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 2016

Project Reference Number

NIA_WPD_018

Project Registration

Project Title

Electric Vehicle Emissions Testing

Project Reference Number

NIA_WPD_018

Project Licensee(s)

National Grid Electricity Distribution

Project Start

July 2016

Project Duration

1 year and 0 months

Nominated Project Contact(s)

Benjamin Godfrey - Innovation & Low Carbon Networks Engineer

Project Budget

£145,500.00

Summary

This project will cover the testing of between 15 to 20 EVs and charging rates up to 32A.

Problem Being Solved

Electric Vehicle (EV) manufacturers are unwilling to share the specific harmonic data on the EVs currently in circulation in the UK. Vehicles should be compliant with harmonized EU standards under UNECE R10, but various versions of this standard apply to the existing fleet and there is further uncertainly over which standards apply due to the transitional provisions for conformity. Furthermore UNECE R10 only requires compliance with 61000-3-11 and 61000-3-12 for charging over 16A, which does not provide unconditional connection to the network.

Without confirmation of the standards these vehicles comply to, the customer risks facing increased network charges, either due to conservative reinforcement requirements, or widespread reactive reinforcement schemes to ensure the network remains within limits.

Identifying the EVs which can be classed as non-disturbing and meet the technical requirements of 61000-3-2 and 61000-3-3 will enable DNOs to assess and approve these connections quicker.

Method(s)

This project will assess the harmonic disturbance of EVs by carrying out repeated charge and discharge tests for a range of vehicles and charging levels on monitored EV Chargepoints.

The results of the monitoring will be analysed and a report created on their level of disturbance and standards met.

Scope

This project will cover the testing of between 15 to 20 EVs and charging rates up to 32A.

Objective(s)

This project will determine the level of harmonics and flicker observed during the charging of EVs and document the emissions conducted back onto the electrical distribution network.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

1. Testing of at least 15 electric vehicles
2. Recording of power quality data for specific vehicle types
3. EV power quality data analysed for compliance with relevant standards
4. Report on EV Emissions Testing completed

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The sample size of at least 15 vehicles will ensure that the majority of mainstream vehicles in the UK are tested. The testing regime and number of charge/discharge cycles will ensure confidence is given to the results.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL4 Bench Scale Research

Geographical Area

Millbrook Testing Facilities

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£130,950

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)

Devices conforming to the technical requirements of IEC 61000-3-2 and 61000-3-3 are suitable for connection at locations with a higher impedance than device confirming to IEC 61000-3-11 and 61000-3-12. IEC TR60725 estimates 90% of properties to have an impedance equal to or less than 0.25 + j0.23 Ohms and 98% of properties to have an impedance equal to or less than 0.46 + j0.45 Ohms. Zref for testing purposes in the 61000-3-3 standard requires an impedance of 0.40 +j0.25 Ohms. Extrapolating those values, an estimated 95% of properties will exceed the impedance required by 61000-3-3 and require reinforcement.
Within the WPD region, this will equate to around 375,000 properties and if each property required a new service at an indicative cost of £1,200, this would total £450m.

Please provide a calculation of the expected benefits the Solution

n/a

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

The figures of required reinforcement locations are based on UK data, so approximately 5% of UK domestic households would require works if the lower thresholds within the standards are not met.

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

If the vehicles do meet the lower thresholds within the standards, no further costs would be incurred to roll out the method, apart from dissemination and training costs.

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

The learning generated from the project will be disseminated to all network operators through the ENA Low Carbon Technologies working group and will inform the level of required power quality assessment for EV Chargepoint connections.

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

- [x] Yes