SIF Discovery Round 2 Project Registration

Date of Submission

May 2023

Project Reference Number

NPG_SIF_001

Project Registration

Project Title

Inform

Project Reference Number

NPG_SIF_001

Project Licensee(s)

Northern Powergrid

Project Start

Apr 2023

Project Duration

3 Months

Nominated Project Contact(s)

James Nunn Nunns
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Project Budget

£138,731.00

Funding Mechanism

SIF Discovery - Round 2

SIF Funding

£123,196.00

Strategy Theme

Data and digitalisation

Challenge Area

Accelerating decarbonisation of major energy demands.

Lead Sector

Electricity Distribution

Other Related Sectors

Electricity Distribution

Funding Licensees

NPg - Northern Powergrid (Yorkshire) Plc

Lead Funding Licensee

NPg - Northern Powergrid (Northeast) Limited

Collaborating Networks

Northern Powergrid

Technology Areas

Commercial, Digital Network, Distributed Generation, Energy Storage, Environmental, Low Carbon Generation, LV & 11kV Networks, Modelling, Stakeholder Engagement

Equality, Diversity And InclusionSurvey

Yes

Project Summary

The proposed project is aimed at scoping a self-serve automated connections estimator for larger sites/non-domestic buildings, that can be accessed by those considering early-stage projects. We expect fewer projects will fail or be delayed if the connections costs and options are easily accessible at the beginning of the project.
Those using the self-serve tool will be able to get a better, more rapid understanding of the capacity and associated costs, with the potential for options to be provided on to how to manage the cost. This would be by exploring energy efficiency improvements or storage or flexibility on the site to help reduce the network capacity management and encouraging dialogue between the ONO and the applicant. For the applicant it could help prioritise projects that are able to go ahead without capacity constraints, seeking Public Sector Decarbonisation Scheme (PSDS) or other funding which requires quick project implementation. In urn the ONO would have a way of capturing all the considered projects in the local area which would help with it strategic planning for future reinforcement.
The proposed estimator being considered in this scoping study would assess capacity for a decarbonisation solution for a site, generate estimates for upgrades and indicative costs. Based on modelling of the local system, and its current demands the solution would put indicative price estimates against each site upgrading specific attributes. This will allow the site owner to make an early and informed decision on the optimum decarbonisation route and accelerate the decarbonisation of large or complex non-domestic facilities.
If taken forward to development, it would appear on Northern Powergrid's website during the Beta stage. The estimator would be intuitively combined with the existing connection tool AutoOesign providing all connections applicants one seamless experience. This project will extend AutoOesign's capabilities to support non-domestic connections.
AutoOesign was generated by EA Technology and combining this existing knowledge with that which has arisen from the ESC's learning from the MEP programme and Local Area Planning, the proposal is to scope out a tool that builds on known technology and insights that will unlock the challenges detailed in question 4.

Project Description

Decarbonisation of large or complex non-domestic sites such as those of hospitals, university campuses and military sites is essential to achieve net-zero. Each of these sites have many options and routes to consider each leading to a different electricity demand profile. (Public Sector emissions make up 2% of UK emissions and 9% of all building stock). At the moment, it is not possible for site owners to quickly obtain the costs associated with different decarbonisation schemes before significant site design assessment has been completed.
Inform will develop an automated connections estimator for larger sites/nondomestic buildings. It is an optioneering tool for developers, owners and operators to determine the electricity network capacity and associated upgrading costs as part of their initial scheme development planning.
The proposed estimator would assess capacity for a decarbonisation solution for a site, generate estimates for distribution network upgrades and indicative costs. Based on modelling of the local distribution network and its current demands, the solution would provide indicative price estimates against each site upgrading specific attributes. It will allow the site owner to make an early and informed decision on the optimum decarbonisation route and accelerate the decarbonisation of large or complex non-domestic facilities.
It will be interoperable allowing existing connections tools like Northern Powergrid's Autodesign to support non-domestic connections. This analysis will increase the speed of providing budgetary connection applications to customers whilst also providing an early view to forecasting new demand levels. EA Technology, Energy Systems Catapult (ESC), City of York Council and The Newcastle upon Tyne Hospitals NHS Foundation Trust will collaborate with Northern Power Grid to deliver the Discovery Phase of this SIF project. Other interested parties not declared as formal partners who propose to participate in the stakeholder group include the Ministry of Justice (MOJ), the Ministry of Defence (MOD), BEIS and NHSE&I. Both MOD and MOJ have extensive estate across the UK and see this proposal as a way to unlock a key barrier.

