

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 2015

Project Reference Number

NIA_WWU_023

Project Registration

Project Title

Lead Crystal Battery Assessment

Project Reference Number

NIA_WWU_023

Project Licensee(s)

Wales & West Utilities

Project Start

April 2015

Project Duration

0 years and 7 months

Nominated Project Contact(s)

WWU- Paul Rackley (Project Manager) – (lead GDN)
SGN- Mark Skerritt (Project Manager) UKPN- Bob Ferris
(Project Manager) NGN – Alec Breen (Project Manager)

Project Budget

£20,511.00

Summary

The intention of this project is to evaluate the potential of using Lead Crystal Battery technology over and above existing, traditional network applications; as well as investigating whether there are any other alternative battery technologies available that may be of equal or greater benefit.

Depending on the findings from this project, then consider creating a 'follow on' project to implement the use of an alternative battery technology, or technologies, in traditional applications.

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

Lead acid batteries used in traditional network applications are known to have a number of disadvantages and limitations; particularly with respect to service life, operating at higher temperatures, the need for controlled environments, along with the need for diligent safety and environmental management. New battery technologies are being developed at an increasing rate, to meet the growing demands of other industries for batteries that have larger capacities at higher temperatures, in smaller sizes with longer lives. Lead crystal battery technology has the potential to be used with traditional network applications to deliver enhanced service life, among other financial and technical benefits over traditional lead acid batteries.

Method(s)

This research project will investigate the potential benefits of lead crystal batteries and other alternative battery technologies; those potential benefits being, longer service life, extreme temperature resistance, high current discharge performance, improved environmental and safety aspects, and credentials over traditional lead acid batteries. This new technology could be used for network

applications, where traditional lead acid batteries are currently used, including substation tripping batteries, SCADA (Supervisory Control and Data Acquisition) outstation batteries and distribution switchgear/automation batteries.

Scope

The intention of this project is to evaluate the potential of using Lead Crystal Battery technology over and above existing, traditional network applications; as well as investigating whether there are any other alternative battery technologies available that may be of equal or greater benefit.

Depending on the findings from this project, then consider creating a 'follow on' project to implement the use of an alternative battery technology, or technologies, in traditional applications.

Objective(s)

The objective of this project is to:

- Carry out a desktop review of lead crystal battery technology (compared with traditional lead acid and NiCAD batteries).
- Identify any other competing battery technologies that may be relevant for network applications.
- Evaluate the potential benefits (technical and financial) of using new lead crystal battery technology over traditional lead acid and NiCAD batteries.
- Determine network applications where like-for-like replacement of traditional lead acid or NiCAD batteries is feasible and beneficial.
- Confirm whether there is merit in pursuing a follow on project to implement the use of an alternative battery technology to traditional applications.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be deemed to be successful if the following outcomes are achieved:

- Providing a desk top review of lead crystal battery technology, applications and perceived benefits; including identification of any other competing battery technologies that may be relevant now and in the near future.
- Completing a review of DNO and GDN network applications, where new lead crystal battery technology could be deployed, and associated technical requirements; including technical feasibility for like-for-like replacement of traditional lead acid or NiCAD batteries.
- Evaluation of the benefits (technical and financial) of deploying new lead crystal battery technology to traditional lead acid or NiCAD battery network applications.

This research project will ultimately deliver a comprehensive report that clearly demonstrates the potential benefits for using new lead crystal technology, and any other potentially suitable battery alternatives, for those specific network applications highlighted as being technically feasible and beneficial.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This research project has been designed initially to carry out a conceptual study. It was deemed appropriate to limit this project to a relatively small scale study because of the low technology readiness level. The network licensees have not committed to funding further stages of research and development until feasibility has been established through this project.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL2 Invention and Research

Geographical Area

This project will be undertaken by Threepwood Consulting Ltd at their office in Newcastle upon Tyne

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

WWU

£5,209 total (External costs £3,907, Internal costs £1,302) Project expenditure, 90% of which is Allowable NIA Expenditure (£4,688)

SGN

£5,209 total (External costs £3,907, Internal costs £1,302) Project expenditure, 90% of which is Allowable NIA Expenditure (£4,688)

NGN

£5,209 total (External costs £3,907, Internal costs £1,302) Project expenditure, 90% of which is Allowable NIA Expenditure (£4,688)

UKPN

£4,884 total (External costs £3,907, Internal costs £977) Project expenditure, 90% of which is Allowable NIA Expenditure (£4,396)

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)

Because this project solely focuses on the conceptual development of the technology it is difficult to quantify the potential financial benefits at this stage.

It is envisaged that deployment of this technology would lead to financial benefits in the following areas:

- Enhanced server life
- Reduced maintenance costs

Please provide a calculation of the expected benefits the Solution

This is a research project

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

This method could be applied across the whole of GB and applies to all network operators.

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

There are no costs associated with sharing the conclusion and recommendations of this study with the other Network Licensees, which will be the first step towards roll out across GB. As stated above, the very early technology readiness level means that it is not possible to estimate the costs of deployment at this stage.

The learning from the report will be documented on the smarter networks learning portal.

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

All Network Licensees will be able to use the learning generated because the outcomes will be presented in a clearly defined report that focuses on providing possible solutions to address the objectives.

This research will provide Network Licensees with a conceptual study of the new lead crystal batteries and their application across the networks both in gas and electricity.

This will then allow Network Licensees to analyse internally where they foresee the benefits and whether they outweigh the costs and disadvantages of current battery methods.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

WWU has been successful in using innovation to move the business forward since inception to a position where real stakeholder benefits have been delivered. This is particularly so in the output areas of safety, reliability, environment, social obligations, customer satisfaction and value for money. This research innovation project will allow us to assess emerging technologies and ensure that we are offering value for money to all.

- 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