SIF Alpha Round 2 Project Registration

Date of Submission

Project Reference Number

10061356

Initial Project Details

Project Title

Trinity

Project Contact

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Challenge Area

Improving energy system resilience and robustness

Strategy Theme

Optimised assets and practices

Lead Sector

Electricity Distribution

Project Start Date

01/10/2023

Project Duration (Months)

6

Lead Funding Licensee

UKPN - Eastern Power Networks Plc

Funding Mechanism

SIF Alpha - Round 2

Collaborating Networks

Scottish and Southern Electricity Networks Distribution

Technology Areas

Control Systems

Modelling

Network Automation

Resilience

Project Summary

Trinity aims to address the increasing complexity faced by control room staff due to the Net Zero transition, benefiting both electricity network operators and their customers. Such complexity poses risks of prolonged disruption, suboptimal capital allocation, and network inefficiency that can impact customer satisfaction and the overall energy system.

Delivering control room simulator facilities enhances network operators' abilities to handle conflicts, manage uncertain demand and generation, maintain system resilience, develop new capabilities, and test regulatory policies and innovative solutions outside of nationally critical and stringently controlled production systems. Ultimately, Trinity improves the service for customers increasingly reliant on electricity networks.

Add Preceding Project(s)

10061355 - Trinity

NIA_SSEN_0053 - Future Control Room

Add Third Party Collaborator(s)

General Electric

PNDC

Digital Catapult

Project Budget

£557,751.00

SIF Funding

£499,545.00

Project Approaches and Desired Outcomes

Problem statement

Flexibility, digitalisation, and innovation drive efficiencies and are key enablers for Net Zero but result in more complex electricity networks with more assets and market participants. Managing and operating distribution networks is becoming more demanding, with new control points, failure modes, and system interactions.

Control room capabilities need to evolve by deploying, testing and optimising new operations, control solutions and systems. This must be delivered whilst maintaining safe and reliable operations, dealing with increasingly uncertain levels of demand and generation, and developing state of the art Distribution System Operator (DSO) capabilities. Control rooms are not set-up to rapidly evolve whilst maintaining current levels of performance.

Trinity is seeking to address a fundamental reason control room capabilities are slow to advance: the lack of a comprehensive and integrated network simulator for the distribution sector. Stringent controls are in place to avoid issues with the DNO's live power management system, the Advanced Distribution Management System (ADMS), making any alterations to the system a long, risky and drawn-out process. A simulator provides an 'offline' system to test new technology or configurations on without the risk of affecting critical national infrastructure.

Engaging potential users of the innovation was a key Discovery Phase outcome. Engagement with control room, control system and automation engineers at UK Power Networks (UKPN) allowed us to gain deeper insights into the challenges faced by control rooms in the context of the energy transition: the reliance on key personnel, manual processes, significant limitations of current simulator solutions, and implications of the energy transition on network complexity. The engagement with other DNOs served to validate the use cases and the corresponding simulator design developed during the Discovery Phase and informed the scope of the Alpha Phase work to be undertaken by the new partners, Scottish & Southern Energy Networks (SSEN) and Digital Catapult.

Throughout the Discovery Phase the specific use case requirements have been articulated, refined, and prioritised. The advantages and disadvantages of different system architecture pathways and integration options were established. Our understanding of any barriers to adoption advanced significantly, including the technical entry criteria necessary for any simulator implementation. Learnings from Discovery Phase directly informed the Alpha Phase scope and objectives. We will continuously refine our understanding of the problem, the use cases a simulator unlocks, and the value of this innovation to the broader GB energy system by delving deeper into the user requirements and benefits in an iterative and agile manner throughout the project.

Trinity directly addresses the aim of the Challenge 3: "Improving energy system resilience and robustness". DNO control rooms must evolve in the people, process and technology domain to enhance energy system robustness. Sophisticated network simulations are foundational in allowing this evolution.

The fully integrated simulator will provide reliable and accurate information on the impact of different future energy scenarios, planned and unplanned events, and associated network configurations on operations, assets, and customers. The ability to simulate scenarios allows the efficient roll-out of new infrastructure whilst reducing customer disruption and improving power outage planning and response.

