SP Energy Networks

# SIF Beta Round 2 Project Registration

## Date of Submission

Jan 2026

## Project Reference Number

10117774

# Initial Project Details

## Project Title

D-SUITE

## Project Contact

Andrew Moon

## Challenge Area

Improving energy system resilience and robustness

## Strategy Theme

Optimised assets and practices

## Lead Sector

Electricity Distribution

## Project Start Date

01/09/2024

## Project Duration (Months)

60

## Lead Funding Licensee

SP Energy Networks

## Funding Mechanism

SIF Beta - Round 2

## Collaborating Networks

UK Power Networks

## Technology Areas

Active Network Management

Comms and IT

LV & 11kV Networks

Condition Monitoring

Control Systems

Cyber Security

Modelling

Demand Response

Network Automation

Network Monitoring

## Project Summary

The D-Suite beta phase meets three of Ofgem’s SIF Round Two Innovation Challenges: Preparing for a net zero power system; Improving energy system resilience and robustness; and Accelerating decarbonisation of major energy demands. It will be achieved by developing partially rated power-electronic devices (D-STATCOM, D-SOP, D-ST) integrated with a production-grade LV Design Tool and Network Level Control System (NLCS) that together aims to address the growing challenges in low voltage (LV) electricity distribution networks caused by the rapid uptake of decarbonisation technologies such as EVs, heat pumps and distributed generation.

LV networks are increasingly experiencing voltage excursions, high transformer utilisation and severe phase imbalances. Traditional reinforcement approaches are often costly and disruptive. D-Suite seeks to develop and trial partially rated LV PEDs that offer a flexible, cost-effective alternative to conventional reinforcement.

The project is developing three core PED technologies as follows:

- Distribution Smart Transformer (D-ST) which is based on Unified Power Flow Controller (UPFC) architecture. The target Core Services of this device includes Voltage control per phase at the outgoing terminal, imbalanced load cancellation to reduce phase current imbalance seen upstream and controlled power flow to share capacity between neighbouring substations.
- Distribution STATCOM (D-STATCOM) which is a shunt-connected device for reactive power compensation and phase voltage balancing. The expected Core Services include voltage control per phase at the point of connection, power factor correction by regulating reactive power to reduce upstream flows/losses, imbalanced load cancellation to improve asset utilisation and phase voltage profiles.
- Distribution Soft Open Point (D-SOP) which is a back-to-back AC/DC/AC converter for dynamic feeder interconnection and bidirectional power flow control. The expected Core Services include controlled active/reactive power flow between two LV networks via back-to-back conversion, voltage control per phase through reactive power injection/absorption, imbalanced load cancellation ensuring no imbalance is transferred between the two interconnected substations.

These devices are supported by an operational LV Design Tool, developed by Newcastle University, which enables optimal siting and sizing of PEDs based on network constraints, technical benefits and cost effectiveness.

## Add Preceding Project(s)

10086622 - D-Suite

10060423 - D-Suite

## Add Third Party Collaborator(s)

Newcastle University

Integrated Power Tech (IPT)

## Project Budget

£8,963,046.00

## SIF Funding

£8,065,746.00

# Project Approaches and Desired Outcomes

## Solution statement and solution focus

The D-Suite project will use a series of technical methods to deliver a solution to the capacity and voltage management challenges posed by increasing LCT uptake.

1.Developing the PED Control Philosophy and Specifications

The first step involves defining the control logic and operational parameters for each PED type (D-STATCOM, D-SOP, D-ST). This includes reactive power control, phase balancing, voltage regulation and harmonic filtering. Specifications will be aligned with IEC and ENA standards and tailored to LV network conditions.

2. Designing the LV Network Modelling and Simulation Framework

A simulation environment will be developed to model LV feeders under varying LCT scenarios. This includes time-series analysis of voltage profiles, load diversity and phase imbalance. The framework will be used to assess PED impact and inform optimal deployment strategies.

3.Developing the LV Design Tool

The LV Design Tool will be built to support network planners in identifying suitable locations for PEDs. It will incorporate ADMD calculations, reinforcement deferral logic and visualisation of PED effectiveness. The tool will be web-based and integrate with existing planning systems such as NAVI.

