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NIA Project Registration and PEA Document

Date of Submission

Aug 2023

Project Reference Number

NPG_NIA_045

Project Registration

Project Title

OHL Collision Avoidance

Project Reference Number

NPG_NIA_045

Project Licensee(s)

Northern Powergrid

Project Start

August 2023

Project Duration

1 year and 7 months

Nominated Project Contact(s)

Andrew Dudman,
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Project Budget

£690,000.00

Summary

This project aims to develop a solution that enables the GPS location of overhead lines to be loaded in the navigation systems of agricultural vehicles to alert drivers to the presence of overhead lines and prevent OHL strikes.

Third Party Collaborators

Open Grid Systems

Frazer-Nash Consultancy Ltd

Sheffield Hallam University

Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

Problem Being Solved

DNOs normally raises awareness on electrical safety in collaboration with the National Farmers Union (NFU), through engagement with agricultural colleges and attendance at regional agricultural shows. These initiatives, based on the Health and Safety (HSE) guidance note GS6, allows them to deliver proactive educational awareness on assessing and maintaining safe working clearances. Due to COVID-19 restrictions, this has not been possible during 2020 and 2021.

However, despite the safety awareness training, overhead line strike incidents still occur. Data from 2020 shows that there were a number of incidents over the course of the year, the majority of which are attributed to the agricultural (29 cases), construction and road haulage sectors (10 cases). All of these incidents were avoidable.

To the best of DNO's knowledge, agricultural, construction plant and commercial vehicles do not have specific built-in safety features

that provide proximity alerts to the overhead line network. However, some variants may have GPS systems which allow users to configure warnings for physical objects such as pole supports and stay wires. This does not include detection of live electricity nearby on powerlines.

Method(s)

Three companies, Open Grid Systems, Sheffield Hallam University and Frazer-Nash Consultancy, are collaborating to develop and validate the a system that can alert users or vehicles when proximity to OHL falls below a pre-defined threshold. The system will comprise of a common cloud, portable on-board device and/ or magnetometers and features in smartphones. Relevant trends and observations from historical OHL strike data will also be used to refine alerts.

Scope

- Development of prototype on-board capable of producing audible and visual alarms.

Development and validation of mobile sensing app incorporating data from magnetometers and smart phone sensors.

- Analysis of historical incidents, identifying any common root causes of OHL contact incidents and development of a stakeholder and communications strategy.

Objective(s)

- Design, implementation, and validation of mobile sensing application that uses data from magnetometers and other inbuilt smart phone sensors
- Development of on-board embedded system; including field measurements and validation
- Design and implementation of interoperable APIs to facilitate integration with backend system
- Analysis of historical incidents, identifying any common root causes of OHL contact incidents.
- Stakeholder and communications strategy to help reduce number of contacts.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

This project is entirely focussed on the protection and reduction of risk of injury and death associated with vulnerable lone workers in (mostly) rural locations.

Additionally the project should marginally reduce the impact of outages as the result of impacts between agricultural vehicles and the distribution network. Any reduction in unplanned/accidental outages reduces the downside exposure of vulnerable customers and also helps to decrease temporal induced vulnerability in those that may not be initially impacted.

Success Criteria

The project will be considered successful if these criteria are met:

- Must be a user-friendly solution that is compatible with different operational systems.
- Must provide visual alerts that assist in preventing OHL strikes.
- Must be compatible with other cable avoidance systems/ practices used by all DNOs and adoptable by all networks.
- Must not result in claims against networks due to users only relying on the solution.
- Must provide insightful reporting tools that allows existing records to be regularly updated with suitable comms strategy.
- Where these cannot be delivered, an analysis and assessment as to the reasons why they cannot be achieved, that learning being published and shared, would also constitute a successful although not positive outcome.

Project Partners and External Funding

UKPN, £230k

Potential for New Learning

An understanding of how customers interact with DNO's when operating in close proximity of OHL. This learning could assist

understanding on how to manage underground Cable Strikes.

How DNOs collectively can work and share network information to benefit customers. This learning will support Projects in ED2 – Vulnerable Customers

Scale of Project

The project is designed to develop learning and understand specific issues and/or behavioural patterns associated with OHL strikes. The scale of the project allows application of proposed technology on specific network areas but will not cover every network area

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The study areas are to be defined during stage 1. The selection made will be based on data availability and size but may not cover the total area covered by all funding parties.

Revenue Allowed for the RIIO Settlement

None.

Indicative Total NIA Project Expenditure

£690,000

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:

The project aims to deliver an understanding of how customers interact with DNO's when operating in close proximity of OHL. This is a particular issue for lone-workers in rural locations, often engaged in agricultural work. The project seeks to reduce the risk of death or injury through inadvertent contact events with OHLs.

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

The expected benefits will be a reduction in costs associated with network downtime Improved efficiency in monitoring incidents related to OHL assets.

Fewer/shorter outages resulting in direct savings in both labour and resources.

Resources will be required to train staff in the safe use/integration of solution and/or for updating internal documents to recognise the solution as an accepted additional resource.

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

The guidance produced through this project will be able to be used by all distribution network operators and possibly transmission operators. As such it is widely applicable and easily replicable.

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

Costs are still subject to final design but the target is Indicative cost is £200k per participating licensee.

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 should result in a directly usable product that can be adopted, with minimal modification (probably limited to provision of relevant network GIS information) by any licensed entity.

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.

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.

This is a collaborative project between three DNOs. This project was also reviewed by a fourth DNO which chose not to participate. None of these organisations were aware of any similar technology available in the marketplace currently nor in development on the basis of previous work undertaken by regulatory innovation funding mechanisms.

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 combination of skills required to bring deliver this type of innovation is broad and comes from across three separate organisations. It is the work of the DNOs, acting through the Energy innovation Centre that identified the need and have bought this consortium of appropriate expertise. It is unlikely that all three would have come together otherwise or that an individual organisation would have the breadth of expertise required to both identify the need and deliver the innovation.

Relevant Foreground IPR

The new foreground IP will be embodied in a product available to all licensed, and other, entities. Further IP with respect to usage and reliability will be made available in the form of specific or within more general reporting, depending on the precise nature of the project outcomes.

Data Access Details

Not relevant for this project.

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

This project is high risk and there is no relevant commercial recovery available through the ED2 TOTEX mechanisms.

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 innovation is cutting edge and has a relatively low level of initial TRL. This is demonstrative of a project of high technical risk.

Commercially the market for such an application is relatively small and without the stimulation of innovation funding the required development work would not be undertaken.

This project has been approved by a senior member of staff

Yes