliance ustomer s	nd flexible plat Field force bu ervice	torm	afforded Smart Ph s processes assoc	ones and bes ciated with da	spoke ta collection,
L	Exper for Cu	nditure rrent FY	Expenditu for Prev'	ure FY	Expenditur for Next F	re Y	Total Project Costs		Status
Internal		£20,285	£12	,032		£0			Submitted
External		£39,087	£38	,184		£0	£243,725	Draft	02/05/2013
Materials		£0	0 £0			£0		Final	21/05/2013
Fotal		£59,372	£50	,216		£0		Approved	
				Ali	gnment with	IFI/S	D		
1 Low Car	bon								
2 Eradicat	ina								
Fuel Pove	rty								
3 Promoti	ng								
	ivings	Strong Alian	mont Impro	vomont to		atv via	an efficient tech		ion to conture
Network	liable	data whilst	out in the field	l.	process sale	ely via	t an enicient techn	ological solut	ion to capture
✓ 5 Protecti Environm	ng the ent	Minor Alignment. Reduce the amount paper and avoidance of re-visits to site.							
Technologica	o Development and testing of smartphone application for use in the Gas Distribution industry							industry	
addressed by project	y	o Future p	roofing syster	n cosing t	o ensure pote	ential	integration with be	spoke GDFO	/SAP systems
Innovation	Туре	SD R	ating	Bene	fits Rating		Residual Risk	0	verall Score
Incremen	tal	Signif	icant		17		-6		23
Expected bei of project	nefits	Improvemenuse of the s As data will	nts in process martphone ap be captured o	s safety, d op technol on site this	ata quality an logy will reduc s will also avo	d time ce sigi id uni	eliness by removing nificantly the paper necssary revisits to	g hand-offs a r used in the o site.	nd delays. The back office.
		Adoption	n (Year)	Duratio	n of Benefits	;	Prob' of Succes	s F	Project NPV
		20	12		2 yrs		75%		£459,021
Potential for achieving expected ber	nefits	Efficiencies	, improved co	mpliance	and environm	rental	benefits.		
Project Prog	ress	The project within the pr result of this closed.	successfully roject 10 apps s project the c	proved the s were dev levelopme	e concept of in veloped with 5 ent of addition	ntrodu 5 now al app	ucing mobile applic incorporated into t os continue and the	ations into th he business erefore this p	e business and as usual. As a roject can be
	ers	Amec, BBU Morrisons, I	S, Morgan Si Enterprise	ndell, Ska	nska,	Pro	vider(s) Hyphen		
	ers	result of this closed. Amec, BBU Morrisons, I	s project the c S, Morgan Si Enterprise	levelopme ndell, Ska	ent of addition nska,	al app Prov	vider(s) Hyphen	erefore this p	roject can be
Collab' Partn									

(IFI77) A	sset ł	lealth M	odelling					0040/40
Project Description	Develop assets s	ment of a Co o that these o	ndition Basec can be asses	l Risk Moo sed to prio	lel that will detern ritise investment	nine the future healt decisions.	۲ h index of NG	GD's key
	Exper for Cu	nditure rrent FY	Expendito for Prev'	ure FY	Expenditure for Next FY	Total Project Costs		Status
nternal		£29,969	£12	,805	£15,488			Submitted
xternal	£	250,000	£142	,334	£88,000	£564,873	Draft	03/05/2013
laterials		£0		£0	£0		Final	21/05/2013
otal	£	279,969	£155	,139	£103,488		Approved	
				Ali	gnment with IFI/	SD		
1 Low Ca	rbon							
2 Eradicat	ting ertv							
3 Promoti Energy Sa	ing avings							
4 Safe, Re Network	eliable	Good alignr intervention approach.	nent. Underst s to mitigate i	tanding of risk, and p	asset condition a rioritise / select o	nd criticality, identify ptimal expenditure v	ving and mod via a conditior	elling different n based risk
5 Protecti Environm	ng the ent							
echnologic ea / issue ddressed b roject	al Y	o Asset ma o Simplific o An autor knowledge.	anagement in ation of regul nated methoo	ivestment atory subn dical appro	decision making, nission data that i ach to asset man	based on actual ind is fully auditable and nagement that suppl	lividual asset I repeatable. ements existi	condition data
Innovation	Туре	SD Ra	ating	Bene	fits Rating	Residual Risk	O	verall Score
Incremen	ntal	Med	ium		19	3		16
xpected be i project	nefits	The tool will the conditio risk is deter	review and u n and deterio mined from th	pdate data	a sets for each as ors that impact up s.	sset category thus poon the performance	roviding unde e of key asset	erstanding as t is and how the
		Adoptio	n (Year)	Duratio	n of Benefits	Prob' of Succes	s P	roject NPV
		20	12		8 yrs	50%		-£529,273
otential for chieving xpected ber	nefits	Potential to	inform our ris	k model a	nd inform Asset N	Management Strate	ду.	
roject Prog	ress	Undertake A replacemen	Asset manage t.	ement risk	profiling and mod	delling on tier 2 pipe	s that are not	subject to
ollab' Partr	ners				Pro	ovider(s) EA Tech	nology	

(IFI79) B	io-SN	G Pilot I	Plant De	sign a	nd Demon	stration			
Project Description	To desig	In and build a	a pilot plant th	at demon	strates the produ	ction of bio-SNG fror	N n biogenic wa	/ear: 2012/13 aste.	
	Exper for Cu	nditure rrent FY	Expendit for Prev	ture Expenditure 'FY for Next FY		Total Project Costs		Status Submitted	
Internal		£43,045	£18	3,250	£0				
External	£	230,241	£74	,907	£0	£554,147	Draft	02/05/2013	
Materials		£0		£0	£0		Final	21/05/2013	
Total	£	273,286	£93	9,157	£0		Approved		
				Ali	gnment with IF	/SD			
✓ 1 Low Car Economy	'bon	The project demonstrati sources, the into the long	forms an ess ing that large ereby providir g term future	ential buil quantities ng justifica if/when he	ding block in Nat of renewable ga tion for continued ating using fossi	ional Grid's 'heat sto s could be produced d retention of the exis l gas becomes more	ry', by from zero / le sting gas dist problematic.	ow carbon ribution network	
L 2 Eradicat	ting erty								
3 Promoti Energy Sa	ng avings								
✓ 4 Safe, Re Network	eliable	As bio-SNG would be produced from indigenous waste resources, this would enhance supply security by providing an alternative to fossil gas imports as UKCS gas production declines.							
✓ 5 Protecti Environm	ng the ent	Thermal gasification is environmentally preferable to the alternatives of incineration or landfill of waste. Production of bio-SNG maximises the efficiency of energy from waste compared with electricity generation and can be applied at relatively small scale, thereby obviating the need for long distance transport of waste. Thermal gasification plants are more acceptable to the public than incineration plant in view of their lower environmental impact on their surroundings (e.g. air quality and visual impact).							
Technologica area / issue addressed by project	al Y	o high-leve gasification integration o High leve	el process de facility, inclue of this proces el assessmer	sign of a p ding selec s into the nt of waste	ilot bio-SNG plat tion of the catalys overall design. availability and	nt based on the existi st provider for the me composition.	ing APP Gas othanation sta	plasma® age and	
Innovation	Туре	SD R	ating	Bene	fits Rating	Residual Risk	о	verall Score	
Substituti	on	Med	ium		10	4		6	
Expected be of project	nefits	Demonstrat production o commercial National Gr	ion of SNG p of renewable plants and e id's participat	roduction pipeline qu nhanced e ion should	from biogenic wa uality SNG, with employment. enhance our rep	ste would establish t possible future benef putation as a leading	he UK as a lits in terms of proponent of	eader in the f exports of f the low	
			n (Year)	Duratio	n of Benefits	Prob' of Succes	s F	Project NPV	
		20	14	Durutio	0 yrs	25%		-£540,359	
Potential for achieving expected ber	nefits	The knowledge benefits have been realised during the course of the project. National Grid and its partners in this work can now be seen as the UK leaders in the production of renewable SNG. The report provide a full understanding of the process but also highlighted the potential hurdles that will need to be addressed such as the potential hydrogen content that the syngas may produce. The environment benefits can still be on course to be achieved. To realise these benefits, the full commercialisation of syngas installations will have to be developed and deployed first but only once the demonstration plant is constructed and proven to physically work. The output from this project							
		positive res	ponses have	been rece	eived thus enhand	cing National Grid's r	eputation in t	this arena.	
Project Prog	ress	A report wa syngas clea	s produced c an up to GSM	ontaining I R could be	the detailed design e achieved at rea	gn and costing of the sonable cost and, th	pilot plant th at a commer	at confirmed cial BioSNG	
				Summ	er 2012		natio	nal grid	

(IFI79) Bio-Sl	NG Pilot Plant Design and Dem	onstration	1
			Year: 2012/13
	could be competitive compared to other renew	vable technologie	es assuming RHI and ROC funding.
	Additional work was also undertaken by the pa additional requirement proved successful and	roject to test the added robustnes	proposed catalytic conversion. This as to the overall proposed design.
	The reports content has now been used to pre proposal to support the demonstration phase If the subsequent demonstration of the pilot pl potentially scaled up into a full scale sized pla could be gasified. The gasification of waste o UK for a calendar year, thus avoid sending wa	epare a NIC (Network the project who of the project who ant proves succe nt where it estiman this scale woul ste to landfill. Fit	work Innovation Competition) bid en bidding commences in April 2014. essful the technology can then be ated that 100,000 tonnes pa of waste d serve an average sized town in the ull roll out could be as early as 2017.
Collab' Partners	Advanced Plasma Power Progressive Energy Limited	Provider(s)	Advanced Plasma Power

Summer 2012

a robust wide s extract water fro liture I ent FY £60 £0 £645 £705 Winor. Reductio opposed to the	Expenditure for Prev' FY £5,290 £0 £67,500 £72,790	Expenditure for Next FY £(£(£(£(£(£(£(£(£(£(£(Total Project Costs	ility of an air Draft	drive powere Status Submitted
liture I ent FY £60 £0 £645 £705 Winor. Reductio ppposed to the	Expenditure for Prev' FY £5,290 £0 £67,500 £72,790 on in carbon e	Expenditure for Next FY £(£(£(£(Alignment with IF	Total Project Costs	Draft	Status Submitted
£60 £0 £645 £705 Winor. Reduction opposed to the	£5,290 £0 £67,500 £72,790 on in carbon e	L EC	2 2 2 2 2 2 2 2 2 2 2 2 2 2 80,048	Draft	
£0 £645 £705 Winor. Reduction opposed to the	£0 £67,500 £72,790 on in carbon e	L EC	2 £80,048	Draft	
£645 £705 Winor. Reduction opposed to the	£67,500 £72,790 on in carbon e	Lignment with IF	2		02/05/2013
£705 Vinor. Reduction opposed to the	£72,790 on in carbon e	£(Alignment with IF		Final	21/05/2013
Vinor. Reduction opposed to the	on in carbon e	Alignment with IF)	Approved	
Minor. Reduction Apposed to the	on in carbon e		·I/SD		
		missions as the utilis o run both the vehicle	ation of the vehicle er and units.	igine to powe	r the unit as
Vinor. Increasi networks in the	ng the availab event of a wa	ility of units during the ter ingress incident	e winter period enablin	ng restoration	of gas
Good. The use acceptable 75d	of an air drive B. The systerr	motor will reduce noi will also reduce carb	se levels from its curr oon emissions	ent 104dB to	a more
 Evidence of Demonstration Acceptance normal works of 	robust testing on of the syste by the user th r as part of an	of the product in diffe ems robust design at the design meets c incident.	erent geographical and	d operational irements whe	conditions en used durin
SD Ratin	g	Benefits Rating	Residual Risk	O	verall Score
Medium		13	-4		17
Improved conf compliant noise Improved repu	idence tha the levels and sa itation by deliv	e design meets the re fe use for field operat rering a system that re	quirements of operation tives. educes the impact ou	ons with rega	rds to
at timot of mate	n ingress.				on the public
Adoption (Y	ear) Du	ration of Benefits	Prob' of Succes	s P	on the public
Adoption (Y 2012	ear) Du	ration of Benefits 10 yrs	Prob' of Succes	s P	on the public roject NPV £18,664
Adoption (Y 2012 3enefits can be	ear) Du	10 yrs	Prob' of Succes 75% ementation has occurr	s P	on the public roject NPV £18,664
Adoption (Y 2012 Benefits can be A system has b developed has in he HSE interve operatives requ	realised until een developed reduced noise ntion limits. T ired to move it	the decision for imple d that utilises an air d levels from an avera the balance of the un t on site.	Prob' of Succes 75% ementation has occurr rive motor as the pow ge 104dB(A) to 74dB(it even when full has r	s P red. er house. Th (A) which is n reduced the ri	on the public roject NPV £18,664 ne system ow lover than isk to
Adoption (Y 2012 3enefits can be A system has b developed has i the HSE interve operatives requ t is not possible design. Whilst s	ear) Du realised until een developed reduced noise ntion limits. T ired to move it e at this time to successful the	the decision for imple the decision for imple d that utilises an air d levels from an avera he balance of the un t on site. o clearly state that thi robustness of the mo	Prob' of Succes 75% ementation has occurr rive motor as the pow ge 104dB(A) to 74dB(it even when full has r s unit should become pdifications need furth	s P red. er house. Th (A) which is n reduced the ri the National er monitoring	on the public roject NPV £18,664 the system ow lover than isk to Grid preferre
	Minor. Increasi networks in the Good. The use acceptable 75dl Demonstratio Acceptance normal works of SD Ratin Medium Improved conf compliant noise Improved repu	Minor. Increasing the availab networks in the event of a war Good. The use of an air drive acceptable 75dB. The system be Evidence of robust testing be Demonstration of the system be Acceptance by the user the normal works or as part of an SD Rating Medium Improved confidence tha the compliant noise levels and sa Improved reputation by delive	Minor. Increasing the availability of units during the networks in the event of a water ingress incident Good. The use of an air drive motor will reduce noi acceptable 75dB. The system will also reduce carb Demonstration of the systems robust design Demonstration of the systems robust design Deceptance by the user that the design meets of an incident. SD Rating Benefits Rating Medium 13 Improved confidence tha the design meets the recompliant noise levels and safe use for field operation by delivering a system that recompliant process	Minor. Increasing the availability of units during the winter period enablination betworks in the event of a water ingress incident Good. The use of an air drive motor will reduce noise levels from its curracceptable 75dB. The system will also reduce carbon emissions Demonstration of the systems robust design Demonstration Demonstration </td <td>Minor. Increasing the availability of units during the winter period enabling restoration networks in the event of a water ingress incident Good. The use of an air drive motor will reduce noise levels from its current 104dB to acceptable 75dB. The system will also reduce carbon emissions Demonstration of the systems robust design Demonstration of an incident. SD Rating Benefits Rating Residual Risk Or Medium 13 -4 Improved confidence tha the design meets the requirements of operations with regarding the proved confidence that the design meets the requirements of operations with regarding the proved confidence the system use for fin</td>	Minor. Increasing the availability of units during the winter period enabling restoration networks in the event of a water ingress incident Good. The use of an air drive motor will reduce noise levels from its current 104dB to acceptable 75dB. The system will also reduce carbon emissions Demonstration of the systems robust design Demonstration of an incident. SD Rating Benefits Rating Residual Risk Or Medium 13 -4 Improved confidence tha the design meets the requirements of operations with regarding the proved confidence that the design meets the requirements of operations with regarding the proved confidence the system use for fin