4.Trialling PEDs in Live Network Environments

PEDs will be installed at selected trial sites and operated for a minimum of six months. Performance will be monitored using LV Hubs, smart meters and network sensors. Data will be collected on voltage stability, load balancing and LCT hosting capacity improvements.

5.Validating PED Performance and Tool Accuracy

The final method involves validating the PEDs and LV Design Tool against real-world data. This includes comparing predicted vs. actual network outcomes, assessing compliance with technical standards and gathering feedback from network engineers. Results will inform BaU rollout strategies.

6.Measurement Quality Statement

All PEDs will be monitored using calibrated sensors and LV Hubs compliant with BS EN 61010. Voltage, current and harmonic data will be collected at high resolution to ensure accurate performance assessment.

7.Data Quality Statement

Data sources include smart meter readings, LV Hub telemetry, network topology files and LCT uptake forecasts. Data will be validated through cross-referencing with SCADA systems and manual inspections. Quality assurance protocols will be applied throughout the trial period.

## Innovation justification

The D‑Suite project demonstrates novel and ambitious energy network innovation by introducing a fundamentally new approach to managing low‑voltage (LV) network constraints. Rather than relying on traditional reinforcement, which is costly and disruptive, D‑Suite deploys advanced Power Electronic Devices (PEDs), including D‑STATCOM, D‑SOP and D‑ST, combined with a production‑grade LV Design Tool and Network Level Control System (NLCS). This integrated solution actively controls voltage, phase imbalance and power flow in real time, enabling flexible, cost‑effective reinforcement deferral and accelerating the connection of low carbon technologies (LCTs) such as EVs and heat pumps.

The project builds directly upon the SIF Alpha Phase by addressing gaps identified during early prototyping and stakeholder engagement. In Alpha, the concept of PED deployment and optioneering was validated at a high level.

Beta advances this by:

- Developing and validating a five-step siting and sizing algorithm within the LV Design Tool, integrated with SPEN's NAVI platform for real-time data access.
- Progressing modular PED hardware design and laboratory prototyping to de-risk full-scale trials.
- Establishing a network-level control philosophy and I/O schedule to enable coordinated operation of multiple PEDs.
- Refreshing trial site selection and preparing detailed technical specifications for procurement.

These activities represent a step-change from Alpha, moving from conceptual modelling to production-grade tools and hardware ready for live trials.

The project is suitable for SIF funding rather than business-as-usual or other sources because it entails significant technical, operational and commercial risk. PEDs have not been deployed at scale on GB LV networks and their performance under real-world conditions, including fault scenarios and communication loss, remains unproven. Similarly, the LV Design Tool introduces new algorithms and integration requirements that require rigorous validation before adoption. These uncertainties make the project inappropriate for standard investment mechanisms, but ideal for SIF's innovation framework, which supports high-risk, high-reward demonstrations aligned with Ofgem's Net Zero objectives.

Progression into the Beta Phase is justified by the strong foundations laid in Alpha and the clear need for further development to achieve readiness for Business as Usual (BaU). Beta will deliver tangible outputs, validated PED hardware, a fully functional LV Design Tool and trial evidence, that enable DNOs to adopt these innovations confidently. The project aligns with three SIF Round Two challenges which are preparing for a net zero power system, improving system resilience and accelerating decarbonisation of major energy demands. Its scale, ambition and replicability across GB networks underscore its suitability for continued SIF support.

## Impacts and benefits selection (not scored)

Financial - future reductions in the cost of operating the network

Financial - cost savings per annum on energy bills for consumers

Financial - cost savings per annum for users of network services

Environmental - carbon reduction – direct $CO_2$ savings per annum

Environmental - carbon reduction – indirect $CO_2$ savings per annum

New to market – products

## Impacts and benefits description

A. Current Position (Pre-Innovation Baseline) and Metrics
LV networks are increasingly constrained due to the rapid uptake of low carbon technologies (LCTs) such as EVs, heat pumps and distributed generation. Traditional reinforcement is the default solution, involving costly upgrades to cables and transformers, typically £50,000–£100,000 per feeder. This approach is disruptive, slow to deliver and lacks flexibility.

