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# NIA Project Registration and PEA Document

### Date of Submission

Sep 2024

### Project Reference Number

NIA_UKPN0102

## Project Registration

### Project Title

Blue Light

### Project Reference Number

NIA_UKPN0102

### Project Licensee(s)

UK Power Networks

### Project Start

September 2024

### Project Duration

2 years and 7 months

### Nominated Project Contact(s)

Jack.mckellar@ukpowernetworks.co.uk

### Project Budget

£1,188,442.00

### Summary

Blue Light aims to allow DNOs to enable the decarbonisation of the emergency services in a more efficient and collaborative way. The project intends to streamline the connections process and enhance visibility of connection requirements for emergency services and the DNO, and support network planning and reinforcement. The project will involve research and engagement with emergency services followed by the design and development of a solution. This self-serve solution will allow them to input electrification plans and offer information, including headroom against connection capacity now and over time, and provide optimisation options to reduce costs and ensure resilience. This will provide the DNO with a solution to help emergency services decarbonise efficiently and foster collaboration with stakeholders who have not been traditional customers of connections.

### Nominated Contact Email Address(es)

innovation@ukpowernetworks.co.uk

### Problem Being Solved

Decarbonisation of the emergency services

The emergency services face unique challenges in their quest to decarbonise. The technology must align to their existing operational models with their heightened reliability and security considerations, and retrofitting existing estates presents considerable challenges, including limited space across their sites.

As of 2024, more than 1,000 zero-emission emergency vehicles are now in operation, according to a Freedom of Information (FOI) request sent to police, fire and ambulance services. This number has doubled in the past three years based on research by Gridserve. The fire service is making progress with heat electrification but is still testing proof of concept EV pumping appliances and the 2030 deployment target looks challenging. Similarly, the NHS is trialling EVs for less severe emergencies and transfer services, shadowing

diesel units to evaluate effectiveness. However, with exacting targets in place for all emergency services, their decarbonisation efforts are gaining momentum.

The emergency services have large, distinct fleets and estates that stretch across all DNOs. This presents an ideal opportunity to learn from best practice and share this.

To complicate matters, the emergency services tend to have large disparities in decarbonisation maturity. For example, within the Police Seven Force Commercial Services (7F) organisation, Essex Police are looking to trial some sites for EV charge point installation, whilst other forces are less mature. London Fire Brigade are developing a proof-of-concept zero emissions pumping appliance and other fire services are looking to them to lead the way (this is still in development so there is considerable debate about charging needs).

Overall, we are likely to see all emergency services organisations develop decarbonisation plans, requiring support, information and connections. This will lead to a complex picture for network reinforcement.

## Method(s)

Blue Light proposes a structured approach to assist emergency services with their electrification efforts. The end solution should build on previous innovations, including Optimise Prime and the Site Planning Tool, to simplify the connections process and improve visibility of connections requirements for the emergency services. Whilst the Site Planning Tool provides a self-serve tool indicating possible load profiles for EV charging sites, Blue Light aims to provide a more comprehensive solution for emergency services organisations that enables them to input and view both EV and heat pump installation plans across their estate and over time to support the phased upgrade of sites, allowing them to understand their headroom and the 'tipping point' maximum load that could be taken before reinforcement is required. It will support with understanding the connection requirements of their specialist vehicles and provide suggestions for reducing these requirements by identifying archetypal sites and setting out their options, including moving loads from one site to another, using on-site generation or storage, as well as smart charging. The solution also aims to be used by the DNO to improve its visibility of planned works and improve network planning.

The end solution should support with visibility and planning across each emergency services organisation’s estate. The self-serve platform would enable them to input their EV and heat pump electrification plan and obtain relevant information and advice, aligned to the status of the project at that location, such as being able to see the headroom they have against agreed and potential connection capacity and understand the tipping point at which reinforcement would be needed. The tool would have a time element, enabling them to view how connection requirements and headroom develop over time.

Then, where the potential for capacity constraints exists, the tool should provide alternative options or scenarios as to how they might optimise their estate to reduce connection costs. This could include prioritising certain sites for connection increases, using smart charging, moving assets from one site to another or using generation and/or batteries. The tool could also consider security of supply and the use of combined charging hubs, which could provide an alternative supply point should there be an issue with the power at their home base.

More broadly, although the individual plans would not be shared beyond the organisations providing the information, it would allow DNOs to have a holistic view of demand/export needs across the services including where geographic locations would allow for greater efficiencies in delivering connections or the associated reinforcement.

