

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

Sep 2013

### Project Reference Number

## Project Registration

### Project Title

Ultra Wire

### Project Reference Number

### Project Licensee(s)

National Grid Electricity Transmission

### Project Start

October 2008

### Project Duration

11 years and 1 month

### Nominated Project Contact(s)

National Grid TO Innovation Team

### Project Budget

£55,200.00

## Summary

The UltraWire project consists of 2 parts, firstly the Nano Carbon Enhance Materials (NCEM) consortium, where knowledge is shared between interested parties in the field of enhanced Nano Carbon materials. The members include industry & academia and aim to find applications and drivers for NCEM.

The second part is the Euro FP7 project UltraWire, which NGET joined as a result of the NCEM consortium. Within NCEM, a demonstration of synthesis of wires was given by Dr Kosiol at University of Cambridge. This attracted large interest and the UltraWire project was developed. This project consists of a large consortium, of which NGET is one of the Industrial partners.

### Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

## Problem Being Solved

### Method(s)

### Scope

### Objective(s)

The use of electrical energy continues to increase. Worldwide energy-related carbon dioxide emissions are projected to rise 43% between 2008 and 2035. Our future depends in many ways on increasing the efficiency of our energy usage. Today 8% of generated electricity is consumed in resistive losses, in the distribution network, within the electrical devices employed by end-users and in the transmission network. The large majority of these losses occur in copper-based subsystems including wiring, motors and transformers. Increasing the electrical conductivity of copper-based materials can address reducing losses across the large majority of these electrical uses. It is a potential step-change for society.

Countries and companies that develop the manufacturing technology for high, room-temperature conductivity of copper will be able to

drive value into society and create new jobs. This new manufacturing technology generates value beyond simply cost-reducing manufacturing processes, which continue to drive jobs from Europe to Asia.

With the current drain on Copper resources globally, using Copper in the current demands makes this metal an unsustainable commodity. This project is looking to reduce the amount of copper needed to produce a conductor.

This project describes the scientific development and pilotfabrication of electrical wire made from ultra conductive copper (“UltraWire”), an advanced copper-carbon nanocomposite material. Wire is the most common form in which copper carries electrical energy today, and this is the most useful form for immediate take-up by the energy industry. The project brings factory processes and science together using leading European universities and large companies from the European copper, cable and manufacturing equipment industries.

### **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