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NIA Project Registration and PEA Document

Date of Submission

Sep 2020

Project Reference Number

NIA_WWU_068

Project Registration

Project Title

Flexible Generation Forecasting

Project Reference Number

NIA_WWU_068

Project Licensee(s)

Wales & West Utilities

Project Start

September 2020

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Bethan Winter

Project Budget

£226,666.67

Summary

A project to identify the key drivers and relevant datasets that will enable GDN's to more accurately forecast flexible generation operation on their networks

Nominated Contact Email Address(es)

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Problem Being Solved

Historically, gas demand has been fairly predictable, with the modelling and forecasting capabilities of the UK control centres meeting the needs to predict demand in the short term to support the development of our daily operating strategies.

In the last few years the connection of significant numbers of flexible generation sites to the gas distribution networks has impacted the accuracy of the forecasting models, which are designed to predict gas usage based on the relationship between factors such as temperature and days of the week. Historically, gas generation for base load has taken place at large sites which are excluded from these models and for which notifications from site are received which contain planner operating profiles.

All of the current paths for decarbonising the energy system in the UK include increased use of electricity for transport, alongside an increase in the share of renewable generation on the electricity network. In some scenarios it is also envisaged that heating may also be electrified. With this, there is an assumption that flexible gas generation will bridge gaps in the intermittency of renewable power, as well as the potential for electricity storage and other flexibility services as new markets emerge.

The impact of a shift towards distributed, flexible gas fired electricity generation (forecasted in National Grids Future Energy Scenarios) is already being felt by the UK GDNs, with a sharp increase in the number of applications for connection of flexible gas generation plants for flexible electricity generation in recent years. For instance on the Wales & West Utilities network, around 40 flexible generation sites have already been connected and have another 30 sites for which customers have accepted enquiries. A review of the capacity market auction results suggests another 30 sites may look to connect in addition to this.

This is becoming a key challenge for the UK GDNs – it is driving more volatile and difficult to predict gas demand in the very short term (<48 hours) on the distribution networks, which is having operational impacts (and can lead to increased operational costs) for the

whole system.

To better understand, and to better predict and manage the impact of flexible gas generation on the gas networks, improved modelling capability of flexible gas generation is required to support GDN's (and the wider system) operating and managing their network.

Much of the data that is needed to better forecast gas demand for flexible generation may already exist (with National Grid ESO / DNOs). However, it is currently not possible to access this data. If specific data sharing was allowed between network operators in the UK, it is expected that value could be realised, both to the operation of the GDN, DNOs and ESO, and to cost savings to gas customers.

Method(s)

This project is looking to establish what relevant data is held across gas and electricity networks and develop a model for flexible generation. The numbers of these smaller power generation sites connecting to the network over the coming years is forecast to continue to increase, so it's important that we put new processes and systems in place to help us manage them.

Currently, no model or modelling capability exists that can accurately and robustly forecast the operation of flexible gas generation on gas distribution networks. Developing such a model is required now as the operation of flexible gas generators is becoming less predictable (other flexible assets and the dynamic nature of different flexibility value streams is increasing the complexity of managing the impact of flexible gas generation on the gas networks) in order to enable networks to operate our network more efficiently.

The project will be a four stage project:

WP1: review of the current modelling capabilities for flexible generation

WP2: scoping the key drivers and identifying data needs & availability

WP3: model scoping and development

WP4: demonstrating the value of data sharing

Scope

The approach for the project is made up of four work packages as follows:

WP1: review of the current modelling capabilities for flexible generation

- Fully understand the current modelling capability on flexible generation of the financing network parties and the challenge the face.
- Review of modelling capabilities of other relevant external companies (via interviews and desk-based research).

WP2: scoping the key drivers and identifying data needs & availability

- Define the key drivers of flexible gas generation operation.
- Identify data required, sources, and availability / accessibility

WP3: model scoping and development

- Initial model scoping
- Developing model architecture / analysis approach
- Developing model
- Using, testing & validating model
- Documentation

WP4: demonstrating the value of data sharing

- Working with the financing parties to scope out the final tasks required to make a compelling case to other stakeholders in the energy system for greater data sharing
- Recommendations for what data should be shared between network control centres (GDNs, DNOs, ESO, NGGT).

Objective(s)

The core objectives of the project are to:

- Develop a robust model that can accurately forecast flexible generation plant operation 48 hours ahead.
- Identify the key drivers and relevant datasets that will enable GDNs to more accurately forecast flexible generation operation on their networks.
- Demonstrate a clear business case for improved data sharing between the UK network operators.
- Take a collaborative approach – involving other GDNs, NGGT, DNOs and ESO
- Identify and summarise current best practise approaches / modelling capability in the UK with respect to forecasting flexible generation operation
- Share key learnings and best practise with other UK GDNs & DNOs – to improve whole system forecasting and network planning /

operation in close to real time.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Success of the project will be an understanding of how the sharing of data between networks can improve forecasting for GDN's, that will in turn benefit DNO's NGGT and ESO.

Project Partners and External Funding

Delta- EE and Aphry are the project partners. All funding will be via the NIA.
SGN, Cadent & National Grid Transmission are also supporting the project from a non-financial position.

Potential for New Learning

Robust forecasting data will drive the development of an efficient investment programme which meets the needs of current and future customers while avoiding unnecessary investment.

Scale of Project

The scale of this project will be a desktop study to understand the benefits of data sharing and to produce a prototype for flexible generation forecasting

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

This project will look at data from across Great Britain.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External: £170,000

Internal: £56,666.67

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)

This project will investigate the savings that could be made from improved accuracy of flexible generation forecasting across the operation of the whole system. It is anticipated that these savings would materialise via more efficient use of compressors on the gas transmission system, avoided unnecessary investment in storage in gas distribution systems and efficient use of flexibility markets on electricity networks.

Please provide a calculation of the expected benefits the Solution

Research project – Not required

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

The method is replicable for sites on all networks. In addition, we envisage that there are future applications for e.g. power to gas and other new cross vector technologies going forward to which parts of this learning will apply.

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

The low level TRL means it is unclear what costs would look like at this stage.

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

This is a whole system project and benefits and learning could be relevant to all DNO, GDN, GT and ET control centres.

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.

ALL GDN's are part of this network and no duplication has been identified. The DNO's were also informed on the project and no duplication was highlighted.

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

This is the first project using NIA funding that the deals with forecasting of flexible gas generation, combining stakeholders from the GDN's, DNO's, GT & ET.

Relevant Foreground IPR

n/a

Data Access Details

n/a

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

The benefits are as yet unquantified and it is essential that partners are included from a variety of sectors.

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

Current regulations do not facilitate the sharing of data between control centres. This project will provide networks a chance to collaborate on a common problem and share learnings with even further stakeholders.

This project has been approved by a senior member of staff

Yes