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

Mar 2013

Project Reference Number

Project Registration

Project Title

Constraint and Reserve Optimisation for Wind Generation (CROW)

Project Reference Number

Project Licensee(s)

National Grid Electricity Transmission

Project Start

October 2011

Project Duration

4 years and 1 month

Nominated Project Contact(s)

National Grid TO Innovation Team

Project Budget

£108,000.00

Summary

Current NETS SQSS network operation and planning standards do not take into consideration reserve requirements when determining network capacity. A rapid growth in wind generation in the future will significantly increase the requirement for various forms of reserve and explicit consideration of the impact on network constraints on the allocation of spinning and standing reserves across the system may become important. Similarly, increased reserve requirements may impact on the need for transmission capacity. It is expected that under some circumstances, it may be appropriate to reinforce the transmission network in order to access cost effective resources of reserve that may be in the form of generation or demand.

If this work shows that there are significant benefits from incorporating reserve requirements in network planning, this could be used to consider changing network design standards to include reserve requirements in addition to considering peak demand conditions and constraint costs. It is proposed to carry out this analysis on predicted generation and demand background for the year 2020 and investigate whether the inclusion of generation and demand reserve in planning methodology would deliver economics benefits.

Imperial College will undertake a research project, under the supervision of Prof. Goran Strbac to establish this understanding and to propose alternative methodologies that might be practical to be applied to a real power system.

Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

Problem Being Solved

Method(s)

Scope

Objective(s)

This project will deliver an assessment of the effects of including both generation and demand side reserve in real time operation and transmission capacity planning in systems with significant penetration of wind generation. The twin objectives are to:

- Assess how network constraints impact on allocation of spinning and standing reserve

- Investigate whether investment in new transmission capacity may provide more efficient access to reserves needed to support cost effective integration of wind generation. This work should provide information that will be used to assess if the network planning approach should change to incorporate reserve requirements in National Grid systems with wind generation.

The research will:

- Assess the importance of an approach to reserve management that dynamically optimises the allocation of spinning and standing reserves in the presence of transmission constraints

- Develop a methodology for quantifying the impact that generation and demand side reserve has on the transmission capacity requirements

- Against current National Grid generation and transmission reinforcement predictions for the year 2020 identify where and how much additional transmission capacity would be justified to allow generation and demand side reserve to be effectively utilised in order to reduce operational cost and support wind integration. The opportunities for generation and demand side reserve will be characterised against the predicted demand and generation background for 2020.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

n/a

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

n/a

Geographical Area

Revenue Allowed for the RIIO Settlement

Indicative Total NIA Project Expenditure

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)

n/a

Please provide a calculation of the expected benefits the Solution

n/a

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

n/a

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

n/a

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

n/a

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

Please demonstrate how the learning from the project can be successfully disseminated to Network Licensees and other interested parties.

Please describe how many potential constraints or costs caused, or resulting from the imposed IPR arrangements.<

Please justify why the proposed IPR arrangements provide value for money for customers.

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