

NIA Project Registration and PEA Document

Date of Submission

Oct 2018

Project Reference

ENWL019

Project Registration

Project Title

Interface

Project Reference

ENWL019

Project Licensee(s)

Electricity North West

Project Start

October 2018

Project Duration

3 years and 1 month

Nominated Project Contact(s)

Geraldine Paterson

Project Budget

£1,000,000.00

Summary

This project will investigate and trial a variety of a communications mediums and protocols with a range of DNO and consumers equipment to understand the best solution and produce a functional specification for a single communications hub.

Nominated Contact Email Address(es)

innovation@enwl.co.uk

Problem Being Solved

Currently DNOs have multiple RTU / communication interfaces installed in distribution substations to allow remote operation of HV switchgear and LV switchgear as well as collecting analogues such as voltage, current and temperature. In some cases there can be 4-5 communication devices which all communicate independently with the central systems over the mobile network.

As we move towards a low carbon economy consumers are going to be more reliant on electricity for transport and heat resulting in thousands of devices, such as electric vehicles and heat pumps, connected to the low voltage network greatly increasing the demand on the network. As an alternative to reinforcement for the demand increase DNOs could enter into contractual arrangements to manage these devices on behalf of the consumers and to benefit both the customer and the DNO. To facilitate this management the DNO would need to directly interface with the devices thereby further increasing the number of communications devices in a substation.

It is anticipated that the transition to a low carbon economy could result in up to ten individual communication devices being installed in a distribution substation. To carry out effective Smart Grid management a single communications hub would be beneficial. This hub could interface with the Network Management System, DNO owned equipment and customer owned equipment. The hub should

transmit both monitoring data and fault data to the NMS as well as operational commands to both DNO and customer owned equipment.

This project will investigate the feasibility of connecting all these devices into the same communications interface using varying protocols and communications mediums whilst maintaining data security.

Method(s)

This project will investigate and trial a variety of a communications mediums and protocols with a range of DNO and consumers equipment to understand the best solution and produce a functional specification for a single communications hub.

The project will also develop control methodologies for managing third party devices such as electric vehicles or heat pumps to assist in reducing network constraints.

Scope

The project will be mainly an investigative piece into the various interfaces, communications mediums and protocols. Trials will be conducted to ensure all the different devices work together whilst maintaining data security.

Objective(s)

1. Identify all communications mediums and protocols for monitoring and control of DNO and customers equipment.
2. Trial interfaces to DNO and customer equipment.
3. Develop control methodologies for managing customer's and DNO equipment to resolve local constraints.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

1. Production of functional specification for a communications hub to transfer monitoring data and controls between the NMS and DNO / customer owned equipment.
2. Production of control methodologies for managing customer's equipment.
3. Successful trial of the communications hub and interfaces and associated control methodologies

Project Partners and External Funding

n/a

Potential for New Learning

This project will deliver a specification for a new communications hub which will allow Electricity North West to interface with both our own and customer's equipment. This will give us improved information on and better control of the LV network with minimal installed equipment.

Scale of Project

The project will conduct small scale trials to prove the interfaces and data transfer, possibly on a test bench, to cover the different variants of devices.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

North West of England

Revenue Allowed for the RIIO Settlement

0

Indicative Total NIA Project Expenditure

£1000000

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)

The introduction of a single communications hub could save up to £40 000 per distribution substation.

Please provide a calculation of the expected benefits the Solution

Assuming the cost of a current RTU is £5 000 it could cost up to £50 000 to install enough RTUs to control and monitor everything that is required. It is anticipated that the new hub would cost approx £10k resulting in a saving of £40k per substation. In addition to the installed cost saving this project can facilitate Active Network Management and improved fault response by providing real time coordinated information from the low voltage network. It will also bring carbon benefits as DNOs could connect more low carbon technology in a quicker timescale.

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

The communications hub could be deployed at any GB distribution substation.

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

Electricity North West has approximately 40, 000 distribution substations. If it is assumed that we are 7% of the GB network this means that the device could be deployed at 570 000 substations across GB. If the cost per device is £10k then the total cost to roll out to all substations would be £5.7bn.

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

n/a

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

This project will address two challenges. Having a communications route to customers will give them more choice as they could participate in demand response contracts with the DNO. Also the hub will allow the transfer of monitoring data to the NMS which will allow us to better manage our network and make the most out of our existing assets.

- 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.

A review of the Smarter Networks Portal has revealed a few projects in the area of communications focusing mainly on protocols but none relating directly to the hardware development.

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

Historically there was no need to monitor or control the low voltage network but with the increase in low carbon technologies more control devices are being added to substations with individual communications links. It is predicted that the numbers of these devices will continue to increase therefore it is timely that we seek a combined modular communications solution.

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as part of its business and usual activities

The project is investigating a possible new solution which currently has a low TRL level which warrants research.

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 is a research project looking at a new solution and it is possible that the proposed equipment will require significant development to enable devices to work together and create a business ready device which can be replicated across the industry.

This project has been approved by a senior member of staff

Yes