SIF Round 3 Project Registration

Date of Submission

May 2024

Project Reference Number

10061345

Initial Project Details

Project Title

Data Mate

Project Contact

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Challenge Area

Whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout

Strategy Theme

Data and digitalisation

Lead Sector

Electricity Distribution

Project Start Date

01/03/2024

Project Duration (Months)

3

Lead Funding Licensee

UKPN - South Eastern Power Networks Plc

Funding Mechanism

SIF Discovery - Round 3

Collaborating Networks

UK Power Networks

Technology Areas

Carbon Emission Reduction Technologies

LV & 11kV Networks

Demand Response

Project Summary

As more LCTs connect to the network, UKPN have seen a rise in voltage complaints from customers due to voltage limits of the LCT equipment being triggered. Immediate data is not available to UKPN to sufficiently conduct a root-cause analysis, impacting the ability to provide conclusive and quick response to issues. However, this detailed data is available from customers' own LCTs.

DataMate aims to better understand LCTs voltage impact on the network by developing a partnership ecosystem and open data framework with LCT operators. Through crowdsourcing voltage data, DataMate will enable proactive response from electricity networks and improve customer experience.

Add Third Party Collaborator(s)

SIA Partners UK

Project Budget

£127,275.00

SIF Funding

£114,547.00

Project Approaches and Desired Outcomes

Problem statement

As more LCTs connect to the grid, UKPN have seen a rise in voltage complaints from its customers, up 54% in 2023 (YTD). After several investigations, LCTs were identified to cause voltage swings, creating impactful issues for customers, for instance EV chargers tripping, preventing customers from charging their vehicle. Lengthy resolution times further amplify these issues.

As LCT connections are set to increase, DNOs must enhance their understanding of LCTs voltage impact on the grid. Proactively anticipating issues will improve the speed and quality of response, including relevant voltage management approaches.

DNOs face limitations in root cause analysis for voltage complaints as data from distribution substations is too far from the voltage issue and smart meters have insufficient granularity. The accessible data from smart meters is largely half-hourly, meaning UKPN is unable to conclusively inform customers what has caused the issue or know how best to prevent issues from reoccurring. However, customers can manually supply per-second granularity voltage data from their LCT providers (e.g. EV chargepoint operators, solar and battery installers and suppliers) to UKPN. This enables the identification of exact timestamps for voltage trips. Hence, the current manual approach is solely reactive to incidents reported by customers.

Data Mate aims to establish a market framework and tool to utilise crowdsourced data from grid-edge equipment (e.g. LCT providers' own equipment) to provide greater visibility. This will help DNOs develop a more proactive voltage management approach, hence mitigating issues caused by a rise in LCTs connecting to the grid.

The project will:

Engage and establish partnerships with LCT providers/operators and wider stakeholders to gauge interests, validate current issues and identify opportunities for data sharing

Identify available LCT data that can provide improve understanding of the voltage impact of LCTs on the network

Develop a solution to access this data to enable DNOs to proactively identify and resolve issues quicker and more efficiently than the current reactive approach.

Data Mate will leverage data, digital tools, and novel arrangements to identify and resolve voltage issues, maximise existing network capacity, prevent incidents for customers and thereby assist UKPN in providing a greater level of service to its customers. This directly aligns to SIF Challenge 1, Theme 2. The solutions delivered will help with network planning and utilisation by providing the DNO with greater visibility and improved network management capability.

There is no relevant publicly funded previous work which contributes to Data Mate.

Video Description

https://youtu.be/wqzrITGyY18

Innovation justification

DataMate aims to crowdsource data from devices connected at the grid-edge, i.e. those near the electricity network boundary, by establishing an ecosystem including LCT providers and other stakeholders. This industry-first approach will enable DNOs to obtain the data to proactively identify and effectively manage voltage challenges stemming from the increasing number of LCTs connecting to the network.

Although grid-edge data exists, currently there is no market proposition or platform to allow DNOs to unlock and harness this data to improve granular visibility. Hence the current TRL, IRL and CRL remain low.

Discovery seeks to establish interest and participation from necessary stakeholders, develop data requirements and mapping, and explore potential open data sharing models. It is anticipated that the TRL, IRL and CRL will reach 3-4 at the end of Discovery. Preliminary engagement has shown interest from stakeholders in providing such data.

