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

Jan 2014

Project Reference Number

NIA_NGGT0014

Project Registration

Project Title

Daily gas demand forecasting

Project Reference Number

NIA_NGGT0014

Project Licensee(s)

National Gas Transmission PLC

Project Start

May 2011

Project Duration

3 years and 5 months

Nominated Project Contact(s)

Chris Aldridge (box.GT.innovation@nationalgrid.com)

Project Budget

£375,000.00

Summary

The main aim of the project is to develop new methods for forecasting the daily gas demand from the National Transmission System. These would be used to improve the demand forecasts that are provided to the market and used in operational decision-making.

The national gas demand forecast includes the demand from distribution networks, power stations, industrial loads, storage sites and interconnectors. Current systems calculate demand forecasts using a “bottom-up” approach, by combining forecasts for individual elements, using regression techniques. The model is complicated and reliability of results can be variable. An extra forecast is done a day ahead using a spreadsheet model; largely based on a “top-down” forecast of the total demand, also using regression, which gives a more accurate prediction. These are used as the basis for the forecasts published and used by the Gas National Control Room.

The project will involve exploring the use of new local predictor techniques for this activity, rather than current regression-based models. Improved demand forecasts will be of benefit to gas shippers in balancing their supply and demand portfolio, enhancing the information National Grid provides to its customers. They will also support improved operational planning, and more efficient balancing actions, and reduced costs met by the industry.

Third Party Collaborators

University of Liverpool

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

National Grid Transmission forecasts the national gas demand for each day over a range of timescales, from a week ahead to within the day, and publishes forecasts to the gas market.

This project investigates using local predictor techniques, which automatically identify similar days in history to the forecast day, to make a top-down forecast of total demand. This is a different approach to the fixed regression formula currently used, and initial tests have indicated a significant increase in accuracy over the current models.

Method(s)

The Method is as follows:

1. Develop initial day-ahead model and test as live trial
2. Improve day-ahead model and further test as live trial. Report on model
3. Continue support for live trials
4. Refine local search for day ahead model and test as live trial
5. Develop initial models for 5 to 2 days ahead, and test as live trial
6. Enable implementation
7. Further improve forecasts for 5 to 2 and day ahead, through emerging drivers and alternative models

Scope

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Objective(s)

The Objective is to develop new methods for forecasting the daily gas demand from the National Transmission System.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Project success would be the delivery of a new method to improve the demand forecasts that are provided to the market and to be used in operational decision-making.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project looks to develop improved performance for national gas demand forecasting .

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The research and development is desk based, both at National Grid House and the University of Liverpool.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

IFI - £176k
NIA - £200k

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 major benefit of the work is that it would potentially lead to better information for National Grid to provide to customers and the gas industry, potentially reducing gas price distortions. National Grid's published demand forecasts ahead of the day are used by the market to aid trading and operational decisions in balancing supply and demand on the day. This project would also enable optimised utilisation of the network. Improved knowledge of demand levels by the market and National Grid could reduce the volume of balancing actions taken, decreasing the associated costs which are met by shippers and ultimately customers.

In 2010 balancing actions were taken on over 200 days, with an average value of around £500k/day. As an example, a successful outcome of the project could remove the need for balancing actions on one day per year, removing approximately £500k p.a. from the costs passed to the community.

Please provide a calculation of the expected benefits the Solution

Base Case = £500k x 200 days = £100,000k pa
Method= £500k x 199 days = £99,500k pa
Financial benefit = £500k pa

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

The tool is applicable for modeling gas demand on the National Transmission System.

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

The key deliverables of this project are an understanding of how suitable different model techniques and inputs are for these forecasts, gained through knowledge transfer and prototyping during the project. Therefore, there are no additional costs associated with implementation.

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 learning is specific to the gas transmission business operation, the information will be available from academic and industry publications.

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

The project is aligned to the Customer Satisfaction/ Commercial theme.

☑ 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

- [x] Yes