The first phase of the project involves researching the problem and engaging with key stakeholders to understand their decarbonisation plans, partnering with two or three organisations to trial the approach with real data as a proof-of-concept, and designing the solution. The project will then focus on the build of the solution, which is Phase 2. Further detail on each of the phases can be found in the Scope section below.

Measurement & Data Quality Statement:

The scope of this project is to provide a new solution for emergency services organisations and DNOs. The project will deliver clear benefits to DNOs through improving the quality of connection applications, thereby reducing the time required to process and iterate applications. The project is also likely to accelerate the decarbonisation of the emergency services, giving them enhanced visibility of their headroom and the options they must improve their plans.

Data gathered during the trial will be kept securely and deleted within a suitable timeframe in accordance with data protection requirements. In compliance with GDPR requirements anonymised and aggregated data only, will be included in project reports for wider distribution.

## Scope

Blue Light aims to support the decarbonisation of emergency services in the UK by developing and implementing innovative tools and strategies to facilitate their decarbonisation plans. The project will focus on comprehensive research, stakeholder engagement and technical development to address the unique challenges faced by the emergency services in electrifying their fleets.

The project will include research and engagement and subsequently will involve the development of a proof-of-concept solution for the tool and an implementation plan for BAU.

The project is relevant to all blue-light emergency services organisations in UK Power Networks' three licence areas. This includes 36 police, fire and ambulance organisations. The "Research and Engagement" work package will look to engage with as many of these as possible.

In work packages 2 and 3 of Phase 1 when the proof-of-concept solution is being developed, we will focus on a suitable number of partners to trial the solution.

Phase 1

WP1: Research and Engagement

Engage with multiple emergency services organisations and gather detailed information on their decarbonisation plans, key stakeholders involved, main concerns and risks, and operational requirements.

WP2: Connection planning and optimisation tool

Develop a solution that enables emergency services to map out their electrification plans and optimise the connection of EVs across their estate. This will be delivered by gathering data from partners to build the prototype, whilst simultaneously engaging with users to design how the end solution should be used.

WP3: Design standardisation

Develop archetypal sites for each partner and determine the behind-the-meter options for reducing connections requirements. This will feed into the end solution, enabling the emergency services organisations to see the options available to them at each site across their estate.

Phase 2

Solution Development

Following the above phases, the solution will be developed.

· This will be further scoped out based on the findings from Phase 1.

Project change: The project end date was extended to 31 March 2027. This change was made to ensure that the solution which had been developed into validated wireframes in phase 2 was able to be successfully developed as a full tool. This extension allows for the award of a delivery partner, a minimum viable product to be tested in live trials with super users from the NHS, fire and police, and delivery of a full version of the tool into BAU.

Extending the project by 12 months (which is without any additional cost) enables successful delivery of the Blue Light tool, and successful integration into business as usual for both UK Power Networks and our blue light connection customers.

## Objective(s)

To engage with police, fire, and ambulance organisations to gather data on their decarbonisation plans and how the electricity distribution infrastructure should look for these targets to be met.

To build a new tool that can be used to:

· Assist emergency services in mapping out their electrification plans across their estate, enabling them to make more informed decisions, alleviating the unique challenges facing the sector, as laid out in Section 3.1.1.

· Enable the DNO to collaborate more effectively with emergency services and cut out time wasted reviewing insufficiently informed applications and requests.

## Consumer Vulnerability Impact Assessment

The project does not have a specific Consumer Vulnerability focus but enables the blue light services to meet the needs of vulnerable customers in a decarbonised way.

## Success Criteria

Engage with police, fire, and ambulance organisations in UK Power Networks' areas to gather data on their decarbonisation plans and how the electricity distribution infrastructure should look for these targets to be met.

· Demonstrate the potential improvement to the percentage of successful connection upgrade applications that are made by emergency services organisations.

· Demonstrate the potential improvement to network planning and decision making by using the improved understanding of emergency services decarbonisation plans.

## Project Partners and External Funding

By fostering collaboration with a diverse range of partners, Blue Light aims to deliver robust and innovative solutions to support the decarbonisation of emergency services.

UK Power Networks will partner with Sia Partners to deliver Work Packages 1 and 2. Sia Partners are a specialist management consultancy who combine deep sector expertise in the energy sector with data science capabilities. They are ideally placed to deliver the engagement, research and proof-of-concept development.

The partner for Work Package 3 is UKPN Services. They have extensive experience delivering advice and support to clients on how to optimise their behind-the-meter design and have previously worked on assignments related to the emergency services.

## Potential for New Learning

Through engaging with emergency services, DNOs are expected to gain insights into the existing and future ambitions of these services' decarbonisation efforts. This will include their existing vehicle and electricity usage, their decarbonisation plans, and the key building blocks to this.

