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

Jul 2014

Project Reference Number

NIA_NGET0153

Project Registration

Project Title

Life Cycle Costing and Value Optimisation (ICase Award)

Project Reference Number

NIA_NGET0153

Project Licensee(s)

National Grid Electricity Transmission

Project Start

October 2014

Project Duration

3 years and 7 months

Nominated Project Contact(s)

Derrick Dunkley

Project Budget

£148,000.00

Summary

This project involves a PH student developing a literature review following external and internal stakeholder engagement which demonstrates the findings of the analysis of whole life value and life cycle costing and making recommendation to the business.

This project will create a consist approach to determine whole life value and life cycle costing and provide a benchmarking opportunity to establish how National Grid applies these techniques and methodologies. This will be achieved by evaluating and reviewing appropriate techniques currently used within National Grid to identify opportunities to enhance our knowledge and contribute to improving the way National Grid makes whole life value decisions.

Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

Problem Being Solved

National Grid is currently being challenged by the existing RIIO T1 arrangements to interrogate investment programmes and identify opportunities which require much more detailed and enhanced tools capable of assessing financial and non-financial data, including carbon and sustainability measures, stakeholder and customer satisfaction and risk appetite.

Key challenges that this project will aim to overcome include;

- Devise a best practice guide to support National Grid develop strategies to measure and reduce carbon.
- Provide improved decision making methods which will help National Grid achieve value optimised investment decision making.
- Ensure that National Grid is incorporating intangibles like customer relations in its whole life value assessments.

The cost of carbon becomes a very important consideration in the future life cycle costing decision making of assets as is the interaction of assets being located on our network due to environmental, risk and criticality measures. Being able to subtly understand cost implications over the long term will be very beneficial to the decisions making process of National Grid and contribute to our

approach to RIIO T2.

Method(s)

Research

This project will create a consistant approach to determine whole life value and life cycle costing and provide a benchmarking opportunity to establish how National Grid applies these techniques and methodologies. This will be achieved by evaluating and reviewing appropriate techniques currently used within National Grid to identify opportunities to enhance our knowledge and contribute to improving the way National Grid makes whole life value decisions.

The project will consist of the following six stages:-

Work Package 1

Review the literature on Life Cycle Assessment (LCA). Environmental Impact Assessment (EIA), Cost Benefit Analysis (CBA) and Through Life Costing (TLC) across sectors for long-life assets.

Work Package 2

Review of the existing Whole Life Value Framework (WLVF) and application of the LCA, EIA, CBA, TLC in the energy sector and more specifically National Grid.

Work Package 3

Define a methodology and approach to be used and identify exemplar asset(s) for use in the PhD. Proposed Life Cycle Cost and Value Optimisation – using quantitative and qualitative techniques.

Work Package 4

Undertake a pilot study using proposed techniques to assess available data, limitations and approaches and enhancements / feedback through stakeholder engagement.

Work Package 5

Evaluate the proposed approach for a subset of high-value assets and complete the PhD.

Scope

This project involves a PH student developing a literature review following external and internal stakeholder engagement which demonstrates the findings of the analysis of whole life value and life cycle costing and making recommendation to the business.

This project will create a consist approach to determine whole life value and life cycle costing and provide a benchmarking opportunity to establish how National Grid applies these techniques and methodologies. This will be achieved by evaluating and reviewing appropriate techniques currently used within National Grid to identify opportunities to enhance our knowledge and contribute to improving the way National Grid makes whole life value decisions.

Objective(s)

The objective of this project include:-

- Developing an approach which supports Whole Life Value methodology (WLV) including financial Life Cycle Costing incorporating CAPEX and OPEX spend across single asset replacement decisions or multiple assets in complex projects (schemes).
- Investigate whether a whole life value decision making process can provide valuable insight into financial options.
- Consistently incorporate consideration of risks.
- Enable the financial assessment across the Life Cycle of changes to Policies and Technical Specifications.
- Include carbon accounting and costing into the decision making process

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The success criteria for the project include:-

- Report on the state-of-the-art tools and techniques and challenges with a particular emphasis on quantitative and qualitative approaches.
- Report detailing National Grid's activities in the context of leaders in the field
- A two-year plan of defined techniques to be evaluated for use in the WLVF and assets to be evaluated at pilot and exemplar levels to demonstrate proof of concept. PhD Confirmation Report
- Initial evaluation of qualitative techniques and their use in the NG framework.
- Structured approach for integrating quantitative and qualitative techniques in decision-making WLVF.
- Final literature review to demonstrate the outcome, results and findings from the project with proposals and recommendations to take forward.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project is limited to a desktop study.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The work will be completed at the University of Bath.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

The total NIA Project Expenditure is £80,000

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)

It is anticipated that efficiencies resulting from this analysis will be between 0.002% and 0.005%. If this level of efficiency is applied on only 10% of the 8 year RIIO T1 CAPEX forecasted expenditure of £13.6bn it would equate to a benefit which will range from £272,000 to £680,000.

Please provide a calculation of the expected benefits the Solution

Not required for research projects.

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

The whole life value and life cycle costing methodologies and techniques identified as part of this project would be applicable to all Network Licensees; additional analysis is advised to establish whether they are most appropriate and effective for other licensees.

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

The implementation of the project will involve the updating of processes and procedures to incorporate whole life costing and training across the key business functions, an estimate cost for this is between £30,000 - £40,000.

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):

☐ 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

- ☐ 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 whole life cycle methodology will provide valuable new learning and knowledge for managing of asset on the network relating to cost and carbon options and decisions; this can be applied to all Network Licensees.

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.

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