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## NIA Project Registration and PEA Document

### Date of Submission

Mar 2013

### Project Reference Number

## Project Registration

### Project Title

SuperGen – HiDEF (Highly Distributed Energy Future)

### Project Reference Number

### Project Licensee(s)

National Grid Electricity Transmission

### Project Start

March 2009

### Project Duration

2 years and 1 month

### Nominated Project Contact(s)

National Grid TO Innovation Team

### Project Budget

£4,586,000.00

## Summary

The Highly Distributed Power Systems Consortium has developed plans for renewal that will demonstrate a radical vision of a highly distributed energy future that enables all end users to participate in system operation and real time energy markets and thereby more fully exploits the potential of distributed generation and active load resources to deliver a more sustainable and resilient provision of energy for the future. This Highly Distributed Energy Future (HiDEF) programme researches the essential elements of a decentralised system that could be implemented over the period 2025 & 2050, but at the same time has been structured to support the evidence base relating to key questions of current concern within the stakeholder community and in this way its relevance extends beyond the limits of its decentralised system vision.

In concept, the research vision is one of decentralised resources, control and market participation extending to include end users at system extremities. This challenges the current fit-and-forget strategies for the incorporation of such small elements within the power system that fails to capture the potential added value of this distributed technology. Furthermore, this approach opens up new opportunities that are not feasible in the conventional centralised structure, such as local heat and cooling grids, or district biogas schemes.

In recognising this, the consortium's scope has broadened from electrical power systems to future energy systems. This builds naturally on the extensive device based modelling work and conceptual work conducted under HDPS 1. In particular, the cell concept developed by HDPS 1 becomes the mechanism for localised management of not only electrical energy but also gas/heat/cooling and to extent energy for transportation.

The HiDEF project strongly complements the research, development and demonstration activities of Technology Strategy Board (TSB), the Carbon Trust, ETI, industry and EPSRC. A cross-cutting systems perspective is taken by the HiDEF team, building from detailed bottom-up modelling and systems level requirements. In this way the consortium is particularly qualified to contribute to an understanding of distributed resources and loads, their optimal coordination, and mechanisms for comprehensive integration.

### Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

## **Problem Being Solved**

## **Method(s)**

## **Scope**

## **Objective(s)**

The Consortium will develop the analytical, sustainability and economic evaluation tools, interface technologies and coordination strategies that are required to demonstrate the credibility, test the feasibility and engineer the integrative solutions of a future power system that delivers sustainability and security through the widespread deployment of Distributed Energy Resources (DER) and thus contributes to national and international ambition for a low carbon future.

## **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