Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Apr 2024

Project Reference Number

NIA_UKPN0101

Project Registration

Project Title

Innovation Highway

Project Reference Number

NIA_UKPN0101

Project Licensee(s)

UK Power Networks

Project Start

May 2024

Project Duration

1 year and 0 months

Nominated Project Contact(s)

Inam Shah

Project Budget

£1,720,000.00

Summary

The Innovation Highway project will utilise AI and machine-learning to optimise the full innovation value chain. The platform developed will help facilitate collaboration amongst networks, and other sectors such as water companies so they can innovate together. AI-empowered algorithms will simplify the identification, mapping, assessment and selection of problems and ideas, reducing manual processing time and enhancing effective decision making; this will support identifying and prioritising projects that will deliver the highest benefits. The platform will also help networks automate the development of cost benefit analysis.

Nominated Contact Email Address(es)

innovation@ukpowernetworks.co.uk

Problem Being Solved

It is recognised that energy networks require the deployment of truly transformational innovation, at speed and scale to facilitate a Net Zero Power System by 2035. This requires innovation not just in technology, but in systems and processes. Also, not just within each network, but across networks and other interdependent sectors such as water and transport.
To improve, optimise and enhance the current innovation tools and processes, the follow challenges should be addressed:
Networks overwork to find ideas and solutions: idea generation from many global innovators to appropriately shortlist those with the potential to make a positive impact and/or provide feedback is resource intensive and time consuming. This often results in large amounts of time being spent to review and justify reasonings for ideas being rejected rather than to progressing good ideas into successful projects and eventual BAU deployments.
Accelerator to come up with better ideas or problems: Problems are not always adequately defined or captured with the required levels of strategic or operational clarity.
Co-create ideas and solutions: Improving collaboration between networks, customers and stakeholders from other sectors, to avoid duplication of efforts and increasing the value for money for customers, networks and the regulator.
Digitalisation and intelligence: Innovation systems and processes are often manual, time intensive and limited in cutting edge intelligence such as AI, thus providing opportunity for innovation.

Measuring the benefits: from successful (and learning from unsuccessful) innovation can be optimised as it often requires the manual assessment and tracking of benefits to derive the return on investment.
Evidence to support these problems has been captured from several sources below helping to highlight some of the challenges facing both innovators and energy networks.
The EIC's Innovator Survey highlights barriers for innovators that our project partner, ideaonomy, can help solve including connecting with the right people, embracing disruptive innovation, measuring success, pace, and business as usual deployment. The key barrier identified is around transparency of industry problems and processes, something ideaonomy will manage directly through its problem identification module and smart clustering of teams working on shared problems. The project will help to directly address several of the actions in the report including Challenges Prioritisation (action 3, dealt with via the problem identification and prioritisation module and Accelerating Pace action 9, addressed via the timeboxed process).
As highlighted in the ENA's Innovation Strategy, a number of key principles are required in order to deliver on six core innovation themes including Whole Energy System, Data and Digitalisation and Supporting Consumers in Vulnerable Situations. These principles include creating an innovation culture across the networks, delivering greater consumer benefits and enhanced data and knowledge sharing. Most importantly the strategy highlights the importance of collaboration and stakeholder engagement in innovation.

Innovation Highway supports not only the innovation themes within the strategy by enabling all participating networks to target their innovation efforts at specific high priority problems. It does this whilst at the same time fully digitalising the innovation value chain, enhancing collaboration, engagement and knowledge sharing. Crucially, the project will help to transform the culture of innovation across the networks enabling all employees and innovation teams to accelerate efforts whilst simplifying processes using machine learning and AI. One of the key objectives in the strategy is meeting the needs of consumers and network users, ideaonomy will provide a digital interface for consumers and networks users to engage at scale to vastly improve the way we identify problems and generate ideas.
As Ofgem's consultation on the future of local energy institutions and governance shows, the role of local authorities is likely to become more embedded with local area energy planning. Ideaonomy will create a means to collaborate across a wide variety of stakeholders using a focussed process that targets ideas at high priority problems. Ideaonomy will give all participating networks the ability to work very closely and efficiently with local stakeholders alongside Ofgem, DESNZ and the Future System Operator in this regard.
Ofgem's previous evaluation of network innovation activities highlighted that "there is insufficient high-level overview and co-ordination of individual projects to ensure alignment with the overall direction of the industry". The project will directly help to address this via its smart clustering capability.

