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 2017

Project Reference Number

NIA_NGN_213

Project Registration

Project Title

iStop

Project Reference Number

NIA_NGN_213

Project Licensee(s)

Northern Gas Networks

Project Start

July 2017

Project Duration

1 year and 2 months

Nominated Project Contact(s)

Mark Squires - Transport Manager (NGN)

Project Budget

£15,000.00

Summary

We see this as a two stage process:

1. Prototype development of retro-fit solution

2. Initial field trials of the developed prototypes - circa 3 vehicles with GDN OBP (Currently have over100 in the NGN fleet)

The retrofit will require a competent electrician, for the purposes of this project each vehicle will require fitting to be undertaken at Gardner Denver, Bradford, taking approximately 1/2 day per installation.

Following this project it may be possible to retrofit the solution at agreed suitable locations.

Third Party Collaborators

Gardner Denver

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Northern Gas Networks launched a call for innovation via the EIC to identify alternatives to currently used Power Take Offs (PTOs)/ On Board Power (OBP).

Gardner Denver presented to NGN a number of their developed fuel saving, intelligent engine stop / start systems for large trucks for companies such as BOC, Suttons and Arla foods.

The problem identified is that an OBP unit is required to run at high engine revs in order for equipment, such as electro fusion machines, to operate correctly. When an electrical appliance is required a switch is turned to engage, increasing the engine speed. This high idle uses more fuel than lower engine speed and unless the operator switches the system off at a switch the system continues at this higher speed.

During the operation of PTO equipment, specifically On Board Power (OBP), the engine of vehicles used in the event of gas emergency repairs and replacement activity is left running at a high idle for long periods of time.

Operators engage the system prior to leaving the cabin of the vehicle, depressing the clutch and engaging the OBP. The engine is often left engaged for the duration of work as operatives do not know when during work tasks they will need power. The high idle uses large amounts of fuel as well as creating both noise and air pollution.

Method(s)

The solution will automatically sense the load on the electrical side of the OBP system and once the electrical load is removed will decrease the engine revs until a load is sensed again.

This project will develop the currently deployed innovation into the van market and deliver a new product to work alongside current (OBP) systems. Three prototypes will be produced and field trialled to gain data.

The OBP power operates in two modes and at three speeds:

1. Compressor Only Mode - in this mode the engine idles at 1200RPM and increases to 1990RPM when the operator requests compressed air. Once the operator finishes using the air, a predetermined timer allows the system to return to 1200RPM.

2. Compressor / Alternator Mode - in this mode the engine idles at 1660RPM, this is to ensure that the operator gets a continuous 50Hz from their electricity supply, the compressor also works in this state, but at 1660RPM not 1990RPM. In this mode the engine does not reduce from 1660RPM.

Therefore the three speeds are: 1200 / 1660 & 1990 RPM.

The compressor system utilises a pressure relief valve and pilot valve to understand whether the system is being used or not and our concept involves recreating this process within the alternator circuit of the OBP.

Scope

We see this as a two stage process:

1. Prototype development of retro-fit solution

2. Initial field trials of the developed prototypes - circa 3 vehicles with GDN OBP (Currently have over100 in the NGN fleet)

The retrofit will require a competent electrician, for the purposes of this project each vehicle will require fitting to be undertaken at Gardner Denver, Bradford, taking approximately 1/2 day per installation.

Following this project it may be possible to retrofit the solution at agreed suitable locations.

Objective(s)

Stage 1 – Develop 3 prototypes

- Agree data capture (emissions, noise, fuel etc.), feedback and details (fitting etc.) for initial trials
- Understand engine characteristics for GDN activities and agree typical work cycle for base testing
- Gather base data over a three month period of work cycles, emissions, fuel use etc.
- Bench demonstration of prototype unit to Steering Group
- Agree any further modifications
- Develop and fit 3 prototype units to NGN fleet
- Indication of future potential savings from Automatic Gearbox vehicles of CNG vehicles

Stage 2 – Initial field trials

- Undertake three months of operation for the three prototypes

- Gather data and feedback from trials
- Agree any further modifications and progression to stage 3
- Determine if any further action is required for adoption of the prototype solution across NGN (documentation, testing etc.)

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The outputs for this project will be;

- a retro-fit solution
- supporting data and feedback for retro-fit solution from trials
- quantifiable reduced fuel use and impact on operatives and stakeholders

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project will be conducted under field trial conditions and as a result there will be a limited number of trials.

This approach is designed to prove the technology works in real operational environments and that the work to commericialise (TRL9) is fully understood based on documented evidence.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The technology will be trialled across the NGN network, once developed the technology will have the potential to be used across the UK gas industry.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

NGN External costs £11,250

NGN internal costs £3,750

Total project costs:£15,000

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:

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)

This project will develop the currently deployed innovation into the van market and deliver a new product to work alongside current (OBP) systems. Three prototypes will be produced and field trialled to gain data.

Benefits to the Gas Distribution Networks (GDN) will include; fuel savings; potential reduction in vehicle maintenance costs; reduced emissions and reduced audible levels on site. Stakeholder benefit may be seen from reduced noise levels on site

Forecasted financial benefit for NGN fleet is £60,000 per annum

Please provide a calculation of the expected benefits the Solution

Assumptions are that this system can save 0.75 litres / hr for an average of 2 hrs per day, 5 days per week over 48 weeks per year, this equates to 360 litres per year at £1.20 / lt equals £432 per vehicle per annum.

We are currently aiming for an installed retro-fit solution to be no more than £450

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

This is an feasibility study for NGN's network vehicles, all networks utilise on site power generation through the course of network operations

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

The predicted price point is £450 per vehicle, with c.140 eligible vehicles in the network fleet this equates to an implementation cost of £63,000. Multiplied across 8 networks this equates to £504,000.

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 problem addressed by this project is industry wide and at present no such solution is available, this project will offer technology to all network licensees with the focus being on improving efficiency of on board power which is an essential part of the toolkit used by network teams to maintain the network.

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

To facilitate an improved financial and environmental performance through the use of Network vehicles as part of network operations.

Expanded focus on safety, efficiency and environmental impacts through an improved demand fed remote on board power solution.

☑ 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