Preceding Projects

NIA_NPG_024 - Autodesign: LV Connections Self-Service Tool

Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

Project Description And Benefits

Applicants Location (not scored)

NORTHERN POWERGRID (NORTHEAST) LIMITED, Lloyds Court, 78 Grey Street, Newcastle upon Tyne, NE1 6AF
EA Technology Ltd. (02566313) -- Capenhurst Technology Park, Chester, Cheshire, CH 1 6ES
Energy Systems Catapult (08705784) -- Cannon House 7th Floor, 18 Priory Queensway, Birmingham, West Midlands, 84 6BS
Newcastle upon Tyne Hospitals NHS Trust -- Newcastle Upon Tyne, NE? ?DN
City of York Council -- York, YO1 6GA

Project Short Description (not scored)

Inform provides an automated energy use and connections estimator to accelerate the decarbonisation of larger sites/non-domestic buildings. This better informs initial scheme development planning.

Video description

Innovation justification

The Problem
To support decarbonisation of heat and transport, large, complex sites (NHS hospitals, local authority buildings, military estates, etc.) will need to upgrade their existing connections to accommodate the increasing electrical demand. Those sites may also choose to install renewable generation and therefore require an ability to export. For each of these sites; a level of initial design, feasibility study and business case needs to be completed before there is value in engaging with the ONO regarding connection possibilities.

However, lack of knowledge around the cost of the connection can mean that the preferred option is not viable and an alternative option should have been selected earlier in the design phase. This is the primary cause for decarbonisation projects to fail as significant redesign is required.
Existing Work and Missing Knowledge
The proposal is to build upon the existing self-serve Auto Design tool used by Northern Powergrid. That tool is currently focussed on providing customers with budget quotations associated with new connection requests for domestic properties or single large sites up to 210 kVA. This toolset currently does not consider:

- Existing connections
- Larger, complex sites
- HV connected sites

Modern Energy Partners - a BEIS funded innovation programme ran 2018 to Sept 21 during which 42 large campus style sites (military estates, prisons, hospitals, offices and universities) were assessed for their potential to decarbonise. Emissions were considered at a building and site level understanding half hourly energy use and technology, building up a very clear picture of the patterns and themes that are likely to occur across the UK. It demonstrated that the typical cost to decarbonise a campus style site would be in the region of £12.6m and almost always would require electrification of heat. However, this project did not go as far as being able to analyse or quantify the cost of connection upgrades to support the new energy demands.
The Innovation
Combining existing knowledge and datasets on the energy demands of large sites along with the development of innovative toolsets to understand the impact on the electricity networks can accelerate the uptake of low carbon technologies along with improving the efficiency and transparency of the distribution networks connection process. The toolsets and capabilities developed as part of this project will be developed in such a way that they can be applied across the GB distribution networks to facilitate the rapid decarbonisation of existing customer sites.

Benefits Part 1

Environmental - carbon reduction – direct CO2 savings per annum against a business-as-usual counterfactual
Environmental - carbon reduction – indirect CO2 savings per annum against a business-as-usual counterfactual
Financial - cost savings per annum for users of network services
Financial - cost savings per annum on energy bills for consumers
Financial - future reductions in the cost of operating the network
New to market – products, processes, and services

Benefits Part 2

Future reductions in the cost of operating the network (Benefits for DNOs)

- Better automated knowledge and recording of queries
- Better longer-term network management though recording the usage of the tool
- Better management of deployable staff time through less speculative connection requests (reduction in contact time for each connection request and reduction in number of connections requests)
- Lower capacity demand asks through site better management of LCT.
- Removal of connection barriers for the decarbonisation of major energy demands (budget estimates available through the online portal).
- Remove the need for a connections engineer to provide a budget estimate. The budget estimate could come from the self-serve software tool.