Understanding data requirements and the technical and commercial feasibility of data sharing are crucial first steps in ensuring the viability of developing a data sharing framework or platform. The scale and scope of Discovery will enable delivery of these key steps ahead of development and testing.

Considerable investment, partner engagement and innovation will be required to develop DataMate into a full solution, which would not be achievable as part of business-as-usual activity. Given the phased nature of the SIF, we believe the project is well suited to this mechanism as it will enable upfront engagement and feasibility assessments ahead of proposition development and testing, before any scalable or widespread deployment is delivered.

To date, when voltage complaints arise, UKPN provide self-serve voltage recorders to customers to capture data. Also, voltage management innovation projects exist like Stratus, EcoVAR, voltage regulators and CLASS. However, these will only be considered after identifying an issue and hence, they remain a reactive response to a complaint process, often involving numerous customer visits and slowing down the speed of resolving complaints. DataMate will reduce the number of customer complaints by proactively identifying voltage incursions.

The fragmented nature of LCT providers' data and systems, paired with unprecedented LCT uptake, means that without the development of solutions through DataMate, DNO's will remain in the dark about causes of voltage issues and be left to continue reactive response to voltage management. DataMate will help define DNO proactive approaches and potentially an automated voltage management response, reducing the need for manual process such as on-site visits.

Impacts and benefits selection (not scored)

Financial - future reductions in the cost of operating the network

Environmental - carbon reduction – direct CO2 savings per annum

Revenues - creation of new revenue streams

New to market – processes

Others that are not SIF specific

Impacts and benefits description

We will use current voltage complaint data as our initial counterfactual against which we will evaluate success. However, as the project evolves and the visibility of data extends, other metrics will also be established to serve as counterfactual for evaluating impact. We envisage the following key benefits:

Financial - future reductions in the cost of operating the network

Better-informed voltage management (i.e. proactive vs. reactive response) will lead to reduction in cost from reduced site visits/voltage record equipment, and obtaining a more resilient network.

· Metrics: number and cost of voltage related site visits, resolution time of voltage issues, updated processes around voltage management

Environmental - carbon reduction – direct CO2 savings per annum

One of the aims of the project is to facilitate the roll-out of LCTs and not being a blocker by having a well-managed and prepared network. Ensuring LCTs are connected and by preventing excursions due to voltage issues we will ensure carbon emission reductions are delivered.

· Metrics: for the future trial, assessment of LCTs deployment within the selected area and associated carbon emission reductions enabled as a result

Revenues – creation of new revenue streams

Creation of a new market proposition to crowdsource data from various stakeholders.

· Metrics: cost to acquire data from stakeholders

New to Market – processes

A better understanding of the LCTs impacts onto the network, i.e. identifying the relationship between LCTs and voltage may have implications for network planning and voltage management.

· Metrics: decreasing rate of voltage management complaints, demonstration of LCTs impact on voltage variations

New to market – services

The project will develop a new data service for DNOs to use. Although grid-edge data exists, currently there is no market proposition to allow DNOs to unlock and harness this data.

· Metrics: New services developed and launched

· Metrics: Number of voltage alerts and issues identified (ongoing measurement metric also linked to new revenues benefit category)

Others that are not SIF specific (benefits for the consumers)

Reduce voltage complaints and improved quality of supply, leading to a greater customer satisfaction.

· Metrics: decreasing rate of voltage management complaints, customer satisfaction scores

Reduced failures (e.g. tripped EV charger so vehicle not charged in the morning or PV inverter tripped)

· Metrics: decreasing rate of voltage management complaints, data analysis on one specific area

All benefits are linked to the deployment of Data Mate solution into business-as-usual following Beta, although some may be realised during the Project.

Teams and resources

Data Mate has two key Project Partners:

UKPN: UK's largest electricity distributor delivering power to 8.5 million homes and businesses across London, the east and south east of England. We are responsible for owning and maintaining the cables and assets in our licence area. We will be the main end user of the innovation, using crowdsourced data to better understand LCTs impact, grid-edge devices, identify voltage issues and develop a proactive voltage management response.

Role: UKPN will lead this project and be responsible for overall project management and dissemination of information across the industry. Our network operations, planning and customer services teams will contribute with relevant information and subject matter expert support related to voltage issues and complaints.

