Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Jun 2023

Project Reference Number

NIA_WWU_02_27

Project Registration

Project Title

Gas Control System – Impact Assessment (Future requirements)

Project Reference Number

NIA_WWU_02_27

Project Licensee(s)

Wales & West Utilities

Project Start

June 2023

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Bethan Winter

Project Budget

£311,737.00

Summary

This proejct will produce an impact assessment, allowing the networks to have a better understanding of the future needs of our system operator function and data requirements for transition.

Third Party Collaborators

Wipro Limited

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

The UK Government's Energy White Paper (2020) has identified hydrogen as a potential source of decarbonised heat in buildings. In order to prove the viability of hydrogen the UK Government requires a strong evidence base before deciding whether to promote hydrogen distributed in the existing gas network infrastructure (at all current pressures) to decarbonise heat.

Decarbonisation of the Gas Distribution Networks (GDNs) will require transition from natural gas to an alternative green gas, for example hydrogen. There has been significant progress in recent years to accelerate the shift to green gases, such as the recent introduction of hydrogen blending in natural gas networks. Nevertheless, there are still many obstacles to overcome before 100% hydrogen can be injected into the network.

To help with this transition the GB Gas Networks require an impact assessment to identify any changes that may be required on our existing Control Room systems to ensure they will meet future requirements for Future of Energy purposes. The scope of future requirements includes the need to manage networks carrying a range of gasses; methane, biomethane, hydrogen blend and pure hydrogen at all stages during the transition. The impact assessment must also take into account other technical requirements and

opportunities that are anticipated in the same timescales e.g. to support cyber security advances and increased digitalisation.

The following bullets detail the potential functionality needed by our systems to support a transition to net zero and broaden the capability to align to an increase in commercial operations possible as new gases and connections come on stream. This is not an exhaustive list

- We may need to forecast energy as well as volume / pressure (by different load types and sub-LDZ i.e., across discrete systems
- Need to forecast supply and third-party storage injection and withdrawal as well as demand
- We will need processes and systems that can manage the hydrogen transition e.g., on a system-by-system basis to feed into our whole system strategies and to allow configuration of the discrete systems
- It may be beneficial to link safe control of operations for transition to our systems and mapping, these may link to < 7 bar systems and then feed into SCADA where relevant or there may be potential for us to monitor more e.g., < 7 bar in our System operation systems as they transition
- We will need to continue to be able to calculate storage, for example Linepack, based on methane and also to calculate it base on hydrogen characteristics e.g. the implications of different relative densities and calorific values on stock change and demand (for methane / 100% hydrogen and hydrogen blend)
- We will need capability to manage more variation in distributed supplies. These supplies are likely to be less controllable /flexible / resilient and there may be less stability from a gas quality perspective
- We may need capability to manage more rapid variation in supply response due to weather / intermittency and potential impacts of climate change
- We may need different / lower use profiles for demands e.g., domestic electrification and those providing services to grid
- We will need to provide different / additional information to support future billing methodologies
- New systems will be needed to support commercial balancing (supply / demand) c.f. residual balancing (should some be controlled from control room)
- Agile systems will be required because there is uncertainty about where producers will be situated and how we will communicate with them, and what it is we'll be transporting

Method(s)

Discovery

This stage will study the as-is system operations landscape, through document reviews, demos, control room visits and user discussions.

Define H2 and Future of Energy scenarios & target capabilities

- Identify key H2 scenarios to be explored, and
- Define to a necessary and sufficient degree the target system operation capabilities required for each scenario.

Assess impact of scenario on as-is operations

Assess in detail the impact of the identified scenarios and target capabilities on:

- System operation processes, systems, data, and external links across all process domains and associated platforms including SCADA/HMI, network model management, line pack management and other functions such as offtake strategy and notifications, storage, forecasting, settlement/billing interfaces
- Changes to user roles and associated change management needs
- Field capabilities such as sensors, RTUs, data-loggers and telemetry
- Cybersecurity architecture and requirements

We will also consider the potential mutual impact between the H2 scenarios and other planned enterprise and regulatory initiatives.

Develop deliverables & roadmap

This track will build on the detailed IA and heat maps to deliver the final outputs.

Data quality Statement

Wipro are fully committed to maintaining high standards of data quality throughout the Hydrogen Control Room Readiness Impact Assessment project. During the impact assessment phases, we will collect data from various sources, including system design and application documents, workshop outputs, and publicly available information related to Hydrogen transition, and store this data in a secure SharePoint location. To ensure the protection of specific business IP and personal data, we will sensitise the information as

per applicable policies such as GDPR, and subject it to peer review and approval before uploading it to the SharePoint location. We will maintain a data traceability matrix from data collection through analysis, correction, and conclusion, which will facilitate easy stakeholder reference.

This data will be used for impact analysis of future energy scenarios on control systems, and we will share impact analysis outputs with GDN stakeholders for review. We remain committed to maintaining high standards of data quality, and we will take all necessary steps to safeguard the integrity and confidentiality of the data throughout the project

Measurement Quality Statement

Wipro will employ a robust data measurement quality approach to ensure that the impact analysis exercise meets its data quality objectives. The approach will include standard system and process analysis procedures to assess the impact of Future of Energy(FOE) H2 scenarios on control room systems, processes, and data. The process will start during the Planning and discovery phase by taking a baseline of systems and processes using methods such as workshops and analysing associated documentation. As part of this baseline activity, Wipro will define the key data quality objectives for the analysis, identifying the critical data elements required, and assessing the current state of data quality in these elements.