Baseline metrics include:

1. Voltage compliance which is the number of feeders exceeding statutory voltage limit
2. Phase imbalance which is measured in amperes across phases
3. Transformer utilisation which is the percentage loading relative to nameplate rating
4. Customer interruptions (CI) and minutes lost (CML) which are reliability indicators
5. Reinforcement costs which is the average cost per LV feeder upgrade

B. Forecast of Cumulative Net Benefits to Energy Consumers (Network Partner Level)
If implemented into Business as Usual (BaU), D-Suite offers significant financial, environmental and societal benefits:

1. Financial benefits by avoided reinforcement costs estimated at £2m direct savings for SPEN, with whole-life Net Present Value (NPV) of £98.38m for SPEN and £795.4m GB-wide, best-case exceeding £5.8bn.
2. Environmental benefits which are reduced carbon emissions through accelerated LCT adoption and deferred reinforcement works (estimated £24m environmental benefit for SPEN).
3. Societal benefits which are improved reliability and reduced disruption, supporting vulnerable customers and enabling equitable access to decarbonisation technologies (estimated £40m societal benefit for SPEN). Metrics for benefits include avoided reinforcement expenditure, NPV calculations, reduction in CI/CML and increased hosting capacity for EVs and heat pumps.

C. Benefits Already Realised Through Project Delivery

During the Beta Phase, the project has delivered early benefits:

1. Technical validation of the LV Design Tool against SPEN PowerFactory models, ensuring accuracy and readiness for BaU integration.
2. Supply chain engagement and manufacturer shortlisting, reducing procurement risk and accelerating readiness for commercialisation.
3. Knowledge dissemination through CIRED, CIGRE and ENA forums, improving industry awareness and capability.
4. Risk mitigation via modular PED prototypes and simulation models, de-risking future trials and reducing programme uncertainty.

D. Other Impacts and Benefits Beyond Selected Categories

Over and above financial and technical benefits, DI-Suite delivers:

1. Social benefits which are enhanced reliability for vulnerable customers by reducing voltage excursions and phase imbalance, particularly in areas with high medical equipment reliance or poor insulation.
2. Environmental benefits which are Supports Net Zero by enabling faster, cost-effective LCT connections without reinforcement, reducing carbon footprint of network upgrades.
3. Energy system resilience as benefit, PEDs provide dynamic voltage and power flow control, improving LV network robustness under high demand and generation variability.
4. Knowledge creation benfit through Open-source LV Design Tool reference version and trial learnings will accelerate innovation adoption across GB networks.

## Teams and resources

The DI-Suite Beta Phase will be delivered through a collaborative team comprising SP Energy Networks (SPEN), UK Power Networks (UKPN), Newcastle University and Integrated Power Tech (IPT), supported by external manufacturing partners to be appointed in early 2026.

- SP Energy Networks (Lead Licensee)

Responsible for overall project governance, delivery and commercialisation strategy. SPEN leads technical activities including procurement, trial site installations, safety compliance and integration of the LV Design Tool into NAVI for BaU adoption.

- Newcastle University (Academic Partner)

Leads development of the LV Design Tool, including algorithms, backend architecture and integration with SPEN systems. Provides modelling, validation and user interface design expertise.

- Integrated Power Tech (Technology Partner)

Develops modular PED reference designs, simulation models and laboratory prototypes to de-risk hardware development. Supports control strategy validation and hardware-in-the-loop testing.

- UK Power Networks (Collaborating DNO)

Provides cross-DNO user requirements, independent validation of LV Design Tool functionality and feedback on BaU adoption pathways.

Changes from Alpha Phase

The Beta Phase introduces significant resource expansion compared to Alpha:

- Appointment of manufacturing partners through competitive tendering to design, build and test PED hardware for live trials.
- Formation of an external technical approval committee to review PED specifications and ensure compliance with standards.
- Increased engagement with SPEN district teams for trial site feasibility and operational readiness.
- Additional software engineering resources for NAVI integration and backend optimisation.