Trinity aims to address the increasing complexity faced by control room staff due to the Net Zero transition, benefiting both electricity network operators and their customers. Such complexity poses risks of prolonged disruption, suboptimal capital allocation, and network inefficiency that can impact customer satisfaction and the overall energy system. Trinity directly mitigates the risk that the increasing demand on the DNO control room causes a bottleneck in achieving Net Zero targets, by optimising the control engineer's interactions and decisions associated with new network conditions in a safe environment.

Innovation justification

The project will lay the groundwork for a digital twin of the electricity distribution network: a fully integrated network simulator which moves the control room away from reactive towards proactive planning and incident response, becoming an indispensable tool to design and test the network of the future. It is the first time that such a simulator is deployed and tested at the scale and complexity needed to prove its usability, accuracy and value.

Trinity will enhance operators' abilities to handle conflicts, manage uncertain demand and generation, maintain system resilience, develop DSO capabilities, and test regulatory policies and innovative solutions. This will improve service and reliability for customers reliant on the electricity networks.

Trinity applies against the Challenge Theme 2: "Strengthening UK's energy system robustness to support efficient roll out of new infrastructure". At the end of Alpha, Trinity will have deployed a working simulator that provides trusted information on the electricity network's response to

changes driven by the energy transition. Accurately predicting this response is critical for de-risking deployment of new solutions such as LCT uptake and flexibility offerings.

The NIA-funded Future Control Room (FCR) (https://ssen-innovation.co.uk/nia-projects/nia-ssen-0053-future-control-room/) project led by SSEN with UKPN and PNDC as partners served as a strong foundation on which to launch Trinity. The simulator applications developed in this project fed into the Trinity use case definition. The assessment of different architectures in Discovery (see appendix) was informed by the desk-based output of FCR, a conceptual simulator design and architecture. The key reasons for selecting one architecture for Alpha phase deployment were around user experience, configuration effort, ease of integration, and model scalability.

End users' direct involvement in Discovery phase helped to shape an Alpha Phase that focuses on demonstrating the real-life value of the simulator by "putting it in front of users". SSEN has been selected as a partner for Alpha Phase, since Discovery Phase engagement with DNOs and a TNO indicated that SSEN can provide a complimentary perspective, both in terms of user requirements and route to market.

The approach of validating the simulator in Alpha Phase has also been informed by the NIC "Constellation" project (https://innovation.ukpowernetworks.co.uk/projects/constellation/), which, amongst others, includes the partners UKPN, PNDC and GE. Learnings from the testing environment developed in Constellation have informed how the validation process will be implemented within the Alpha Phase of Trinity, meaning this activity is both accelerated and de-risked.

Exploring integration options with the wider energy ecosystem form another key part of Trinity and are important stepping-stones in making the simulator a pivotal resource for the GB energy sector. The SIF Round 1 Discovery project "En-TWIN-e" (https://smarter.energynetworks.org/projects/10025651/) informed the scope of the work package which is exploring integration options of the simulator with the wider energy system. Trinity will build on the innovation generated by En-TWIN-e, where a distribution-level network simulator was identified as a pivotal component of a digital twin spanning transmission and distribution. Led by Digital Catapult (also En-TWIN-e partner), this work package and associated engagement with the ESO and DSOs is expected to provide impulses that maximise Trinity's impact beyond the DNO level.

The approach of having limited partners with clear accountability and commitment to the objectives of Trinity will be maintained in Alpha Phase. Given the project's technical nature, an ambitious but focused scale is required to maximise chances of BAU implementation at end of Beta. With costs for Trinity estimated to be £13.6m capex and £680k annual opex, it is unlikely that any single DNO would make the level of investment necessary to address the scale and complexity of the problem alone

Impact and benefits (not scored)

Financial - future reductions in the cost of operating the network

Impacts and benefits description

The benefits category for which an initial CBA has been performed, and which will be extended in Alpha Phase is "Financial - future reductions in the cost of operating the network".

The future reductions in this benefits category from Trinity fall into three expenditure categories noted below. The estimated net present value (NPV) of Trinity's impact on these categories is ~£138m for UKPN alone over 2023-2050, with a corresponding annual NPV of ~£4.9m.

