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NIA Project Registration and PEA Document

Date of Submission

Aug 2022

Project Reference Number

NIA_UKPN0081

Project Registration

Project Title

High Voltage (HV) Auto Quote

Project Reference Number

NIA_UKPN0081

Project Licensee(s)

UK Power Networks

Project Start

September 2022

Project Duration

1 year and 10 months

Nominated Project Contact(s)

innovation@ukpowernetworks.co.uk

Project Budget

£2,851,182.00

Summary

High Voltage (HV) Auto Quote will provide self-service connection offers to customers enquiring about connections between 300 kVA and 1 MVA. Furthermore, it aims to provide budget estimates for connections from 1 MVA to 2.5 MVA. This project will codify the tacit logic used in HV quotes to enable this automation, together with development of logic to assess the cost of traffic management (TM). TM is an increasingly large component of quotes as voltage levels increase.

Budget estimates are currently offered to customers in other network areas for low voltage (LV) networks. However, lack of traffic management integration prevents connection offers being issued at HV levels. This innovation project will perform the necessary analysis and development to put connection offer requests in the hands of the consumer, allowing them to see the cost of different options interactively, reducing time to deliver connection offers and improving service delivery.

Nominated Contact Email Address(es)

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Problem Being Solved

Offers for new HV connections require several manual activities that are not always linear. UK Power Networks receives the connection application from a customer who will want a budget estimate or a firm connection offer (or frequently both), which UK Power Networks is obliged to provide. UK Power Networks undertakes a series of assessments including a site visit where appropriate, to generate the budget estimates and firm connection offers.

This manual process can take days if not weeks to complete, dependent on the complexity of the request. This process is slow for the customer and is labour intensive for UK Power Networks. This is not the end of the process. Once a customer receives the quotation, they may query the costs and the point of connection due to lacking visibility of the capacity constraints on the network and the nearest available connection points.

This can lead to a protracted period of discussion between the customer and the UK Power Networks to determine the most cost-effective point of connection for the customer, which adds additional time to the whole process. Ultimately the connection offer may not be accepted. Therefore, the time spent could have been used to serve other customers. This places pressure on UK Power Networks' customer facing connections teams whilst providing excellent customer service. Furthermore, only 26% of the connection offers are currently accepted.

The number of connection requests are expected to grow by 40% from current (2022) figures by 2028. Using current methods, this would require significant increase in volume of staff and therefore costs to maintain the same performance, let alone maintain high levels of customer service.

Customer expectations are also rising in terms of the ability to self-serve and have visibility of all relevant information available immediately, rather than having to wait for a response to their requests. For example, other DNOs (NPG and SPEN) already have white labelled EA Technology's Autodesign product for budget estimates. Anecdotal feedback from a high voltage street charge point provider, Connected Kerb, indicates the target market are already using these self-service tools, which is raising the bar for network operators. This project takes the solution to the next level, offering firm connection offers, rather than budget estimates. Innovation in traffic costing and offer interactivity management are required to bridge the gap between estimates and firm offers.

Method(s)

The overall aim of the project is to enable self-service connection offer functionality for high voltage connections customers between 300 kVA and 1 MVA. It is aimed to provide budget estimates for connections between 1 MVA and 2.5 MVA.

This project will deliver an externally available website to provide full high voltage connection offers to UK Power Networks' customers using an interface designed to allow customers to drop an asset on a map. To do so requires detailed discovery and documentation of the current manual processes and underlying data. The processes and data will then be codified and tested against manually generated connection offers.

EA Technology has a tool in business as usual (BAU) operation with another DNO, NorthernPower Grid, to provide self-service budget estimates for connections requests up to 210 kVA. This tool, based on AutoDesign, allows the customer to enter the details of their connection and it provides them with the available capacity at the LV point of connection. It then provides a budget estimate. To ensure the solution is novel and adds sufficient value the Auto Quote project will develop a new traffic management module and any other additional functionality that would enable connection offers rather than budget estimates to be provided.

Delivery will be in two phases. The first phase of the project is a two month discovery phase. During the discovery phase, EA Technology will work with UK Power Networks to understand the current connection offer generation processes (data and logic) in detail. EA Technology will then develop the logical design based upon the workshop outputs. The requirements gathering and design will allow for more detailed cost estimation of the remaining work. The logical design will then be assessed by the UK Power Networks' Technology Architectural Review Board. The revised project costs and schedule will be re-assessed by the UK Power Networks' Innovation Steering Group.

