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

May 2020

Project Reference Number

NIA_NGGT0165

Project Registration

Project Title

i40 Connectivity Project

Project Reference Number

NIA_NGGT0165

Project Licensee(s)

National Gas Transmission PLC

Project Start

May 2020

Project Duration

0 years and 11 months

Nominated Project Contact(s)

Paul Lee & Lee Sanok

Project Budget

£657,232.00

Summary

Identify, test and trial a cost-effective approach for enabling business use cases for remote connectivity and establish appropriate cyber security measures in accordance with Cyber Security Standard IEC62443, Network & Information System Directive (NISD) and the Cyber Assessment Framework (CAF).

Preceding Projects

NIA_NGGT0114 - Open Source SCADA Platform

NIA_NGGT0128 - Open Source SCADA Platform Phase 2

NIA_NGGT0138 - Secure AGI – Intrusion Detection System (IDS)

Third Party Collaborators

Belcan Advanced Solutions Limited

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

At present, remote access and connectivity to live operational sites is extremely restrictive and limited when compared with modern use-cases (cloud-based infrastructure etc.) The present remote access and connectivity methods have been developed in silos over many years and are subsequently inefficient, restrictive and inadequate for future requirements. With new requirements for operational flexibility and cyber security, a holistic connectivity approach is needed.

Method(s)

This project will take a two-phase approach.

Phase 1 will focus on the discovery of all in-service and planned connection requirements with the objective of understanding the common requirements across terminals, compressor stations and above ground installations (AGIs). A holistic study of this scale has never been undertaken within the utilities sector, and the output of this phase will offer significant financial savings when introducing modern remotely connected systems to the network. Systems will be reviewed and assessed from both operational and cyber security perspectives.

Stage Gate – A review of TOTEX and the operational benefits of introducing fit-for-purpose remotely connected systems will be reviewed prior to Phase 2 commencing.

Phase 2 will focus on a proof-of-concept trial which will be used to define the ongoing business need and will trial a number of solutions in an offline environment. The systems will be subjected to operational testing, with a view to identifying solutions which avoid the requirement for bespoke and site-specific configurations.

Scope

National Grid have the following needs which this programme will address:

- A common baseline requirement needs to be established, based on the various use-cases both presently and planned for the future
- This project seeks to define a minimal viable remote access platform, which satisfies current and future business needs
- The need to connect more systems digitally, whilst ensuring that cyber security standards are improved and aligned with the Network and Information Security Directive (NISD)
- With the current connectivity systems in operation, National Grid are unable to effectively utilize the best available technologies
- The current capabilities in the marketplace are not well understood in the context of Operational Technology (OT)
- There are a number of system upgrade and replacement projects planned for RIIO-T2, all of which will have varying requirements in terms of remote connectivity

The current processes which are in place to facilitate remote connectivity to operational sites have resulted in complex system-wide architectures. The current state has evolved over time, with many existing systems being both designed and built before the risk of cyber-attacks was a consideration.

Our operational technology networks are not future-proofed and do not allow for truly effective remote access and operation of a number of systems.

Objective(s)

- Define a least functionality remote access platform, which scales with the current and future business needs for the entire energy industry.
- Trial a number of viable solutions to ensure that they are able to support current and future business needs, whilst both protecting and improving cyber security.
- De-risk and enhance the RIIO-T2 Remote Connectivity Programme.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

- Fully identify and document the current and future remote connectivity requirements for the NTS.
- Test and identify a number of fit-for-purpose least functionality remote connectivity platforms.

Project Partners and External Funding

Project Partner – Lagoni Engineering Limited
External Funding – £160k

Potential for New Learning

This programme will offer an informed insight into the potential for maximising the use of effective remotely connected systems which can support true remote working.

The fundamental basis of this programme will inform the debate as to the suitability of various remote access and connectivity options for all operational National Grid infrastructure, as well as for the potential adoption by the distribution network operators.

The learning from this programme can also be cascaded in forums such as the UK Cyber Security Tas Group (E3CC) and with the

National Cyber Security Centre.

Scale of Project

Phase 1 of the project is desk-based.
Phase 2 of the project is to be trialed from our project partner's laboratories.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

All work will be conducted in the UK at our project partners laboratories.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£657,232
Plus additional project partner contribution of £160,000.

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:

n/a

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)

£11.55m.

Please provide a calculation of the expected benefits the Solution

IT/OT investment/change programmes always include Change-the-Business (CTB) and Run-the-Business (RTB) costs. An RTB value represents the ongoing cost to run IT/OT services at current performance levels.

