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NIA Project Registration and PEA Document

Date of Submission

Dec 2013

Project Reference Number

NIA_NGET0025

Project Registration

Project Title

Feasibility Study for Sustainable Substation Design

Project Reference Number

NIA_NGET0025

Project Licensee(s)

National Grid Electricity Transmission

Project Start

February 2012

Project Duration

2 years and 2 months

Nominated Project Contact(s)

Paul Alchin

Project Budget

£340,000.00

Summary

National Grid is "...committed to be an innovative leader in energy management and to safeguarding our global environment for future generations". Supporting this vision, our Corporate Responsibility Report states "...we will only retain our right to operate by working to the highest standards, by trusting our employees to do the right thing and by running our company responsibly and sustainably".

A goal of the new regulatory regime (RIIO) is to develop a reliable and sustainable energy network that gives current and future consumers value for money. It also aims to promote innovation that will be needed to deliver agreed outputs such as safety, reliability and a reduced environmental impact.

The new substation to be built at Highbury is yet to receive planning permission, Design options are being considered with particular emphasis on visual amenity due to its high visibility in an already congested area. Sustainable options for the new build may help to progress its planning application. Any sustainable design options should therefore be prioritised at this location.

This proposal seeks investment for the consideration of such options on the design of Highbury substation. By employing a University Masters undergraduate to work with a National Grid employee, seconded to LPT for a period of six months, these options (and others) could be fully explored using current technology and business contacts within and external to the company. This work would involve a full and thorough calculation of the whole life cost of any sustainable design option, with particular emphasis on the carbon cost/saving. Working as part of the LPT project team will provide exposure to the design team within the Northern Electricity Alliance to ensure any sustainable design options are practicable and workable within the boundaries of existing procedures and contractual relationships.

Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

Problem Being Solved

This project will investigate two new substations that are being built at Kensal Green and Highbury to connect 400kV underground cables that will be installed in new tunnels, currently under construction in the London area. The London Power Tunnels (LPT) project is

a highly visible, flagship project for National Grid that attracts much Government and media interest. It is imperative that we should live our vision and work in a sustainable manner. The project has itself produced a "Statement of Intent" that pledges to become the industry leader in environmental sustainability.

With this in mind, the LPT project provides an excellent opportunity to develop our approach in the search for a more sustainable design of substation.

Method(s)

In order to investigate this problem various methods will be used. This will include the following;

1. List of potential sustainable opportunities
2. Whole life cost analysis for each option (financial/carbon)
3. Practicable options for Highbury Substation
4. Potential replication for other projects

Scope

National Grid is "...committed to be an innovative leader in energy management and to safeguarding our global environment for future generations". Supporting this vision, our Corporate Responsibility Report states "...we will only retain our right to operate by working to the highest standards, by trusting our employees to do the right thing and by running our company responsibly and sustainably".

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Objective(s)

To develop a considered, workable and innovative, sustainable design for a substation new-build project in line with Transmission objectives and our corporate vision to lead the development of a more sustainable energy network.

This objective will be achieved by:

- Identifying options for a more sustainable design of substation with particular emphasis on low- carbon technology
- Considering the whole-life cost of such options from a financial and carbon perspective
- Working with designers of a substation new-build project to ensure they are practicable and will

realise a benefit to the company and the communities we serve.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

This project will achieve its aims if it delivers options for identifying and developing a more sustainable design for a substation. Where there is not a viable option for a sustainable alternative to traditional ways of working, the project will be an important source of information,

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project will be delivered on a substation scale. As such, we cannot reduce the scope and provide the same level of benefits to customers.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

This project is being focussed on Highbury substation

Revenue Allowed for the RIIO Settlement

Zero

Indicative Total NIA Project Expenditure

IFI= £205,000

NIA=£135,000

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 proposal will deliver real benefits to the environment and show how innovation can help to deliver a low-carbon economy. Investing time upfront in the design of the project will help to make sustainable options more viable that will be cost efficient in the long term, providing a pay-back challenge to our normal working practices. These benefits can be replicated across future substation projects.

Please provide a calculation of the expected benefits the Solution

Base Cost – Not Applicable

Method cost - £99,620

Benefits for this project are to consumers directly – Islington Borough Council, Neighboring Primary School, and Residential flats in form of heating from the Highbury Substation.

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

In theory, this can be rolled out to all substation sites, however the likelihood is that all future schemes will take learning from this project and apply it as applicable.

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

Unclear, this method has not been designed or been made commercially available yet.

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)

This project addresses sustainability challenges and therefore responds to reducing emissions and the circular economy themes.

- 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

Yes