The project's research and engagement will cover the on-site constraints facing the emergency services, including spatial considerations that make the installation of new substations complicated. Therefore, the project may provide new learnings and data on the use of containerised or miniaturised substations to support the research and development taking place on that topic. These insights could potentially be applied to other types of fleets in the future, particularly as the network progresses into RIIO-ED3.

Learnings will look to be disseminated via a workshop or webinar to emergency services organisations and DNOs to ensure that they are aware of the solution, alongside direct discussions with any organisations where required. All learnings will be published onto the UK Power Networks Innovation website, and upon successful delivery of the project, UK Power Networks will explore further sharing of via either press release, social media or both.

## Scale of Project

In Work Package 1, the project initially aims to understand the decarbonisation plans of emergency services, the information and support they need from the DNO, and their main concerns and risks. At this stage, project will aim to engage with as many of the 36 emergency services organisations in UK Power Networks' licence areas as possible.

In Work Packages 2 and 3, the project will progress to more detailed designs and analysis. This will require more in-depth stakeholder involvement so the project will involve two or three emergency services organisations at this stage. The project aims to create a consistent and efficient process for collaboration between DNOs and emergency services. Therefore, the solution will be designed to be applicable for all emergency services and DNOs across the country.

## Technology Readiness at Start

TRL4 Bench Scale Research

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

The project is relevant to all blue light emergency services organisations in UK Power Networks' three licence areas. Work Package 1's research and engagement will aim to engage with as many of these organisations as possible.

For work packages 2 and 3, where the proof-of-concept solution will be developed, the focus will be on a suitable number of partners to trial the solution.

## Revenue Allowed for the RIIO Settlement

No funding was provided within the current RIIO settlement that will become surplus to requirements as a result of this project.

## Indicative Total NIA Project Expenditure

The total project budget is £1,188,442, of which £1,069,598 (90%) will be recovered from NIA.

# Project Eligibility Assessment Part 1

## Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

Please answer **at least one** of the following:

## How the Project has the potential to facilitate the energy system transition:

The emergency services face unique challenges in their quest to decarbonise. They have difficult-to-predict vehicle usage and charging patterns across their estates, include unique vehicles such as pumping appliances, which must be balanced with the continuous requirement for their services. They have increased security of supply requirements, where a loss of supply or a dead EV battery could be life-threatening. They also have restrictions and constraints regarding how they use their sites and the space available. The emergency services are coming to DNOs for support not only with new connections or connections upgrades but also with these broader issues that feed into them. As the influx of these requests accelerates, it is vital that DNOs and emergency services have an efficient and consistent way of collaborating.As of 2024, more than 1,000 zero-emission emergency vehicles are now in operation, according to a Freedom of Information (FOI) request sent to police, fire and ambulance services. With the help of Blue Light and its outputs, emergency services will have the ability to understand the specific infrastructure requirements, the timing of when to initiate certain advancements to achieve their decarbonisation goals, and the options available to do it as efficiently as possible

Additionally, as more and more fleets of other organisations start to replace ICEs with EVs, the tool designed with Blue Light can be adapted to the needs of these new customers, facilitating the energy system transition further.

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

The project does not have a specific Consumer Vulnerability focus but enables the blue light services to meet the needs of vulnerable customers in a decarbonised way.

## 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

N/A

## Please provide a calculation and/or description of the expected benefits of the solution

Through streamlining the connection application process and reducing the number of applications per connection site, fewer resources will be needed to design and approve new connections. This will in turn result in lower cost for the DNO, which will translate into reduced bills for existing customers.

At present only 20% of applications are accepted, resulting in multiple iterations of applications that can take several days per application. As a result of the tool, and the support provided to the emergency services, each emergency service site will be more likely to only require one connection application to UK Power Networks and that application will provide all the necessary information. This is driven by the fact that the tool will provide the information they require to complete an accurate and successful new connection or connection upgrade application.

This can be simplified with the following expression:

· UK Power Networks cost per emergency service site = Number of applications per site * Days spent per application * Cost per day

· Total UK Power Networks cost = Cost per emergency service site * Total number of sites across estate

· By increasing the application acceptance rate from 20% to 100%, the number of applications per site decreases from 5 to 1, thereby reducing the cost per site.

· We have assumed that the sites will be decarbonised at a constant rate from now through to 2032.

As a result, the project is expected to result in financial NPV of (Base Cost – Method Cost + Benefits) of £531k in RIIO-ED2 and £1,182k in RIIO-ED3, by providing cost savings

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

Initially, the solution can be used by the 36 police, fire and ambulance services in UK Power Networks licence areas. However, the solution could be used across all police, fire and ambulance organisations across Great Britain – over 100 organisations in total.