Cost savings per annum for users of network services (Benefits for site developers and operators):

- An easy and quick way to understand network constraints and associated costs for upgrade costs.
- A way to understand what the options might be answering questions such as "what might be needed to reduce the site load by to manage upgrade costs /timeline." or "how can on-site storage be used to manage site load and reduce connection costs".
- Less delays in project programme and reduced risk of decarbonisation project not proceeding.
- Less unknown costs late in the construction programme.
- If managing a portfolio of sites/estate a way of understanding where my investment will be most beneficial.
- Empowering non-domestic customers to make better connections choices resulting in lower connections costs.

Cost savings per annum on energy bills for consumers (Benefits for all customers):

- Lower reinforcement costs requiring socialisation.
- Business case estimating the likely savings will be developed at the discovery phase.

Carbon reduction -- indirect CO2 savings:

- Accelerating non-residential buildings to decarbonise will reduce UK CO2 emissions (non-residential accounts for 9% of emissions).
- Needing to build less electricity network reducing embedded emissions in material production.

New to market:

A software tool that allows budget quotes to be automated, supporting the digitalisation of the DNOs.

Project Plans And Milestones

Project Plan and Milestones

WP1: Toolset Customer Requirements Mapping

- Research the differences between current models and requirements for predicting non-domestic building loads with low carbon technologies
- Considerations of the types of "building use" data - what is available, is it live or static.
- Develop an understanding of the requirements for a self-serve connection tool for existing LV and HV sites looking to decarbonise their facilities. This includes mapping the datasets and data flows that will be required
- Engagement with WP2 to map out high level user journeys Outputs:
- Existing toolset gap analysis
- Input/ output data requirements Milestone: Requirements list Time: 4 weeks

WP2: Stakeholder engagement

Developing a DNO and complex sites stakeholder working group to allow for a cross DNO solution. There will be two stakeholder engagement events during discovery phase:

- Identify stakeholders (DNOs, large energy users, end to end providers, building data energy collectors)
- Desktop research and workshop planning
- Provide visual examples of current status to create a vision
- Capture data sources and understand output requirements
- Research confirming the need of the audience including what information would support their needs based on evidence

Milestone: Stakeholder engagement insights Time: Two 2-week blocks

WP3: Business case and benefits development:

Developing the business case understating the benefits of how the tool will accelerate the decarbonisation of major energy demands and reduce DNO costs:

- Review of available information to develop estimates
- Determination of accuracy from sites and network operators
- Reinforcement cost data collection
- Estimation of reinforcement saved by connections tool
- Estimation of ONO time and resources saved by using connections tool
- CBA to estimate the benefits to network, electricity customers, site developers and operators from developing the tool

Milestone: CBA results Time: 4 weeks

WP4: Project management

Dedicated project management work stream to ensure that the project is efficiently delivered within the Discovery phase window. This includes ensuring that suitable engagement and dissemination activities take place with other SIF projects and the wider stakeholder group along with providing the Monitoring Officer with progress updates.

Outputs:

- Project Management documentation
- Show and tell presentation
- Project closedown report

Regulatory Barriers (not scored)

We do not foresee any regulatory barriers to this proposal.

Changes to the charging methodology set out in the Ofgem Access and Forward Looking Charges Significant Code Review will reduce the reinforcement related connections costs experienced by customers. However, there will still be costs associated with the direct connection aspects alongside the timelines for any upstream reinforcement works to be considered. This project aims to ensure that all of that information is provided in a quick, clear and transparent way to the site owner so they can make an informed decision.

Additionally, providing this through an automated mechanism enables customers to carry out informed optioneering activities with minimal direct impact on the distribution networks whilst simultaneously ensuring the distribution networks are informed about the potential for future energy demand increases to consider in their longer term network planning.

Commercials

Route To Market

Our idea is to develop innovative new areas of self-service connections support from DNOs to existing customers in specific categories. It is envisaged to come to market as a software system that can be procured by a DNO either as an expansion of and existing system or by competitive tender. Proving both that this approach is possible and has value is likely to stimulate a market, creating competition in the medium to long term.