Summer 2012

national**grid**

(IFI81) He	eat E	conomic	s Project						
								١	/ear: 2012/13
Project Description	Identify Carbon	whether gas o economy than	ought to be mo	ore or les isaged b	s prominent, fror by government	n an econo	mic point o	of view, as p	art of a low
L	Exper for Cu	nditure Irrent FY	Expenditu for Prev' F	re =γ	Expenditure for Next FY	Total Co	Project		Status
Internal		£19,963	£26,	059	£0				Submitted
External		£24,437	£75,	000	£0	£	184,991	Draft	02/05/2013
Materials		£1,669	£43,	131	£0			Final	21/05/2013
Total		£46,069	£144,	190	£0			Approved	
				Al	ignment with IF	I/SD			
✓ 1 Low Car Economy	rbon	Identifies the identifies the key policy m	e scale of bion e economic mo illestones to e	nethane erits of re nable a l	economically via etaining gas in a ow Carbon UK v	ble for gas low Carbon sion to bec	to gas gric economy. ome a rea	l injection by . Proposes p lity.	decade and athways and
2 Eradicat Fuel Pove	ting erty								
3 Promoti Energy Sa	ng avings								
4 Safe, Re Network	eliable	Identifies the reality conce	e timescales a erning specific	nd miles ally bio-r	tones required to nethane and the	enable a l assumption	ow Carbor ns previous	i pathway to s made.	become a
5 Protectin Environm	ng the ent								
Technologica area / issue addressed by	al V	o determine the level and	e the level of h d implications	neat ecor	nomically attracti	ve to electr	ify or deliv	er from heat	networks and
project	-	o determine o outline th	e the level of the costs for en	pio-mether ergy in e	ane to aim to del ach decade and	iver by dec policies / te	ade. echnologie	s commercia	ally required
project	Туре	o determine o outline th SD Ra	e the level of the costs for en	bio-metha ergy in e Bene	etworks. ane to aim to del ach decade and efits Rating	iver by dec policies / te Resic	ade. echnologie lual Risk	s commercia O	ally required verall Score
project Innovation	Type Ital	o determine o outline th SD Ra Signifi	e the level of t e costs for en tting cant	bio-metha ergy in e Bene	etworks. ane to aim to del ach decade and efits Rating	iver by dec policies / te Resic	ade. echnologie Iual Risk 3	s commercia O	ally required verall Score 9
project Innovation Incremen Expected ber of project	Type Ital	o determinion o outline th SD Ra Signifi Transfer of k of business submissions The output v beat in a low	e the level of the costs for en tting cant key knowledge requirements and reputation vill inform the carbon economic	ergy in e Bene ge from me / needs o on. dialogue	etworks. ane to aim to del ach decade and efits Rating 12 odelling related t of 2050 which wil with DECC rega	iver by dec. policies / te Resic b the longe I support as rding long t	ade. echnologie lual Risk 3 vity of netw sset depre- erm views	s commercia O vork assets - ciation, regu concerning	ally required verall Score 9 identification latory the delivery of
project Innovation Incremen Expected ber of project	Type tal nefits	o determinion o outline the SD Ra Signifi Transfer of k of business submissions The output v heat in a low	e the level of the costs for en ting cant key knowledge requirements and reputation vill inform the v carbon economic (Year)	Brownerstein Bene From mu / needs o n. dialogue omy. Duratio	etworks. ane to aim to del ach decade and efits Rating 12 odelling related t of 2050 which wil with DECC rega	iver by dec policies / te Resic o the longe I support as rding long t	ade. echnologie lual Risk 3 vity of network sset depre- erm views	s commercia O vork assets - ciation, regu concerning	ally required verall Score 9 · identification latory the delivery of Project NPV
Innovation Incremen Expected ber of project	Type tal	o determinino outline the SD Ra Signifit Transfer of k of business submissions The output v heat in a low Adoption 201	e the level of the costs for en atting cant key knowledge requirements and reputation vill inform the v carbon economic (Year) 3	ergy in e Bene 9 from mo / needs o n. dialogue omy. Duratio	etworks. ane to aim to del ach decade and efits Rating 12 odelling related to of 2050 which will with DECC rega on of Benefits 0 yrs	iver by dec. policies / te Resic o the longe I support as rding long t Prob' c	ade. echnologie lual Risk 3 vity of netv sset depre erm views of Success 50%	s commercia O vork assets - ciation, regu concerning	ally required verall Score 9 identification latory the delivery of Project NPV -£182,822
Project Innovation Incremen Expected ber of project Potential for achieving expected ber	Type tal nefits	o determinion o outline the SD Ra Signifi Transfer of k of business submissions The output v heat in a low Adoption 201 Redpoint de	e the level of the costs for en tting cant key knowledge requirements and reputation vill inform the v carbon economic (Year) 3 veloped a holi	ergy in e Bene Bene from mo / needs o n. dialogue omy. Duratio	etworks. ane to aim to del ach decade and efits Rating 12 odelling related t of 2050 which wil with DECC rega on of Benefits 0 yrs gy model satisfy	iver by dec. policies / te Resic to the longe I support as rding long t Prob' c	ade. echnologie lual Risk 3 vity of netv sset depre- erm views of Success 50% ctives of th	s commercia	ally required verall Score 9 - identification latory the delivery of Project NPV -£182,822
project Innovation Incremen Expected ber of project Potential for achieving expected ber Project Prog	Type tal nefits ress	 o determining o outline the SD Rational Signifi Transfer of kost submissions The output wheat in a low Adoption 201 Redpoint de National Griding National Gridin vestigate the 2050 horizon key fuel sou method. The from similard various hous included alou heating. The low carbon so the study carbon so the study	e the level of the costs for en tting cant cant cant cant cant cant cant cant cant cant cant cant cant cant carbon econo carbon econo cono carbon econo carbon econo	Bio-meth: ergy in e Bene e from mo / needs o n. dialogue omy. Duratio stic ener edpoint I rral gas, vas desig sfying the esigned nodels. In g types tions to n fied a rai licated th a compe e most e ritical to . The pro- ents Hea	etworks. ane to aim to del ach decade and efits Rating 12 odelling related to of 2050 which will with DECC regative with DECC regative on of Benefits 0 yrs gy model satisfy Baringa to develor gas networks an med to objective e UK Climate Ch to incorporate keen n particular, the si was explored. In nake use of alter nge of new gas a ne long term utilis elling case for the conomic scenari security of energ oject produced a t Strategy consu	iver by dec. policies / tec Resic to the longe I support as rding long t Prob' c Prob' c mag all object op a least c d customer y identify th ange Act 2 addition, a native fuels ppliances t sation of ga long term o for achiev y supplies a technical re ltation in 20	ade. ade. ade. ade. ade. ade. ade. add.	s commercia O vork assets - ciation, regu concerning concerning s F e project. e project. e project. ed energy n conclosies f markets to v tions in the r l variation in the r s to date rem l variation in the r s to date rem l variation in the r s to date rem l variation the r s to date rem l variation in the r s to date	ally required verall Score 9 - identification latory the delivery of Project NPV -£182,822

(IFI81) Heat E	Economics Project	
	primary model by the Department of Energy and Climate Change in their Mar	Year: 2012/13
	Meeting the Challenge" publication which summarised the conclusions to the	ir 2012 strategy paper.
Collab' Partners	Provider(s) Redpoint, AIN	<u>1MS</u>
	Summer 2012	national grid

Project To provide a bottom up study on the optimal appliance technology pathways. by property type, based on inspace on consumers (cost to change and behavioural) and the inspace on one sumers (cost to change and behavioural) and the inspace on one sumers (cost to change and behavioural) and the inspace on the gas and electricity distribution Internal Expenditure for Prev FY Expenditure for Prev FY Total Project Satus 1 tow Carbon 60 <td< th=""><th>(IFI86) D</th><th>omes</th><th>tic Heati</th><th>ng Project</th><th></th><th></th><th></th><th></th></td<>	(IFI86) D	omes	tic Heati	ng Project				
Projectipion The provides a bottom up study on the optimal appliance technology pathways, by property type, based on forward an engine heating technology, required to meavable targists, highlighting the impact on consumes; (cost to change and behavioural) and the impact on the gas and electricity distribution networks out to 2050. Internal Expenditure to 2050. Expenditure to 2050. Expenditure to 2050. Total Project Costs Status Internal 229.281 20 20 250.908 Dratt 3005/2013 Total 20.90 20 20 20.908 Total 3005/2013 Total 20.90 20 20 20.908 Total 3005/2013 Total 20.90 20							Ŷ	ear: 2012/13
Expenditure for Current Fy Schemet Fy Expenditure for Next Fy Total Project Sol Statu Submitted Internal £29,281 £0 £0 £0 £0.0 <td< th=""><th>Project Description</th><th>To provie known a impact o networks</th><th>de a bottom u nd emerging l n consumers s out to 2050.</th><th>p study on the optima neating technology, re (cost to change and</th><th>I appliance technolo quired to meet carb behavioural) and the</th><th>ogy pathways, by p on and renewable e impact on the ga</th><th>roperty type, targets, highl s and electric</th><th>based on ighting the ity distribution</th></td<>	Project Description	To provie known a impact o networks	de a bottom u nd emerging l n consumers s out to 2050.	p study on the optima neating technology, re (cost to change and	I appliance technolo quired to meet carb behavioural) and the	ogy pathways, by p on and renewable e impact on the ga	roperty type, targets, highl s and electric	based on ighting the ity distribution
Internal Submitted External £29,281 £0 £0 £0 £20,081 Draft 03/05/2013 Materials £0 £0 £0 £0 £20,081 Print 03/05/2013 Total £34,670 £0 £0 £0 Approved 21/05/2013 I Low Carbon Economy Research to better understand future the uptake of various residential appliances that may develop in a low carbon economy. 2 Eradicating Puel Poverty Research to better understand future the uptake of various residential appliances that may develop in a low carbon economy. 3 Promoting Energy Savings		Exper for Cu	nditure rrent FY	Expenditure for Prev' FY	Expenditure for Next FY	Total Project Costs	I	Status
External 229,281 0	Internal		£5,389	£0	£0			Submitted
Materials 20 20 20 20 Final 21/05/2013 Total 23/670 20 20 20 Approved	External		£29,281	£0	£0	£82,908	Draft	03/05/2013
Total £34,670 £0 £0 £0 Approved I Low Carbon Economy Research to better understand future the uptake of various residential appliances that may develop in a low carbon economy. I Low Carbon Economy Research to better understand future the uptake of various residential appliances that may develop in a low carbon economy. 2 Eradicating Fuel Poverty Image: Control of the potential appliance choices based on known and emerging fuel stafe, Reliable Network 5 Protecting the Environment Image: Control of the potential appliance choices based on known and emerging fuel stafe, Reliable (mage: Control of the optimal appliance choices based on known and emerging fuel stafe, Reliable (mage: Control of the optimal appliance choices based on known and emerging freer / Issue addressed by project 1 Agp out a range of realistic heating solutions base around long term scenarios, in particular, referencing the types of appliance suitable for different housing types out to 2050 3. Providing a more detailed scenario analysis with focus on domestic heating supply, demand and heating method up to 2050 achieving the 80% national C2C reduction target. 4. Review the implications of how existing Government policies could influence the scenarios i.e. the Carbon Neutral Homes, Renewable Heat Incentive or any other relevant assumptions or sensitivities that should be considered. 5. Consider the current UK housing stock split and new build "zero carbon homes" definitions from the Zero Carbon Hub. 6. Consider the within day and within year seasonal swing in heat demand and demand reductions over time by segmented hou	Materials		£0	£0	£0		Final	21/05/2013
I Low Carbon Economy Research to better understand future the uptake of various residential appliances that may develop in a low carbon economy. I Low Carbon Economy Research to better understand future the uptake of various residential appliances that may develop in a low carbon economy. I Stafe Areitable Image: Stafe Areitable A	Total		£34,670	£0	£0		Approved	
I Low Carbon Economy Research to better understand future the uptake of various residential appliances that may develop in a low carbon economy. 2 Eradicating Fuel Poverty Image: Construct the construction of th				A	lignment with IFI/S	D		
P Eradicating Fuel Poverty 3 Promoting Energy Savings 3 State, Reliable Network 5 Protecting the Environment Technological area / issue addressed by 1. Provide a bottom up study on the optimal appliance choices based on known and emerging the mact of that on energy demand and gas and electric distribution networks taking into account the various types of property. 2. Map out a range of realistic beating solutions base around long term scenarios, in particular, referencing the types of appliances suitable for different housing types out to 2050 3. Providing a more detailed scenario analysis with focus on domestic heating supply, demand and heating method up to 2050 achieving the 80% national CO2 reduction target. 4. Review the implications of how existing Government policies could influence the scenarios i.e. the Carbon Neutral Homes, Renewable Heat Incentive or any other relevant assumptions or sensitivities that should be considered. 5. Consider the within day and within year seasonal swing in heat demand and demand reductions from the Zero Carbon Hub. 6. Consider the within day and within year seasonal swing in heat demand and demand reductions or variable pack inding, electrification, storage etc. 7. Consider the existing assumptions and projections regarding energy efficiency rollout rates and examine how variatous levels of energy efficiency can impact on overall costs. 8. Consider the within day and within y	✓ 1 Low Ca Economy	arbon /	Research to in a low carb	better understand fut oon economy.	ure the uptake of va	rious residential a	opliances that	may develop
Image: Series of the seris of the series of the series of the series	2 Eradica Fuel Pov	ating erty						
□ 4 Safe, Reliable Network □ 5 Protecting the Environment Technological area / issue addressed by project 1. Provide a bottom up study on the optimal appliance choices based on known and emerging heating technology, highlighting the impact on the consumer (cost to change and behavioural) and the various types of property. 2. Map out a range of realistic heating solutions base around long term scenarios, in particular, referencing the types of appliances suitable for different housing types out to 2050 3. Providing a more detailed scenario analysis with focus on domestic heating supply, demand and heating method up to 2050 achieving the 80% national CO2 reduction target. 4. Review the implications of how existing Government policies could influence the scenarios i.e. the Carbon Neutral Homes, Renewable Heat Incentive or any other relevant assumptions or sensitivities that should be considered. 5. Consider the current UK housing stock split and new build "zero carbon homes" definitions from the Zero Carbon Hub. 6. Consider the within day and within year seasonal swing in heat demand and demand reductions over time by segmented housing analysis and how that could be met from alternative sources e.g. hybrid/peak heating, electrification, storage etc. 7. Consider the existing assumptions and projections regarding energy efficiency rollout rates and examine how various levels of energy efficiency can impact on overall costs. 8. Consider the within day and within year seasonal swing in to account technology, efficiency and variations in house types and compare this to costs for conventional heating systems. 1	3 Promote Energy S	ting avings						
S Protecting the Environment Technological area / issue ating technology, highlighting the impact on the consumer (cost to change and behavioural) and the impact of that on energy demand and gas and electric distribution networks taking into account the various types of property. 2. Map out a range of realistic heating solutions base around long term scenarios, in particular, referencing the types of appliances suitable for different housing types out to 2050 3. Providing a more detailed scenario analysis with focus on domestic heating supply, demand and heating method up to 2050 achieving the 80% national CO2 reduction target. 4. Review the implications of how existing Government policies could influence the scenarios i.e. the Carbon Neutral Homes, Renewable Heat Incentive or any other relevant assumptions or sensitivities that should be considered. 5. Consider the current UK housing stock split and new build "zero carbon homes" definitions from the Zero Carbon Hub. 6. Consider the within day and within year seasonal swing in heat demand and demand reductions over time by segmented housing analysis and how that could be met from alternative sources e.g. hybrid/peak heating, electrification, storage etc. 7. Consider the existing assumptions and projections regarding energy efficiency rollout rates and examine how various levels of energy efficiency can impact on overall costs. 8. Consider injection of biomethane, quantity realistically available and alternative uses for heat, transport and power. 9. Evaluate the average annual cost for the provision of heat taking into account technology, efficiency and variations in house types and compare this to costs for conventional heating s	4 Safe, R Network	eliable						
 Provide a bottom up study on the optimal appliance choices based on known and emerging heating technology, highlighting the impact on the consumer (cost to change and behavioural) and the impact of that on energy demand and gas and electric distribution networks taking into account the various types of property. Map out a range of realistic heating solutions base around long term scenarios, in particular, referencing the types of appliances suitable for different housing types out to 2050 Providing a more detailed scenario analysis with focus on domestic heating supply, demand and heating method up to 2050 achieving the 80% national CO2 reduction target. Review the implications of how existing Government policies could influence the scenarios i.e. the Carbon Neutral Homes, Renewable Heat Incentive or any other relevant assumptions or sensitivities that should be considered. Consider the current UK housing stock split and new build "zero carbon homes" definitions from the Zero Carbon Hub. Consider the within day and within year seasonal swing in heat demand and demand reductions over time by segmented housing analysis and how that could be met from alternative sources e.g. hybrid/peak heating, electrification, storage etc. Consider the existing assumptions and projections regarding energy efficiency rollout rates and examine how various levels of energy efficiency can impact on overall costs. Consider injection of biomethane, quantity realistically available and alternative uses for heat, transport and power. Evaluate the average annual cost for the provision of heat taking into account technology, efficiency rol tor timpacts on customers e.g. behavioural change/demand side response e.g. changes in appliance usage and system interaction such as those outlined in the EST research into heat pumps. Map out other impacts on customers e.g. behavioural change/demand side response e.g. chang	5 Protect Environn	ing the nent						
Summer 2012 nationalgrid	area / issue addressed b project	by	 Provide a heating tech the impact o the various t Map out a referencing f Providing heating meth Review t the Carbon 1 sensitivities Conside the Zero Car Conside over time by hybrid/peak Conside examine how Conside transport and Evaluate efficiency an Nap out changes in a heat pumps Identify 	a bottom up study on t nology, highlighting th f that on energy dema ypes of property. a range of realistic hea the types of appliance a more detailed scen nod up to 2050 achiev the implications of how Neutral Homes, Renew that should be conside r the current UK housi rbon Hub. r the within day and w segmented housing a heating, electrification r the existing assumpt w various levels of energy r injection of biometha d power. the average annual of d variations in house to ther impacts on cus appliance usage and s any issues associated on issues biomass bo	he optimal applianci e impact on the cor- and and gas and ele ating solutions base s suitable for differe lario analysis with for ing the 80% national v existing Governme wable Heat Incentive ered. Ing stock split and n ithin year seasonal s analysis and how that i, storage etc. ions and projections ergy efficiency can in ane, quantity realistic cost for the provision types and compare tomers e.g. behavior system interaction su	e choices based o isumer (cost to ch ctric distribution ne around long term int housing types c bous on domestic h al CO2 reduction ta ent policies could in e or any other relev ew build "zero cark swing in heat dem at could be met fro s regarding energy mpact on overall c cally available and n of heat taking into this to costs for co bural change/dema uch as those outlin echnologies i.e. ref	n known and lange and bel etworks taking scenarios, in jut to 2050 heating supply arget. Influence the s want assumpt bon homes" d and and dema m alternative efficiency rol posts. alternative us o account tech onventional he and side respo led in the EST rofitting heat	emerging navioural) and g into account particular, r, demand and cenarios i.e. ions or efinitions from and reductions sources e.g. lout rates and ses for heat, mology, eating systems. onse e.g. Tresearch into pumps, solid
			<u> </u>	Sumn	1er 2012		natio	nal grid

