

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

Oct 2021

### Project Reference Number

NPG\_036\_NIA

## Project Registration

### Project Title

Silent Power II

### Project Reference Number

NPG\_036\_NIA

### Project Licensee(s)

Northern Powergrid

### Project Start

October 2021

### Project Duration

1 year and 6 months

### Nominated Project Contact(s)

Emma Burton (Project Manager)

### Project Budget

£320,000.00

## Summary

A extension of the successful Silent Power project, the output of that now in everyday use. This new phase allows the use of the technology with 3 phase connections extending the scope and usefulness of this environmentally beneficial approach to commercial and industrial customers.

## Preceding Projects

NIA\_NPG\_016 - Silent Night – Hybrid EV Generator

## Third Party Collaborators

Turntide Technologies Ltd

## Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

## Problem Being Solved

Northern Powergrid use mobile diesel generators to provide power to low voltage faults. The use of diesel generators in this way is generally fuel inefficient as generators are sized for peak load and therefore run below capacity most of the time they are connected. Consequently running cost, noise and CO2 emissions are in excess of what could be achieved with a more efficient method of maintaining temporary supplies. Building on the success of the first Silent Power project, Silent Power 2 will develop a modularised, 3 phase system which will be able to restore commercial as well as residential customers.

## Method(s)

The objective of the project is to explore if deploying a unique electrical energy storage system will create a mobile microgrid, absorbing local generation and supporting local demand. We currently have 3x single phase Silent Power vehicles available for operational use in the business and we are collecting data on their usage. The systems are rated at 25kWh and have a 40kVa output. However this project will develop a 3-phase system with larger capacity.

## Scope

The project is to design a system which can be used as a backup energy source which can be plugged into the 3-phase AC power system. This system is intended to be used to power larger establishments during power outages. The power requirements are significantly higher with respect to the original Silent Night project. The system also will be designed such that it can be charged from an A/C source.

## Objective(s)

- Determine whether a 3-phase electrical energy storage system can be safely installed in a standard sized fleet vehicle.
- Develop and fully test communications, tracking and control systems ensuring compatibility with our current, or modified, operational approach.
- Determine operational characteristics of such a vehicle
- Assess carbon footprint, fuel usage, support time, recharge motor utilisation, noise pollution.
- Assess maintenance regime, battery life.
- Determine the operating economics of such a vehicle, across the full asset life cycle, and make comparisons with alternative approaches.
- Assess and make recommendations for broader adoption.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

N/A.

## Success Criteria

The success criteria for the Project will include -

- Power output to be 50kVA per phase (3 phase AC system)
  - System to be built to fit in standard van which can be driven by any driver with a standard license
  - Preferably would have an option to incorporate PV Panels and/or small wind turbines for charging
- The intention is to use Hyperdrive GEN4 Modular Li-ion Battery Packs

## Project Partners and External Funding

N/A

## Potential for New Learning

The project builds on the successful Silent Power activity. This demonstrated the technology for use at single phase LV and the environmental and customer benefit. Building on that unique and new learning this project extends the functionality to 3-phase connections for wider applicability.

## Scale of Project

Project scale is limited to the production of a demonstrator/prototype.

## Technology Readiness at Start

TRL4 Bench Scale Research

## Technology Readiness at End

TRL7 Inactive Commissioning

## **Geographical Area**

N/A

## **Revenue Allowed for the RIIO Settlement**

None

## **Indicative Total NIA Project Expenditure**

£320,000

## 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:

Project reduces carbon footprint of the business.

#### How the Project has potential to benefit consumer in vulnerable situations:

In reducing environmental impact, especially regarding noise and street disruption, the project will benefit vulnerable customers.

### 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)

The proposed electrical energy storage system could be used in around 40% of generator operations, potentially reducing fuel consumption by (conservatively) 40% in those cases. The annual fuel saving across the NPg business would be around £400k with a further saving in the offset carbon.

#### Please provide a calculation of the expected benefits the Solution

Additional benefits are available in terms of noise and particulate reduction, and other societal benefits around, eg, emergency night-time working, although these are difficult to assess.

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

The methodology and technology can be rolled across the whole of the GB network.

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

Roll-out costs are negligible. Costs would be covered in the usual course of the replacement cycle for fleet vehicles and contract renewal for generation.

### 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 trialed 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

## RIO-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

Learning will be available via the project's final report, publically available to all licenced entities and embodiments of the technology will be available through the usual commercial routes for such equipment as an embedded capability.

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

Reduction of the environmental impact of network operations and reduction in the carbon footprint of Northern Powergrid are specific innovation objectives.

### 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.

Project is built on the unique learning created in Silent Power and is not been available elsewhere.

### 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

The project builds on only recently available outputs from a previous NIA project.

### Relevant Foreground IPR

Relevant foreground IP, on technical performance, will be embodied within the pre-production prototype. Reporting will be available.

### Data Access Details

N/A

### Please identify why the Network Licensees will not fund the project as part of its business and usual activities

The project remains a high risk technology development activity with an uncertain technical and economic outcome.

**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**

The project remains a high risk technology development activity with an uncertain technical and economic outcome.

**This project has been approved by a senior member of staff**

Yes