EA Technology already have a commercial relationship with Northern Powergrid for the provision of LV self-service connection budget estimates so have a direct route to market with a first client within the project partners. This will enable the fastest possible route to business as usual.

There is clear value to the DNO for this product now, with further value after 1 April 2023. Reducing the cost and time associated with early stage optioneering is valuable to both [customers] and DNOs as more [customers] make plans to decarbonise. There is greater value to a DNO where [customers] can be steered to energy efficient options that reduce their network impact, as this will both speed up connections and reduce the network reinforcement costs socialised among all electricity bill-payers, including those least able to pay.

Depending on the connections pricing and rules in different countries there is potentially a significant international market for the tools developed. The barrier to enter to another geography should not be underestimated, however, as new input data will need to be gathered to cater for differences in climate, building design and building use.

Intellectual property rights (not scored)

All partners acknowledge and accept the requirements to make methods, approaches and functional specification available in line with Section 9 of current SIF Guidance Document - 9 September 2022.

Please note that most IP developed is anticipated to be built into the EA Technology ConnectGrid family of Commercial Products and made available for sale. As such it will be Foreground IP and not Relevant Foreground IP as per the SIF governance.

ESC's MEP material has been produced as part of an innovation project funded by BEIS and as such is publicly available. ESC would retain the rights to the background IP as derived through the MEP programme.

Costs and value for money

The total cost associated with the delivery of this project is: £138,732 of which

£15,538 (11%) will come from Project Partner contributions broken down as follows:

- Northern Powergrid = £1,200
- EA Technology= £7,006
- Energy Systems Catapult= £5,482 (with additional £5,775 in-kind support)
- Newcastle upon Tyne Hospitals NHS Foundation Trust= £1,250
- City of York Council = £600

Consumer Value for Money

Value for Money (VfM) in the proposed programme is about maximising the impact of each pound spent to ensuring success versus agreed objectives. The assembled partners and proposed work packages have been scrutinised by senior management colleagues across all partner organisations.

VfM can be expressed in terms of pursuing economy (careful management of available resources), efficiency (delivering the best level of service for less), effectiveness (delivering the right service) and equity (reaching different groups) to achieve desired outcomes and maximise the benefit of those outcomes. Achieving best value is not just about the price of an item or service but also about the effectiveness, added value, durability and quality.

The majority of this funding is provided to the specialist consultancy activities of EA Technology and Energy Systems Catapult. These companies bring extensive background from working across the energy system, grid connection and building

decarbonisation. To ensure value for money the project partners have focussed on opportunities to reduce unnecessary costs wherever possible. This has been achieved through the collaboration of EA Technology and Energy Systems Catapult to tackle a barrier to building decarbonisation.

Complementary to Business as Usual Activities

The project will generate new learning, and represents value for money for the consumer because the primary focus for the project is to enable existing customers connected to the distribution networks to optimise their decarbonisation plans. This will reduce costs associated with socialized network investment costs directly whilst also providing in-direct savings from reduced costs associated with public services.

Normal Industry Rates In the preparation of this proposal we have worked closely with our Project Partners to ensure their involvement is provided at a commercially competitive rate in line with those we've seen from project delivery elsewhere. This has been achieved through careful discussion and consideration into where the Project Partners are able to increase efficiency, reduce risk and maximise the value they deliver to the project. As a result, this project offers excellent value for money to consumers whilst also ensuring high quality, reliable outputs are achievable.

Document Upload

Documents Uploaded Where Applicable

Yes

Documents:

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EA20136-SS1-Cost Benefit Calculator_v1.0.xlsx

ESC - Inform Workshops summary slide deck v1.0.pptx

Functionality Table.pdf

Inform - SIF Show & Tell Presentation - Final_v1.0.pptx

Inform Data Requirements_v1.0.pdf

Inform Discovery Phase Final Report_v1.0.pdf

User Journeys - Developed from Stakeholder Feedback.pdf

User Journeys Overview.pdf

This project has been approved by a senior member of staff

☑ Yes