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

Nov 2016

Project Reference Number

NIA_SPT_1609

Project Registration

Project Title

The Planning Data Exchange System between Network Licensees to Enable a Smarter Grid

Project Reference Number

NIA_SPT_1609

Project Licensee(s)

SP Energy Networks Transmission

Project Start

January 2017

Project Duration

5 years and 1 month

Nominated Project Contact(s)

James Yu (Future Networks Manager)

Project Budget

£950,000.00

Summary

Key learnings (Criteria) from delivery of this project includes:

· Software Interface List, and Communication Specifications;

· Flow Chart on How to implement an Electronic Data Exchange (EDE) system between DNOs, TOs and GBSO;

· Publications on How to apply Common Information Model (CIM) standards to achieve a consistent data modelling specification across GBSO and DNOs (Applying CIM at DNO end and transferring compliant model to the GBSO);

Roadmap for Business as Usual<!--[if gte mso 9]> <

Nominated Contact Email Address(es)

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Problem Being Solved

DNOs and National Grid have a long track record of successful interaction in operational planning and investment planning co-ordination. However, the expected uptake of low carbon technologies and the advent of the Smart Grid will impact on the required level of interaction between the DNO and the SO in the future.

Greater interaction will be necessary as distributed energy resources (DER) become increasingly required to provide not just energy but whole-system services as well. For example, embedded generation, demand response and energy storage, along with distribution system services can contribute to system balancing. To achieve this, “full coordination across the SO/DSO boundary” will

be required, as noted by the IET[1].

Presently, operational and planning information is transferred between the DNOs and SO in accordance with Grid Code requirements. For example, DNOs provide “Week 24” network planning data to National Grid annually and in return, National Grid supplies “Week 42” data, which is a network-equivalent data model for fault level assessments.

The “Week 24 Authorised Network Model” is an official snapshot in time of the distribution network and sets the baseline for all subsequent data exchange. This model includes all the detailed network data, including topology, connectivity, electrical parameters, and all embedded generation up to 1MW. It also contains the long-term (i.e. >12 months) demand and generation forecasts. Network changes (such as planned reinforcements and planned outages) are then represented relative to this baseline. These changes are date stamped and this information is updated and sent to the SO regularly. Short-term demand and generation forecasts make use of information and estimates associated with <1MW generation as well as weather forecast information and any active network constraints, such as unplanned outages and active ANM schemes.

The “Week 24 Authorised Network Model” is updated annually, having been checked against data held in the main data repositories (i.e. Power-On, GIS, SAP) for changed connectivity and new electrical parameters).

It is recognised1 that future distribution system planning will require more extensive studies and forecasting to assess the performance of systems with increased levels of generation and to realise the potential whole-system benefits from distributed energy resources. The suggested requirement for more detailed models spanning transmission and distribution systems[2] is likely to necessitate the transfer of more information more frequently between the SO/TO and DNO.

The existing method of information collection and submission between the DNO and SO is highly dependent on key personnel extracting data from a number of different systems manually. Furthermore, the analysis of the data is undertaken in uniform manner without taking into account the characteristics of the DNO region. This process is not sustainable when the requirement for more frequent transfers of a richer set of information outlined above is taken into consideration.

[1] http://www.theiet.org/sectors/energy/documents/modelling-6.cfm?type=pdf

[2] http://www.theiet.org/sectors/energy/documents/cst-part1-main.cfm?type=pdf

Method(s)

A holistic approach is required to clarify the existing and future roles of DNO, TO and SO in an involving (but also changing at accelerated pace) energy sector. This project is aiming to provide a tool to facilitate such a transition.

Based on the existing work and completed innovation projects at ENA (Workstream 7, P2/6 Review Group), this project is to put in practice the recommendations from different sources (including European organisations) on this regard.

DNO, TO will work closely with SO to agree a fit-for-purpose specification, and trial the solution, to accommodate the flexibility and future requirements of data exchange between the three parties (and between different software platforms).

The project is proposed to have a phased approach:

1) Design and Specification Stage; (2 years, Budget of £450k)

2) Delivery Stage

3) Trial, Review and Improvement

4) Future Rollout

During the first stage, a summary of the existing practices and efforts at individual companies will be documented to detail the potentials and ensure that efforts are proportional to the likely outcome;

It is also within the scope of stage 1 to generate a specification to enable the planning data transfer (including software platform specifications and the ICT (communication infrastructure) specifications. Another important outcome from Stage 1 will be a criteria list for the trial area (and condition of the existing infrastructure).

Based on the comments/feedbacks from this stage, the following stages (stages 2-4) will see the delivery and trial of the method. The

key learning will be captured and disseminated along the process. It was estimated that the overall budget would be in the order of £1.2m including in-kind support.

Scope

The fully delivered solution will:

· Automate the creation of the annual "Week 24" DNO-SO data exchange using the data analytics, including the bi-lateral QA checks with National Grid, will be carried out for the whole of SPENs distribution network (i.e. both SPD and SPM distribution license areas), as will the periodic updates on network changes (i.e. planned reinforcements and planned outages).

· Produce short-term demand (and generation) forecasts, including information on unplanned outages and the expected state of active network management schemes,

The trial is currently designed to be undertaken in the in SPD licence area in Dumfries & Galloway.

There are also opportunity/chances to extend this trial to another DNO area.

Objective(s)

The objective is to provide the SO with greater visibility of what is happening on distribution networks in operational planning and design planning timescales. This will enable more frequent data exchanges, increasing from the current situation of annual data exchanges to (up to) daily exchange of data. This will in turn enable further integration of the DNO-SO data exchange processes. This will require DNOs to enhance their forecasting capabilities. For example, in the past, DNOs forecasted load growth by extrapolation based on historical load trends. With the shift to low carbon technologies, these forecasts will need to account more explicitly for the forecasted uptake of low carbon technologies, such as wind, PV, storage, electric heating and electric transport, taking into account future energy scenarios, such as those produced by DECC and National Grid in the longer term as well as shorter term influences such as the effect of weather.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Key learnings (Criteria) from delivery of this project includes:

· Software Interface List, and Communication Specifications;

· Flow Chart on How to implement an Electronic Data Exchange (EDE) system between DNOs, TOs and GBSO;

· Publications on How to apply Common Information Model (CIM) standards to achieve a consistent data modelling specification across GBSO and DNOs (Applying CIM at DNO end and transferring compliant model to the GBSO);

Roadmap for Business as Usual

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The trial is currently designed to be undertaken in the SPD licence area.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The trial will be undertaken in Dumfries and Galloway

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£950,000

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)

The main saving from this project is the reduction of the workload of key employees in gathering, structuring and submitting the data to be transferred, as regularly occurs with the Week 24 data submissions, producing a net saving. The approximate annual saving from this totals £150,000.

Please provide a calculation of the expected benefits the Solution

Based on the number of work day savings the expected financial benefits are £150,000 per year per licence area.

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

All UK DNO Licence operators are required to transfer this data to the SO, and as such, are all subject to the same costs from staffing. As such, this project is replicable across all of the DNO areas.

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

The initial cost for developing and deploying the system on SP Energy Network's DNO area is not directly scalable to the rollout for the other licence areas.

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

☐ 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 greater visibility of planning and operational data is relevant to 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)

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.

n/a

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

n/a

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

n/a

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

n/a

This project has been approved by a senior member of staff

☑ Yes