

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

Apr 2013

### Project Reference Number

## Project Registration

### Project Title

Ratings Developments

### Project Reference Number

### Project Licensee(s)

National Grid Electricity Transmission

### Project Start

August 2006

### Project Duration

1 year and 4 months

### Nominated Project Contact(s)

National Grid TO Innovation Team

### Project Budget

£197,600.00

## Summary

The following project address rating issues related to National Grid's cable and overhead line assets.

A project has been initiated to improve the delivery of cable ratings calculations through the use of more flexible and accurate Finite Element Analysis (FEA) modelling methods. The project will demonstrate the advantages of finite element analysis of cable rating problems compared to the currently used finite difference method. Analyses performed by BICC (prior to their take over and closure) demonstrated the advantages of this method. FEA is the only readily available method for accurately modelling problems such as cable ratings and can be extended to include phenomena such as thermal dry out. The Auckland black-out demonstrated the need for utilities to understand and be able to model the ratings of their cable systems to avoid thermal runaway and consequent failures.

### Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

## Problem Being Solved

### Method(s)

### Scope

### Objective(s)

Verification of the rating methods used for cable ratings under various laying conditions and considering cable joint rating methods. A review will be carried out using FEA methods to confirm or otherwise existing methods.

Rating methods employed in the design of both forced cooled and naturally ventilated cable tunnels. The objectives of this project are to:

- Review the ratings methods used to design cable tunnels
- Assess existing operational data from cable tunnels, including Distributed Temperature Sensor (DTS) data
- Develop a specification for a rating method for cable tunnels installations with independent cable circuits.

Probabilistic overhead line ratings: This project aims to review whether the level of risk that is currently accepted by National Grid's ratings model is correct. This has not been reviewed for approximately 20 years and with improved instrumentation and measuring methodologies it is thought that the level of risk currently used may be shown to be conservative.

### **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