The estimated benefits are based on UKPN's average expected expenditure on the three categories based on numbers published in its RIIO-ED2 business plan. These are scaled to 2050 using UKPN's DFES load projections at primary substations as Trinity is expected to deliver annual long-term benefits beyond the project. A higher bound of £13.6m project capex is used to calculate overall NPV, demonstrating Trinity's net positive impact, even when higher implementation costs are factored in.

Forecast over 2023 - 2050 of the benefits by expenditure category:

1. Load-related reinforcement (LRR) - predicted saving £133.24m

The baseline expenditure on LRR is estimated to be £3,651m. To capture the benefits associated with increased use of flexibility and therefore reduced LRR, it is assumed that once Trinity is fully developed the number of substations with active flexibility in each modelled year will increase by 5% compared to the annual number in the absence of Trinity. It is also assumed that the amount of flexibility used per substation increases by 2% in the last year of the project and 10% for each year thereafter (not cumulative). Each £1 of flexibility expenditure is assumed to result in ~£14 of LRR deferral, with a 9-year deferral period. This deferral ratio was calculated based on available RIIO-ED2 data across all DNOs by comparing their planned expenditure on flexibility with the corresponding LRR deferral.

2. Flexibility over-procurement - predicted saving £7.1m

The baseline expenditure on flexibility services is estimated to be £195m. 30% of flexibility procured by DNOs is assumed to be over-procured to account for potential disruptions in the provision of flexibility services. Trinity is forecast to reduce the amount of flexibility that is over-procured by 10%.

3. Control room expenditure - predicted saving £19.4m

The baseline control room expenditure is estimated to be £1,761m. The cost reduction of operating the control room is captured through an avoided cost of increased FTE due to efficiencies driven by Trinity, with FTEs avoided by five in 2025/26 and by six thereafter compared to the number of FTEs required without Trinity.

Benefits categories which will be further explored in Alpha Phase:

· Financial - future reductions in the cost of operating the network: Enable DNOs to run their assets closer to their operating margins, thereby reducing/deferring network capital investment costs.

· Financial - cost savings p.a. for users of network services: Optimised control of DERs resulting in maximised financial benefits for customers owning and operating these assets and released network capacity to enable more customer connections without triggering network reinforcement.

· Environmental - carbon reduction -- indirect CO_2 savings p.a.: Accelerate the uptake of LCTs across the distribution system through enabling products and assets to connect with an increasingly dynamic system resulting in indirect carbon reductions.

· New to market: Remove barriers for control room platform integration to increase the uptake and implementation of existing and future innovation solutions/projects; this will result in increased third-party whole system integration (gas, transport, etc.).

· Others (not SIF specific): Enable networks to operate more efficiently through better management of complexity (technical and commercial) and conflicting priorities. This will improve reliability, security of supply, and further reduce CIs/CMLs leading to improved customer satisfaction.

Teams and resources

Trinity's Alpha Phase will be delivered by a consortium consisting of the same core project partners who successfully delivered the Discovery Phase: UKPN, GE, and PNDC, and will be augmented by new partners SSEN and Digital Catapult.

UKPN - DNO serving 8.5m homes and businesses across three distribution network areas and an end user of the integrated simulator. Will provide expertise, users, environments and data for development, integration, and testing. The Control Systems Automation (CSA) team, with their expert technical knowledge in the maintenance and operation of the control system used for managing the distribution network from an architecture, SCADA, and automation perspective is vital for the success of Trinity. Embedding the project team alongside control room, and CSA staff will ensure any solution meets user needs and can be practically implemented and scaled.

UKPN will provide hardware to deploy a test instance of the UKPN SPN ADMS as well as hardware for the simulator software itself. These will be hosted by the CSA team at the Ipswich Fore Hamlet Control Room facility.

GE - Developer of ADMS (PowerOn), a fully integrated, advanced network management solution that completely automates real-time management, monitoring, and control of electrical distribution networks. GE has experience of developing, testing, and deploying ADMS systems for over 30 years. GE will provide the simulator software itself as well as technical resources skilled in deploying and testing ADMS software. Trinity will build upon GE-funded proof-of-concepts delivered during Discovery and utilising UKPN's expertise, test environment and data.

