NIA Project Registration and PEA Document

Date of Submission

Aug 2015

Project Reference Number

NIA_UKPN0008

Project Registration

Project Title

Business Models Enhancement (BME)

Project Reference Number

NIA_UKPN0008

Project Licensee(s)

UK Power Networks

Project Start

August 2015

Project Duration

0 years and 9 months

Nominated Project Contact(s)

UKPN Innovation Team

Project Budget

£208,340.00

Summary

The update to the models will be focused on including data and conclusions on the latest best understanding from LCL on the contributions from;

- Domestic power demand from extensive smart meter data trials

- Demand profiles from electric vehicles, heat pumps and small scale embedded generation

It will also include an update to the interface for the LRE model and a transfer of the model and operation to UK Power Networks.

Nominated Contact Email Address(es)

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Problem Being Solved

In 2013 UK Power Networks assigned Imperial College London (ICL) to create a model which would help us understand the relation between load growth and investment in our networks. This model informed our business plan submission providing guidance on LV reinforcement requirements based on our load growth forecast. Since then the Low Carbon London (LCL) project has concluded and contributed vital new learning by monitoring domestic customers, electric vehicle (EV) users and charge points, heat pumps and photovoltaic (PV) installations. Accordingly we now have robust profiles and data to inform our business models and reflect the real impact of Low Carbon Technology (LCT) uptake.

This project will focus on updating our business planning models to incorporate findings from the LCL project as well as updated forecasts of LCT uptake. Specifically the project will update the Element Energy forecast model and the Transform model. Additionally ICL will update the Load Related Expenditure model and create a user friendly interface for a sustainable transition to UK Power Networks.

Method(s)

This project will involve 4 phases of deliverables.

Phase 1 – Scope Definition

This phase of the project seeks to clarify the requirements of the stakeholders that utilise the models and tools identified for update. It will primarily involve aligning the application of the new datasets and learning to stakeholder expectations.

Phase 2 – Model updates

This phase of the project will focus on implementing the agreed changes to the models.

Phase 2a: Load Forecast (Element Energy) Model update - LCL learnings

The LCL project produced many datasets and learnings which UK Power Networks will incorporate, where possible into its load forecasting activities. As part of the LCL project, an updated version of the Element Energy Load Growth Model (EELG) will be produced which incorporates domestic load profiles for various household types (based on the LCL smart meter data from 5,600 domestic customers), an updated approach to energy efficiency for each of these household types and load profiles for EVs and heat pumps based on LCL trial data.

Phase 2b: Understand the impact of the same LCL findings on the Transform model

This will include the tasks that EA Technology (EATL) will perform through Transform Model runs and relevant analyses in order to demonstrate the differences in results from the current 'standard' Transform Model and a version of the model update with the findings from the LCL project.

Phase 2c: WinDEBUT update

Implementing changes to be outlined by UK Power Networks to the WinDebut model.

Phase 3 – LRE Development

This phase of the project will focus only on the LRE model and will be divided into four sections:

Phase 3a: Enhancing the LRE model capability

The LRE model will be enhanced to include multi-period load conditions. In addition, the LV load diversity modelling capability will be enhanced in line with the LCL findings. Finally a Peak Minimisation Model (PMM) will be developed to enable demand side response modelling capability that will interact with the LRE tool for different uptake scenarios of LCT, energy efficiency measures and load growth.

Phase 3b: Development of user-friendly interface

The key objective of this work package is to develop user-friendly interfaces for the LRE tool, including updates of input and output data format.

Phase 4 – Transfer Models to BAU

This final phase of the project will involve a review of the project deliverables by the stakeholders of the project in order to confirm the successful deliverable criteria of the project have been achieved. It will include UAT tests and delivery of the access to the updated models, hosted on internal servers.

Scope

The update to the models will be focused on including data and conclusions on the latest best understanding from LCL on the contributions from;

- Domestic power demand from extensive smart meter data trials
- Demand profiles from electric vehicles, heat pumps and small scale embedded generation

It will also include an update to the interface for the LRE model and a transfer of the model and operation to UK Power Networks.

Objective(s)

The objective of the project is an update of the following Models and Tools:

- Load Forecast (Element Energy) model

- Transform model

- WinDEBUT

- Load Related Expenditure model

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The following criteria will be considered when assessing whether the project has been successful:

- Transfer of all relevant best learning from LCL to UK Power Networks business models and tools identified above

- Update of the WinDebut model which is available to all DNOs

- Delivery of a new version of the LRE model with a user interface

- Transfer of the updated LRE model to UK Power Networks

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

N/A

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL9 Operations

Geographical Area

N/A

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

£208,340.00

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 updates to these models will improve the estimates on the impacts of LCTs on the network and therefore enhance the outlook on the projected investments required to meet the new demands from these loads. This delivers a net financial benefit to customers in the long term.

Please provide a calculation of the expected benefits the Solution

The output of this project forms the foundation of analysis to determine the financial benefits to customers in the long term.

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

The Transform model and WinDebut tool are available to all DNOs across the GB.

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

The Transform model which is available to all DNOs, once updated, can be used to assess networks across the UK to consider the effect of the conclusions from LCL.

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 updated versions of the Transform Model and WinDebut, including the conclusions of LCNF project LCL, will be accessible to all DNOs. These can be used in business planning functions to examine the impacts of LCTs, using best available knowledge from LCNF project LCL, on network investments.

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