These changes reflect the transition from conceptual design and modelling in Alpha to full-scale development, procurement and trial execution in Beta. The expanded team and resources ensure readiness for delivering validated hardware, a production-grade LV Design Tool and evidence to support BaU integration.

# Project Plans and Milestones

## Project management and delivery

The D-Suite Beta Phase will be managed through a structured governance framework led by SP Energy Networks (SPEN), supported by project partners and external stakeholders. Delivery will follow a milestone-based plan aligned with Ofgem's SIF requirements, ensuring transparency, accountability and timely progress.

**Project Management Approach**

- Weekly technical coordination meetings across work packages to track progress and resolve issues.
- Quarterly Review Meetings (QRMs) with UKRI, including progress reports, financial updates and risk register reviews.
- Steering Board sessions with senior representatives from SPEN, UK Power Networks, Newcastle University and IPT to maintain strategic alignment.
- Dedicated work package leads responsible for scope, schedule and deliverables, supported by SPEN's innovation governance processes.

**Project Plan and Key Milestones**
The Beta Phase is structured around five work packages with the following milestones:

- M1.1 LV Design Tool Module Ready for Integration and Use
- M1.2 Completion of Assessment of Integrating the PED Placement Algorithm into UKPN Design Tools
- M1.4 NLCS Procurement Documents Completed
- M1.5 PED Procurement Documents Completed
- M2.1 All Hardware Procurement Completed
- M2.2 D-Suite PED Factory Testing Completed
- M2.3 All D-Suite PED Commissioned
- M3.1 Operational Trial and Analysis Completed
- M3.2 Completion of Trial Analysis Findings for Application on UKPN Networks
- M4.1 All Policy Documents Completed
- M5.1 Dissemination Completed

These milestones ensure readiness for live trials, validation of technical benefits and preparation for Business-as-Usual (BaU) adoption.

**Risks and Mitigation**
The highest scoring risks identified for the Beta Phase and their mitigation strategies are:

- Potential withdrawal of key manufacturer (ERMCO)
**Impact:** Reduced supplier diversity and increased project risk.
**Mitigation:** Transfer ERMCO's know-how to a UK manufacturer through licensing agreements and engage additional suppliers to ensure sufficient participation.
- New competing technology outperforms PED on cost or technical benefit
**Impact:** Cancellation of hardware development and BaU integration work packages.
**Mitigation:** Apply stage-gate checks at procurement points and use the LV Design Tool to validate alternative technologies while retaining project efficacy.
- Data input requirements from SPEN and third parties not available on time
**Impact:** Delays in LV Design Tool development and integration.
**Mitigation:** Use open-source datasets and Alpha-phase methods as fallback, leverage existing network extract processes and ensure smart meter data self-service access.
- Delays in NAVI API integration for LV Design Tool **Impact:** Project delays and reduced functionality. **Mitigation:** Ensure alternative data sources are available, conduct early interface testing and maintain manual fallback procedures.

## Key outputs and dissemination

**Expected Key Outputs**

**1. LV Design Tool (Production-grade)**

- A validated siting and sizing algorithm (five-step process) implemented as a Python package and integrated with SPEN's NAVI platform for planner use.
- Reference (open) version and anonymised "notional networks" (35 archetypes) to support replication and testing by other DNOs.
- Backend enhancements which are DFES-based scenarios, technical benefit calculation ("volts and amps" deltas), policy flags and API/interface for NAVI.

**2. PED Hardware Package**

- Technical Specifications for D-ST, D-STATCOM and D-SOP (core services, ratings, connection/protection, form factor).
- Procurement & Factory Testing Outputs: tender packs, supplier selection artefacts, FAT results and commissioning records.
- Modular Reference Designs & Lab Prototypes (Imperix platform) with closed-loop test evidence and thermal/control simulation models to de-risk trials.

**3. Network Level Control System (NLCS)**

- inclkuding control philosophy hierarchy, initial modes and an I/O schedule defining measurands, data latencies/types and routes (including near-real-time telemetry).