PNDC - Energy systems research, test and demonstration environment that concentrates on three primary research areas to enable the delivery of whole energy system solutions. The technical lead of the Advance Power and Control research team and Future Control Room focus area leads the PNDC project team and will be responsible for the implementation of the Alpha phase and beyond. He is supported by a team of researchers with expertise in the future control room for the DSO; utility power system technology development and integration; and real time simulation and power hardware in the loop testing for utility power system research. The team will have oversight and support from Research and Development Director, who was instrumental in the setup, launch and growth of PNDC and brings over 15 years' experience of electrical power systems.

As part of the project, PNDC will deploy both the GE Simulator and PNDC validation simulator within the PNDC LV lab. The validation simulator will utilise real time and offline power system simulation presently deployed and operational within the PNDC facility.

SSEN - DNO serving over 3.8m customers across two distribution areas. Having led the NIA-funded Future Control Room project, SSEN are ideally positioned to provide further expertise from a user's perspective, especially given the unique geographic area they are serving and the resulting network configurations. User insights will be complementary to UKPN's requirements and take Trinity a step closer towards becoming a GB-wide innovation. Leveraging this pre-existing relationship will allow the project partners to build upon existing knowledge and context and deliver high-quality outputs within the condensed timeframes of Alpha Phase.

Digital Catapult - the UK's leading advanced digital technology R&D centre, will lead the work package that is exploring the integration of the simulator with the wider energy ecosystem. Using their experience as a facilitator between academia, industry, and technology providers for the En-TWIN-e project means they are uniquely positioned to advance Trinity in this important area.

Project Plans and Milestones

Project management and delivery

Five Work Packages (WPs) are proposed for the Alpha Phase with clear ownership and accountabilities set out in the accompanying Gantt chart and project management template:

· WP1: Simulator and use case deployment, and user acceptance (GE): Deployment of core simulator and subsequent three phase roll-out of targeted use cases in tandem with user requirement acceptance testing of use cases. An Agile iterative approach will be adopted to enable outcomes from initial testing to be fed into subsequent deployment phases; allowing adaption to fit time and budget constraints. Further refinement of training and testing use cases to inform future project direction.

· WP2: Simulator validation (PNDC): Testing of the higher risk elements of the simulator design and validation the capability of the simulator against the use cases identified in Discovery Phase. This testing and validation will be feeds back to WP1 for early problem resolution during the development process.

· WP3: Customer and market analysis for ANM integration (Digital Catapult): Commercial analysis of Active Network Management (ANM) solutions to inform future direction of simulator integration with ANM providers, followed by establishing user needs through a workshop with DSOs/ESO and DNO/TNOs.

· WP4: Cost-benefit analysis refresh (UKPN): Refreshing the CBA and refinement of assumptions for the Beta Phase.

· WP5: Project management (UKPN): Managing end-to-end delivery.

UKPN will run project management using standard best practice methods and tools: a RAID log, and a stakeholder governance schedule aligned with project timelines as detailed in the accompanying project management plan. Project management methods that proved to be effective in Discovery Phase, such as daily stand-ups, fortnightly management meetings, and status reporting will continue in Alpha phase. Digital tools facilitating remote collaboration will be utilised.

All WPs have clear ownership and accountabilities, with assigned activities, and deliverables. Project management will be led by UKPN, but all partners will partake and feed into the process to enable effective project tracking against progress.

Interdependencies between work packages are:

· WP2: Successful simulator deployment in WP1 is necessary to ensure the GE simulators at UKPN and PNDC are identical and validation activities are applicable to the simulator used in WP1.

· WP4: Input from user requirements validation (WP1) is needed to update CBA. Insights from research and customer engagement around ANM integration (WP3) is required to provide an initial view of benefits provided by integration.

· WP1: It should be noted that there exist significant inter-WPs dependencies between the deployment and user testing activities in WP1. The successful deployment and the timely resolution of any critical issues is a pre-requisite for user acceptance testing to take place.

