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

Apr 2014

Project Reference Number

NIA_WWU_011

Project Registration

Project Title

Long term demand forecasting for peak days

Project Reference Number

NIA_WWU_011

Project Licensee(s)

Wales & West Utilities

Project Start

April 2014

Project Duration

0 years and 6 months

Nominated Project Contact(s)

Bethan Winter / Helen Fitzgerald – Wales & West Utilities

Project Budget

£90,029.00

Summary

1. To develop forecasts of peak domestic demand for each of WWU's 3 Local Distribution Zones (Wales North, Wales South, South West) based on changes from the peak demand seen in 2010 for winter 2014/15 taking in factors listed in the method section and any others identified

2. To develop a method to forecast peak domestic demand for future years using the method developed in (1)

Out of scope

1. Development of bottom up peak demand forecasting for the domestic market, the requirement is to model changes from 2010 not to model the 2010 demand and develop a forecast from that. Forecasts of consumption for the domestic market

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

The peak day demand forecasting methodology needs to be updated due to uncertainty and volatility in recent forecasts. There is a general expectation that annual consumption will reduce because of a number of factors including fuel prices and increased efficiencies with insulation and new boilers; however, there is little confidence that the impacts will be as significant at peak I in 20 demands . Due to a lack of confidence in existing forecasting processes we are currently maintaining a conservative position in assuming no reductions at peak 1 in 20 demands in the next few years. This may be resulting in us sterilizing NTS capacity and could lead to inefficient investment in both the WWU and NTS networks.

Method(s)

Rather than developing new bottom up forecasting models to model peak demand this approach takes the WWU peak demand 2010

as a baseline and considers how domestic demand would change taking into account:

1) Temperatures falling below those experienced in 2010 and whether this would result in increased peak gas usage

2) Net increases in domestic new build

3) Retrofitting of higher levels of thermal insulation in housing stock

4) Retrofitting of high efficiency combination boilers in place of older boilers

5) Changes in domestic customer behavior

Segmentation of the domestic market may be appropriate

Non temperature sensitive demand will be forecast by other methods and the portion of non-domestic load that is temperature sensitive will be assumed to unchanged as a first approximation

Scope

1: To develop forecasts of peak domestic demand for each of WWU's 3 Local Distribution Zones (Wales North, Wales South, South West) based on changes from the peak demand seen in 2010 for winter 2014/15 taking in factors listed in the method section and any others identified

2: To develop a method to forecast peak domestic demand for future years using the method developed in (1)

Out of scope

1) Development of bottom up peak demand forecasting for the domestic market, the requirement is to model changes from 2010 not to model the 2010 demand and develop a forecast from that.

Forecasts of consumption for the domestic market

Objective(s)

To provide a sense check for our current peak demand forecasts and to develop an alternative approach to forecasting peak demand. This will enable us to operate the network more efficiently and may allow us to release NTS Exit Capacity that we are potentially holding unnecessarily and will avoid the need for unnecessary investment.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The production of forecasts with supporting methodology to demonstrate a defendable view for the next few years.

The delivery of a piece of software which is suitably developed / documented so as to be able to be used in future years with revised parameters if necessary.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The scale of this project includes analysis of Wales & West Utilities peak demand data from 2010 in 3 local distribution zones being North Wales, South Wales and the South West of England. The project will produce a working software model that can be used in future years to ensure capacity.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

The project will impact on all 3 of Wales & West Utilities local distribution zones but we anticipate that the approach used could be used by all Gas Distribution Networks.

Revenue Allowed for the RIIO Settlement

No revenue allowed for in RIIO settlement

Indicative Total NIA Project Expenditure

External costs are £67,590 of which 90% are NIA eligible (£60,831)

Internal Costs are £22,439

Total NIA project expenditure = £90,029

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)

Peak day demand forecasts are used by the GDNs to plan capacity requirements within their distribution networks and also when booking NTS Exit Capacity. Any under forecast may have an adverse effect on supply security through the potential introduction of capacity constraints (in either the NTS or GDN networks). In contrast any over forecast may lead to unnecessary investment and increased costs in either network

Please provide a calculation of the expected benefits the Solution

The research into long term demand forecasting has the potential to release storage capacity in our network to enable new connections to take gas without the need for additional investment in the Total System (the Local Distribution Zones and the National Transmission System taken together) as follows.

Storage capacity is needed within the WWU Network because most customers do not take at a constant rate, preferring to take more gas during peak hours (between 06:00 and 22:00) and proportionately less overnight (22:00 and 06:00). There is currently no spare storage capacity in the majority of the WWU network and as the NTS has also become more constrained in recent years, we have not had any Flex requests (to NTS to use storage capacity from their network) accepted in the last few years.

A number of recent connections enquiries for new power stations have identified a requirement for us to increase storage in the Total System to accommodate the new loads which has a significant cost. The cost per kscm storage based on actual data from previous projects shows a range of prices from £43k per kscm to £104 per kscm depending on the location and pressure tier in which the storage is to be provided.

If this research shows that our long term peak demand forecasts can be reduced this will release capacity in the Total System which may result in these new customers (and others) being able to be connected without the additional investment that is currently being identified.

Every 1% reduction in overall peak demand would release approx 60,000 kcm storage with a value, based on the costs above in the range of £2.6 million to £6.3 million.

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

This method could be applied by all gas distribution networks for demand forecasting.

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

The technical report would be shared amongst all GDNs. It is anticipated that the software would be able to be purchased for less than £30,000.

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):

- [x] 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 methodology / software could be shared with other GDNs for use in their demand forecasting processes

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

Our Innovation strategy has identified the need to 'continue to reduce the key output risks of reliability and safety without excessive recourse to investment'.

- [x] Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

- [x] 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