Method(s)

The introduction of an innovation management platform that manages the whole cross network innovation value chain could result in a step change in how networks innovate and interact with the innovation community leading to improvement in pace and efficiency.
To best address the problems above, a digitised 'mixed intelligence' (human and AI) innovation platform is being developed that provides energy networks with the ability to:
Form a web of interconnected clusters around key problems such as data and digitalisation, whole systems or consumer vulnerability with stakeholders. This clustering will then help create a connected ecosystem across those interested (networks, innovators, DESNZ, Ofgem and other stakeholder) with the same focus areas.
Connect problems to problems, ideas, projects and fast-follow solutions using machine learning and AI. The platform will demonstrate the power of AI by auto generating problems and ideas, calculating benefits, identifying previous and current projects addressing said problems and ideas, finding and matching solution providers to the problem to avoid unnecessary duplication and ensure higher quality innovation inputs, outputs and outcomes
Utilise an end-to-end innovation management platform that manages the whole innovation value chain from measuring innovation and identifying problems, through to generating, selecting, incubating, implementing and scaling ideas. Thus, simplifying the process of managing the innovation pipeline and reducing the need (and cost) of using multiple digital tools for different stages of the process.
The end-to-end digital platform to manage the innovation value chain from measurement throughout to implementation and scale will enable UK Power Networks and other sponsoring networks to manage more innovation with less of a strain on existing resources.
By using both the smart clustering capability and end-to-end management platform together, collaboration will become both greater, and easier by digitally identifying shared problems and ideas whilst also creating a more effective route to third party innovator platforms such as the EIC, ENA, Isle Utilities and Innovate UK.

Measurement Quality Statement and Data Quality Statement
Data gathered during the project follows a robust triage process to ensure that it is assessed for regulatory, privacy, and commercial sensitivity. Appropriate mitigations are defined where appropriate. Governance also ensures it is 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 the software or in project reports for wider distribution.

Scope

The project will be delivered in three stages as outlined below.

Stage 1 – Feasibility
Project governance structure
Stakeholder engagement plan
Mapping existing processes (baselining)
Competition horizon scan
User needs
Use cases
User stories
Requirements capturing
Commercial (value proposition, revenue streams, licensing and pricing, finance and funding, IPR/legal assessment
Stage 2 – Discovery
Data discovery
Refined user stories
UI/UX design
Technology selection and architecture design
Data flow design
Prototype development (problem identification module)
Testing and feedback
AI Solution design refinement
Stage 3 – Alpha
Prototype refinement based on feedback
Feature development
Testing and bug fixing
Demo of MVP
Subsequent module prototyping (idea generation, measurement)

Objective(s)

The objectives of the project are:

Understand the innovation process across networks and define user requirements with the aim of optimising and improving the existing innovation process
Develop, publish and maintain a prioritised product roadmap for the digital tool that goes beyond the scope of this project and is informed through engagement with stakeholders across the industry
Develop a working prototype of the problem identification module, a high-fidelity prototype of the idea generation module, and a low fidelity prototype of the measurement module
Demonstrate the power of Innovation Highway's AI capabilities via an AI-based 'tech flex' that target key user needs

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

Innovation Highway has been designed to enhance equality, diversity and inclusion by design. It provides a route to engage all consumers and network users in the innovation process in a way that has been hard to achieve previously. It enables all network users and consumers to submit their problems and ideas online.

Innovation Highway also enables problems to be identified, broken down, prioritised and selected that related directly to fuel poverty and vulnerability. It does this in a way that involves multiple stakeholders across the sector to help galvanise what used to be disparate efforts into a single, targeted effort.

Success Criteria

Each work package has defined success criteria as per the information below:

Stage 1: Feasibility
Produce a project report(s) that include:
Project governance structure
Stakeholder engagement plan
Mapping existing processes (baselining)
Competition horizon scan
User needs

Value proposition and cost benefit analysis
Licensing and pricing and requirements based on user needs and priorities

Stage 2: Discovery
Successful creation of a prototype that encapsulates core functionalities of problem identification and design principles.
Successful identification of areas for enhancement and alignment with user needs.
Successful development of a plan for developing modules through Alpha stage for AI solution design refinement.