Risks and mitigation strategies are set out in the risk register. Key risks in the Alpha Phase are:

· Significant issues/defects detected in GE simulator functions, therefore affecting validation and testing, i.e. not all targeted use cases are completed. Agile deployment in three phases mitigates this risk.

· Reliance on key personnel with specialist knowledge (GE simulator development team and UKPN CSA team) and challenges in resourcing associated with parallel deployment of simulator at PNDC and UKPN.

· Data exchange: risk to security, processing requirements and misinterpretation.

· Data management: risk associated with obtaining high fidelity network data in all instances, and keeping it synchronised with updates to the network.

Two checkpoints will serve to mitigate risks associated with the dependencies within and between workstreams:

· End of month two: Ensuring the GE simulator with fundamental capabilities is successfully deployed at UKPN and PNDC, ready for user acceptance testing (WP1) and validation (WP2) to commence.

· End of month three: Ensuring use cases are deployed and user acceptance testing can continue into comprehensive use cases.

Key outputs and dissemination

We have set clear, achievable, and measurable objectives for each work package with the lead specified in brackets:

WP1: Simulator and use case deployment, and user acceptance (GE) - A fully deployed simulator on UKPN's SPN network working on 11kV and 33 kV. Compute resources will have been provisioned and GE will setup the core simulator for the SPN network. Twelve use cases will be deployed in three phases, with an initial deployment of four foundational use cases. Following each deployment phase, the deployment will be validated, and user acceptance testing will be performed. This includes an assessment of the benefits associated with each use case feeding into CBA of WP4. New user requirements, specifically for training and low-risk high-impact scenarios will have been provided by SSEN and user requirements document updated accordingly.

Key outputs will be:

· Simulator environment specification document

· Extended requirements document

· Deployment report

· Recorded demo videos

· User acceptance report

· Summarised findings, including selected demo videos and articulation of customer benefits, will be published on UKPN website

WP2: Simulator validation (PNDC) - By the end of the Alpha Phase, PNDC will have tested the higher risk elements of the simulator design and validated the capability of the simulator against the use cases identified by UKPN in Discovery Phase Deliverable 1. This testing and validation will be fed back to GE and UKPN for early problem resolution during the development process, and eventual sign off and adoption at the end of the development cycle. Key outputs will be:

· Document outlining priority use cases for validation

· Aggregated feedback report

· Aggregated feedback presentation

· A case study for disseminating project findings will be published on the PNDC website. A presentation of project findings to industry stakeholders at the PNDC innovation forum to share learnings and inform Beta phase scope will be held.

WP3: Customer and market analysis for ANM integration (Digital Catapult) - A commercial analysis informing the integration options of the simulator with ANM solutions. Key stakeholders across the energy landscape (ESO, DSO) will provide perspective on current challenges and opportunities for integration. The ANM technology landscape and vendor assessment provides an indication of simulator integration feasibility and options. High-level benefits of integration will be captured and fed into CBA (WP5). Key outputs will be:

· User engagement workshop

· Workshop summary report

· Commercial analysis report and supplemented presentation

WP4: Cost-benefit analysis refresh (UKPN) - A full CBA that reassesses the quantified benefits described in Q5, calculates the unquantified benefits also described in Q5, and combines these with the use case benefits from WP1 and commercial analysis from WP3.

In addition to any work package specific dissemination described, all Alpha Phase projects will be uploaded to the Smarter Networks Portal and feature on the UKPN innovation website with specific project learnings being disseminated at the IUK Show & Tell events. In addition, UKPN will host an in-person event in London to disseminate the learnings and key outputs of all our successfully awarded Alpha Phase projects to a wider audience. UKPN will look to share project successes and discoveries via its social media channels with the possibility of publishing external press media where appropriate.

WP5: Project management (UKPN) - Successfully managed project in line with SIF and UKPN expectations and requirements.

SIF-related artefacts

· In-project Alpha phase progress report

· Show & Tell Webinar

· Updated project management template

Commercials

Intellectual property rights, procurement and contracting (not scored)

The parties agree to adopt the default IPR arrangements for this project as set out in Section 9 of the SIF Governance Framework.

