

NIA Project Registration and PEA Document

Date of Submission

Mar 2023

Project Reference Number

NIA_SPEN_0085

Project Registration

Project Title

XR Facilitating Training and Operations (X-FacTOR)

Project Reference Number

NIA_SPEN_0085

Project Licensee(s)

SP Energy Networks Distribution

Project Start

May 2023

Project Duration

0 years and 8 months

Nominated Project Contact(s)

Lara Cardoso

Project Budget

£150,000.00

Summary

The industry is experiencing the loss of expert staff through retirement and attrition due to increased demand of those skills. Technology has advanced exponentially, creating an increased necessity of adding of high-tech, dynamic equipment and systems to our grid, improving the journey towards Net Zero. To achieve that, the energy industry must create new and utilise the current technology in innovative ways, supporting effective infrastructure delivery.

X-FacTOR will leverage the existing Extended Reality Technology, applying it within the energy industry, designing an immersive training program for and with expertise of the network field workers, making the knowledge transfer a more effective, efficient, and safer process, which will be translated in a more robust and resilient grid operation, making it more reliable for energy customers.

Third Party Collaborators

Digital Catapult

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

To achieve a resilient and robust Net Zero Power system, we must ensure our power system embraces new technology and assets required for a smart grid to manage and control our network. The transition is ongoing under existing Innovation and business as usual activities and the future smart grid will be built and maintained by a workforce that is constantly changing and adapting to new technology.

The problem X-FACTOR is addressing is keeping the network expertise within the industry. Additionally, the special equipment workers need to learn to use may not be easy to access without traveling to remote locations or shutting down production equipment. There is also a high number of human error incidents when maintaining, planning and rolling-out energy infrastructure.

This project is innovative as it aims to introduce existing technology into a new market in what is called 'Market Development' in 'Ansoff's Matrix'. There is no immersive training program in the UK applying XR Technology on the energy grid. There is risk associated to finding the right fit between the training needs and what XR can offer. There is also risk in relation to adoption of new technologies and processes.

Previous projects related to XR have been focusing on the use of Building Information Modelling (BIM). X-FACTOR plans to leverage those results and digital models to focus on training to harness human cognitive processes. We will explore the opportunities of remote training, including gamification features, reducing incidents from working in hazardous environments and complexity in managing roll-out of new energy infrastructure. Without this project, we would be looking at off the shelf solutions with limited ability to customise or integrate our own data sources or assets.

In terms of economic value, without XR training across the business, DNOs risk losing know-how. If members of staff are not trained there is an inherent impact on how long it takes to maintain and deploy new infrastructure which translates into system downtime, energy loss, disruptions in the service (with associated penalties), etc. The project will allow to maximise resource usage by recording training sessions. Overall, we are addressing a core operational function which has potential to reduce cost. In terms of sustainability value, we foresee reduction of direct emissions from mobilisation of personnel but most importantly give the tools to engineers and technicians for a more effective integration of renewable energy generation into the network.

Method(s)

A desktop feasibility study to investigate the feasibility of implementing XR Training with GB's network field workers as well as validating the economic benefits.

Scope

Work Package 1: Project Management

- Check project progress regularly
- Make sure project advances as planned, and create action plans if schedule is not followed
- Stakeholder mapping and engagement (internal and external)
- Risk assessment
- Change Management approach
- Comply with NIA Governance

Lead: SPEN

Deliverable: Completed project and inputs for next phase

Work Package 2: Explore

- Objective: Researching, identifying, and articulating common understanding and framing of users, pain points and processes as well as challenges and opportunities.
- Client roundtables: In-person sessions with key stakeholders across the key SPEN business units
- Understand the current state of the problem space
- Gap analysis: Looking at what is available today and what the gaps are

Lead: Digital Catapult

Deliverable: Framing of problem statements

Work Package 3: Identification of Business Use Cases

- Business cases assessment
- Identify where the project would have the most positive impact
- Identify where the project would be adopted faster
- Prioritise business cases and engage with stakeholders

Lead: SPEN

Deliverable: Selected use cases for Initial Program Scope

Work Package 4: Ideate & Define

- Objective: Develop the vision and roadmap of the most promising XR concept, suitable to make impact within the identified users.
- Industry Consultation: Interviews with innovators, especially ones that have existing training platforms
- Techstorm & prioritisation workshop: List of potential concepts that use digital technologies to tackle identified problems. Determine which concepts are more feasible, viable and can generate the greatest impact.
- Project vision and roadmap for the development of the alpha phase: provide a neutral view of what the technology future might look like and the necessary steps to get there.