Stage 3: Alpha
Successful development of Minimum Viable Product (MVP).

Project Partners and External Funding

The project will be completed in collaboration with Northern Powergrid and SP Energy Networks. Other non-funding networks will support the project with the possibility of joining following completion of Stage 1: Feasibility.
The Energy Innovation Centre (EIC) and Energy Networks Association (ENA) will also support the project as interested stakeholders.
In addition to the energy networks listed above, we are collaborating with ideaonomy who have built a team made up of the following companies and services:
Ideaonomy - Management Team, Product Team, Operations Team, Technical Team, Finance, Legal, T&S
Faculty AI - Data Architecture, Data Engineering, Software Engineering, Business Analysis, UX Design
Zuhlke Engineering – Data Science, Machine Learning
CGI – Commercial & Legal
CogCo – Behavioural Science, UX Design
Omni – Design and Animation

Potential for New Learning

The project provides significant potential for new learning. These learnings will be principally applied across the following areas:
Problems: learning about what problems we are trying to solve across a range of stakeholders and the relationships and partnering opportunities across these stakeholders
Ideas: learning about new ways to find and select the ideas that can solve our problems and partnering with those who have had ideas that could solve our problems
Projects: learning about new ways we can analyse historical and current projects that have already solved these problems
Solutions: learning about new ways to identify and select existing solutions that could solve our problems
AI in innovation: learning how AI can support our innovation activities of identifying problems and solutions, and partially automating the CBA process

Scale of Project

The project has been structured such that value must be evidenced early during the Feasibility and Discovery stages. The Alpha Phase will seek to demonstrate and prove that this value can be unlocked but will only proceed if networks and innovators accept the evidence produced. The subsequent stages will be funded outside of this NIA project and will seek to scale and expand the innovation management platform and interconnected clusters.

The scale and ambition of the project has been carefully considered to optimise the speed of execution with the robustness and usability of the future solution. Justification for the scale of the investment can be broken down into the following areas:

Innovation Ecosystem Integration: The interconnected nature of the project across so many energy networks alongside the future integration of the water and transport sectors demands a comprehensive solution that enables cross-sectoral collaboration. Limiting the scale would inhibit the project's capacity to serve as a holistic, unifying platform.
Advanced Digital Tools: The scale permits us to invest in advanced digital tools such as machine learning and AI to ensure the platform is modular, scalable, and capable of integrating with third party tools. This will ensure the technological infrastructure is both cutting edge as well as optimised for future scalability.
Stakeholder Engagement: A smaller scale project may not have the resources to adequately engage with multiple stakeholders. Ideaonomy aims to be a converging point for networks, regulators, customers, and other sectors, necessitating a broader scope and depth.
Global Reach: The future scale of the platform is intended to accommodate problem identification, idea generation and selection from a global pool of stakeholders. A limited scale would limit the range and diversity of innovation, ultimately restricting impact and benefit.

Economies of Scale: Lastly, the scale enables cost-efficiencies in development and operation across project partners that would be

otherwise unattainable. This directly contributes to maximising value for money for consumers.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The project is developing an online innovation management platform that will be available to networks, innovators and other stakeholders globally, but initially focusing GB.

Revenue Allowed for the RIIO Settlement

There is no funding provided to the network licenses within the current RIIO-ED2 settlement that is likely to be surplus to requirements as a result of the Project.

Indicative Total NIA Project Expenditure

The total expenditure for the project is £1,720,000 of which the total allowable NIA Expenditure is £1,548,000. This can be broken down as follows:
UK Power Networks: £607,500
SP Energy Networks: £562,500
Northern Powergrid: £378,000