	CD Dating	Deposite Dating	Decidual Dick	Year: 2012/13
	SD Rating Medium			
Expected benefits of project	- Transfer of key informa of business requirements submissions and reputat Identifies the market seg markets so business imp	tion from modelling related s / need by 2050 which will ion. ments for gas into the futu pacts can be assessed and	to the longevity of network support asset depreciation re and indicate market inte strategies formulated.	k assets - identification h, regulatory rvention risks to such
	- Reputational benefits for The project also provides	or all participants as the ou s good leverage benefits fo	tput will input inform the DI or all funding participants.	ECC Heat Strategy.
	Adoption (Year)	Duration of Benefits	Prob' of Success	Project NPV
	2012	1 yrs	25%	-£82,908
Potential for chieving expected benefits	The production of the rep processes the energy ind targets. This output will	port provides essential kno dustry could adopt that will inform the DECC Heating	wledge concerning the suit assist the UK in meeting it Strategy.	able technologies and s 2050 renewable
Project Progress	The report can be acces model was produced in o energy industry and the deciding what technolog be used by Strategy & P	sed via the ENA website. order to analyse the scenar funding participants will be es it should pursue in mee olicy department within the	In order to review the optio rios. This was warmly rece able to use the model goir ting their own renewable ta Market Operations team v	ns within the report a rived by the wider of forward as a tool in argets. This model wil vith Transmission.
ollab' Partners	National Grid Transmiss	ion, NGN, SGN, P	rovider(s) Energy Netwo	rks Association,

(IFI87) Pi	pe C	ondition	Assess	ment S	System				
_									Year: 2012/13
Description	l o deve pipes to In this co	lop a technolo be safely main ontext remedia	gy that satis ntained for c ation could in	sties obliga continued u nvolve inte	itions under the use, or be cate rnal repair, or	e Pipe gorise semi	eline Safety Regula ed in such a way to structural linings.	ations to prioritis	enable Tier 2/3 se for remediation.
	Exper for Cu	nditure rrent FY	Expendit for Prev	ure ' FY	Expenditure for Next F	e 1	Total Project Costs		Status
Internal		£17,559		£0		£0			Submitted
External	£	110,000		£0	£75,0	00	£450,000	Dr	aft 07/05/2013
Materials		£40,000		£0		£0		Fi	nal 21/05/2013
Total	£	:167,559		£0	£75,0	00		Approv	ed
				Ali	gnment with	IFI/SI	D		
✓ 1 Low Car Economy	bon	Identification for better price be taken to r	of possible pritisation ar ninimise lea	failures in nd justificat kage whils	iron tier 2 and tion of mains r at also minimis	3 ma eplac ing th	ains prior to the eve ement and allowing ne amount of iron m	ent occur g for pre nains reg	rring thus allowing ventative action to placement required.
2 Eradicat Fuel Pove	ing rty							•	
3 Promotil Energy Sa	ng ivings								
4 Safe, Re Network	liable	The ability to enable targe	identify by ted and effic	quantitativ	e data analysis 1 to be taken.	s of th	ne structural capab	ility of in	dividual pipes will
✓ 5 Protectin Environme	ng the ent	Identification for better prid be taken to r	of possible pritisation ar ninimise lea	failures in nd justificat kage whils	iron tier 2 and tion of mains r at also minimis	3 ma eplac ing th	ains prior to the eve ement and allowing the amount of iron m	ent occur g for pre nains rep	rring thus allowing ventative action to placement required.
area / issue addressed by project	ai /	 Provide a external pipe circa 100 mid pipeline dian Prove cap pass through Developm information p lengths. 	working set wall defects crostrain lim heters bability at lan us dependar hent of an "in hertaining to	t of pipe cc s to 25% o it of detect rge diamet nt on diame ntelligent" pipewall d	ondition assess r less of pipew tion and the loo er mains sizes eter data collection lefects, induce	sment vall th cation with syste d stra	t equipment capab ickness, measuren o of associated stre full circumferential em capable of proc ain and stress raise	le of detennent of in ress raise coverage lucing us r locatio	ecting internal and nduced strain to rs acting on Tier 2 ge with 2no or 3no sable management ns within pipeline
Innovation [·]	Туре	SD Ra	ting	Bene	fits Rating		Residual Risk		Overall Score
Increment	tal	Mediu	um		20		-3		23
Expected ber of project	nefits	Of the popula Ofgem's fina mandatory c The use of th could be use	ation of som I proposal, f ondition and his systerm i d to defer re	te 6400KM 140KM of 1 1 382KM of is initially ta eplacemen	l of Tier 2/3 pip Fier 2 above th f non mandato argeted at Tier t or remediatic	bes th le risk ry Tie 2 >ri on.	te following lengths caction threshold (er 3 (£600M). isk action threshold	have be £89M), 3 I whereb	een 'allowed' under 300KM of non by the technology
		Adoption	(Year)	Duratio	n of Benefits		Prob' of Success	;	Project NPV
		201	4		1 yrs		50%		£366,967
Potential for achieving expected ber	nefits	Benefits are	on track to I	be delivere	ed during the fu	uture	stages of the proje	ct.	
Project Prog	ress	Tests on an cracks, wall that the num	extracted se hickness lo ber and sen	ection of Cl ss and infe sitivity of t	I main have co er strain and he he sensors ne	onfirm ence s cessa	ed that the prototy stresses. Knowled ary to desired outpu	pe tool c ge has t its.	an detect hairline been gained such
Collab' Partn	ers	WWU				Prov	ider(s) DVS Tec	hnologie	S
				Summ	er 2012			nat	tional grid

Adoptio	Expendit for Prev	ture ' FY £0 £0 £0 £0 62; IL104; IL Benefit	Expenditure for Next FY £0 £0 £0 10 10 10; IL117; IL14 s Rating	Total Project Costs	Draft Final Approved	Status Submitted 03/05/2013 21/05/2013
£13,602 £73,512 £0 £87,114 Covered by SD R SD R Adoptio 20	v projects IFI:	£0 £0 £0 £0 Aligr 62; IL104; IL Benefit	£0 £0 £0 £0 £0 £0	£661,608 SD	Draft Final Approved	Submitted 03/05/2013 21/05/2013
£73,512 £0 £87,114 Covered by SD R SD R Adoptio 20	r projects IFI:	€0 €0 €0 Aligr 62; IL104; IL Benefit	£0 £0 £0 10 ment with IFI/3 110; IL117; IL14 s Rating	£661,608 SD	Draft Final Approved	03/05/2013 21/05/2013
£0 £87,114	v projects IFI:	£0 £0 Aligr 62; IL104; IL Benefit	£0 £0 ment with IFI/5	SD I1 and IL143 Residual Risk	Final Approved	21/05/2013
£87,114	v projects IFI:	£0 Aligr Aligr 62; IL104; IL Benefit	£0 ment with IFI/s 110; IL117; IL14 s Rating	SD	Approved	verall Score
Covered by SD R Adoptio 20	r projects IFI:	Aligr 62; IL104; IL Benefit	Internet with IFI/s	SD		verall Score
Covered by SD R Adoptio 20	r projects IFI:	62; IL104; IL Benefit	110; IL117; IL14 s Rating	I1 and IL143 Residual Risk	O	verall Score
Covered by SD R Adoptio 20	r projects IFI:	62; IL104; IL Benefit	110; IL117; IL14 s Rating	I1 and IL143 Residual Risk		verall Score
Covered by SD R Adoptio 20	r projects IFI:	62; IL104; IL Benefit	110; IL117; IL14 s Rating	I1 and IL143 Residual Risk	O'	verall Score
Covered by SD R Adoptio 20	v projects IFI:	62; IL104; IL Benefit	110; IL117; IL14 s Rating	I1 and IL143 Residual Risk	O'	verall Score
Covered by SD R Adoptio 20	v projects IFI:	62; IL104; IL Benefit	110; IL117; IL14 s Rating	I1 and IL143 Residual Risk	0	verall Score
Covered by SD R Adoptio	rojects IFI:	62; IL104; IL Benefit	110; IL117; IL14 s Rating	I1 and IL143 Residual Risk	0	verall Score
SD R Adoptio	lating	Benefit	s Rating	Residual Risk	O'	verall Score
Adoptio	n (Year)					
Adoptio	n (Year)					
Adoptio	n (Year)					
20	. ,	Duration	of Benefits	Prob' of Succes	s P	Project NPV
	13	0	yrs	25%		£0
New ideas	feedstock. O	ne consistent	way to collabor	rate with SME and C	GDNs.	
Following s the collabor with a route working wit	takeholder fe ration with the to table new h new innova	edback and l e Energy Net / ideas to the ttions with lar	building on the e work Centre wa GDN's and sup ge organisations	experiences of the E s established in 201 port them commerc s.	Electricity network 12. The EIC p cially to mana	work operators provide SME's age risk in
Targets we six projects participatec which lead	re set at the s commenced d in 3. 40 new to 6 projects	start of 2012 I with NG par / innovative le starting in 20	to have 3 collab ticipating in all c ads were collec 13.	orative projects live of them alongside So cted by the EIC, 14	during the ye GN and NGN synopsis whe	ear. A total of I. W&W ere evaluated
Electricity N Northern Ga Northern Po Scotia Gas Scottish Po Southern & UK Power I Wales&We	North West as Networks ower Grid Networks wer Scottish Ele Networks est Utilities	ctric	Pro	wider(s) Energy I	nnovation Ce	entre
	Targets we six projects participated which lead Electricity N Northern G Northern G Northern P Scotia Gas Scottish Pc Southern & UK Power I Wales&We	Targets were set at the six projects commenced participated in 3. 40 new which lead to 6 projects Electricity North West Northern Gas Networks Northern Power Grid Scotia Gas Networks Scottish Power Southern & Scottish Ele UK Power Networks Wales&West Utilities	Targets were set at the start of 2012 six projects commenced with NG part participated in 3. 40 new innovative le which lead to 6 projects starting in 20 Electricity North West Northern Gas Networks Northern Power Grid Scotia Gas Networks Scottish Power Southern & Scottish Electric UK Power Networks Wales&West Utilities	Targets were set at the start of 2012 to have 3 collability six projects commenced with NG participating in all of participated in 3. 40 new innovative leads were colled which lead to 6 projects starting in 2013. Electricity North West Northern Gas Networks Northern Power Grid Scotia Gas Networks Scottish Power Southern & Scottish Electric UK Power Networks Wales&West Utilities	Working with new innovations with large organisations. Targets were set at the start of 2012 to have 3 collaborative projects live six projects commenced with NG participating in all of them alongside S participated in 3. 40 new innovative leads were collected by the EIC, 14 which lead to 6 projects starting in 2013. Electricity North West Provider(s) Northern Gas Networks Northern Power Grid Scotia Gas Networks Southern & Scottish Electric UK Power Networks Wales&West Utilities	Working with new innovations with large organisations. Targets were set at the start of 2012 to have 3 collaborative projects live during the y six projects commenced with NG participating in all of them alongside SGN and NGN participated in 3. 40 new innovative leads were collected by the EIC, 14 synopsis whe which lead to 6 projects starting in 2013. Electricity North West Northern Gas Networks Northern Power Grid Scottian Gas Networks Southern & Scottish Electric UK Power Networks Wales&West Utilities