Subject to approvals, the second phase will codify the existing process and logic using an agile delivery. Agile is based upon short sprints to deliver incremental change while giving rapid feedback to ensure delivery meets expectation and to allow for requirements to change as development progresses.

Update September 2023:

At the time of writing, the project is in the agile delivery phase, with workshops developing the ideal customer journey, the overall solutions architecture, the connection design decision making process and the data sources it relies upon, regulatory obligations and the traffic management module. Requirements from each of these workshops are being documented and prioritised to shape the development. Furthermore, the project is separately engaging external stakeholders to get their feedback on the development priorities.

As a result of findings during the delivery phase, it was established that the data, architectural and integration needs were more complex and will take longer than originally estimated. This is now reflected in the revised project duration and budget.

The Auto Quote tool will integrate into the existing suite of UK Power Networks' connections web applications: Smart Gateway. EA Technology will host the tool externally on Microsoft Azure. However, it is envisaged that no customer data, other than location, will be processed by Auto Quote. Customer data will follow the existing processes and Auto Quote pricing will need to integrate into existing enterprise systems. Therefore, the following activities are required:

1. Define the current connections process and customer journey and rules

2. Understand the existing connections web application, identifying the requirements for integration and develop and implement the solution with UK Power Networks' web development partner.
3. Identify the requirements for integration into enterprise systems and develop and implement the solution

Upon completion of the tool, prior to go live, the tool will be tested and benchmarked against known connection offers and tested with customers. Only once this has been successfully completed will the tool be publicly released. Within the first few weeks of the tool in use we will request feedback from the users of the tool.

Update March 2024

The project is coming to the end of the testing phase following which is the "readiness to launch" phase. In the testing phase, we have tested the different functionalities of the tool to give confidence on the tool usability and accuracy. The testing has led to new findings especially with regards to tool accuracy and interpretation of traffic management requirements.

As a result of the findings during the testing phase, we have had to refine our approach to bill of materials and traffic management calculations, and other functionalities driving inaccuracies. The time and resources required to fix the bugs and improve the tool accuracy is now reflected in the revised project budget and duration.

Scope

The project scope is as follows:

1. Make geospatial and powerflow data sources within the UK Power Networks' network areas accessible
2. Engage customers via workshops to discover and document current process requirements
3. Provision of improved AutoDesign engines on Azure cloud
4. Bespoke network data translator and interface
5. UK Power Networks price books, user journeys and other network specific content to be integrated in the tool
6. Deployment of an innovative traffic management module
7. User journey mapping and website integration
8. Integration with UK Power Networks' website and Smart Connect systems
9. Application trials and testing
10. Go Live

Objective(s)

The objectives of the HV Auto Quote project are to:

1. Discover and document the logic and data used to manually produce HV connection offers via a number of workshops with UK Power Networks' HV connection offer Subject Matter Experts
2. Identify and share the data necessary to provide automated connection offers
3. Where sufficient data (e.g. vectorised mapping) is unavailable for full quotation, suitable guidance or exclusion is applied until the data is available.
4. Codify the logic used to make connection offer decisions, including automating traffic management cost calculations
5. Develop a self-service tool to automate firm connection offer generation for capacities between 300 kVA and 1MVA. The connection offers should be issued back to enterprise systems for the jobs to be scheduled.
6. The same tool should provide budget estimates for capacities $> 1\text{MVA} \leq 2.5\text{MVA}$
7. Define a product roadmap for future enhancements
8. Identify processes and procedures required for deployment of HV Auto Quote as BAU and opportunities to scale the solution beyond UK Power Networks' license areas

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

Not Applicable

Success Criteria

The delivery of the following outcomes will be considered when assessing whether the project has been successful:

1. Auto Quote has been integrated into BAU operations
2. Auto Quote has issued connection offers within +/- 10% of manually calculated connection offers
3. 75% of connection requests are processed without human intervention from UK Power Networks' Connections teams
4. Feedback received from customers is acted on or scheduled into the product roadmap

Project Partners and External Funding

EA Technology are a project partner and are providing project management, solution design and engagement support as and when necessary. EA Technology have already provided resources up front to assist with scoping the project and understanding vectorised spatial network data quality for the three UK Power Networks network areas. One.Network are being consulted for advice on traffic

management quoting. Google Deepmind have been engaged to determine if they can vectorise some elements of UK Power Networks' spatial network data.