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 project is strategically positioned to facilitate the energy system transition in multiple ways, notably by providing the foundation for a cohesive platform for innovation and stakeholder collaboration at an unparalleled scale. This includes:
Cross sectoral collaboration: By integrating various sectors such as energy, water, and transport, the project fosters systemic thinking. This reduces the risks of repetition and duplication within and across dependant sectors therefore increasing the chances of an effective transition that is also faster, cheaper and more efficient.
Increased efficiency and optimisation: Reduce the manual time spent in the problem and ideation stage allow more time for high priority innovation ideas
Speed and scalability: The digital nature of the platform allows for rapid iteration and scaling of promising solutions.
Transparent metrics & reporting: Sophisticated tracking and reporting tools within the platform will allow all stakeholders to measure and understand the impact of various innovations on social, economic, and environmental fronts. This transparency is critical for maintaining stakeholder trust and securing ongoing support for transition activities.
Regulatory alignment: By providing a mechanism for real-time feedback from regulatory bodies such as Ofgem and DESNZ, the project ensures that innovations are aligned with evolving policy frameworks, thereby reducing the risk of stranded investments.

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

Innovation Highway has been designed to enhance equality, diversity and inclusion by design. It provides a route to engage all consumers and network users in the innovation process in a way that has been hard to achieve previously. It enables all network users and consumers to submit their problems and ideas online.

Innovation Highway also enables problems to be identified, broken down, prioritised and selected that related directly to fuel poverty and vulnerability. It does this in a way that involves multiple stakeholders across the sector to help galvanise what used to be disparate efforts into a single, targeted effort.

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)

Not applicable

Please provide a calculation of the expected benefits the Solution

There are four quantified benefits for the project. They are:

1. Reduction in time needed to process ideas
This benefit is based upon the time saved engaging with innovators unnecessarily and sifting through ideas prior to selection of what should and shouldn't be approved and developed into a project. This would be informed by insights from previous projects, identification of similar historical ideas, and potential solutions that already exist.

The calculation of this benefit is based on the average number of ideas that have been rejected over 2021/2022. The project will

reduce the time taken by an innovation engineer to review and reject these ideas by 60%. This is a recurring annual benefit.

2. Reduction in number of ideas unnecessarily progressed through governance
The project will create a 60% efficiency saving from investing resource in taking ideas through governance that then get rejected. The annual saving is based on the average number of ideas developed through Gate A and Gate B (these are UK Power Networks' internal governance stage gates) that did not commence into full projects over 2019-2022.

3. Reduction in cost to develop project CBAs
The project will create a 60% efficiency saving via the AI tech flex that would look to automate the development of CBAs, reducing the need for human involvement. The cost saving is based on the average time spent creating CBAs over 2019-2022, assuming a continuous annual cost saving after deployment.

4. Uneconomic Project Spend Reduction
Over ED1, based on E6 reports, there was a total of £4.95 million spent on projects that returned no benefits. The project will reduce the spend on projects that return no benefits by 40% by focusing on projects that are more likely to deliver value through better problem identification and ideation. This will result in more projects having benefits.

For UK Power Networks, this could result in a £0.83m saving over RIIO-ED2
Base cost (PV) £3.76m
Method cost (PV) £2.93m

For UK Power Networks, this could result in a £1.63m saving over RIIO-ED3
Base cost (PV) £4.00m
Method cost (PV) £2.37m

Similar benefits are anticipated for the other participating networks, where the value will be based on their relevant size compared to UK Power Networks.

These benefits would apply across the entire innovation portfolio whether funded via the Network Innovation Allowance, the Strategic Innovation Fund or business funded innovation. Further refinement and communication of benefits will be undertaken during the Feasibility stage (Stage 1) of the project.

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

The replicability of the project across GB and beyond is:
Type of organisations: The method is versatile and can be applied to various types of organisations including networks, suppliers, generators, businesses, local authorities, trade associations, NGOs, charities and consumers.
Percentage of network licensees: Given its digital nature and low barrier to entry, we anticipate that all Network Licensees across energy and water could effectively integrate with the digital platform. This could then be rolled out across all energy and water companies globally.
Cross sectoral replicability: Beyond the energy sector, the method can be effectively replicated across dependent sectors like transport, serving as a unified problem-solving and innovation platform for a high percentage of companies in these sectors as well.

In summary, the method is highly replicable across a broad spectrum of sectors in GB and beyond. Its modular and adaptable nature allows for large-scale integration, serving the majority of Network Licensees and potentially revolutionising the innovation landscape across multiple industries.

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

Not applicable

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

See Section 2.8. Also, where successful the technology will be made commercially available, in line with the requirements of NIA.