(IFI89) 2	050 Ir	nfrastru	ıctı	ure Outlook				
Project Description	Deliver o	economic c nities on di	data ffere	to enable the evaluati nt types of fixed energy	ion of various ener gy infrastructure fro	gy infrastructure opt om now until 2050.	Y ions and ide	ear: 2012/13 ntify research
	Expe	nditure		Expenditure	Expenditure	Total Project		Status
Internal	for Cu	£11,732		for Prev FY £0	for next FY	Costs		Submitted
External		£40,000		£0	£0	£51 732	Draft	03/05/2013
Materials		£0		£0	£0	201,702	Final	21/05/2013
Total		£51,732		£0	£0		Approved	
				Ali	ignment with IFI/S	SD		
✓ 1 Low Ca Economy	rbon	The UK is technolog technolog developm successf	s to p gies. gy us nent ully,	potentially start a tran The demand pattern se. Hence, there is a r that are needed to er with minimal capital a	sition to new and c s and profile are al need to identify ke isure this transition and operational cos	changing supply cap so likely to vary with y areas of energy inf n to a low Carbon Ec st, and maximum eff	acity from di a change ir rastructure i onomy can iciency.	fferent end user research and occur
2 Eradica Fuel Pove 3 Promoti Energy Sa	ting erty ing avings							
4 Safe, Re Network	eliable							
5 Protecti Environm	ing the lent							
Technologic area / issue addressed b project	al Y	The inten As such, the partic The requ	ntion the o cular ired	is to allow the compa cost and performance type of infrastructure. breakdown for infrast	risons to be made data for each sho ructure is as follow	between the differen uld account for all as	nt types of ir spects of that	nfrastructure. at element of
		electricity in Table 30", 32", distances	niiss / trar 1) an 34" a s, so	non - data is required ismission (specifically id different pipe sizes and 36" piping). It is r heat is excluded from	on a per km basis / the AC and onshi for gas and hydro- not expected that h in the transmission	, for different ranges ore and offshore HV gen transmission (i.e eat will be transmitte requirements.	DC voltage i DC voltage i e. 16", 20", 2 ed over signi	ranges shown '4", 26", 28", ficant
		o Distrik voltage le hydrogen temperat should al	oution evel f n dist ures so in	n - as with transmissi for electricity distribut ribution (i.e. Intermec of heat distribution (i. include data for the ret	on, data is required ion (i.e. 33-6.6kV a liate, Medium and .e. using hot water urn piping and ass	d on a per km basis, and 400-230V), differ Low Pressure piping at 120oC, 70oC and ociated infrastructure	for different rent pressur) and differe d 50oC). For e.	ranges of es for gas and ent heat this
		o Storag pumped I transmiss Data sho In additio hydrogen reference	ge - o hydro sion uld r on da n. For e any	data is required for all o or Compressed Air scale storage and flow efer to typical onshor ta for underground sa r heat only large scale o energy storage below	four aforemention Energy Storage (C w batteries or utility e storage for gas a alt cavern offshore e underground then w distribution scale	ed types of energy w AES) should be use y scale batteries for of and the equivalent st storage should be in mal storage is relevance, e.g. end user stora	vector. For e d as the refe distribution I orage for hy included for b ant. The dat age.	lectricity, erence for evel storage. drogen as well. ooth gas and a should not
		o Conve same ener temperat electricity ranges de between include co	ersion ergy ure t / this escri trans onve	ns - this refers to con vector, for example, f o another (in the case should include conve bed above and in Tal smission, intermediate ensions between hot w	version from one to rom one voltage to e of heat). It should ersions between th ole 1. For gas and e, medium and low vater at 120C, 70C	ype of an energy veo another (in the cas be quoted on a per e different transmiss hydrogen this should pressure piping. W and 50C.	etor to anoth e of electrici conversion sion and dist d include con hilst for heat	er type of the ty) or from one basis. For ribution voltage oversions this should
		o Conne	ectio	ns - data is required f	or connections to,	for example, resider	ntial and con	nmercial office
		·		Summ	er 2012		natio	nal grid

(IFI89) 2050 In	frastructure Out	look		
				Year: 2012/13
	buildings on a per connect the types would be reside hydrogen it would be resi generation. Whilst for her	ction basis and an average ential, commercial office, in dential, commercial office, at only commercial office a	should be assumed for e dustrial and vehicle recha industrial, vehicle refuellin nd residential are required	ach type. For electricity arging. For gas and ng stations and power d.
	In terms of the data, para costs are required to be i	meters are required that w n GBP (pounds sterling) in	ill allow evaluation of cost real terms relative to 201	t and performance. All 0.
	The data parameters of in - Capital costs - Fixed operating and ma - Variable operating and ma - Abandonment costs - th - Repurposing costs - Efficiency - this data wo transmission and distribut connection basis for the of - Capacity - data is requira above (i.e. per km convert change due to the impact The variations in question o Time - this will provide years from 2010 - 2050, it As noted above, all cost of o Distance or scale - will distance or scale. A variation infrastructure, whilst a va factors are sufficient to re- excluded from this. o Overall volume of dep deployment of the infrastrue o UK region - how the par- regions are specified (Ea	nterest are: intenance costs maintenance costs is would include the cost of uld be a measure of the er- tion; on a per conversion b different connection types. red for the different infrastru- rsion and connection) The t of certain variations will al the are: the twariation in the above e. 2010 (historic), 2015, 2 data will be in real terms re l provide a measure of the tion in terms of distance is riation in terms of scale is the present these variations. No loyment - the variation in the ructure, e.g. the variation in trameters would vary within st. East Midlands. London.	f decommissioning the im- nergy in versus energy our asis for all conversion typ ucture types on the same degree to which the above so be captured by this Pr parameters and research 020, 2025, 2030, 2035, 20 lative to 2010. variation in the paramete relevant only for transmis only relevant for storage. /ariations to conversions and the parameters in relation in n cost through economies in different parts of the UK North East. North West.	frastructure t: on a per km basis for les; and on a per basis as described e parameters can oject. n opportunities every 5 040, 2045 and 2050. rs as a result of ssion and distribution lf appropriate, scaling and connections are to the level of overall of scale.
	Scotland, South East, So offshore regions for trans Sea, Lundy, Norfolk, Pen Humber).	uth West, Wales, West Mi mission (Channel Islands, tland, Shetlands) and two	dlands and Yorkshire & H Dogger Bank, East Scotla regions for offshore storag	lumber) as well as nine and, Hebrides, Irish ge (North Sea and
Innovation Type	SD Rating	Benefits Rating	Residual Risk	Overall Score
Incremental	Significant	7	-2	9
Expected benefits of project	- The project aims to prov heat and hydrogen netwo currently under developm opportunities or threats c Good leverage ratio i.e. 4	vide cost information conce rks. The information will be rent through IFI81 so that f an be better evaluated. 1:1 in total 5:1 for external s	erning Electric Distribution e applied to internal scena urther strategic reviews of spend only.	, Transmission, District ario based modelling f alternative
	Adoption (Year)	Duration of Benefits	Prob' of Success	Project NPV
	2013	0 yrs	25%	-£100,000
Potential for achieving expected benefits	The project has complete model is be validated by the summer of 2013. The partners, in assessing the vectors. Accordingly, the and strategy developmen potential of producing sig useful reference for future	ed its primary objective to d the Energy Technology Ins e model is intended to assis e economic implications of project serves as a suppor its. The project has provide nificant value to the ongoir e innovation studies.	levelop an infrastructure c titute and will be released st National Grid, and Ener satisfying energy demand t mechanism for further "i ed a view on areas of futur ng operation of network in	to sting model. The I to National Grid during gy Technology Institute ds from varying energy in house" energy policy re research that has the frastructure and a
Project Progress	National Grid joined the E infrastructure cost model. including transmission an purpose of the study was	Energy Technology Institute The study reviews gas, el Id distribution networks in o in part to develop more ro	e project to develop a robu ectric, district heat and hy order to develop a network bust cost information to in	ust energy /drogen networks, < cost calculator. The form long term energy
		Summer 2012	r	national grid

(IFI89) 2050 I	nfrastructure Outlook		
			Year: 2012/13
	strategy models, to gain a better understandin existing infrastructure, and to identify research	g to the practicalities of opportunities in respe	of developing new or reinforcing ective value merit order.
Collab' Partners	National Grid Transmission, E.ON, EDF, BP, Shell, Rolls Royce, Catepillatr, DECC, Defra etc	Provider(s) Ener	gy Technology Institute
	Summer 2012		national grid