In addition, if successful it could be rolled out to other similar use cases such as wider NHS organisations.

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

The solution will be designed for use by any police, fire or ambulance organisation and will not require rework for uses in other geographies. Therefore the costs of roll out would be minimal. There may be some form of integration required by other DNOs but the costs of this depend on the eventual solution and their specific system architecture.

## Requirement 3 / 1

Involve Research, Development or Demonstration

Projects 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

Involve Research, Development or Demonstration - Please select all that apply

☐ 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

Through engaging with emergency services, UK Power Networks is expected to gain insights into the existing and future ambitions of these services' decarbonisation efforts. This will include their existing vehicle and electricity usage, their decarbonisation plans, and the key building blocks to this. This information will support other electricity distribution licensees in understanding and working with the emergency services in their licence areas.

The project's research and engagement will cover the on-site constraints facing the emergency services, including spatial considerations that make the installation of new substations complicated. Therefore, the project may provide new learnings and data on the use of containerised or miniaturised substations to support the research and development taking place on that topic. These insights could potentially be applied to other types of fleets in the future, particularly as the network progresses into RIIO-ED3.

N/A

### Is the default IPR position being applied?

☑ Yes

## Project Eligibility Assessment Part 2

### Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed. Networks must explicitly mention similar projects that they have considered and how these differ.

### Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

Blue Light is innovative because it will use research and engagement with emergency services organisations and DNO connections teams to develop a novel approach for collaboration to ensure that the grid can facilitate their decarbonisation plans. Whilst previous innovations such as the Site Planning Tool can help organisations understand the load impact of new EV chargers, Blue Light will go much further and be a comprehensive solution for emergency services.

Blue Light will enable them to input and view both EV and heat pump installation plans across their entire estate (rather than per site) and over time to support the phased upgrade of sites, allowing them to understand their headroom and the 'tipping point' maximum load that could be taken before reinforcement is required. It will support with understanding the connection requirements of their specialist vehicles and provide options for reducing these requirements, beyond smart charging. It will also include special consideration to security of supply including potential dedicated charge hubs that provide additional resilience.

Whilst stakeholder engagement has already taken place to inform the direction of the project, the more detailed research and engagement phase will ensure that the project is accurately capturing the emergency services' and indeed the DNO's pain points.

### 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

Blue Light is innovative because it will use research and engagement with emergency services organisations and DNO connections teams to develop a novel approach for collaboration to ensure that the grid can facilitate their decarbonisation plans. Whilst previous innovations such as the Site Planning Tool can help organisations understand the load impact of new EV chargers, Blue Light will go much further and be a comprehensive solution for emergency services.

Blue Light will enable them to input and view both EV and heat pump installation plans across their entire estate (rather than per site) and over time to support the phased upgrade of sites, allowing them to understand their headroom and the 'tipping point' maximum load that could be taken before reinforcement is required. It will support with understanding the connection requirements of their specialist vehicles and provide options for reducing these requirements, beyond smart charging. It will also include special consideration to security of supply including potential dedicated charge hubs that provide additional resilience.

Whilst stakeholder engagement has already taken place to inform the direction of the project, the more detailed research and engagement phase will ensure that the project is accurately capturing the emergency services' and indeed the DNO's pain points.

## Relevant Foreground IPR

Using the previous tools and the insights from them, the end solution will support with visibility and planning across each emergency services organisation's estate. The Foreground IPR will be a self-serve platform that enables services to input their electrification plans and obtain relevant information and advice, aligned to the status of the project at that location, such as being able to see the headroom they have against agreed and potential connection capacity. The tool would have a time element, enabling them to view how connection requirements and headroom develop over time. The understanding of site connection requirements based on vehicle requirements can come from the Site Planning Tool.

In addition, the learning generated from engagement with the emergency services and the learnings from the use of the tool during the project will also be foreground IP generated by the project.

## Data Access Details

The project will utilise both publicly available data as well as private data from the emergency services. Some data, such as police forces EV usage data, is not available to the public for security reasons. Where this is made available to the project team, it will not be possible to share it more widely. However, where applicable and accepted by the services themselves, certain archetypes of new connections and or reinforcements locations/designs can be de-sensitised and be shared with interested third parties.

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

The challenges facing emergency services organisations and DNOs regarding the connections process require an innovative approach to improve visibility and reduce the costs of planning and processing applications for all parties. This would represent a significant change from the current approach and there is a level of uncertainty with the investment in this innovation. Therefore, it requires NIA funding to derisk the project and make it viable.

## 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 above.

## This project has been approved by a senior member of staff

☑ Yes