

NIA Project Registration and PEA Document

Date of Submission

Feb 2022

Project Reference

NIA_SSEN_0057

Project Registration

Project Title

Decarbonising Utility Transport using Whole System Thinking

Project Reference

NIA_SSEN_0057

Project Licensee(s)

Scottish & Southern Electricity Networks

Project Start

February 2022

Project Duration

0 years and 10 months

Nominated Project Contact(s)

Tim Sammon

Project Budget

£117,920.00

Summary

The aim of the project is to report on the extent to which utilities are on the decarbonisation journey of their vehicle fleets

Key outputs include:

- Report on the present-day composition of utility fleet vehicles (mixture of electricity and gas network operators).
- Report on vehicle decarbonisation challenges, needs, global logistic trends and options for on-road and off-road vehicles.
- Create a roadmap, including a gap analysis and assessment of intervention options to support utility fleet decarbonisation between now and 2050.
- Roadmap will show what vehicles should be decarbonised and the optimum time to decarbonise them. Decarbonisation options e.g. electric vehicles vs hydrogen vehicles and cost estimates will also be investigated in order to identify least cost options that meet fleet requirements.

Nominated Contact Email Address(es)

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Problem Being Solved

To achieve Net Zero emission targets by 2050 (or 2045 for Scotland) it is expected that the operation of GB utility fleets will have to change. As part of that utilities are expected to cut emissions from their transport fleets and logistics operations whilst ensuring reliable operation of power grids and customer service.

Utilities have started to decarbonise their fleet and logistic operations; having explored their footprint, they have started to transition with their corporate fleets and light commercial vehicles as these are the electric vehicles available in the market.

However, understanding how to decarbonise cost-effectively, while meeting vehicle usage requirements is not well understood. There is a risk that utilities decarbonise at the risk of either incurring high costs or obtaining vehicles that are unable to perform the function of their petrol/diesel predecessors.

Decarbonising of utility company fleets requires a strategy that takes into account technology and economics to enable least-regret investment decisions, particularly for the hard-to-decarbonise vehicles which have unique duty cycles and on-board equipment. As the decarbonisation of transportation for all requires GB utilities to provide reliable power, it is important to factor in the operational consideration for decarbonised utility transportation fleets during times when resilience is required, such as black start and storm operations.

New forms of transportation are becoming commercially available and there are opportunities to decarbonise whilst improving the speed and efficiency of operations.

Method(s)

We propose a desktop-based literature review to understand the composition of utility fleet vehicles, the nature of the challenges and the global logistic trends which are responding to the emerging call for fleet decarbonisation (on-road / off-road transport modes). We will apply whole system thinking which considers adjacent markets which impact the provision of electrification, hydrogen, biomethane and alternative development fuels as potential fuel sources for fleet vehicles. We will also explore opportunities for innovation so that the overall “miles travelled” may be reduced (e.g., using drones / digitisation of sites).

We will complement the literature review by engaging with utility stakeholders (fleet / construction/ operational managers) and solution suppliers (vehicle Original Equipment Manufacturer, infrastructure suppliers etc.) to explore needs, prevailing practices, and transport offers. This will help to unpick the challenges, so that barriers can be clearly articulated and opportunities “spotlighted”. We will develop a roadmap of where innovation, investment, new business models, products etc. are needed to overcome the challenges.

Our approach is unique as it takes a whole system approach, and it is looking to bring a great range of stakeholders together. We will be working with a global consultancy who will be bringing in an international perspective on the challenges and interventions needed. We will be using a whole system modelling software, provided by Energy Systems Catapult (ESC), to provide additional insights on the impact the interventions will have on decarbonising utility fleets.

Scope

In Scope:

Stage 1 Gap Analysis: Desktop Research & Stakeholder engagement

TRL at start of stage: 2

TRL at end of stage: 4

Stage 2 Roadmap Development

TRL at start of stage: 2

TRL at end of stage: 4

Out of scope:

- Vehicle types not owned and operated by utility companies
- Developing a technical solution to address the gaps identified
- Research of areas outside transport and logistics operations

Net benefits to consumers and other utilities such as financial, environmental, etc. will be estimated in Stage 2 (Roadmap Development) as part of the final report.

