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

Aug 2020

Project Reference Number

NIA_UKPN0063

Project Registration

Project Title

Charge Collective

Project Reference Number

NIA_UKPN0063

Project Licensee(s)

UK Power Networks

Project Start

August 2020

Project Duration

2 years and 5 months

Nominated Project Contact(s)

Shira Lappin

Project Budget

£843,640.00

Summary

Low provision of public charging infrastructure has been identified as a significant barrier to growth of the domestic EV market. Charge Collective will look to develop a network solution, in collaboration with Local Authorities, that can cut through the market, coordination, social and upfront connection cost challenges that lead to underinvestment in public charging infrastructure.

Nominated Contact Email Address(es)

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Problem Being Solved

The distribution networks will need to accommodate millions of new electric vehicles (EVs) in the 2020s, which will mean a significant increase in the investment in the number of charge points. Delivering a rollout at this scale will require close coordination between Local Authorities (LAs), Distribution Network Operators (DNOs) and chargepoint developers.

Currently, low provision of public charging infrastructure in the UK has been identified as a significant barrier to growth of the domestic EV market. Investors in chargepoints face barriers to investment related to high capital costs (driven by network reinforcement and sole use asset costs) combined with a set of market, policy and regulatory failures. These barriers reduce investment in chargepoints to below optimal levels. This could affect the UK's ability to meet its carbon budgets and the Net Zero target.

Stakeholders have said that DNOs should go further in addressing these cost barriers: 74% of respondents to UK Power Networks' EV strategy consultation expressed this view. However a network solution that could help cut through market, co-ordination, social and upfront connection cost challenges currently does not exist for the on-street charging segment. In addition to this, once these chargepoints are connected to the network, it is still unclear how much flexibility EVs charging on-street can theoretically provide to the distribution network, therefore limiting the opportunity to rely on the EV flexibility market to optimising network capacity utilisation.

Method(s)

This project will design and trial an intervention to enable investment in this area in a way that is fair to customers and addresses the high connection costs currently faced by chargepoint developers.

Work Package 1: Engage and coordinate LAs and EV stakeholders to plan the roll out of community EV chargepoints, with the intention of delivering community charging at lowest possible network cost. The plan will aim to optimise the location of the chargepoints, taking into account their benefits (e.g. in terms of enabling EV take up and improving air quality), and the associated network costs. This will include a framework to decide where chargepoints should be installed, and the level of support payments required (both of which will be locally determined). The support payments would reduce upfront connection costs for investors, where necessary.

In designing this approach and framework, consideration will be given to applicability and synergies with heat readiness strategies as well, including engaging with heat stakeholders where relevant and sharing learnings.

Work Package 2: The project will design a method for taking the output of this framework and tendering support payments to chargepoint investors, aimed at reducing their upfront costs, where deemed appropriate. This method will have been road-tested with investors and will be ready to launch. The tendering and evaluation approach will be trialled, up to and including concluding the contract in relation to a given area. Installation of the chargepoints and the related network upgrade will be outside the scope of the project.

Work Package 3: In order to investigate the opportunities for flexibility services from public charging infrastructure, a research study will be commissioned to explore this potential by e.g. analysis charging patterns and engaging with customers, with an opportunity to trial specific use cases if there is justification for them.

Scope

Work Package 1 will deliver:

· (1.1) A framework and decision-making tool for developing a plan with the LA, and setting the appropriate commercial model (including determining when it is appropriate for the network to intervene), taking into account lessons learned;

· (1.2) A defined plan and rationale for chosen area(s); and
· (1.3) A cost benefit analysis of benefits of co-ordination, plus a SROI case.

Work Package 2 will deliver:

· (2.1) The design of a discount regime for chosen area(s);
· (2.2) A methodology for tendering for discounts; (2.3) lessons learned from engagement with investor stakeholders; and
· (2.4) “Ready to go” tender documentation for selected trial area.

Work Package 3 will deliver:

· (3.1) A report on the barriers and opportunities for flexibility services from public charging infrastructure;

· (3.2) A selection of use cases and commercial models for on-street flexibility services; and

· (3.3) An assessment of them through real world trial (3.2 and 3.3 subject to the outcome of 3.1).