								Ň	/ear: 2012/13
roject escription	To impro optimise emerger	ove the overa resources a ncy solution o	all efficiency of and provide kno of the future.	f the eme owledge	ergency process b to define busines	by trialling a s requirement	new softwents for the	vare solution e strategic so	package to oftware
	Exper for Cu	nditure rrent FY	Expenditu for Prev'	ure FY	Expenditure for Next FY	Total C	Project osts		Status Submitted
nternal		£81,275		£0	£C				
xternal	£	2384,020		£0	£C		2465,295	Draft	03/05/2013
laterials		£0		£0	£C			Final	21/05/2013
otal	£	2465,295		£0	£C			Approvea	
_				Α	lignment with IF	I/SD			
1 Low Ca Economy	rbon '	Good align day'	ment. Reducti	on in tra	vel times for field	force - less	unutilised	vehicles at o	certain times o
2 Eradica Fuel Pove	iting erty								
3 Promot Energy S	ing avings								
4 Safe, Re Network	eliable	Minor align resources a Improved n business co	ment. Improve and predict fut nanagement ir ontinuity failure	ed data c ure trenc nformatic es	apture and accurates in leakage pattern of the patt	acy. Utilisat erns. Strea resilient te	ion of hist mlined, co chnology v	orical leakag onsistent pro ve can reduc	e data to plan cesses. e the risk of
5 Protect	ing the nent	Good align day'	ment. Reduction	on in tra	vel times for field	force - less	unutilised	vehicles at o	certain times o
		0 030 011	ilstorical leaka	ige patte	rns, seasonal, we	ekend/worl	king day to	generate re	source
rea / Issue ddressed b roject	у	o Cost of the second se	Instorical leaka the optimum on in the numb vehicles within epresentation /TS offers a ea S tool produce S tool allows f etc) from this proj-	age patte resource ber of ve of the Ope of the da asy and es multip for large ect will b natch tea	rns, seasonal, we es to respond to the hicles unutilised a erational shift patt ta – the ability to clear graphical repole shift patterns of volumes of what is the fed into the start and location with we	ekend/worl ne Network tt certain tir ern. quickly see presentatio uickly whic f scenarios t locations ork location	king day to leaks and nes of the the impace n h all meet (changing work also	b generate re Emergencie day, therefo ct of changes the optimisa g shift lengths being underf	source is. re reducing the s to supply and tion criteria s, demand taken by the
rea / Issue ddressed b roject Innovation	туре	o Cost emen requiremen o To have o Reduction number of to o Visual re demand, W o The WT o The WT scenarios e o Outputs ER&R proc	the optimum on in the numb vehicles within epresentation /TS offers a ea 'S tool produce 'S tool allows f etc) from this proj- ess team to m	age patter resource ber of ven the Ope of the da asy and es multip for large ect will b hatch tea Ben	rns, seasonal, we es to respond to th hicles unutilised a erational shift patt ta – the ability to clear graphical re ole shift patterns q volumes of what is the fed into the star im location with w efits Rating	ekend/work te Network t certain tir ern. quickly see oresentatio uickly whic f scenarios t locations ork location Resid	king day to leaks and nes of the the impace h all meet (changing work also	b generate re Emergencie day, therefo ct of changes the optimisa g shift length being undert	source s. re reducing the s to supply and tion criteria s, demand aken by the verall Score
rea / Issue ddressed b roject Innovation	Y Type ntal	o Use of the requirement o To have o Reduction number of the o Visual ro demand, W o The WT o The WT scenarios e o Outputs ER&R proce SD R	the optimum on in the numb vehicles within epresentation I/TS offers a ea S tool produce S tool allows f etc) from this proj- ess team to m tating Jium	age patter resource per of ven the Oper of the da asy and for the da asy and the da asy and for the da asy asy asy asy asy asy asy asy asy for the for the f	rns, seasonal, we es to respond to th hicles unutilised a erational shift patt ata – the ability to clear graphical rep ele shift patterns q volumes of what i he fed into the star im location with w hefits Rating 17	ekend/worl ne Network tt certain tir ern. quickly see presentatio uickly whic f scenarios t locations ork location Resid	king day to leaks and nes of the the impace h all meet (changing work also h	b generate re Emergencie day, therefo ct of changes the optimisa g shift lengths being undert	source s. re reducing the s to supply and tion criteria s, demand taken by the verall Score 18
Innovation Increment Increment Increment Increment Increment	ry Type ntal enefits	o Use of the intervence of the	A knowledge to consistent of the the optimum on in the numb vehicles within epresentation (TS offers a ea (S tool produce (S tool allows f etc) from this proj- cess team to m tating dium	age patter resource per of ven of the da asy and es multip for large ect will b hatch tea Ben o configu ormed por in using eratives.	rns, seasonal, we es to respond to the hicles unutilised a erational shift patt ta – the ability to clear graphical repole shift patterns of volumes of what is the fed into the star im location with we effits Rating 17 re systems to built position concerning leakage data to of	ekend/worl ne Network tt certain tir ern. quickly see oresentatio uickly whic f scenarios t locations ork location Resid d optimum integratior optimise the	king day to leaks and nes of the the impace n h all meet (changing work also dual Risk -1 patterns in into existi e deployme	b generate re Emergencie day, therefo ct of changes the optimisa g shift lengths being undert Deing undert	source s. re reducing the s to supply and tion criteria s, demand taken by the verall Score 18 vithin multiple at a later date. ces that will
Innovation Increment Increment Increment Increment	Type ntal	o Use of the original of the o	the optimum on in the numb vehicles within epresentation (TS offers a ear (S tool produce (S tool allows f etc) from this proj- ess team to m thating dium d knowledge to occesses. Info d methodology rel time for ope (Year)	age patter resource per of ven the Ope of the da asy and es multip for large ect will b hatch tea Ben o configu or configu or using eratives. Durati	rns, seasonal, we es to respond to the hicles unutilised a erational shift patt ta – the ability to clear graphical repole shift patterns of volumes of what is the fed into the star im location with we effts Rating 17 re systems to buil position concerning leakage data to co on of Benefits	ekend/worl ne Network tt certain tir ern. quickly see presentatio uickly whic f scenarios t locations ork location Resid d optimum integratior optimise the Prob' o	king day to leaks and nes of the the impace h all meet (changing work also dual Risk -1 patterns in into existi e deployment of Succes	b generate re Emergencie day, therefo ct of changes the optimisa g shift length being undert Deing undert O n the future v ing systems ent of resour s	source s. re reducing the s to supply and tion criteria s, demand caken by the verall Score 18 vithin multiple at a later date. ces that will Project NPV
Innovation Increment	Y Type ntal enefits	o Use of the requirement o To have o Reduction number of the o o Visual red demand, Wo o The WT o The WT scenarios e o Outputs ER&R proce SD R Meet - Enhanced reduce trav Adoptio	the optimum on in the numb vehicles within epresentation (TS offers a ea (S tool produce (S tool allows f etc) from this proj- ess team to m tating dium d knowledge to ocesses. Info d methodology vel time for ope (Year)	age patter resource per of ven the Ope of the da asy and es multip for large ect will b hatch tea Ben o configu prined po in using eratives. Durati	rns, seasonal, we es to respond to the hicles unutilised a erational shift patt ata – the ability to clear graphical rep ble shift patterns of volumes of what is ne fed into the star im location with we nefits Rating 17 re systems to buil osition concerning leakage data to of on of Benefits 1 yrs	ekend/worl ne Network tt certain tir ern. quickly see presentatio uickly whic f scenarios t locations ork locations ork location Resid d optimum integration optimise the Prob' o	king day to leaks and nes of the the impace h all meet (changing work also dual Risk -1 patterns in into exist e deployment of Succes	b generate re Emergencie day, therefo ct of changes the optimisa g shift length being undert O n the future v ing systems ent of resour s F	source s. re reducing the s to supply and tion criteria s, demand taken by the verall Score 18 vithin multiple at a later date. ces that will Project NPV £2,534,705
Innovation Increment roject Increment roject Increment roject Increment roject Increment roject Increment roject Increment roject Increment roject	Type ntal mefits	o Use of the second sec	A the optimum on in the numb vehicles within epresentation (TS offers a ear (S tool produce (S tool allows f etc) from this proj- eases team to m the time dium d knowledge to occesses. Info d methodology rel time for ope (Year) (13) is in the deploy	age patter resource per of ven the Ope of the da asy and for large ect will b hatch tea Ben o configu or uning eratives. Durati ment of	rns, seasonal, we es to respond to the hicles unutilised a erational shift patt ata – the ability to clear graphical rep ole shift patterns of volumes of what is the fed into the star un location with we effits Rating 17 re systems to buil osition concerning leakage data to of on of Benefits 1 yrs emergency resources	ekend/worl ne Network tt certain tir ern. quickly see presentatio uickly whic f scenarios t locations ork locations ork location Resid d optimum integratior optimise the Prob' o rces are ex	king day to leaks and nes of the the impace h all meet (changing work also dual Risk -1 patterns in into existi e deployme 50% pected in N	b generate re Emergencie day, therefo ct of changes the optimisa g shift length being undert Deing undert O n the future v ing systems ent of resour s F Winter 2013/	source s. re reducing the s to supply and tion criteria s, demand caken by the verall Score 18 vithin multiple at a later date. ces that will Project NPV £2,534,705 2014.
Innovation Incremen Expected be f project Potential for chieving xpected be Project Prog	Type ntal enefits nefits gress	o Use of the second sec	the optimum on in the numb vehicles within epresentation (TS offers a ear 'S tool produce 'S tool allows f etc) from this proj- eess team to m thating dium d knowledge to occesses. Info d methodology rel time for ope n (Year) 113 is in the deploy	age patter resource ber of ven the Ope of the da asy and es multip for large ect will b hatch tea Ben o configu or using eratives. Durati ment of opvative s potations of	rns, seasonal, we es to respond to the hicles unutilised a erational shift patt ta – the ability to clear graphical repole shift patterns of volumes of what is e fed into the star im location with we effits Rating 17 re systems to buil soliton concerning leakage data to co on of Benefits 1 yrs emergency resources, and p tware emergency	ekend/worl ne Network tt certain tir ern. quickly see oresentatio uickly whic f scenarios t locations ork locations ork location Resid d optimum integration optimise the Prob' o crees are ex as improve roviding kn solution of	king day to leaks and nes of the the impace h all meet (changing work also h dual Risk -1 patterns in into exist e deployme of Succes 50% pected in h d the over owledge to the future.	b generate re Emergencie day, therefo ct of changes the optimisa g shift length being undert Deing undert O n the future v ing systems ent of resour s F Winter 2013/ rall efficiency o define busi	source s. re reducing the s to supply and tion criteria s, demand taken by the verall Score 18 vithin multiple at a later date. ces that will Project NPV £2,534,705 2014.
Innovation Incremer xpected be f project 'otential for chieving xpected be roject Prog	Type ntal enefits refits gress ners	o Use of the second sec	the optimum on in the numb vehicles within epresentation (TS offers a ear (S tool produce (S tool allows f etc) from this proj- ess team to m tating dium d knowledge to ocesses. Info d methodology rel time for ope (Year) (Year) (S in the deploy) g of a new inno process by op its for the strat	age patter resource per of ven the Ope of the da asy and es multip for large ect will b hatch tea Ben o configu ormed po in using eratives. Durati ment of	rns, seasonal, we es to respond to the hicles unutilised a erational shift patt ta – the ability to clear graphical rep ble shift patterns of volumes of what is the fed into the star un location with we effits Rating 17 re systems to buil osition concerning leakage data to of on of Benefits 1 yrs emergency resources, and p tware emergency Provide the star of tware solution here	ekend/worl ne Network tt certain tir ern. quickly see presentatio uickly whic f scenarios t locations ork locations ork location Resid d optimum integration optimise the Prob' o rces are ex as improve roviding kn solution of rovider(s)	king day to leaks and nes of the the impace n h all meet (changing work also dual Risk -1 patterns in into existi e deployme of Succes 50% pected in N ed the over owledge to the future.	b generate re Emergencie day, therefo ct of changes the optimisa g shift lengths being underf D D n the future v ing systems ent of resour s S Winter 2013/ call efficiency o define busi	source s. re reducing the s to supply and tion criteria s, demand taken by the verall Score 18 vithin multiple at a later date. ces that will Project NPV £2,534,705 2014. of the ness
(IL100) S	Supas	pray						v	ear: 2012/13
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Project Description	Increase gas esc	e the utilisatio apes in the m	on of internal N nost cost effec	Mainsprag tive man	y repair techniqu ner.	e to reduc	e leakage a	nd resolve pu	blic reported
	Expe for Cu	nditure Irrent FY	Expenditu for Prev'	ure FY	Expenditure for Next FY	Tota	al Project Costs		Status Submitted
Internal		£4,922		£0	£	0			
External		£17,500		£0	£		£39,922	Draft	02/05/2013
Materials		£17,500		0£	£	0		Final	21/05/2013
Total		£39,922		£0	£	0		Approved	
		[Α	lignment with IF	I/SD			
L 1 Low Ca Economy	rbon								
2 Eradica Fuel Pove	ting erty								
3 Promoti Energy Sa	ing avings								
✓ 4 Safe, Re Network	eliable	The wider g current read actual block treat targete	joal is that the ctive use. By i kers it will be p ed areas of kn	e system mproving possible f lown risk	will become a pro the performance to deploy mainsp	eventative e of the eo ray during	maintenan quipment ar periods of	ce technique nd removal of low leakage.	rather than its perceived and This will then
✓ 5 Protecti Environm	ng the ent	The increas excavation the use of a	sed use in app requirements a system to mi	olication of necessa inimise th	of the internal ma ry to resolve pub ne impact our wo	inspray s lic reporte rks have o	vstem will so d escapes. on the trave	ee a reductior It will allow te Iling public.	n in the ams to request
Technologic area / issue addressed b project	al y	o Combine carried out joint o Increase diameter m o A review identified du further can	e the Internal to identify and the length wi ains of the develo uring the leaka be leveraged.	Spray he I locate tl hich can opment a age work	ad with an Intern he potential sourd be inserted by 2 nd benefits obtai shop exist or if fu	al Inspect ce of leak 5%, this is ned to det irther final	ion Camera age and ens especially ermine if th ncial gains f	a to enable a f sure accurate important in the e perceived b from developin	ull survey to be spraying of the ne larger lockers ng the system
Innovation	Туре	SD R	ating	Ben	efits Rating	Res	sidual Risk	O	verall Score
Incremen	ntal	Signit	ficant		13		-1		14
Expected be of project	nefits	- Improvem be deployed - The increa excavation the use of a	ents in interna d easily and w ased use in ap requirements a system to m	al sprayir /ith more pplication necessa inimise th	ng should see inc confidence that of the internal m ry to resolve pub ne impact our wo	reased ta current lev ainspray lic reporte rks have o	rgeted use vels have ac system will d escapes. on the trave	that will allow chieved. see a reductio It will allow te lling public.	the system to on in the ams to request
		Adoptio	n (Year)	Durati	on of Benefits	Prob	of Succes	is P	roject NPV
		20	13		2 yrs		50%		£62,814
Potential for achieving expected be	nefits	Benefits rer	nain on track.						
Project Prog	ress	The Interna enable a ful ensure acci	I Spray head II survey to be urate spraying	has beer carried o of the jo	n successfully into out to identify and pint.	egrated w d locate th	ith an Interr e potential	al Inspection source of leal	Camera to kage and
Collab' Partr	ners				P	rovider(s) ALH Ltd		
				Second	n or 2012			natio	nal arid
				Sum	nci 2012			natio	naigi iu

(IL102) N	/IEG I	mproven	nent					Vear: 2012/13
Project Description	To asse effective	ss the practic eness of the c	al and financ urrent Gas C	ial feasib onditionir	ility of the technong process	logy offered by T	TP to signific	antly improve the
	Expe for Cu	nditure rrent FY	Expendit for Prev'	ure FY	Expenditure for Next FY	Total Proje Costs	ect	Status
Internal		£4,861		£0	£8,403	3		Submitted
External		£52,000		£0	£30,00) £98,	784 D	raft 02/05/2013
Materials		£0		£0	£	0	Fi	inal 21/05/2013
Total		£56,861		£0	£38,403	3	Approv	ved
				Α	lignment with IF	FI/SD		
1 Low Ca Economy	rbon							
2 Eradica Fuel Pove	ting erty							
✓ 3 Promot Energy Sa	ing avings	Savings in r	esources wit	h not hav	ing to undertake	unnecessary wo	rk.	
✓ 4 Safe, Re Network	eliable	Some minor create local worst case	r improvemer sed concenti mains blocka	nt in redu rations of ges	cing MEG drop o condensed fluid	ut, ie the tenden thereby creating	cy for current restriction to	MEG fogging to gas flow and in the
5 Protecti Environm	ing the ient	The technol leakage fror	ogy, if prover n lead yarn jo	n, could s pints and	ignificantly impro thereby reducing	ve MEG saturati emissions	on levels and	hence reduce
Technologic area / issue addressed b project	al y	 Controllable MEG saturation levels Linking the volume of MEG input at any point in time to downstream demand 						
Innovation	Туре	SD Ra	ating	Ben	efits Rating	Residual	Risk	Overall Score
Incremer	ntal	Signif	icant		16	-1		17
Expected be of project	nefits	- The currer more contro	t average MI llable, efficie	EG satura nt system	ation level is 22% 1.	. The technolog	y provides a r	neans to have a
		Adoption	n (Year)	Durati	on of Benefits	Prob' of Su	ccess	Project NPV
		20	14		7 yrs	50%		£8,245,502
Potential for achieving expected be	nefits	Benefits will	be establish	ed during	the stage 2 trial	which is planned	to take place	e during 2013-14.
Project Prog	ress	A feasibility technologies provide a m trial.	study has be s. The feasik ore consister	en carrie bility has o nt MEG s	d out on the pote confirmed that it aturation level. V	ential use of an a may be possible Vork is progressi	alternative to e to scale the t ng to identify	existing MEG echnology to 2 sites for potential
Collab' Partr	ners				P	rovider(s) The	Technology	Partnership
				Sumn	ner 2012		na	tional grid