Objective(s)

Stage 1

Objective 1: Report on utility fleet decarbonisation progress and collate best practice and data from partners and stakeholders based on global examples of utility fleet decarbonisation.

- Data scope communicated to partners ahead of kick-off.

- Minimum data scope (tbc) includes:

- Current fleet make up (vehicle category, powertrain, age), operation profile (vehicle use, used for critical operations, duty cycle, base location, annual mileage), parking locations and site-specific data (where do vehicles get parked overnight, what other operations are at the site, site locations), existing plans for decarbonising fleet.

- Interviews held with partners and minimum data scope captured.

- Form for data submission provided to partners after kick-off.

Objective 2: Capture and validation of stakeholder challenges.

- Workshop: Data and views from wider stakeholder group captured.

Objective 3: Synthesis of outputs from stakeholder engagement and research to establish current state of play and to develop a gap analysis on current progress, challenges, opportunities, barriers.

- All key areas and key stakeholder views included in Gap Analysis Report.
- Signed off by SSEN

Stage 2

Objective 4: Identify areas of innovation and decarbonisation options that might be developed but are not commercially available yet.

- Agreement of roadmap information architecture/figures of merit

Objective 5: Understand and quantify the potential carbon reduction of decarbonisation options which still meet operational and resilience requirements, cost implications and timelines

- Quantification of key intervention impacts via modelling outputs.

Objective 6: Synthesise all findings and propose least regret options and key milestones and decision points.

- Key areas, key stakeholder, key interventions and key areas of impacts covered.

Objective 7: Develop a roadmap that captures and visualises the appropriate interventions, impacts, timelines, stakeholders and cost implications.

- Roadmap: Key interventions, impacts decision points and timeline captured.
- Signed off by SSEN

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

Not Applicable

Success Criteria

Success criteria 1: Collect data from project partners and inputs from stakeholders

- Key areas and subsectors addressed,
- Key stakeholders included
- Minimum data scope covered.

Success criteria 2: Identify current state of play and existing research and work in utility fleet decarbonisation

- Key areas/subsectors addressed
- Gap analysis report

Success criteria 3: Current trends and methodologies validated by key stakeholders

- Hold workshop with stakeholders
- Attendance of key stakeholders

Success criteria 4: Roadmap of potential future work, timescales and cost.

- Report including roadmap and analysis.
- Modelling evidence provided on key areas of impact from key interventions

Success criteria 5: Identify Quick wins and least-regret decisions

- Clearly stated recommendations

Success criteria 6: Identify work already in progress in UK and North America.

- Specific examples given

Project Partners and External Funding

Project partners:

EIC - Energy Innovation Centre Limited

SSEN - Scottish Hydro Electric Power Distribution PLC

NGN - Northern Gas Networks Limited

NPG - Northern Powergrid (Northeast) Limited

UKPN - UK Power Networks (Operations) Limited

SP Energy Networks

Potential for New Learning

The project will identify areas where interventions are needed to support decarbonisation of utility fleets and logistics operations, especially as it relates to utility-specific vehicles operating during extreme events. This will create new learning and will enable SSEN

and other utilities to understand where innovation is needed and what steps they will need to take to reduce carbon emissions.

Scale of Project

The project is fairly small scale, costing under £150k. At this stage there is no need to make the scale any larger or smaller as it is a research project aimed to stimulate thinking around utility investment in fleet decarbonisation. On completion of the project a Roadmap (including utility fleet vehicles currently in use) will be made available that will better inform utilities on investment options and costs that may lead to future larger projects or investments.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL4 Bench Scale Research

Geographical Area

The project will be desktop based but provide learnings for all DNO and TO project partners who provide the necessary data to produce a Strategy Report and Roadmap. Other Utilities can also view outputs and apply learnings to their own fleets.