Potential for New Learning

The project will be the first to provide automated full HV connection offers and answer the question: Can a digital self-service model reduce the time to provide a connection offer, reduce costs, without impacting accuracy and customer service levels?

It will generate learnings on the logic and data required to provide a full connection offer to the UK Power Networks HV network. Some of this costing logic and data is commercially sensitive and cannot be shared. However, the higher-level process is not and can be published.

The traffic management module already mentioned, has broader potential application for gas and water utilities. In addition, the project will assess additional features and functionality that will improve the self-service connection offer automation:

- Transition from raster to vector based geospatial network data throughout the network
- Use actual network load data rather than default load profiles to display network capacity
- Connection queue management
- Response to emergent policy changes e.g. Strategic Charging Review
- CO2 impact calculations for new connections

Scale of Project

The aim is to provide connection offers for all the UK Power Networks regions. If the project were of a smaller scale, it would not capture the diversity of network complexity. As such, the necessary learnings would be delayed until the whole network is addressed. Furthermore, the traffic management module will need data from a variety of different authorities with different permitting schemes and associated costs. Without this scale, the tool would not have sufficient accuracy to be commercially viable.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The project will cover all of UK Power Networks' licence areas; Eastern Power Networks plc (EPN); London Power Networks plc (LPN); and, South Eastern Power Networks plc (SPN).

Revenue Allowed for the RIIO Settlement

No revenue has been allowed in the RIIO-ED1 settlement.

Indicative Total NIA Project Expenditure

The total NIA expenditure that UK Power Networks expects to incur for this project is 90% of total project budget or £2,566,063.

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:

The number of connection requests are expected to grow by 40% from current (2022) figures by 2028. Using current methods, this would require significant increase in volume of staff and therefore costs to maintain the same performance, let alone maintain high levels of customer service. Also, currently only 26% of connection offers are accepted.

Customer expectations are also rising in terms of the ability to self-serve and have visibility of all relevant information available immediately, rather than having to wait for a response to their requests. The overall aim of the project is to enable self-service connection offer functionality for high voltage connections customers between 300 kVA and 1 MVA. It is aimed to provide budget estimates for connections between 1 MVA and 2.5 MVA. In doing so we can help facilitate faster connections to the network by speeding up the connection offers process for projects that fit this capacity.

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)

As this project is carrying over from RIIO-ED1 to RIIO-ED2 the below text has been left for completeness.

This project has the potential to deliver substantial benefits to customers and society through greatly reduced times for HV connection offers which allow the requestor to interact with the connection offer process, altering parameters such as the connection point, to find the most optimal location to connect to the network before the quote is issued rather than requesting multiple manual quotes. This should facilitate the accelerated uptake of low carbon EV charge points and new housing projects.

This is estimated to provide £8.8m (NPV) of connection offer generation effort saved across RIIO-ED2. This effort can then be re-focused on providing higher impact services as well as minimising costs to DUoS customers from abortive work, particularly in light of Access and Charging Reforms which entail a greater proportion of connections costs being borne by DUoS customers in the future.

Please provide a calculation of the expected benefits the Solution

The expected benefits have been calculated as follows:

The baseline benefit is calculated as the average labour cost saved per connection offer/ budget estimate multiplied by the number of offers / estimates issued.

From this baseline benefit we have subtracted the following costs

- The IT operational costs to run and licence Auto Quote (external software licence and application hosting)
- The cost of manual offers / estimates not served by the tool*.

A 40% adoption rate for the tool has been applied for benefits calculation purposes. This adoption rate is conservative and allows for the larger commercial customers that will want a dedicated connections designer.

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

The project deploys a web-based tool, which can be used anywhere with an internet connection. The data behind the tool is from UK Power Networks' three licenced network areas. However, the tool could be deployed across all of GB and could be adopted by all DNOs.

This assumes other DNOs have similar price books based upon compatible units and use the same logic for pricing work as UK Power Networks. The traffic management costs may differ from region to region, but it would be simple to integrate different permitting costs based upon regional variation. If a standardised national tool were in place, it would mean a consistent interface and approach for providing connection offers nationally, with updates benefitting all regions.

