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NIA Project Registration and PEA Document

Date of Submission

Sep 2019

Project Reference Number

NIA_SSEN_0040

Project Registration

Project Title

Technical Interfaces to Scale as a DSO

Project Reference Number

NIA_SSEN_0040

Project Licensee(s)

Scottish and Southern Electricity Networks Distribution

Project Start

September 2019

Project Duration

2 years and 1 month

Nominated Project Contact(s)

Colin Mathieson

Project Budget

£448,000.00

Summary

As part of the implementation of the Distribution System Operator (DSO) role, safe and secure communication with customers is critical for enabling flexible connections and flexibility services. This is important to create a liquid market for flexibility services and allow as many participants as possible across use cases. In addition, there is a need for lower cost means of integrating Distributed Energy Resources (DER) than current methods. It is particularly the case when we require to scale these initiatives to ensure we can retain the integrity of our systems while interacting with all customers, large or small.

Third Party Collaborators

PNDC

Nominated Contact Email Address(es)

fnp.pmo@sse.com

Problem Being Solved

As part of the implementation of the Distribution System Operator (DSO) role, safe and secure communication with customers is critical for enabling flexible connections and flexibility services. This is important to create a liquid market for flexibility services and allow as many participants as possible across use cases. In addition, there is a need for lower cost means of integrating Distributed Energy Resources (DER) than current methods. It is particularly the case when we require to scale these initiatives to ensure we can retain the integrity of our systems while interacting with all customers, large or small. At present, there is no cost-effective manner in which to do so and this is a barrier to opening the flexibility market to smaller scale generators and participants. In expanding the number of DER connections, the cyber-security threat space increases significantly. This project will look at the boundary point at which our systems are connected to those of third parties, to identify appropriate requirements for customer interfaces at small scale.

Method(s)

The project will investigate and assess the cyber security implications of various interfaces and end-point hardware options tested in diverse international trials. During investigation, a review of literature and case studies will be carried out to identify and assess low

cost and scalable interfaces and their cyber security implications. The output from this work is ultimately a functional specification and a shortlist of interfaces to trial.

The identification of a shortlist of interfaces would allow the project to trial the options, by the supplier building and integrating hardware and trialling different communication protocols and monitoring software. The trial will ensure that the interfaces are applicable to the GB and SSEN. It will also allow us to explore the cyber security implications and give us insight on how we would integrate the much increased numbers of customer end points into our core systems. This will allow the development of a specification that can be put forward to the ENA as a potential standard and as a base specification to allow interfaces to be procured against.

Scope

The project is reviewing international interfaces however the output is focused on solutions which are applicable to the GB. To inform this work, all investigated interfaces must be broad enough to cover a representative spread of currently deployed solutions as well as trialled future options. A subset of these interfaces and a number of their combinations, are then trialled to create a detailed specification that covers the hardware, software, communication and cyber security requirements of such an interface.

Objective(s)

This project will deliver:

1. A review of interfaces and end-point devices from international trials and deployments
2. A review of cyber security risks and impacts
3. A functional specification document in phase 1 to inform trial in phase 2
4. A trial at the PNDC to garner practical experience with the most promising interfaces
5. A detailed specification document for DSO interfaces built up from all the learning trials

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

A thorough investigation of interfaces that have been trialled and deployed to understand their applicability to networks in the GB, in order to produce a shortlist of interfaces to trial.

Understand the cyber security implications of these interfaces

A practical trial of the selected interfaces to understand the detailed implications of using them

Creation of a specification for DSO interfaces for use in future use in BAU scenarios

Project Partners and External Funding

UKPN – DNO reviewer – time in lieu

Potential for New Learning

The project will investigate the various interfaces and end-point hardware options that have been trialled in other international trials.

This investigation will identify suitable options for SSEN to trial to ensure the trials are applicable to the GB and SSEN. It will allow us to explore the cyber security implications of hardware and software components and give us insight on how we would integrate the much-increased numbers of customer end-points into our core systems.

The learning will be disseminated through the sharing of reports and trial results, as well as through appropriate conference and ENA channels, including but not limited to the LCNI conference.

Scale of Project

The project will investigate interfaces between the DNO and third parties – ‘customer interfaces’, drawing on experience from international trials and deployments. There is particular focus on LV and HV interfaces, and where proven scalable, EHV. This scale allows for a thorough trial but remains broad enough to allow for replication and applicability to other DNO regions.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The project will initially focus on GB applications but the project learning is not geographically constrained by the output.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£448,000, of which 90% (£403,200) 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)

A reduction of at least £5000 for an Operational Technology type interface to potentially few hundred pounds could drive a reduction in cost by ten times for customer who wants to enter a flexibility market.

Please provide a calculation of the expected benefits the Solution

n/a

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

The purpose of this project is to produce a specification that will allow DNOs to look straight to BAU implementation. The BAU implementation costs will depend on the region-specific requirements, i.e. number of DERs and their location and size – it is expected that as the transition to DSO develops, near to, if not 100% of network areas will require customer interfaces to allow for accessible flexibility networks.

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

Relatively minimal with the final specification, it would be the basis of a procurement exercise to be outlined by each DNO.

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

As DNOs transition to DSOs, there is an increasing need to use interfaces to connect to customers to provide flexibility services. We already see the increase of flexibility markets across the GB network operators. The intention is to take the output of this project to the ENA for incorporation into a standard, which would allow for customers operating across the GB networks a level of consistency in requirements to access electricity flexibility markets.

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.

There has not been a project focusing on low cost interfaces applicable for flexibility services and investigating the cyber security implications of this.

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

Flexible connections, flexibility services and distributed energy resources are an emerging and growing market. These are causing an increasing number of customer connection end-points which need to be safely integrated with the DNOs core systems. There are currently no large-scale investigations into the cyber security and cost implications of the hardware and software components that can be used for these connections. Safe and secure communication methods are critical to ensure network and customer security.

Relevant Foreground IPR

n/a

Data Access Details

n/a

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

The investigations carried out by this project are looking at the cyber security of connections in the DSO. Since this is an issue that will become more apparent in the future this falls outside the scope of routine business activities. There is also a lack of in-house technical expertise and equipment/software within the affected network licensees to undertake the project under normal business as usual activities.

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 project involves a collaborative effort between SSEN and UKPN to establish a potential solution to a problem that is becoming more prevalent on their networks. The learning from this project is likely to have an impact not only for other network licensees but also for the entire supply chain. The recommendations from this project will likely inform future software and hardware requirements for customer connection end-points to enable network flexibility and connect a growing number of distributed energy resources. Ultimately, this would be expected to deliver value and security to our customers. Although the previous statements present a strong business case, work of this nature still poses a financial risk since the outcome may not be successful. If successful, the benefits of this project will also not be fully realised until we have moved further towards the DSO (which is still largely unknown). The sharing of the learning from this project, as required under NIA rules, means there will be potential for future cost savings for all DNOs through avoidance of repeating similar investigations into a shared problem.

This project has been approved by a senior member of staff

Yes