The partners recognise that knowledge transfer is one of the key aims of the SIF, and that the benefits of this project will be maximised by the ability of other licensees to be able to learn from the Project so as to create improved outcomes or reduce costs for consumers. The partners do not anticipate that the Alpha Phase will result in the creation of IPR that cannot be freely disseminated and have no expectation of creating income streams or royalties from IPR outside of participation in a competitive marketplace for services that may be informed or stimulated via the outcomes of the project.

The GE simulator will form GE background IPR for Alpha Phase and will be offered as a commercial product to future licensees under terms to be agreed. The Foreground IPR generated through the Alpha Phase will relate to findings from the use case testing and evolution of the use case requirements specified in the Discovery Phase and how the background IPR is utilised and deployed to meet the use cases. This will be shared through the Project reporting. If Trinity proceeds successfully to Beta Phase, GE expect to create IPR, including enhancements of the

simulator functionality based on user feedback and support for additional use cases, that will be part of a commercial product and will be made commercially available as such.

All Trinity project work will be delivered by the project partners; no subcontracting arrangements, tenders or procurement activities are anticipated to take part during Alpha Phase.

Commercialisation, route to market and business as usual

A primary goal of Trinity is to accelerate the adoption of a distribution network simulator across GB. After a detailed option analysis during Discovery Phase, it was decided that the core simulator functionality deployed at UKPN will be based on GE's network simulator. The maturity of the existing proof-of-concept offers a fast and less risky route to market. Furthermore, the integration with ADMS and abstraction of low-level components offered a superior user experience and a more robust adoption journey. This network simulator module is based on the GE ADMS, which is used by 13 of the 14 DNO regions in GB, including UKPN and SSEN. The global market size is approximately 40 utilities using this module.

The route to market for the simulator was validated as part of Discovery Phase Deliverable 4. It was determined that the primary route to market for the network simulator will be as an additional licensable component of the ADMS solution. Where feasible, a use case oriented modular licence structure will be considered, with possible components including Power Model Simulator; Outage Simulation; Meters Simulation. This modular licence structure would allow networks to select and pay for simulator components that are relevant for their specific needs and network configurations. It is anticipated that additional use cases may be developed as part of the Beta Phase, as well as possible enhancements based on feedback from user acceptance testing in Alpha Phase. These would form part of the commercialisation activities ahead of full roll-out.

Options may also be included for customers who wish to run multiple simulation environments, and a possible future commercial opportunity is seen for GE to manage or even host (via cloud) training environments on behalf of customers. Extended simulation offerings for the Transmission market (ESO) are also being considered.

Detailed commercialisation and pricing activities will take place closer to the planned commercial release of GE's simulator module. It is anticipated that this will leverage GE's existing marketing channels to accelerate route-to-market, targeting both existing ADMS users and potential new market opportunities. The stated aim of Alpha Phase is to deploy the simulator in one of UKPN's distribution regions, SPN. The validation and acceptance testing during Alpha Phase are aimed at accelerating and preparing UKPN for the BAU roll-out across the whole network by the end of Beta Phase. The learnings of the deployment of the simulator and the outcomes of the user acceptance testing will directly inform other networks of the most effective way of rolling out the innovation across their network. This includes detailed data pre-requisites and compute environment specifications, along with minimum entry requirements. Furthermore, it will provide guidance on how the simulator can be best leveraged and integrated into BAU processes and what limitations there might exist.

Trinity is supported at a senior level:

· UKPN: Ian Cameron, Director of Innovation & Customer Services and Steve White, Head of Network Operations and Control

· GE: Gordon Paton, Global Product Manager for ADMS

· PNDC: Federico Coffele, Research and Development Director

Policy, standards and regulations (not scored)

The project will be delivered in line with current regulations. We do not anticipate any regulatory barriers that will hinder delivery of the Alpha or Beta Phases at this stage. Therefore, no derogation or exemption is anticipated. Neither do we foresee any barriers for embedding our expected project outcomes into business as usual.

If successful, the simulation environments could be used to test future consultation, policy, and regulation on DNO or DSO related subjects. For example, it is directly applicable to the impact of rota load disconnection events on the distribution networks and could support future changes to the way that grid connection requests are being managed. As the project progresses, engagement with stakeholders responsible for policy and regulation decisions will be necessary to understand their needs and assess the extent to which those needs could be accommodated.