Sia Partners: management consultancy firm with extensive expertise in the Energy & Utilities sectors, in addition to essential capabilities in developing open data partner ecosystems and data science solutions for utilities.

Sia Partners' team will combine Energy consultants, Growth & Innovation experts and Data Scientists to bring together sector together knowledge, open data expertise and technical capability with digital tools and techniques. Sia Partners has successfully delivered several innovation projects involving data solutions for DNOs and water companies in recent years. This includes SPEN's Predict4Resilience project and SSEN's Project TRANSITION, both of which have brought innovative data science and software development capabilities into DNO network planning and control room operations. Sia Partners is also currently working on Stream, which is building out an open data ecosystem to facilitate data sharing across the water sector.

Role: Sia Partners will lead on the stakeholder mapping and engagement and establish a set of use cases for the solution, including an assessment of costs and benefits. They will also support UKPN with mapping data requirements and the required enabling infrastructure to deliver the solution.

We are confident in having the relevant resourcesbetween the two main project partners, to deliver the Discovery phase of this project. The phase will include literature review, workshops organisation, data analysis and qualification, assessing voltage management processes and ways of optimising these (such as automation).

Additionally, a key success factor to Data Mate lies in engagement with LCT providers, aggregators, energy suppliers and end-users. Initial engagement has shown interest and willingness from these stakeholders in providing such data to UKPN. Beyond that, this engagement must demonstrate relevant participation rate and ensure stakeholders' interest to secure partners for future phases and trials.

Project Plans and Milestones

Project management and delivery

Discovery is divided into four work packages:

WP1: Residents engagement and market scoping (Connected Response)

· Aims: Understand how best to incentivise and engage with tenants to reduce their carbon footprint from electric heating, identify the benefits and challenges for RSLs to participate in carbon flex service design and create pipeline for future trials

· Success criteria: Feedback received from 30 residents, future sites for trials identified and validated

WP2: Carbon Flex Pilot and Service Design (Peer Carbon)

· Aims: Design carbon flexing service, specify optimal data strategies for triggering and measuring carbon savings, undertake pilot, test and measure heating effects and CO2 from carbon flexing

· Success criteria: data able to flow between Connected Response and Peer carbon, Pilot completed and CO2 impact is measured

WP3: Policy and Roadmap (Energy Unlocked)

· Aims: Facilitate a common understanding of how a DSO can enable carbon flexing with existing RSL properties, provide a roadmap for future actions for key stakeholders and ensure benefits, regulatory / policy / commercial barriers are identified

· Success criteria: relationship between historic flexibility calls and periods of low carbon intensity is identified, report is validated and approved by UKPN

WP4: Project Management (UK Power Networks)

Aims: Ensure successful partners coordination and delivery of project milestones and deliverables

Success criteria: Successful project delivery to time, cost and in full whilst meeting all SIF governance requirements.

Any interdependencies between work packages, milestones and deliverables have been provided in the Gantt chart (Q7.3).

Project management will be led by UKPN using standard best practice methods and tools, including fortnightly management meetings and status reporting, more frequent stand-ups as required for design sprints, a RAID log, and a stakeholder governance schedule aligned with project timelines. The project has progressed through UKPN's internal innovation and project governance and control governance processes and will continue to be managed under this governance.

Key risks and mitigations are set out in the risk register, including those in relation to policy and regulatory challenges. We will manage risks and issues using a standard risk management approach. Key risks for Discovery include low tenant interest and slow data sharing.

The project will not result in any planned or potential unplanned supply interruptions for consumers, however the CarbonFlex pilot will control heating systems of 217 flats in Trellick Tower. This will be operated by hardware and software operator Connected Response and will not compromise their thermal comfort. Engagement will take place with 30 energy consumers (Trellick Tower residents) to gauge views on their pilot experience.

Key outputs and dissemination

At the end of Discovery, the desired outcome is to have validated the opportunity to establish an open data sharing framework or platform and to have a clear understanding of the potential solution requirements, route to market and benefits case. The output of Discovery will enable further engagement with an ecosystem of partners and the design of a prioritised solution in Alpha.