Objective(s)

The aim of the project is to develop a framework to overcome barriers to investment in public charging infrastructure by reducing network costs and facilitating the efficient provision of upfront support to investors. The objective will include the:

· Engagement of LAs, chargepoint investors and other EV stakeholders to help design an effective intervention;

· Design of a methodology and framework for determining when network intervention is appropriate and for coordinating investment;

· Development of methodology for a coordinated plan for a specific area;

· Testing of network cost savings associated with the methodology's implementation;

· Design and road-testing of a tendering approach;

· Development of "ready to launch" tender docs (subject to the detailed CBA in (1.3) and successful testing of the tendering approach in (2.3); and
Greater understanding of opportunities for flexibility from public charging infrastructure.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be successful if it robustly tests the proposed intervention to enable chargepoint investment and delivers the following:

· Detailed design of an intervention to enable chargepoint investment;

· An assessment of the net benefits of the intervention;

· An assessment of the regulatory and practical issues associated with the intervention;

· Recommendations on whether the intervention should be rolled out, and how it should be amended to improve its effectiveness; and

· An assessment of the opportunities for flexibility from public charging infrastructure.

Project Partners and External Funding

It is expected that the project will work with up to three LAs who will contribute staff time to this project. These will be identified in the early stages of the work.

Frontier Economics is a partner organisation for this work and will deliver much of the analysis. Frontier Economics Limited is a specialist economics consultancy. Frontier's main sector specialisation is energy. Frontier has worked extensively on projects relating to network regulation, innovation and on the transition to a low carbon economy.

Other project partners will be identified through a tender process.

There is no additional exernal funding to this project.

Potential for New Learning

The Project will deliver practical tools to help DNOs to cost-effectively enable chargepoint investment. These will include:

· A process for engaging and coordinating with LAs, chargepoint investors and other EV stakeholders to plan the roll out of EV chargepoints;

· A framework to decide where chargepoints should be installed, and the level of support payments required (both of which will be locally determined);

· A method for taking the output of this framework and tendering support payments to chargepoint investors, aimed at reducing their upfront costs; and

· an assessment of opportunities for flexibility services from public charging infrastructure, by commissioning a research study to explore this potential through e.g. analysis charging patterns and engaging with customers.

This learning will be disseminated through different channels including:

· Publication of clear and accessible handbooks setting out how to apply the processes and frameworks described in the project; and

· Presentation at appropriate events.

Scale of Project

To ensure that the project provides learning that is relevant to all DNOs, it is important that the project covers a range of locations and network types.

To this end, it is planned to work with up to three LAs within UK Power Networks' licence areas, and in up to five specific locations within each LA.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

As described above, it is planned to work with up to three LAs within UK Power Networks' licence areas, and in up to five specific locations within each LA. The exact locations will be determined in Work Package 1.

Revenue Allowed for the RIIO Settlement

None.

Indicative Total NIA Project Expenditure

The total expenditure that UK Power Networks expects to incure for this project is £843,640, of which 90% will be recovered from NIA.

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)

The net financial benefits to connecting customers come from network savings by upgrading the network more efficiently through coordination and local planning. By coordinating investment in chargepoints and the required network reinforcements, there are network savings from anticipating reinforcements and digging once, compared to the current piecemeal approach to upgrades.

The benefits below could be realised between 2022 and 2030. The majority of the benefits could be realised in RIIO-ED2, given the timeframe of the project (with project level benefits realised in 2022) and subsequent roll-out into business-as-usual happening in RIIO-ED2.

NPV (£k)

Base Cost	£133,763.95k
Method cost	£61,831.40k
Method Benefits	£0.00k

Savings: Base Cost - Method Cost £71,932.55k

High level assumptions:

- Number of EVs without off-street parking calculated using projected number of EVs from UK Power Networks' Distributed Future Energy Scenarios medium scenario, multiplied by likelihood of not having off-street parking;

- Assumes ratio of 10 EVs per chargers and 16 chargers per substation; and

- Assumes 5% of substations need upgrade/reinforcements at the level that benefits from coordinated approach.

Please provide a calculation of the expected benefits the Solution

Total NPV (£k)

Base Cost	£4,338.19k

Method cost £2,073.73k
Method Benefits £0.00k

NPV: Base Cost - (Method Cost - Benefits) £2,264.46k
These project-level benefits are realised in 2022.