Value for money

Total project costs: £557,751

Total SIF funding requested: £499,545

UKPN

· Total costs: £171,880

· Contribution: 10% (£17,188, contribution via labour in kind)

· SIF funding requested: £154,692 (31% of total requested for Alpha Phase)

GE

· Total costs: £230,740

· Contribution: 11% (£25,500, contribution via labour in kind)

· SIF funding requested: £205,240 (41% of total requested for Alpha Phase)

PNDC

· Total costs: £107,213

· Contribution: 10% (£10,721, contribution via labour in kind)

· SIF funding requested: £96,492 (19% of total requested for Alpha Phase)

SSEN

· Total costs: £11,912

· Contribution: 10% (£1,191, contribution via labour in kind)

· SIF funding requested: £10,721 (2% of total requested for Alpha Phase)

Digital Catapult

· Total costs: £36,006

· Contribution: 10% (£3,606, contribution via labour in kind)

· SIF funding requested: £32,400 (7% of total requested for Alpha Phase)

The estimated net present benefit on UK Power Networks' network operations alone is estimated at ~£138m over 2023-2050, corresponding to an annual net present benefit of ~£4.9m. When delivered, this project will underpin a transformation of distribution network control enabling hundreds of millions of pounds of benefits that, even with project costs exceeding the high estimates provided, represents a significant return. Benefits will be returned to customers via the network operators, seen directly by other parts of the energy supply chain such as DER/LCT owners and billpayers, as well as indirect environmental benefits.

UKPN's in-kind contribution is providing resources with deep expertise in the area of control systems and automation, who are key, in-demand resources in network operations.

GE will finance its contribution to the project implementation effort using internal funding. Furthermore, it will provide licenses to the proof-of-concept version of the GE simulator to both UKPN (SPN) and PNDC development environments for the duration of the Alpha Phase, for the purposes of testing and evaluation under this project. This has an estimated value of £22,000 per PoC instance, thus providing a further £44,000 of equivalent value to the project. GE also proposes that the simulator interfaces with UKPN and PNDC's existing licensed GE ADMS, thus utilising these pre-existing assets and avoiding the cost and effort of creating additional instances.

GE is providing specialist engineering support as its contribution to the project and draws on engineering expertise with a range of in-demand skills, experience and specialisations. Engineers working on Trinity possess an unparalleled level of proficiency and experience in grid management solutions. Their expertise allows them to develop innovative solutions, optimise performance, and mitigate risks more effectively, ultimately resulting in a more efficient use of project funding. GE will allocate appropriate resources skills are used at all stages, utilising highly experienced engineers only where necessary, thus ensuring best value for money for the overall project.

PNDC, as part of the University of Strathclyde, as well as providing 10% contributions to the project is also providing a 25% discount from their commercial rates towards project outcomes. This is to both to demonstrate value for money to the customers, and to demonstrate our commitment to project objectives.

Digital Catapult's financial contribution will be leveraged from core funding as part of project expense. Costs for this project are proportionate with the level of expertise and time commitment to the project. As a not-for-profit organisation, Digital Catapult is wholly focussed on the acceleration of the adoption of digital technology. We will utilise pre-existing facilities in this project including our immersive labs. Built to encourage and support the UK's growing immersive community in developing commercially viable immersive content and applications.

There are no subcontractor costs for the Alpha Phase as the Project Partners have the necessary expertise and experience to deliver the Alpha Phase without incurring additional costs.

Associated Innovation Projects

- ○ Yes (Please remember to upload all required documentation)
- ◉ No

Supporting documents

File Upload

SIF Round 2 Alpha - Trinity - Show & Tell 2024-04-22 - final.pdf - 1.6 MB
SIF Round 2 Alpha - Trinity - End of Phase Meeting 2024-03-22.pdf - 3.9 MB
Trinity - SIF Round 2 Alpha - Mid-Point Meeting 2024-01-29.pdf - 899.6 KB
SIF Alpha Round 2 Project Registration 2024-01-23 1_23 - 79.2 KB

Documents uploaded where applicable?

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