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

Strategic Research & Development (Programme)

Project Reference Number

Project Licensee(s)

National Grid Electricity Transmission

Project Start

January 2012

Project Duration

-1 years and -2 months

Nominated Project Contact(s)

National Grid TO Innovation Team

Project Budget

£12,000,000.00

Summary

This project is a combination of strategic projects being carried out largely by university groups as part of major strategic collaborations. Projects are supported under EU funding, Electricity Supply Research (ESR) network funding and Engineering and Physical Sciences Research Council (EPSRC) funding in conjunction with contributions from international utilities. The projects focus on understanding the potential of techniques or technologies to impact the electricity Transmission network.

Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

Problem Being Solved

Method(s)

Scope

Objective(s)

The project will look at the following areas:

Electricity Supply Network: Projects areas currently being monitored by National Grid through the network include Knowledge Discovery from On-line Cable Condition Monitoring Systems – Insulation Degradation and Aging Diagnostics (Glasgow Caledonian University and the University of Strathclyde), Energy Efficient Cities (University of Cambridge), Development of Transformer and Fault Current Limiter for High Power DC Networks (University of Aberdeen) and Energy Loss Study for AC Excited Superconducting Coils (University of Cambridge).

Forecasting Average Circuit Reliability: One of the key metrics for understanding network unreliability is the Average Circuit Unreliability. It has been reported as in internal KPI for many years and is also fundamental to the annual Regulatory Reporting Pack

submission. It describes % network unavailability as a result of asset unreliability (outages related to faults, defects and failures etc). As part of the Network Output Measures methodology there is a requirement to forecast Average Circuit Unreliability. The present techniques are embryonic and limited to just a year's forecast. The KTN for Industrial Mathematics, acting as an agent of EPSRC, receives an annual allocation of funding for Industrial Mathematics Internships for short projects to support postgraduate researchers working on industrial-academic collaborations in mathematics. An Internship involves a high calibre PhD student taking time off from their studies and joining a company for a period of 3 to 6 months to work on a stand-alone project specified by a company. This project is co-funded with EPSRC, who will fund 50% of the student's stipend. The project for National Grid will involve developing a more sophisticated forecast technique for the Average Circuit Unreliability metric.

Modelling and control of AC-DC system with significant generation from Wind: In 2008 alone 2000 MW of new wind capacity was connected to the UK grid. With further 6000 MW under construction and 10,000 MW under planning stage in the first round, the UK transmission system in the next 5-10 years is going to face unprecedented operational challenges. The challenges are envisaged to be contributed by many factors such as locations, characteristics of new generation and planned retirement of more and more centralised synchronous generations. As majority of the wind uptake is going to be in North West of Scotland and demand growth will still be dominated in the down south in England, secured transfer of the energy is going to be a major problem across the Scotland-England inter connector which is already stability limited.

The Development of an Equivalent Power Network Model for HVDC Studies: To assess the performances of the DC system under various operation conditions and assess the influence of the HVDC transmission on system security and AC network performance.

Transmission Tower Field Testing and analysis: Following previous work there is an understanding of the uplift capacity of National Grid's existing transmission tower foundations under steady state and dynamic loading conditions.

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