The key objectives for Discovery are to:

· Identify LCTs partners to collect data from, define possible ways of data sharing and management

· Gain understanding of ecosystem's view on LCT voltage issues and use of data, validate interest for development of market framework and tools to utilise data from grid-edge devices

· Determine use cases offered by LCT data sharing and develop options for route to market, including potential data platforms, commercial models and benefits

Key outputs from Discovery

By the end of Discovery, Data Mate aims to complete the objective of each work package and produce the following key outputs which will be disseminated effectively:

WP1: Ecosystem mapping and engagement

· Outputs: Literature review, ecosystem mapping, Crowdsourcing Stakeholder Group (CSG) design and findings report

· Responsible: Sia Partners

WP2: Establish potential solution options and benefits

· Outputs: Report with list of potential use cases, benefits assessment, high level commercial models and route to market assessment (including stakeholder validation)

· Responsible: Sia Partners

WP3: Data requirements and enabling infrastructure

· Outputs: Data requirements report, high level design of enabling system architecture (data mapping and integration)

· Responsible: UKPN

WP4: Project Management

· Outputs: Discovery Show & Tell and final report

· Responsible: UKPN

Knowledge Dissemination

Our project outputs will be uploaded to the Smarter Networks Portal and feature on the UK Power Networks' website with specific project learnings being disseminated at the IUK Show & Tell events. The project will be presented at other UKPN events should the opportunity arise.

UKPN will look to share project successes and discoveries via its social media channels with the possibility of publishing external media where appropriate.

As detailed above the outputs of Data Mate will be made available to all networks and therefore does not undermine competitive markets. Similarly, the end use of the project will source data from many stakeholders and potentially create new services and revenues for external users, so it does not undermine competitive markets.

Some outputs may have commercially sensitive information which will be either redacted for external sharing or made available upon request.

Commercials

Intellectual Property Rights (IPR) (not scored)

The parties agree to adopt the default IPR arrangements for this project as set out in Section 9 of the SIF Governance document.

Value for money

The total project cost for Discovery is £127,275 and the total SIF funding requested is £114,547. This is balanced across the project partners as follows:

UK Power Networks

- Total costs: £38,075
- Total contribution: £3,808 (10%)
- Total SIF funding requested: £34,267

Sia Partners

- Total costs: £89,200
- Total contribution: £8,920 (10%)
- Total SIF funding requested: £80,280

The project will meet the minimum 10% compulsory contribution from the Project Partners as an in-kind contribution via labour. There will be no sub-contractor costs, nor any other additional funding from other innovation funds.

Key points in relation to value for money:

Effective market engagement: Through both Sia Partners' and UKPN's subject matter experts and connections to industry, substantial engagement with stakeholders and potential partners will be considerably easier and cheaper than partners less engaged in the industry. For example, securing time with potential partners may incur longer response times and potential fees. This relatively higher participation and engagement rate enables a more well-informed and developed solution for the cost.

Centralised expertise: the use of Sia Partners' in-house teams (Energy & Utilities, Growth & Innovation, Data Science) provides sector expertise tied with key technical capabilities. By having all necessary capabilities under the same partner, the potential high costs of separated, sole providers are avoided.

Competitive labour rates: Sia Partners are suppliers on UKPN's business consultancy framework and were appointed following a competitive procurement exercise which included rates negotiations and an assessment of value for money.

The project will drive down costs to monitor and resolve voltage issues on the network. The alternative is continuation of a reactive and manual approach to resolving voltage issues which can be time consuming and costly or deploying widescale monitoring along feeders, again which is not cost effective.

To ensure new solutions and services can be quickly adopted into business-as-usual, the project will work closely with UKPN and other stakeholders throughout the project lifecycle to ensure the solution is fit for purpose and scalable across networks. Also, many of stakeholders the project will engage operate nationally which will support scalability across GB. The route to potential commercialisation of the innovation, as well as the development towards business-as-usual, are key learnings from Discovery and future phases.

Supporting documents

File Upload

DataMate - R3 Discovery - Show and Tell 040624.pdf - 380.4 KB
DataMate - R3 Discovery - End of Phase meeting 300524 V2.pdf - 753.7 KB
SIF Round 3 Project Registration 2024-07-08 10_37 - 63.5 KB
SIF Round 3 Project Registration 2024-05-13 9_54 - 63.4 KB

Documents uploaded where applicable?

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