NIA Project Registration and PEA Document

Date of Submission

Sep 2019

Project Reference Number

NIA_SHET_0027

Project Registration

Project Title

Expanding LoRa

Project Reference Number

NIA_SHET_0027

Project Licensee(s)

Scottish and Southern Electricity Networks Transmission

Project Start

September 2019

Project Duration

1 year and 7 months

Nominated Project Contact(s)

Fiona Irwin

Project Budget

£72,500.00

Summary

SSEN RainMan Project was the first UK real-time field monitoring system installed with a Low Power Wide Area Network communication medium (referred to here as LoRa). The LoRa network gathers real-time information from monitoring equipment using an Internet of Things (IoT) platform to collect data. The SSEN RainMan Project specifically developed pole movement detection IoT, to monitor the status of the wooden poles across the Isle of Skye.

Nominated Contact Email Address(es)

transmissioninnovation@sse.com

Problem Being Solved

SSEN RainMan Project was the first UK real-time field monitoring system installed with a Low Power Wide Area Network communication medium (referred to here as LoRa). The LoRa network gathers real-time information from monitoring equipment using an Internet of Things (IoT) platform to collect data. The SSEN RainMan Project specifically developed pole movement detection IoT, to monitor the status of the wooden poles across the Isle of Skye.

LoRa enables long-range data transmissions with low power consumption, which is proving to be an economic and reliable method of communication in rural areas which have limited mobile telephone coverage.
Interest in LoRa has grown, commercial companies are investigating the role out of LoRa networks; which would be suitable to connect monitoring devices from any Utility. There is a need to investigate how to connect off-the-shelf bought IoT monitoring equipment and also how to view / make use of the resulting data.

Method(s)

Purchase off-the-shelf IoT monitoring equipment and install the items across Isle of Skye. Investigate how to connect the new IoT onto the existing SSEN LoRa Network and explore how the real-time field data is accessible.

Scope

The existing SSEN LoRa Network will be used. The IoT monitoring equipment will measure parameters which influence the electrical

network. The IoT monitoring equipment will be placed at locations that will also help further knowledge capture on the ability of the existing LoRa Network.

Objective(s)

To prove the assumption that LoRa enabled IoT monitoring equipment can be;

· purchased for less than £50 per unit
· is easily installed onto a LoRa Network
· Real-time field data can be readily accessible

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Confirmation that off-the-shelf IoT can be purchase at an acceptable unit cost, installed, with the resulting real-time field data viewable within a short timeframe.

Project Partners and External Funding

N/A

Potential for New Learning

The project will provide valuable new learning relating how to connect LoRa enabled IoT and view the subsequent real-time field information.

Scale of Project

This project is designed to capture and share learning around efficiently installing LoRa enabled IoT and viewing field data. The use of LoRa is not limited to the electricity industry and information may be of interest to both the Gas and Water Utilities as a means of gathering remote system information.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be undertaken within the Scottish Hydro Electric Transmission licence area in Scotland.

Revenue Allowed for the RIIO Settlement

No allowance has been made for implementing of LoRa enabled IoT. However, the knowledge gained has the potential to provide a cost effective and time savings solution for future remote real-time field monitoring.

Indicative Total NIA Project Expenditure

The total expenditure for the project is £ 72,500
 90% (£62,250) is allowable NIA expenditure.

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)

Providing information on how to install LoRa enabled IoT and make use of the field data, will unlock a range of remote monitoring opportunities to help bring about operational benefits.

Please provide a calculation of the expected benefits the Solution

Not required for this research project

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

Remote monitoring presently requires excessive auxiliary power supplies equipment with patchy data signal coverage. LoRa enabled IoT offers a low power alternative which can send data further then 25km, which unlocks a range of opportunities for effective, minimal cost monitoring solutions.

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

LoRa depends on a privately funded company installing LoRa gateways; in Scotland plans are developing for such a roll-out of infrastructure. With an established LoRa gateway network, the outlay will be the price of the LoRa enabled IoT and an annual lump sum to the LoRa network provider. There is no cost for LoRa data transmission.

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 knowledge gained has the potential to provide a cost effective and time savings solution for remote real-time field monitoring.

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

☑ 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.

Based on published IFI and NIA information there are no known projects being undertaken by other networks licensees to investigate LoRa.

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

SSEN RainMan Project was the first to use LoRa communication for specifically developed real-time field monitoring. With the LoRa network install there is now the opportunity to expand the range of LoRa enabled monitoring IoT and investigate how the data can be made viewable.

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

No allowances have been made in the RIIO-T1 settlement for the purchase of LoRa enabled IoT. The results from the project will

hopefully confirm new options for monitoring the electrical system in remote and hard to reach areas.

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

There is significant learning to be shared from this investigation, as LoRa communication has the potential to offer a very affordable form of low cost, easily viewable information from remote locations. Inclusion within the NIA portfolio will enable the learning to be shared to a much wider range of interested Parties.

This project has been approved by a senior member of staff

☑ Yes