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

n/a

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.

We have undertaken:
A review of the ENA Smarter Networks Portal;
Engagement with networks, innovators and other stakeholders; and
A search for publications
We have not found any other projects, products or initiatives that share the same problem statement, method, scope or objectives. Whilst there are organisations that have developed tools, practices and processes that facilitate innovation these target isolated elements of the innovation value chain rather than end-to-end management of it. Very few of these tools are fully digitalised or automated and all require manual and / or offline intervention. The innovation management platform will be full digitalised and consideration for integration with existing tools, practices and processes will be a core part of the project.

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

he project represents a shift in how innovation is approached, managed, and scaled across energy networks. The innovative aspects

can be categorised into several key dimensions:
Holistic cross-sector integration: Unlike traditional platforms that often focus on individual organisations, the project is designed to facilitate collaboration across interdependent sectors like energy, water, and transport. This level of integration is unique.
Digital ecosystem for innovation: The platform acts as a digital innovation ecosystem, amalgamating every stage of the innovation value chain — from problem identification to solution deployment — into a single, unified platform. This is a marked departure from existing methods that rely on disparate tools and manual processes.
Symbiotic collaborations: By enabling real-time input from a wide variety of stakeholders, the platform makes supports collaborations happen at scale. This inclusivity, covering everyone from networks to customers and other aligned sectors is truly groundbreaking.
Automated CBA: By partially automating the process of developing cost benefit analysis within the networks, the project will demonstrate very innovative capabilities that save network customers money.
Automated problem/idea triage: The platform employs machine learning algorithms to automate problem and idea generation, selection and evaluation, thereby speeding up the process while minimising human biases. This makes it resource-efficient and novel.

By converging these multifaceted innovative features into a single platform, the project is positioned to change how energy networks approach and implement innovation. It is a highly ambitious, revolutionary step towards achieving a just, efficient, and accelerated transition to a Net Zero future.

Relevant Foreground IPR

The default IPR position will be applied. The Relevant Foreground IPR generated in the project will be the development of the innovation management platform and supporting documentation. More specifically:
A working prototype of the problem identification module, a high-fidelity prototype of the idea generation module, and a low fidelity prototype of the measurement module.
The user (network and innovator) needs captured within use cases, users stories and requirements documents
The corresponding software design that maps to the user needs and will include UI / UX design, technology and architecture design, data flow design and AI solution design.

Data Access Details

Data sharing will primarily be between the Project Partners listed in Section 2.7 to develop the software. Other third parties may be engaged by Project Partner where appropriate e.g. other networks, utilities, and industry bodies. Data sharing will be facilitated via secure methods using existing cloud providers.
Personally identifiable information will be captured and exchanged when using the online innovation management platform. It is expected that this information will be shared between networks, innovators and their representatives at a minimum to enable communication between parties. This will be subject to a full data protection impact assessment (DPIA) to ensure that GDPR requirements are met.
The DPIA will be completed when we have a better understanding of the data sets involved, which is expected to be when the data sharing agreements are confirmed.
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 personal or commercial information may be interpreted. However, all efforts will be made to desensitise where possible. The approach will be consistent across Project Partner project teams.
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

Networks, including UK Power Networks, are continuously investing to improve how they undertake innovation activities. These efforts are supported by organisations such as the Energy Networks Association, the Energy Innovation Centre and Innovate UK.

The introduction of an innovation management platform that manages the whole cross network innovation value chain could result in a step change in how networks innovate and interact with the innovation community leading to grater project success and improving pace and efficiency.

Ideaonomy (the lead innovator organisation) is an early-stage startup and due to the risk involved in the project and the uncertainty around the benefits that will be delivered, these activities would not form part of our business-as-usual activities. To progress an innovative project that brings multiple networks together to address a common problem and which carries significant risk in implementation, additional innovation funding is required as a stimulus.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

As noted in the NIA guidance, certain projects are speculative in nature and yield uncertain commercial returns. This is the case for this project, where a new digital product and associated processes will be developed and trialled. The NIA funding will enable the Project Partners to undertake a project which has commercial and operational risks associated with it, in terms of a lack of certainty on results.

This project has been approved by a senior member of staff

☑ Yes