High level assumptions:

- Number of EVs without off-street parking calculated using projected number of EVs from UK Power Networks' Distributed Future Energy Scenarios medium scenario, multiplied by likelihood of not having off-street parking;

- Assumes ratio of 10 EVs per chargers and 16 chargers per substation; and
Assumes 5% of substations need upgrade/reinforcements at the level that benefits from coordinated approach.

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

To scale to GB, National Grid's Consumer Transformation scenario can be used to determine the number of EVs. The average proportion of houses without off-street parking outside of UK Power Networks' license areas is assumed to be 35%.

The same ratio of EVs to chargers (10:1), chargers to substation (16:1) and proportion of substations requiring upgrade (5%) that was used to assess the benefits at UK Power Networks' level can be used.

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

Dividing the proposed UKPN-level benefits (£71.9m) by the three license areas and multiplying by 14 to scale up across GB gives GB-level benefits of £335.7m. This is likely to be an overestimation due to higher levels of availability of off-street parking in other license areas.

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

If successful, this Method could be rolled out to all of UK Power Networks' network areas and DNOs in GB. Other DNOs such as SSEN have already expressed interest in understanding how this approach can be deployed in the future. Given the 2050 Net Zero target set

up by central Government and climate change emergency declared by 274 LAs in the UK, it is expected that the challenges experienced in the provision of on-street charging infrastructure are common to other areas in GB with local plans for air quality improvements and electrification of transport.

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.

Similar work is not being carried out elsewhere in GB. This is based on:

- a review of the ENA Smarter Networks Portal;
- initial engagement with LAs and DNOs; and
- a search for publications.

While other DNOs are discussing work on chargepoint investment, this is generally aimed at taking a more reactive, rather than a coordinated approach. The commercial arrangement for a discount regime is not being carried out 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

Overcoming barriers to EV charging infrastructure investment has emerged as a critical issue, following recent Government commitments to increased decarbonisation. Networks have developed and trialled several technical and commercial solutions to optimise network utilisation before upgrading the network to minimise connection costs. However, a robust framework for identifying where high capital costs combined with a set of market, policy and regulatory failures are reducing investment in chargepoints to below optimal levels and when further network intervention is required has never been trialled before. Additionally, EV charging flexibility has been investigated more extensively for the residential off-street charging segment and commercial vehicles. On-street charging flexibility, in contract, is a largely unexplored field. Compared to other charging segments, the utilisation of on-street charging infrastructure is highly dependent on a number of variables including parking availability and allocation, customer driving and charging patterns, and chargepoint payment mechanisms all of which may impact the reliability of flexibility services. Therefore, this requires further research to better understand what that flexibility will look like within the specific opportunities and limitation of on-street charging.

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

As there is currently no off-the-shelf solution that guides DNO investment in networks to support public charging infrastructure, there is a significant piece of development work in this project. As EV uptake accelerates, a tool of this kind will be an enabler of future investment that will be of direct benefit to the customer. In section 3.2 of the NIA Governance document, the DNOs are encouraged to pursue different types of Methods and Solutions. The development of an approach to enable investment at scale in public charging infrastructure as well as a flexibility solution for on-street chargers and the associated benefits are both areas that have not received a great amount of attention from any innovation stimulus. Due to the risk involved in the project and not fully knowing whether the benefits can be delivered across UK Power Networks' licence areas, these activities would not form part of business as usual activities. In order to progress an innovative project which carries significant risk in implementation, additional innovation funding is required as a stimulus.

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 can only be undertaken as an innovation pilot given the commercial risks associated with the deployment of an unproven network investment mechanism to support the deployment of on-street charging infrastructure. The proposed approach to incentivising private investment in public chargers also has an unproven business case, and the range of potential benefits should be tested before the tool can be deployed. As noted in the NIA guidance, certain projects are speculative in nature and yield uncertain commercial returns. This is the case for with this project. There is a commercial risk that the solution developed as part of the project is not adopted by the stakeholders involved following the trial period. This could be due to the fact that the solution has not reach the level of maturity required for business-as-usual application. This risk is being mitigated against through early engagement with stakeholders and ensuring requirements are clearly defined and documented. If the project is successful, it will have proven a number of commercial solutions and business processes which will enhance the role of DNOs in facilitating the electrification of transport in a fair and timely manner, ensuring no customer gets left behind in the Net Zero transition. The specific details regarding the benefits are captured under section 2c of this document.

This project has been approved by a senior member of staff

☑ Yes