In the subsequent phases, Wipro will conduct analysis workshops with GDN stakeholders to define target system capabilities, assess and document changes, improvement areas, new system capabilities, and requirements for Proof of Concept (POC). The impact of FOE H2 scenarios will be assessed from multiple dimensions, including systems, processes, data, operating model, and cyber security. Wipro will establish proper governance to plan, monitor, and report progress of this project. All impact assessment deliverables will be peer-reviewed, and the results of these activities will be reported to stakeholders regularly to ensure transparency and accountability. The impact of FOE H2 scenarios will be traced back to the documentation baselined at the start of the engagement to ensure traceability, reliability, and comparability of results.

The project is rated low in the common assessment framework detailed in the ENIP document after assessing the total project value, the progression through the TRL levels, the number of project delivery partners and the high level of data assumptions. No additional peer review is required for this project.

Scope

The scope of the impact assessment includes:

- Systems and related processes that directly support System Operation activities in the distribution networks and the impact on the national system
- Scada systems used by National Gas which is on the same platform as the SCADA systems in use in the Distribution Networks
- Resource requirements that are directly impacted by any changes to those control room systems e.g. if additional configuration will be required
- Links to external systems, (although the external systems themselves are out of scope)
- Provision of recommendations in respect of, but not limited to, the current issues listed in paragraph 6.3 on next steps to inform our control room systems' strategies

This work begins the assessment process required to understand the changes needed to underpin the many changes anticipated as we move to net zero. This project is the first phase, with a potential further three phases that will take the project further through the TRL.

There is a lot of ongoing work to identify the most effective route to meet net zero in the UK and this project is one of many projects to evidence the major or minor role hydrogen will have in different scenarios. Repurposing the UK gas networks with hydrogen to support the challenge of the climate change act has the potential to save £millions with minimal gas customer disruption verses alternative decarbonisation solutions

Objective(s)

To undertake a robust impact assessment, providing analysis and options on the gas networks control room systems strategy

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

An assessment of distributional impacts (technical, financial and wellbeing related) for this project has been carried out using a bespoke assessment tool, which assesses the project as having a neutral effect on consumers in vulnerable situations. To help inform the assessment, this tool considers the categories of consumers identified in the Priority Services Register.

Success Criteria

The project will be deemed a success if the networks have a better understanding of the future needs of our system operator function, system and data requirements for transition.

Project Partners and External Funding

The project partners will be WIPRO and the project will be fully funded via NIA.

Potential for New Learning

The networks will have a greater understanding of the future needs of the system operator function and what changes are needed as the energy mix in the UK changes. All project findings will be made available at the end of the project.

Scale of Project

This is a desktop study to understand the needs of the networks at this stage. This is the appropriate scale for the project, as it allows the networks to understand the art of the possible before moving forward with actual changes to the control room.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project will look at the systems of all participating networks, it is not defined by a geographical location

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

WWU External: £89,781

NGN External: £89,781

NG External: £89,781

Total External: £269,343

WWU Internal: £29.927.11

NGN Internal: £12,467.20

NG External: £29,927.11

Total Internal: £42,934.11

Total: £311,737

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

The system operator function is an integral part of the gas network delivering energy to customers safely. As new forms of energy start to enter the market, and networks move towards a whole system approach. we need to ensure that all systems are fit for purpose. This work begins the assessment process required to understand the changes needed to underpin the many changes anticipated as we move to net zero

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

N/A

Please provide a calculation of the expected benefits the Solution

At this stage the project is a research project, as it is delivering an impact assessment.

Please provide an estimate of how replicable the Method is across GB

All networks could take the learnings from this project and apply them to their system operator functions.

Please provide an outline of the costs of rolling out the Method across GB.

At this stage roll out costs are not known, due to the low TRL of the project.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

☐ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).

☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)

☐ A specific novel operational practice directly related to the operation of the Network Licensees system

☐ A specific novel commercial arrangement

RIIO-2 Projects

☐ A specific piece of new equipment (including monitoring, control and communications systems and software)

☐ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven

☑ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)

☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology

☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution

☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

This work will develop an initial impact assessment - fingerprint of our existing critical systems and articulate what areas will not support or be impacted by a transition to hydrogen, management of multi gas systems or decommissioning. This learning will inform further stages of analysis and development of novel solution to provide the agility and open data systems we need in future.

All networks can take the learnings from this project given the consistent fundamentals of current system operation functions and consistent arrangements between GDNs and NGT.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

n/a

Is the default IPR position being applied?

☑ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

All gas networks are aware of the project and no concerns have been raised with this project duplicating work.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

N/A

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

Currently the control systems used are not designed to manage significant change is asset configuration or multi fuel systems, this project is the first step in ensuring that systems are future proofed and ready to be upgraded as and when future energy sources are bought into the network.

Relevant Foreground IPR

The final report produced at the end of the project, will form the applicable foreground IP

Data Access Details

Data for this project can be found or requested in a number of ways:

- A request for information via the Smarter Networks Portal at https://smarter.energynetworks.org, to contact select a project and click 'Contact Lead Network'. WWU already publishes much of the data arising from our innovation projects here so you may wish to check this website before making an application.
- Via our Innovation website here
- Via our managed mailbox innovation@wwutilities.co.uk
- Details on the terms on which such data will be made available by Wales & West Utilities can be found in our publicly available "Data sharing policy relating to NIC/NIA projects" here

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

Ofgem published its final determinations which included a variety of provisions to enable necessary development work on Net Zero projects but also to ensure vulnerable customers are thought about in any decision making. This project has the potential to facilitate the energy system transition and is therefore eligible to use the NIA funding mechanism.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

The project would only be undertaken with support from NIA funding, it is in the interests of gas customers, the regulator and the UK government and the realisation of any benefits are outside the control of the gas networks. There is no allowance in BAU business plans for this type of work and there is a risk that if hydrogen is not accepted as a means to heat homes in 2050 that this work is no longer valid.

This project has been approved by a senior member of staff

☑ Yes