Lead: Digital Catapult

Deliverable: Final XR concept vision and roadmap

Work Package 5: Next Phase Scoping

- Delivery outputs from each work package to SIF
- Utilise each work package's finding to progress with Next Phase Application
- Review stakeholders and partners for Next Phase

Lead: SPEN

Deliverable: Closedown Report and inputs for next phase

Objective(s)

Identify the business cases in which a XR approach would be best utilised for training new starts in operational activities, and compile findings in closedown report, to input information for next phase.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

N/A

Success Criteria

Business cases identified and inputs for next phase collected

Project Partners and External Funding

Digital Catapult are a tech-agnostic and neutral organisation with the interest to increase adoption of advanced digital technologies in the UK market, help the ecosystem of innovators enter new markets and act as a magnifier of the results with the wider energy sector. The most important skills leveraged in this project are immersive technology, innovation, and design, which Digital Catapult excels at. Also, they've got an Immersive Lab with the latest VR equipment including haptic technology.

Potential for New Learning

This project will provide learning on the feasibility, business cases and requirements on XR Training for distribution networks in the UK

Scale of Project

X-FacTOR facilitates a small-scale feasibility study, which will inform both a small-scale and a large-scale demonstration.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

N/A

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£150,000

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:

X-FacTOR has the potential to facilitate the energy system transition through digitalisation of the training content via extended reality, which will be implemented once the feasibility study is completed successfully.

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

n/a

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)

N/A

Please provide a calculation of the expected benefits the Solution

This is a research-based project. Benefits will be quantified throughout the project

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

The project will study and identify the best business cases to roll-out Electric Network specific XR Training and will propose how it can be released across GB

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

This is a research-based project. Roll out costs will be quantified throughout the project

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 trialed 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

The learning generated can be utilised by relevant Network Licensees by funding and implementing XR into their own operational onboarding processes, since all research is being made in line with UK requirements.

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.

A key barrier to our Net zero goal is the workforce to deliver this. According to Smart Energy International, more than half (52%) of the UK electricity sector's workforce over the age of 45, and the 2021 National Grid Net Zero Energy Workforce Report states that between now and 2050 the UK energy sector will require an estimated 400,000 people to fill new and existing roles. X-FACTOR will upskill and train the future workforce to deliver the Net Zero network of tomorrow.

Previous market research shows that X-FacTOR will be the first of its kind in GB, and with this project, utility sector experienced staff will be able to maximise knowledge transfer through the design, implementation, and maintenance phases of projects on the network

This first phase, the feasibility study, will identify use cases and evaluate how flexible, immersive learning might add most value in accelerating and sustaining how UK Smart grid infrastructure will be used.

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

It is the first project to focus on specific training for electric network field workers in the UK

Relevant Foreground IPR

N/A

Data Access Details

Access to this data must be requested by contacting SPInnovation@spenergynetworks.com Please provide the following information in your request:

- Affiliation, position and contact details of requesting party
- Relevant project and type of data required
- Reasons for requesting this data and evidence that this data will be used in the interest of the UK network electricity customers
- How data will be shared internally and externally by the requesting party

Any data request deemed unsuitable for sharing will be highlighted to the appropriate requesting party. After receiving the request we will provide the estimated date for completing the data provision based on other requests and our team workload at that time. All requested data remains the property of SP Energy Networks.

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

There is no allowance within the SP Distribution RII0-2 business as usual funding that is appropriate to fund this innovation project.

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

The project has both technical and commercial risks, such as the availability of data from key stakeholders, and the non-existence of appropriate business models to address the specific needs in this project. Due to the early TRL, the success of the project and associated financial benefits of the project cannot be determined at this stage therefore it can only be undertaken with the support of NIA. This NIA is in place to meet all user requirements of the scope and to de-risk the delivery.

This project has been approved by a senior member of staff

Yes