(IL103) (Project Description	Jnpig To deve	lop a strategy	pelines	ent of GDUK high pr	essure pipe	lines not cu	Y rrently inter	ear: 2012/13 nally inspected.
sesonption	Exper	nditure	Expenditure	Expenditure	Total	Project		Status
Internal	lor Cu	£20,609	£0	£	0	USIS		Submitted
External		£89,767	£0	£	0		Draft	07/05/2013
/aterials		£1,040	£0	£	0	2111,410	Final	21/05/2013
otal	£	2111,416	£0	£	0		Approved	
				Alignment with I	=I/SD			
] 1 Low Ca	rbon			·				
Economy 2 Eradica Fuel Pove	/ iting erty							
3 Promot Energy S	ing avings							
4 Safe, R Network	eliable	Early detect divert and re	ion of pipeline defe econfigure the network	ects and interference work, undertake repa	e damage w iir work and	ill facilitate minimize ri	prompt inter sk to securit	vention to ty of supply.
Environm	nent							
echnologic rea / issue ddressed b roject	al y	o Trial and o Developi piggable 6"	Demonstration of ment and testing o pipelines	a piggable 6" pipelir f a risk based mana	ne gement app	roach to su	pport the se	lection of non
Innovation	Туре	SD Ra	ating I	Benefits Rating	Resid	dual Risk	O	verall Score
Incremen	ntal	Med	ium	11	3			8
xpected be f project	enefits	- Improved I assessment	knowledge of curre techniques. Impro	wledge of current in-line inspection capat chniques. Improved pipeline inspection p		nd alternati ation metho	ve above gr dology and	ound strategy.
		Adoption	n (Year) Du	ration of Benefits	Prob' o	of Success	Р	roject NPV
		20	13	0 yrs		50%		-£111,416
otential for chieving xpected be	nefits	Potential to	inform our risk mo	del and inform Asse	t Managem	ent Strategy	1.	
roject Prog	gress	Undertake a help pigg 6	a number of field tr inch pipeline popu	ials to determine applation.	propriatenes	s /suitabilit	y of two tech	nnologies to
Collab' Parti	ners			F	Provider(s)	Corrosion Denton, B	Services, G BUS	L Noble
			Sı	ummer 2012			natio	nal grid

(IL104) I	E-pipe	es							
								Y	ear: 2012/13
Project Description	Access ascertai procedu	the ePIPE tec n what resin d Iral processes	hnology to es evelopments need to be in	tablish its are need	s suitability for ed, what equip ed.	the application	on of riser is need to	repair. The p be altered and	oroject will d what
	Expe for Cu	nditure Irrent FY	Expenditu for Prev'	ire FY	Expenditur for Next F	e Total (C	Project osts		Submitted
Internal		£4,140		£0	£7,7	95			Cabinitiou
External		£44,290		£0	£44,2	90	£177,161	Draft	02/05/2013
Materials		£0		£0		£0		Final	21/05/2013
Total		£48,430		£0	£52,0	85		Approved	
				Ali	gnment with	IFI/SD			
1 Low Ca Economy	arbon /	This technol	ogy will preve	ent leaks a	and thus help	o reduce gas	s usage.		
2 Eradica Fuel Pov	ating erty	Many vulner make these	able custome environments	rs are ho safer.	used in buildir	gs that conta	ain gas rise	ers. This syste	em will help to
✓ 3 Promot Energy S	ting avings	Substantial r study.	eduction and	avoidanc	ce of gas leaks	, following in	nplementa	tion of the out	come of this
✓ 4 Safe, R Network	eliable	After a gas r	iser has been	treated t	he supply of g	as should no	t be interr	upted.	
✓ 5 Protect Environn	ing the nent	Reduced can Preventing g Benefits to a	rbon footprint as leaks is be high populat	for gas ri eneficial t ion of affe	sers, following to the environn toted sites (eg	implementa ent as meth 40%-60% lo	tion of the ane is a po cations)	outcome of tl otent greenhc	nis study. Juse gas.
Technologio area / issue addressed b project	cal Dy	o A technology assessment to include some critical tests necessary to confirm suitability.							bility.
Innovation	Туре	SD Ra	ting	Bene	fits Rating	Resi	dual Risk	O	verall Score
Substitu	tion	Medi	um		27		-5		32
Expected be of project	enefits	 Ascertain v what proced Using ePIF 	vhat resin dev ural processe 'E may provid	velopmen es need to le a more	ts are needed be implemen cost effective	what equipn ted. solution to fu	nent desig ull replace	ns need to be ment.	e altered and
		Adoption	(Year)	Duratio	n of Benefits	Prob'	of Succes	s P	roject NPV
		201	3		10 yrs		25%	5	21,616,718
Potential for achieving	r	This project performance	started in Jan	uary 201	3 and is expec	ted to delive	r benefits t	to safety and	network
Project Pro	gress	The output f	rom Stage 1 v	will be val	idation of the	echnology.			
Collab' Part	ners	NGN, SGN				Provider(s)	Energy I Restorat	nnovation Ce tion Services	ntre, Pipe
	Summer 2012 nationalgri								nal grid

concept of a remote d metallic carrier pip le context of it's pote re Expendi FY for Prev 339 245 £0 384 inating service conr	connection betwee pe) and a PE servic ential application to iture Experimentary r' FY for N £0	n a replacement e (inserted within the 'TORS' objec aditure Tota ext FY 0 £0 £0 £0 £0 with IFI/SD gement, noticing	PE main (inserte a de-commission tive. Il Project Costs £61,384 App and council inter	Yea ed within a ned metalli Draft Final proved raction.	ar: 2012/13 de- c carrier Status Submitted 02/05/2013 21/05/2013		
concept of a remote d metallic carrier pip le context of it's pote re Expendi FY for Prev 339 045 £0 384 iinating service conr	connection betwee be) and a PE servic ential application to iture Experience 'FY for N £0	n a replacement (inserted within the 'TORS' objec diture Totz ext FY £0 £0 £0 \$0 with IFI/SD gement, noticing	PE main (inserte a de-commission tive. al Project Costs £61,384 App and council inter	ed within a ned metalli Draft Final proved raction.	de- c carrier Status Submitted 02/05/2013 21/05/2013		
re Expendi FY for Prev 339 045 £0 384 inating service conr	ture Expendence 20 for N 20	editure Tota ext FY £0 £0 £0 £0 £0 with IFI/SD gement, noticing	1 Project Costs £61,384 App and council inter	Draft Final proved raction.	Status Submitted 02/05/2013 21/05/2013		
inating service conr	£0 £0 £0 £0 £0 £0 £0 £0 Alignment nection traffic mana	£0 £0 £0 £0 £0 £0 gement, noticing	£61,384 Ap	Draft Final proved raction.	Submitted 02/05/2013 21/05/2013		
145 £0 1884 10 10 10 10 10 10 10 10 10 10	£0 £0 £0 £0 £0 Alignment nection traffic mana	£0 £0 £0 with IFI/SD gement, noticing	£61,384 App and council inter	Draft Final proved raction.	02/05/2013 21/05/2013		
£0 384 iinating service conr	£0 £0 Alignment nection traffic mana	£0 £0 with IFI/SD gement, noticing	Ap	Final proved raction.	21/05/2013		
inating service conr	£0 Alignment	£0 with IFI/SD gement, noticing	Ap	raction.			
inating service conr	Alignment	with IFI/SD gement, noticing	and council inter	raction.			
inating service conr	nection traffic mana	gement, noticing	and council inter	raction.			
inating service conr							
inating service conr							
inating service conr							
Eliminating service connection excavation, operation and reinstatement logistics costs and effort and reduced potential for LTI's. Reducing customer and third party disruption, increasing custom satisfaction.							
uce environmental i irement for landfill c	mpact by minimizir of excavated spoil.	g all associated w	vorks as above i	ncluding th	e		
Produce a proof of c in a de-commission allic carrier pipe with	oncept of a remote ed metallic carrier p nin the context of it'	connection betwe ipe and a PE ser potential applica	en a replaceme vice inserted witl tion within the 'T	nt PE main hin a de-co FORS' obje	inserted mmissioned ctive.		
SD Rating	Benefits Rat	ng Res	idual Risk	Ove	rall Score		
Medium	5		-3		8		
wledge to inform if t	he proof of concep	is achievable.					
doption (Year)	Duration of Be	nefits Prob	of Success	Pro	ject NPV		
2013	0 yrs		25%	-£	61,384		
output of this projec nection of PE mains	ct has increased the and services in the	understanding o replacement cor	f the issues asso ntext.	ociated with	n remote		
output of this project nection of PE mains project commenced wed with minimum	t has increased the and services in the d with a proof of co streetworks interve	e understanding o replacement cor ncept to see if rep ntion.	f the issues asso ntext. placement mains	ociated with	h remote ces could be		
output of this project nection of PE mains project commenced wed with minimum POC report has not er NIA	ct has increased the and services in the d with a proof of co streetworks interve w been completed a	e understanding o replacement cor ncept to see if rep ntion.	f the issues asso ntext. placement mains ation to taking pl	ociated with s and servio lace for futu	h remote ces could be ure work		
	Iuce environmental i irement for landfill of Produce a proof of c in a de-commission allic carrier pipe with SD Rating Medium wledge to inform if t Adoption (Year) 2013	Backonn Juce environmental impact by minimizing uirement for landfill of excavated spoil. Produce a proof of concept of a remote of in a de-commissioned metallic carrier p allic carrier pipe within the context of it's SD Rating Benefits Rati Medium 5 wledge to inform if the proof of concept Adoption (Year) Duration of Ber 2013 0 yrs	Baction: Juce environmental impact by minimizing all associated wirement for landfill of excavated spoil. Produce a proof of concept of a remote connection betwee in a de-commissioned metallic carrier pipe and a PE ser allic carrier pipe within the context of it's potential applica SD Rating Benefits Rating Res Medium 5	Baction: Juce environmental impact by minimizing all associated works as above i jirement for landfill of excavated spoil. Produce a proof of concept of a remote connection between a replaceme in a de-commissioned metallic carrier pipe and a PE service inserted wit allic carrier pipe within the context of it's potential application within the 'T SD Rating Benefits Rating Residual Risk Medium 5 -3 wledge to inform if the proof of concept is achievable. Prob' of Success 2013 0 yrs 25%	Jucce environmental impact by minimizing all associated works as above including th Jurement for landfill of excavated spoil. Produce a proof of concept of a remote connection between a replacement PE main in a de-commissioned metallic carrier pipe and a PE service inserted within a de-co allic carrier pipe within the context of it's potential application within the 'TORS' obje SD Rating Benefits Rating Residual Risk Ove Medium 5 -3		

(IL110) Ir	nterna	al Stress	Corrosi	on Cra	acking					
										Year: 2012/13
Project Description	To unde pipeline:	erstand and de s previously us	velop a meth sed to transp	nod to ass ort manuf	ess the threat actured gas.	t of in	iternal stre	ss corros	ion crackin	g (ISCC) in
L	Exper for Cu	nditure rrent FY	Expenditu for Prev'	ure FY	Expenditur for Next F	re Y	Total P Cos	roject sts		Submitted
Internal		£1,035		£0	£1,7	716				Cubinitiou
External		£9,500		£0	£9,5	500	£	22,932	Draft	03/05/2013
Materials		£250		£0	£2	250			Final	21/05/2013
Total		£10,785		£0	£11,4	166			Approved	
				Ali	gnment with	IFI/S	SD			
1 Low Car Economy	bon									
2 Eradicat Fuel Pove	ing rty									
3 Promoti Energy Sa	ng wings									
✓ 4 Safe, Re Network	liable	Security of s	upply throug	h improve	d knowledge	of the	e threat of	ISCC		
5 Protecti Environm	ng the ent									
Technologica area / issue addressed by	al V	o Undertak presence of sample may	e internal ins ISCC (deper be required	pection (N nding on th during a s	API) of six pip ne outcome of ubsequent sta	e sar f the i age).	nples retrie	eved from a more d	Lamesley etailed insp	to confirm the pection of each
		o Develop a likely to cont ISCC would o Identify a pipeline supp	a threat asse ain ISCC and most likely b nd attempt to blied.	essment al d develop de located. do map the	lgorithm to en guidelines to different gas	able i ident manı	identificatio tify where a ufacturing p	on of thos along the processes	se pipelines pipeline ro s in the UK	that are most ute that the by area and/or
		o Identify th	ie gas manu	facturing p	process assoc	ciated	d with Lame	esley sind	ce its const	ruction.
Innovation	Туре	SD Ra	ting	Bene	fits Rating		Residu	al Risk	(Overall Score
Incremen	tal	Medi	um		9			0		9
Expected be of project	nefits	- Understand	ling the exte	nt of the th	nreat of ISCC	to th	e integrity	of the gas	s pipeline n	etworks.
		Adoption	(Year)	Duratio	n of Benefits	;	Prob' of	Success	6	Project NPV
		201	3		0 yrs		25	5%		-£89,569
Potential for achieving expected ber	nefits	Expected to	deliver outpu	uts of finar	ncial, knowled	ge ar	nd network	performa	ance benef	ts
Project Prog	ress	Stage 1 com	menced in F	ebruary 2	013 and com	orises	s of feasibi	lity and p	reliminary a	assessments.
Collab' Partn	ers	NGN, SGN,	WWU			Pro	vider(s)	Energy Ir Denton	novation C	entre, GL Noble
				Summ	er 2012				natio	onal grid

(IL117) (Optica	al Methar	ne Sensii	ng Sys	stem - Op	otiSc	i			
									Year: 2012/13	
Project Description	Develop detectio	ment of a mo n and locatior	bile, optical m n of gas leaks	iethane s into and	ensing system within cable or	for ga simila	is escape teams ir ducting.	s to use in urb	an areas for	
	Exper for Cu	nditure rrent FY	Expenditu for Prev'	ire FY	Expenditure for Next F	e Y	Total Project Costs		Submitted	
Internal		£1,333		£0	£8,3	42			Cubinitiou	
External		£14,256		£0	£47,3	99	£226,846	Draft	21/05/2013	
Materials		£0		£0		£0		Final	21/05/2013	
Total		£15,589		£0	£55,74	41		Approved		
				Ali	ignment with	IFI/SD)			
 1 Low Ca Economy 2 Eradica 	rbon / iting	Rapid leak l	ocation and re	educed re	pair time minir	mises	gas losses from	the distribution	on network.	
Fuel Pove	erty ing									
Energy S	avings	Lloing this to								
V 4 Safe, R Network	eliadie	o Substant reliability of o Significa o Decrease	ially improve the gas netwo ntly reduce the the overall c	the gas le ork. e gas lea ost of lea	eak identification k identification k identification	on proc and re and r	cess and hence epair time. epair cost for ga	the integrity, as distributors	safety and	
✓ 5 Protect Environn	ing the nent	 Faster gas leak location reduces fugitive methane (a potent greenhouse gas) emissions to the atmosphere Reduced fugitive gas emissions and all optical sensing technique with no spark risk makes it inherently safer for the workforce and public Reduced excavation work required prior to locating the gas leak, hence minimising transport disruption and third party risk 								
Technologic area / issue addressed b project	al Dy	Using Tunea technical be sensing tech o Self-refe o Zero gas o No high o 100%v/v me o Sensor a o Methane to extract ga o Actual ga time on the	able Diode La nefits to this s nniques: rencing TDLS cross-sensiti concentration ethane re intrinsically measuremen as and hence as concentrati remote instru	ser Speci solution b technolo vity as las gas level v safe with t made ir disrupt th on distrib ment, ass	troscopy (TDL eyond the ope gy means no o ser tuned to on measurement h no spark risk h the service di e local concen ution along du sisting rapid ide	S) and rationa calibra ily deta t satura t satura or pos uct, so htration ct mea entifica	fibre optic tech al ones above w tion drift and no ect methane ation, as system ssibility of electro no data update at the measure asured at severa tion of the gas l	nology confer hen compare requirement a can reliably ical interferent e delays cause ement point in al points and c leak location.	s other d to other for re-calibration detect up to ce ed by the need the duct displayed in real-	
Innovation	Туре	SD Ra	ating	Bene	fits Rating		Residual Risl	к С	verall Score	
Increme	ntal	Medi	um		7		-2		9	
Expected be of project	enefits	- Rapid leak	location and	reduced I	repair time mir	nimises	s gas losses fro	m the distribu	tion network.	
		Adoption	n (Year)	Duratio	on of Benefits		Prob' of Succe	ss l	Project NPV	
		201	15		0 yrs		25%		-£213,064	
Potential for achieving expected be	nefits	The anticipa	ted output wil	l be impre	ovements to th	ie envi	ronment, netwo	rk performand	ce and financial.	
Project Prog	gress	Project com	menced in Fe	bruary 20	013. Stage 1 is	Proof	of Concept.			
Collab' Part	ners	NGN, SGN				Provi	der(s) Energy	Innovation C	entre. OptoSci	
				Summ	er 2012			natio	onal grid	