This project can potentially deliver a reduction in OPEX costs by reducing RTB value from the 15% that is currently applied to Operational Transformation (which this project falls under) to the 4.5% RTB cost traditionally applied to IT transformation.

This project aims to de-risk the overall Operational Transformation programme by reducing the RTB value by streamlining the programme, and in turn reduce future annual OPEX costs.

This c.10.5% (15% to 4.5%) saving is applied to the IT/OT Programme budget of £11m per annum.

(10 years x 15% of £11m) – (10 years x 4.5% of £11m)
Equates to:
(10 x £1.65m = £16.5m) – (10 x £0.495m = £4.95m) = £11.55m

Resulting in £1.155m p.a. savings

Therefore, financial benefits of this project are in the region of £11.55m over a 10 year programme.

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

This method is replicable across all NGGT terminals, compressors and above-ground installations (198 sites in total) and is potentially beneficial to all other operators of connected essential services.

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

This project will not provide this answer. The final technical report for this project will inform all interested parties of the scope, complexity and cost of the final solution and will allow major CAPEX budgets to be firmed-up and utilized in the most effective manner.

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

The issue of secure and effective remote connectivity applies to all network licensees.

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

Fit for the Future – Cyber and Infrastructure
Fit for the Future – Modernising our Systems
☑ Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

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.

The current NIA portfolio of other gas distribution networks does not indicate a similar type of programme. All networks will be fully informed of the progress of the current initiative.

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

The innovation for this project is to identify and define a minimal viable remote access platform, which scales with the current and future business needs for the entire energy industry. The applicable standard (IEC-62443) hasn't yet been published in its final form.

Deployment of these technologies in the energy sector is extremely limited. With new requirements for operational flexibility and cyber security, a holistic connectivity approach is needed. This type of programme has not been carried out before as previous remote access and connectivity solutions have always been developed in silos, especially with regards to operational technology. In recent years the remote access and connectivity options have been significantly developed and enhanced thus are now in a mature enough state to be considered using an all-encompassing holistic approach. The provision of an effective remote access and connectivity solution for use on all operational sites offers considerable benefits not only to NGGT, but to DNOs also. This type of project has not been undertaken before as the NIS Directive which covers cyber security requirements is a relatively new piece of legislation. This solution will ensure that the latest developments in remote connection technology, coupled with enhancing the defenses against cyber security attacks, can be used to protect these critical operational assets.

Relevant Foreground IPR

n/a

Data Access Details

n/a

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

The NIA funding offers the most expedient route for NGGT to evaluate the technological options with a carefully controlled and ring fenced programme. Only this approach will enable NGGT to develop and test possible remote connection system without it being compromised by the needs of business as usual programmes, which require tested and proven business ready solutions at the time of installation.

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

This programme will focus on cutting-edge technologies as well as though provided by the traditional supply chain. This novel approach to technologies is not one which could be undertaken as part of standard business operations as trials couldn't be undertaken in a safe environment. The Network and Information Systems (NIS) Directive 2016 (as transposed into UK law by way of the Network and Information Systems Regulations 2018) places a legal requirement on operators of essential services (OES) requiring them to "...take appropriate and proportionate technical and organisational measures to manage risks posed to the security of the network and information systems on which their essential service relies." This trial allows us to stay one-step ahead of cyber attackers. The latest advancements of remote connection technology potentially offer considerable benefits to NGGT and other network operators if their capabilities are proven and would help NGGT to comply with the NIS Directive 2016, hence meeting technical, operational and regulatory requirements. The remote connection solutions to be utilised and tested in this project are currently being used in the cyber security community, but their effectiveness has never been evaluated against the application within gas transmission assets. The risks of not carrying out this programme into the potential application of new remote connection technologies are that the government may change their stance on current legislation and impose stricter cyber security targets, (security patch management for example), that National Grid may not be able to react quick enough to. A full capability assessment requires a dedicated programme of evaluation by the relevant technical experts. Innovation funding provides a robust framework that enables these assessments to be undertaken and ensures that all the necessary updating of procedures and standards are captured and approved, decreasing the business implementation time. Innovation funding ensures the dissemination of the generic findings are communicated to all networks which improves efficiency and ensures that relevant networks can benefit from the outcomes of this project. Once the truly ground-breaking work has been undertaken, BAU funding will be used to trial solutions in a live site environment.

This project has been approved by a senior member of staff

☑ Yes