Revenue Allowed for the RIIO Settlement

Not Applicable – This project will not create financial savings within RIIO-ED1

Indicative Total NIA Project Expenditure

RIIO-ED1 – 90% of project costs

RIIO-ED2 – None.

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:

Not Applicable

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

Not Applicable

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)

Not Applicable – This is a low TRL Research Project. The outcomes of the project will provide cost savings estimates.

Non-financial benefits

Direct Benefits

Financial- Informing financial planning

Delivery mechanism: Delivery mechanism: Incorporate identified quick wins and low-regret options and decision points and timelines into financial planning. Consider predicted cost implications in financial planning.

Health & Safety - Informing decision making / wider impact assessment

Delivery mechanism: Include miles travelled in key output parameters evaluate wider impact and consider in decision making.

Environmental - Informing decision making

Delivery mechanism: Include emissions in key output parameters and consider quantified emission reduction in decision making.

Customers - Supporting evidence

Delivery mechanism: Roadmap and report provide supporting evidence and rationale justifying decisions on decarbonisation.

Community - Informing decision making

Delivery mechanism: Include parameters representing air and/or noise pollution in key output parameters and consider in decision making.

Carbon Reduction - Informing decision making

Delivery mechanism: Include carbon emission in key output parameters and consider quantified carbon reduction in decision making.

Indirect Benefits

Financial- Reduction in fuel costs associated with fleet operations

Delivery mechanism: Incorporate identified quick wins and low-regret options and decision points and timelines into financial planning. Consider predicted cost implications in financial planning.

Health & Safety - Reduction in travel related injuries

Delivery mechanism: Include miles travelled in key output parameters evaluate wider impact and consider in decision making.

Environmental - Emission reduction

Delivery mechanism: Include emissions in key output parameters and consider quantified emission reduction in decision making.

Customers - Air quality improvement

Delivery mechanism: Roadmap and report provide supporting evidence and rationale justifying decisions on decarbonisation.

Community – Air & noise quality improvement

Delivery mechanism: Include parameters representing air and/or noise pollution in key output parameters and consider in decision making.

Carbon Reduction - Supporting utilities to fulfil their commitments on fleet emission reduction

Delivery mechanism: Include carbon emission in key output parameters and consider quantified carbon reduction in decision making.

Please provide a calculation of the expected benefits the Solution

Not Applicable – This is a low TRL Research Project. The outcomes of the project will provide cost savings estimates.

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

All partner DNOs / TNOs who provide data to the project will benefit from the outcomes i.e. A strategy Roadmap on how best to decarbonise transport fleets. Other Utilities can also view outputs and apply learnings to their own fleets.

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

Not Applicable – This is a low TRL Research Project. The outcomes of the project will provide cost savings estimates.

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

n/a

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.

No previous studies focussed on utility fleets have been undertaken with such a wide range of collaborators.

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

This project will collate and analyse data on transport fleets from two electricity transmission, four electricity distribution, and one gas distribution licence-holders. It will develop a roadmap of where innovation, investment, and new business models and products are required to overcome the challenges of decarbonising utility transport fleets. No explicit, collaborative literature review currently exists on this topic. The Project will see Utility companies across differing industries collaboratively working together to reduce the Carbon Footprint of their Transport and Logistic fleets.

Relevant Foreground IPR

Foreground IPR will be made available as per NIA requirements throughout this project.

Data Access Details

Data will be made available through a Strategy Report and Roadmap. This will be published as a stand-alone document that will be made available through the EIC or SSEN. Contact futurenetworks@sse.com for more information.

For information on how to request data gathered as part of this project see Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure at <https://www.ssen.co.uk/InnovationLibrary/Distribution/>

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

This project is considering the wider landscape, with collaboration from gas and electricity sectors so has a wider remit than SSEN business as usual funding activities.

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

As this is a cross-sector collaborative project NIA is the most appropriate funding mechanism, that enables cross-sector discussions and shared learning.

This project has been approved by a senior member of staff

Yes