(IL120) \	/entin	g Contro	ollers						Year: 2012/13
Project Description	To provi	de a robust m	easurement	and evalu	ation of the en	nissio	on rates from selec	ted venting	controllers.
	Exper for Cu	nditure rrent FY	Expenditu for Prev'	ire FY	Expenditur for Next F	e (Total Project Costs		Status Submitted
Internal		£20,742		£0	£24,3	04			
External	£	109,077		£0	£138,0	88	£357,034	Draft	21/05/2013
Materials		£56,435		£0		£0		Final	21/05/2013
Total	£	186,254		£0	£162,3	92		Approved	
				AI	ignment with	IFI/SI	D		
✓ 1 Low Ca Economy	rbon	Reduced ca following im	rbon footprint plementation	for AGI s	site operations tcome of this s	relate tudy.	ed to valve position	ners and co	ntrollers,
2 Eradica Fuel Pove	ting erty								
✓ 3 Promot Energy S	ing avings	Reduced los	sses of natura	al gas at A	AGIs, following	imple	ementation of the	outcome of	this study.
4 Safe, Re Network	eliable								
✓ 5 Protecti Environm	ing the ient	Reduced ca following im	rbon footprint plementation	for AGI s	site operations tcome of this s	relate tudy.	ed to valve position	ners and co	ntrollers,
addressed b project	У	 approaches o Laboratory tests on a Bristol Babcock and Becker controller will be included, with tests to establish: that the manufacturers quoted release rates can be validated; the correlation betwee control pressure and vent rate and the validation of the off-site measurement method. o Initial site tests on up to ten sites covering all the controller vents at each site. This work will on individual controllers, investigating the impacts of actuation pressure, controller type and ot installation specific parameters. o Site test work at four selected sites to cover a continuous 24-hour period at three times over year proposed mid-summer, 'shoulder' month and mid-winter, to establish the impact of flows network demand. o Correlation of the measured emission rates/controller types with data from DNCC to estable 							tests to tion between d. s work will focus ype and other times over the to of flows and C to establish if study.
Innovation	Type	SD Ra	ating	Bene	efits Rating		Residual Risk	(Overall Score
Incremer	ntal	Medi	um		12		1		11
Expected be of project	nefits	- Currently, a estimate is the for each of the Venting, a native type of vention associated with through the that the revised	AGI Venting a based on a Na he five Natior ew model is r ng equipmen with asset rep incentive. The sed methodol	at 84GWh ational fig nal Grid L required t t on site. lacement e new mo ogy resul	n represents ap jure reported in DZs. In order t hat is 'activity' With this type t can be captur idel needs to b tts in a robust a	oproxi o red based of mo ed wi e den asses	imately 5% of over 94 Watt Committe uce the calculated d, i.e. one that is b odel in place, any r ithin the leakage n nonstrated to Ofge sment of AGI Ven	rall emission be report an l level of em based on the reduction in nodel and b bem and Ship ting.	as. However, this d is fixed value issions for AGI e number and emissions e rewarded opers to show
		Adoption	n (Year)	Duratio	on of Benefits		Prob' of Succes	s	Project NPV
		201	3		8 yrs		50%		£2,485,137
Potential for achieving expected be	nefits	Significant r	eduction in ga	as emissi	ons.				
Project Prog	ress	Undertake a controllers v	nalysis and s vith non gas	upporting venting c	field trials to controllers.	detern	mine opportunity to	o replace ga	s venting
Collab' Partr	ners					Prov	ider(s) GL Noble	e Denton	
				Summ	ver 2012			natio	onal grid

scription typescription typesc	Expenditure or Current FY £644 £4,006 £0 £4,650	Expenditur for Prev' F	e Expenditure for Next FY £0 £2,690 £0 £0 £0 £0	Total Project Costs		Status
fi Iternal xternal laterials otal 1 Low Carbo Economy	Expenditure for Current FY £644 £4,006 £0 £4,650	Expenditur for Prev' F	e Expenditure for Next FY £0 £2,690 £0 £0 £0 £0	Total Project Costs £95,873		Status Submitted
tternal	£644 £4,006 £0 £4,650		E0 £2,690 £0 £2,690 £0 £0 £0 £0	£95,873		Submitted
xternal laterials otal 1 Low Carbo Economy	£4,006 £0 £4,650		03 03 03 03 03 03 03 03 03 03 03 03 03 0	£95,873		
aterials otal 1 Low Carbo Economy	£0 £4,650		£0 £0	, -	Draft	02/05/2013
tal 1 Low Carbo Economy	£4,650		00 00 000		Final	21/05/2013
1 Low Carbo Economy	n		£0 £2,690		Approved	
1 Low Carbo Economy	n		Alignment with IF	I/SD		
2 Eradicatin	g					
3 Promoting						
Energy Savi	ngs					
4 Safe, Relia	ble Good align	ment. This wor	k will validate whether the	e current concepts buil	t on 1947 d	ata, reliable
Network	assessmer	nt of both plastic	and permanent deforma	ition, conformance to Is	SO standar	ds and suitab
5 Protecting	the	as transport rev				
Environmen	t					
chnological	o Use cor	mputational fluic	dynamics (CFD) to calc	ulate the actual load di	stribution or	n the orifice
dressed by	plate for a o Use fini	worst possible of the element anal	ase (stage 2). ysis (FEA) to calculate th	e behaviour of the orifi	ce plate un	der the load
roject	distribution	calculated from	the CFD for a worst pos	sible case .		
Innovation Ty	pe SD F	lating	Benefits Rating	Residual Risk	,0 	/erall Score
Significant	IVIEd	ulum	17			10
project	Ints - Modern c Improves t Makes kno and tracea Provides a - Reduces	omputational te he traceability fo wn any problem ble assessment uditable conform difficult removal	chniques now provide a r r measurement errors s associated with existin- acceptable to all and alig nance to the ISO5167 an of deformed orifice plate	neans for developing e g calculation tools. Pro gnment of all calculatio d ISO12767 standards ss or more frequent ren	existing know ovides a rok n tools noval to fac	wiedge. bust, definitive ilitate manual
	assessmer - Reductior orifice plate	n in costs and e	fort for re-machining orifi	ice plates and removin	g/replacing	deformed
	assessmer - Reductior orifice plate Adoptic	n in costs and e es. on (Year)	fort for re-machining orifi	Prob' of Success	g/replacing	deformed roject NPV
	assessmer - Reduction orifice plate Adoptic 20	n in costs and e es. on (Year)	fort for re-machining orifi Duration of Benefits 7 yrs	Prob' of Success	g/replacing P	deformed roject NPV £80,199
otential for hieving pected benef	assessmer - Reduction orifice plate Adoptic 20 This projec knowledge	t in costs and e es. (Year) 14 t is expected to benefits.	fort for re-machining orifi Duration of Benefits 7 yrs deliver environmental, ne	Prob' of Success 25% etwork performance, fin	g/replacing P nancial, safe	deformed roject NPV £80,199 ety and
otential for hieving pected benef roject Progres	assessmer - Reduction orifice plate Adoptic 20 This project knowledge its Stage 2 ha Element Al	on (Year) 14 t is expected to benefits. s recently been nalysis reviews.	fort for re-machining orifi Duration of Benefits 7 yrs deliver environmental, ne commissioned which ent	Prob' of Success 25% etwork performance, fin tails Computation Fluid	g/replacing P nancial, safe	deformed roject NPV £80,199 ety and and Finite

(IL142) S	ealba	ack II							
								•	/ear: 2012/13
Project Description	To devel locations junction) techniqu	op and succe s of engineeri in a safe, eff e.	essfully trial ng difficulty icient and pr	an improv (short leng ractical ma	ed method to re oths of main tha anner and to ag	place t conn ree an	short lengths of ects onto its pare efficient implem	metallic mair ent main in a entation stra	n in specific major road tegy for the
	Exper for Cu	nditure rrent FY	Expendi for Prev	ture ' FY	Expenditure for Next FY	e v	Total Project Costs		Status
Internal		£12,566		£0	£14,88	36			Submitted
External	£	121,772		£0	£84,5	77	£243,801	Draft	02/05/2013
Materials		£10,000		£0	5	20		Final	21/05/2013
Total	£	144,338		£0	£99,46	63		Approved	
				Α	lignment with	IFI/SD			
1 Low Car Economy	rbon								
2 Eradicat Fuel Pove	ting erty								
3 Promoti Energy Sa	ng avings								
4 Safe, Re Network	eliable	With the new located in a operational	w RIIO Tier reas of engir expenditure	1 replacen neering dif and risk.	nent policies fro ficulty to be rep	m Apr laced	il 2013, Sealbach via live transfer l	k II would all eading to a r	ow the mains eduction in
✓ 5 Protecti Environm	ng the ent	Reduce env requirement	ironmental i for landfill c	mpact by i	minimizing all a ed spoil.	ssocia	ted works as abo	ove including	the
Technologica area / issue addressed by project	al Y	o Develop developing a o Techniqu 20m of repla size parent	ment of a rev and recomm ue will be for acement pipe main.	vised nose ending an Low Pres e with a st	e cone, incorpor appropriate se sure mains use retch target of 3	ation c alant a only v 30m, u	of camera techno and delivery meth vith minimum ins p to 8" metallic 'o	ology advanc nod. ertion distan child' main le	es and ce of at least ading on to any
Innovation	Туре	SD Ra	ating	Ben	efits Rating		Residual Risk	C	verall Score
Incremen	tal	Med	ium		5		-3		8
Expected be of project	nefits	 Reduce errequirement Significant policies from to be replac short length 	ivironmental for imported reduction in n April 2013, ed. In particu stub pipes u	impact by d backfill a operation Sealback ular this te under App	y minimizing all and landfill of ex aal expenditure (II would allow echnique will del endix F of T/PM	associ cavate and ris the ma livers a 1/REP2	ated works as al ed spoil. k. With the new lins located in ar a solution to the r 2.	bove includir RIIO Tier 1 r eas of engin requirement	ig the eplacement eering difficulty to replacement
		Adoption	n (Year)	Duratio	on of Benefits	F	Prob' of Succes	s I	Project NPV
		20	13		0 yrs		50%		-£239,119
Potential for achieving expected ber	nefits	Reduction ir engineering	n operationa difficulty to	l expenditu be replace	ure and risk. Se ed.	ealbac	k may allow the	mains locate	d in areas of
Project Prog	ress	The project limitations of solution and identified 'S recommend and delivery difficulty to b Also reduce	began in 20 f the Sealba I has now prealback II's ation of an a method. If so pe replaced d environme	12 and co ck I techn ogressed olution. Th appropriate successful via live tra ental impar	mmenced with a ique. This feasi to Stage 2, which is will incorpora e sealant, and a I Sealback II will nsfer leading to ct, including the	a feasi bility s ch will ate can greem I allow a redu requir	bility study which tudy saw the ide look at the devel nera technology tent of a suitable mains located in uction in operation rement for landfil	n sought to a ntification of opment and advances, d implementa n areas of er onal expendii I disposal of	ddress the an innovative field trial of the evelopment and tion strategy gineering ure and risk. excavated spoil.
Collab' Partn	iers					Provic	der(s) Synthote	ech, Hyphen	
				Sumn	ner 2012			natic	nal grid