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

The solution could be deployed in any licence area providing the DNO implements processes and systems to facilitate collaboration with EA Technology. In particular, NPG and SPEN are already using similar tools from EA Technology, so enabling access should be more straight forward. Deployment to additional DNOs would be subject to negotiation of commercial terms with EA Technology and costs for any DNO specific customisation.

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

With the decarbonisation of transport and heat, electricity networks across GB are under increasing pressure from customers to upgrade supply. This will likely reach a critical point during RIIO-ED2 when we forecast the number of connection offers in our region could grow by 40% from our current levels.

Other Electricity Distribution licensees and more broadly, other utilities can benefit from the learnings identified in section 2.8. Specifically, the use of actual load data rather than default profiles to display connection capacity status, will provide more accurate customer insight. Understanding how connection capacity is managed during the quoting and acceptance process will help standardise approaches where the requirements are the same. Any utility requiring excavation around roads (power, gas, water and telecoms) can benefit from an automated costing framework for traffic management, based upon variable traffic permitting schemes.

The HV Auto Quote project could realise the opportunity to change the manual nature of issuing connection offers, enabling smoother customer engagement, reducing delivery times, and barriers to low carbon technology uptake. Learnings from the project will be beneficial to all electricity networks and help them remain a facilitator of Net Zero.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

Not applicable as above has been answered.

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 project will be the first to include the required logic required to bridge the gap between budget estimates and firm connection offers.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

Not applicable

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

This project will be the first to include the required logic to bridge the gap between budget estimates and firm connection offers. It will be the first to deliver:

- self-service firm connection offers
- self-service budget estimates above 1 MVA

Innovation is required to understand and codify the current process and then re-engineer them to provide a smoother customer journey and automate the creation of firm connection offers. There are independent systems for planning traffic management for utilities.

However, there is no functionality to automatically cost work associated with traffic management and combine it with other connection costs. To do so, requires innovation between DNOs, traffic management system providers and established power network cost estimation solutions.

Relevant Foreground IPR

IPR will be handled in accordance with NIA rules on IPR for pre-existing commercial products. The relevant foreground IPR can be reused by other network operators.

The data and the processes that already exist within UK Power Networks are UK Power Networks background IPR. Extending this with the input of UK Power Networks to cover the new system requirements is also UK Power Networks foreground IPR. Any system architecture or system design documents are EA Technology Foreground IPR.

When development sprints start, it will be building on background IPR that exists in two existing applications (AutoDesign ([NIA_NPG_024](#)) and ConnectMore ([Project Charge](#))). These are pre-existing commercial products. Logic from these products will be developed further to provide sufficient detail such that UK Power Networks can deliver accurate connection offers including traffic management costs.

Data Access Details

Data sharing will primarily be between UK Power Networks and EA Technology to develop the software. Other third parties may be engaged by UK Power Networks and/or EA Technology where appropriate e.g. traffic management. Data sharing will be facilitated via

existing cloud provider secure methods.

No personally identifiable information will be exchanged when using HV Auto Quote, just a post code to display a UK map region for the client to draw a polygon representing the geographic location to be connected.

The project team will support the sharing of data with interested parties where appropriate on request. This may not be appropriate in some cases where sensitive commercial information may be interpreted. The approach will be consistent across the UK Power Networks project team and the project partner EA Technology.

We will follow our [Innovation Data Sharing Policy](#) for all data sets.

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

In section 3.2 of the NIA Governance document, the DNOs are encouraged to pursue different types of methods and solutions to meet challenges affecting customers and network operators. This project seeks to provide a solution that could meaningfully increase customer satisfaction while accelerating the transition to low carbon transport via on street charging.

Existing self service tools only offer budget estimates. Innovation is required to fully understand the connection offer process in detail so it can be automated.

These activities would not form part of business as usual activities due to the low TRL and inherent risk of the project given the unproven benefits across UK Power Networks' licence areas. NIA project funding is therefore required to progress the innovative nature of the project and the inherent risk that it carries for its implementation.

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 automation technology has not been previously used for firm connection offer issuance, there are both commercial and technical risks which need to be carefully managed to successfully build and migrate to a system which can replicate the existing logic. As noted in the NIA Guidance, certain projects are speculative in nature and yield unproven commercial returns. This project could only be undertaken with the support of NIA. The project offers benefits applicable to the whole network.

This project has been approved by a senior member of staff

Yes