	Ta main	tain the eafer		afilo ocooo	isted with east in	n and distribution mai	Y	Year: 2012/13	
escription	innovati	ve monitoring	y detection s	services as	an alternative to f	full mains replacemen	t.	st effective	
L	Exper for Cu	nditure rrent FY	Expendi for Prev	iture /' FY	Expenditure for Next FY	Total Project Costs		Status	
nternal		£3,415		£0	£16,637]		Submitted	
xternal		£20,000		£0	£101,305	£340,452	Draft	02/05/2013	
aterials		£0		£0	£0		Final	21/05/2013	
otal		£23,415		£0	£117,942		Approved		
_				Ali	ignment with IFI	/SD			
1 Low Car Economy	rbon	Reduced e no Operatio	xcavation as onal problem	there is a r s. Removin	reduced need to r ng the requiremen	eplace Gas Mains tha t of the 30/30 rule on	t have histo monitored p	prically caused pipe lines.	
2 Eradicat Fuel Pove	ting erty								
3 Promoti Energy Sa	ng avings	Savings in	resources wi	th not havir	ng to undertake u	nnecessary work.			
4 Safe, Re	liable	Using this t	echnology c	ould deliver					
		o An imm response ti o The abil o Potentia generated	ediate notific me. ity to locate Ily the oppor (this is unkno	ation of a fi the fracture tunity to de own at this t	racture event to the event (assuming etect the onset of time).	ne pipe line operator e it falls between monit a fracture event if pre-	nabling a m tor stations) failure sign	nuch improved and, als are	
5 Protectii Environm	ng the ent	he Reduced excavation so reducing reinstatement, landfill and natural resources							
rea / issue	µ 1	 To provide an alternative to replacement in certain high profile, urban areas The potential to have an early warning of pipe fracture that can warn of impending fracture (unknown at this time) To be able to pinpoint the location of any fracture and hence enable the source of leak to b excavated and safely managed sooner that would be the case without the system To have the potential to reduce the pipe risk score for those pipes being monitored and here 							
ddressed by roject	y	(unknown a o To be al excavated o To have a cost effect	ole to pinpoir and safely m the potentia stive option to	nt the locati anaged soo I to reduce o full replac	on of any fracture oner that would be the pipe risk score	and hence enable the the case without the for those pipes bein	e source of system ig monitored	fracture leak to be d and hence b	
ddressed by roject Innovation	у Туре	(unknown a o To be al excavated o To have a cost effec SD R	ating time) and safely m the potentia ating	nt the locati anaged soo I to reduce o full replac Bene	on of any fracture oner that would b the pipe risk scor ement fits Rating	and hence enable the e the case without the e for those pipes bein Residual Risk	e source of system g monitored	fracture leak to be d and hence b verall Score	
ddressed by roject Innovation	y Type on	(unknown a o To be al excavated o To have a cost effec SD R	tions time) ble to pinpoir and safely m the potentia stive option to ating lium	nt the locati anaged soo I to reduce o full replac Bene	on of any fracture oner that would be the pipe risk scor- ement fits Rating	e and hence enable the e the case without the re for those pipes bein Residual Risk 0	e source of system ig monitored	fracture leak to be d and hence b verall Score 19	
ddressed by roject Innovation Substitution xpected ber f project	Y Type on nefits	(unknown a o To be al excavated a o To have a cost effect SD R Mect The use of could be us	the potential and safely m the potentia stive option to ating dium fracture aler sed to deem	t the locati anaged soo I to reduce o full replace Bene t is targeted the pipe replace	on of any fracture oner that would b the pipe risk scor ement fits Rating 19 d primarily at Tier mediated ie to rer	e and hence enable the e the case without the re for those pipes bein Residual Risk 0 2 >risk action thresho nove the risk.	e source of system g monitored O	fracture leak to be d and hence b verall Score 19 the technolog	
Innovation Substitution	y Type on nefits	(unknown a o To be al excavated a o To have a cost effec SD R Mec The use of could be us	the potentia and safely m the potentia tive option to ating lium fracture aler sed to deem n (Year)	t the locati anaged soo I to reduce o full replace Bene t is targeted the pipe ref Duratio	on of any fracture oner that would b the pipe risk score ement fits Rating 19 d primarily at Tier mediated ie to rer	and hence enable the the case without the for those pipes bein Residual Risk 0 2 >risk action thresho nove the risk. Prob' of Success	e source of system g monitored O Id whereby	fracture leak to be d and hence b verall Score 19 the technolog Project NPV	
ddressed by roject Innovation Substitutio xpected ber f project	y Type on nefits	(unknown a o To be al excavated a o To have a cost effect SD R Mect The use of could be us Adoptio	tins time) ble to pinpoin and safely m the potentia stive option to ating lium fracture aler sed to deem n (Year) 14	t the locati anaged soo l to reduce o full replace Bene t is targeted the pipe rel Duratio	on of any fracture oner that would be the pipe risk scor- ement fits Rating 19 d primarily at Tier mediated ie to rer on of Benefits 5 yrs	e and hence enable the e the case without the e for those pipes bein Residual Risk 0 2 >risk action thresho nove the risk. Prob' of Success 50%	e source of system g monitored O Id whereby	fracture leak to be d and hence b verall Score 19 the technolog Project NPV £461,923	
ddressed by roject Innovation Substitution xpected ber f project otential for chieving xpected ber	y Type on nefits	(unknown a o To be al excavated a o To have a cost effect SD R Mect The use of could be us Adoptio 20 This projec knowledge	the potentia the potentia tive option to ating lium fracture aler sed to deem n (Year) 14 t is expected benefits.	t the locati anaged soo I to reduce o full replace Bene t is targeted the pipe rep Duratio	on of any fracture oner that would be the pipe risk score ement fits Rating 19 d primarily at Tier mediated ie to rer on of Benefits 5 yrs environmental, ne	e and hence enable the e the case without the re for those pipes bein Residual Risk 0 2 >risk action thresho nove the risk. Prob' of Success 50% twork performance, fil	e source of system g monitored O Id whereby	fracture leak to be d and hence b verall Score 19 the technolog Project NPV £461,923 ety and	
ddressed by roject Innovation Substitution xpected ber chieving xpected ber roject Progr	y Type on nefits nefits ress	(unknown a o To be al excavated a o To have a cost effect SD R Mect The use of could be us Adoptio 20 This project knowledge	the potentia and safely m the potentia stive option to ating lium fracture aler fracture aler fractu	t the locati anaged soo l to reduce o full replace Bene t is targeted the pipe rep Duratio	on of any fracture oner that would be the pipe risk scor- ement fits Rating 19 d primarily at Tier mediated ie to rer on of Benefits 5 yrs environmental, ne	e and hence enable the e the case without the re for those pipes bein Residual Risk 0 2 >risk action thresho nove the risk. Prob' of Success 50% twork performance, fin	e source of system g monitored O Id whereby	fracture leak to be d and hence b verall Score 19 the technolog Project NPV £461,923 ety and	
Idressed by roject Innovation Substitution Substitution spected ber chieving spected ber roject Progra	y Type on nefits nefits ress ners	(unknown a o To be al excavated a o To have a cost effec SD R Mec The use of could be us Adoptio 20 This projec knowledge Project con SGN, NGN	the potentia the potentia tive option to ating lium fracture aler sed to deem n (Year) 14 t is expected benefits.	t the locati anaged soo I to reduce o full replace Bene t is targeted the pipe rep Duratio	on of any fracture oner that would be the pipe risk scor- ement fits Rating 19 d primarily at Tier mediated ie to rer on of Benefits 5 yrs environmental, ne 013. Stage 1 is Pr	e and hence enable the e the case without the re for those pipes bein Residual Risk 0 2 >risk action thresho nove the risk. Prob' of Success 50% twork performance, fin oof of Concept.	e source of system g monitored O Id whereby P nancial, saf	fracture leak to be d and hence b verall Score 19 the technolog Project NPV £461,923 ety and	
ddressed by roject Innovation Substitution xpected ber f project otential for chieving xpected ber roject Progr ollab' Partn	y Type on nefits ress ners	(unknown a o To be al excavated a o To have a cost effec SD R Mec The use of could be us Adoptio 20 This projec knowledge Project com SGN, NGN	the potentia and safely m the potentia stive option to ating lium fracture aler sed to deem n (Year) 14 t is expected benefits.	t the locati anaged sou l to reduce of ull replace Bene t is targeted the pipe rep Duratio	on of any fracture oner that would be the pipe risk scor- ement fits Rating 19 d primarily at Tier mediated ie to rer on of Benefits 5 yrs environmental, ne 013. Stage 1 is Pr	e and hence enable the e the case without the e for those pipes bein Residual Risk 0 2 >risk action thresho nove the risk. Prob' of Success 50% twork performance, fil oof of Concept.	e source of system g monitored O Id whereby F nancial, saf	fracture leak to be d and hence b verall Score 19 the technolog Project NPV £461,923 ety and	

(IL178) I	mpro	ved Diuri	nal Stora	ige Re	quiremen	t Moo	delling			
								١	/ear: 2012/13	
Project Description	To build methodo decision	, test and sup ologies for pre is and operation	port impleme dicting diurna onal planning	ntation of Il storage activities	a system that a needs for a GD	pplies n N to sup	ew modelling te oport improvem	echniques a ents to both	and n investment	
	Expe for Cu	nditure Irrent FY	Expenditu for Prev'	ire FY	Expenditure for Next FY	Тс	otal Project Costs		Submitted	
Internal		£3,068		£0	£6,160	כ			Cubinitied	
External		£27,500		£0	£57,500	0	£294,000	Draft	02/05/2013	
Materials		£0		£0	£	0		Final	21/05/2013	
Total		£30,568		£0	£63,660	0		Approved		
				Ali	gnment with IF	I/SD				
✓ 1 Low Ca Economy	rbon	Potential to model the in Network gas	model the impodel the impodel the impodel the imposed of embed solution of embed solutions and the impodel of the impodel in t	oact of bio	o-methane supp ctricity generation	lies on i on, or ot	required diurnal her energy gen	l storage. F eration whi	Potential to ch affect	
2 Eradica Fuel Pove	ting erty									
3 Promot Energy S	ing avings									
✓ 4 Safe, R Network	eliable	Accurate diu customers.	Irnal storage	requireme	ent modelling is	essentia	al for reliability a	and security	of supply to	
5 Protect Environm	ing the ient									
Technologic area / issue addressed b project	al y	 Develop a new modular and flexible software solution with improved speed performance and usability that will be used primarily to inform network investment decisions and National Transmission System offtake capacity bookings. This will include consideration of the following areas: o Better modelling of diurnal volume to reflect changes in demand behaviour. o Development of new demand models to model particular significant customer behaviours which are overlooked within the current approach, such as: the effect of large loads on a system bio-methane supply Improvements of the modelling of both the information provided to the operations room and the constraints used to simulate/define operator behaviour2. 								
		- Additiona	al statistical a	nalysis of	results.					
Innovation	Туре	SD Ra	ting	Bene	fits Rating	R	esidual Risk	0	verall Score	
Significa	Int	Medi	um		13		-2		15	
Expected be of project	nefits	New Model 1	to predict diur	rnal stora	ge needs for GD	N comp	bliance with reg	ulatory regi	mes	
		Adoption	(Year)	Duratio	n of Benefits	Pro	b' of Success	F	Project NPV	
		201	4		7 yrs		50%		£108,464	
Potential for achieving expected be	nefits	Project has	recently comr	menced ir	n February 2013	and at	this stage all be	enefits are e	expected.	
Project Prog	ress	This collabo reflecting the	rative project e required fun	between ctionality	all 4 GDN's will in a configurabl	support e and fle	the developme exible modelling	ent of a soft g platform.	ware application	
Collab' Parti	ners	NGN, SGN,	WWU		P	rovider	(s) GL Noble	Denton		
				Summ	er 2012			natic	nal grid	

(IL) Operational & Integrity Challenges (Small Projects) 2012/13									
								١	/ear: 2012/13
Project Description	To facilit Alliance incentive	facilitate utilisation of innovative tools, techniques and processes across Operations, Coalitions and iance work activities that result in supporting RIIO objectives in terms of efficiency,outperformance of other centive measures and outputs.							
	Expe for Cu		Expenditu for Prev' F	re =Y	e Expenditure		Total Project Costs		Status
Internal		£55,996		£0		£0			Submitted
External	£	185,230		£0		£0	£262,119	Draft	03/05/2013
Materials	s £20,894			£0		£0		Final	21/05/2013
Total	£	262,120		£0		£0		Approved	
Alignment with IFI/SD									
1 Low Carbon Economy									
2 Eradicating Fuel Poverty									
3 Promoting Energy Savings									
4 Safe, Reliable Network		Improvement in operator safety. Efficient utilisation of tools, techniques and equipment that enhance the operation, replacement and maintenance of the gas network							
✓ 5 Protecting the Environment		Minimising leakage and waste							
Technological area / issue addressed by project		 Technical safety & risk assessments for innovative products Development of new performance specifications that will deliver new innovative products from the market 							
Innovation Type		SD Rating		Benefits Rating		Residual Risk	0	verall Score	
Incremental		Mediu	IM		5		1		4
Expected benefits of project		 Adoption of knowledge via an indepentent appraisal that will determine whether an innovation opportunity can be quickly developed and thus implemented into the business as efficiently as possible. 							
		The knowledge gained will also enable the efficient development of project scopes should any one of the small projects need to be developed into a more substantial project. - A number of projects will investigate how to reduce safety risks as part of the day-to-day operations. These cannot be articulated at this stage due to the early stage in the respective project life cycle. - A number of projects are supporting little dig technologies to minimise the amount of excavation/waste and imported excavtaion materials. - A number of the projects are specifically aligned to RIIO themes and outperformnace including sealback (Tier 1 effetiency), internal repairs (enabler to allow insert of PE in Tier 2/3 pipes with eg weco seals), towbar drill to extend the utilisation of keyhole technologies, CIPP analysis for Tier 1/2/3 alternative liners,.							
		Adoption	(Year)	Duratio	n of Benefits	i	Prob' of Success	s F	Project NPV
		2013	3		0 yrs		25%		-£235,000
Potential for achieving expected ber	'otential for chieving xpected benefitsDual heating. The feasibility has identified a number of manufacturers who are developing these systems. Drilling techniques. Benefits have been delivered Joint repairs. Benefits have been delivered and further projects have been started as a result. Sealback 2. Benefits have been realised and the project continues as a larger development proje Numerical modelling. Implementation of the recommendations is under internal review. Benefits be realised but it will be necessary to develop a clear and simple guidance document Bar code. Whilst the benefits have been demonstrated the application within NGG is subject to internal evaluation and impact assessment on existing Contracts Impact on PE of Biomethane at elevated temperature. Benefits have been realised						a result. pment project w. Benefits will subject to		
		L		Summ	er 2012			natio	nal grid

(IL) Operational & Integrity Challenges (Small Projects) 2012/13

		Year: 2012/13							
	Power 2 gas platform. Benefits are on track High risers. Benefits have been realised MP pressure management. Benefits have been realised althoud development of profile systems is being progressed Nitrogen sleeve. Benefits have been delivered Gas adsorption heat pump. Project is on track. Alternative jointing for PE. Benefits have been delivered Thinner wall PE. Benefits have been delivered	ugh at this time no further							
Project Progress	72.6 Dual heating. Feasibility study has indicated that the inno	vative gas and electric technologies							
Project Progress	 72.6 Dual heating. Feasibility study has indicated that the innovative gas and electric technologies can be successfully integrated. 72.8 Drilling techniques. Enhanced capability drill bits have been successfully trialled 72.15 Joint repairs. Report delivered to confirm 2 viable technologies based on internal joint sealing can be progressed. 122 Sealback 2. Feasibility study has confirmed that there are no technological barriers to re introducing and extending the range and capability of the kit into mains sized 8-18" 123 Numerical modelling. Detailed analysis as to the structural safety of deep excavations has been carried out under a number of different scenarios and recommendations to avoid the use of trench support under some situations have been demonstrated. 136 Bar code. Feasibility delivered. The ability to track significant value items of kit has been demonstrated 159 Impact on PE of Biomethane at elevated temperature. Impact on temperature has provided reassurance that the integrity of pipe is retained. 162 Power 2 gas platform. The membership has enabled knowledge sharing and a research platform for stakeholders. 170 High risers. Internal inspection technologies are suitable for further investigation. 171 MP pressure management. Feasibility completed on the profile control of MP systems and work has confirmed linkage between pressure and leakage. The study has provided assurance that investment decisions about these systame are soundly based. 172 Nitrogen sleeve. Proved that existing of the shelf camera and existing kit and sealants work but further work is required to confirm full end seal capability 								
	undertaken as yet 174 Alternative jointing for PE. An analysis suggests that mechanical fittings may offer an alternative to PE electrofusion for services								
Callahi Bautuana	175 Thinner wall PE. A report on the structural capability of thi	n wall PEs has been delivered							
	FIOVICEI(S)	KIWA, MACAW, MBW, Synthotech							
	Summer 2012	national grid							

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