**4. Trial Evidence Pack**

- Operational trial results at shortlisted SPEN sites (North Wales, Merseyside), before/after metrics, set-point strategies and constraint reduction evidence.
- Cross-network findings which are applicability assessment for UKPN design tools and networks.

**5. Policy & BaU Adoption Materials**

- Operational policies, maintenance procedures, equipment registration protocols and planner workflows for the LV Design Tool.
- Commercialisation & BaU Adoption Strategy (three pillars: techno-economic demonstration, end-user readiness, competitive supply chain).

**6. IP and Data Access**

- Foreground IPR catalogue which includes LV Design Tool algorithms, D-Suite device specifications, trial site selection criteria, control strategy hierarchy.
- Data access routes via SPEN's policy (open, controlled and internal tiers), plus project website links and contact channels.

**7. Governance & Reporting**

- QRMs decks, Stage Gate evidence packs, Annual Report(s), mid-point and final 60-second videos and Steering Board meetings.

**Dissemination Plan**

1. **Industry Conferences & Forums**
   Presentations and papers at CIRED, CIGRE, ENA Innovation Forum, ECCE, Enlit and specialist seminars (e.g., Voltage Matters, university engineering seminars). These will share technical specifications, LV Design Tool methodology and trial lessons to a broad audience of networks, academia, suppliers and consultants.
2. **Public Webinar Series**
   A sequence of webinars aligned with milestones (tool integration, procurement outcomes, trial setup, trial results). Each session will provide anonymised case studies, demonstration clips and Q&A with engineers and suppliers.
3. **Open Technical Artefacts**
   1. Release of the Reference LV Design Tool (source code under permissive licence), documentation and the anonymised notional networks set.
   2. Publishing wireframes and user journey guides to aid UI replication and adoption by other DNOs.
   3. Sharing control philosophy and I/O schedule at a suitable abstraction level for supplier-neutral applicability.

**4.Cross-DNO Collaboration**

Regular workshops with UK Power Networks (and invitations to other DNOs/iDNOs) focused on algorithm validation, integration feasibility, policy alignment and BaU workflows. Outputs are joint technical notes, integration assessments and adoption playbooks.

**5. SPEN Channels & Governance**

Updates on the SPEN project webpage, Quarterly Review Meetings with UKRI/Ofgem, Stage Gate evidence publication (as permissible), and brief 60-second videos at project start, midpoint and end-of-phase summarising achievements and next steps.

**6. Operational Engagement**

District-team briefings and site-visit packs to prepare local operations for installations and commissioning; post-trial debriefs to capture operational feedback and inform policies.

**Lessons Learned to be Disseminated**

1. **Partial Rating Value Case d**emonstrated cost/complexity reduction while achieving material technical benefits (voltage regulation, imbalance correction, hosting capacity gains).
2. **Modular Architecture Advantages** which are scalability, maintainability (swappable modules), manufacturing efficiency and consistent control/protection across device variants.
3. **Trial Planning & Feeder Diversity** Importance of selecting sites with complementary load profiles, realistic constraints and accessible footprints to maximise measurable benefits.
4. **Data & Integration Pragmatics** are necessity of anonymisation, fallback data sources, robust APIs and early interface testing between academic back-end and production environments (NAVI).
5. **UI/UX Clarity for Planners** Tool outputs must be easily interpretable for investment justification—clear benefit visualisation, ranked options and policy flags.
6. **Supply Chain Resilience** which includes the benefits of early and broad supplier engagement, licensing pathways to UK-based manufacturers and independent technical approval to maintain momentum.

**Engagement Plan of Audiences and Timing**

1. Planners & Investment Teams upon LV Design Tool release, UI journey, policy packs (upon M1.1, M4.1).
2. Manufacturers & Test Centres upon technical specs prepration, NLCS requirements documenttion and release of FAT/commissioning learnings (M1.5 → M2.2 → M2.3).
3. Operations & Protection Engineers upon commissioning procedures, control modes, I/O schedules (pre- and post-trial).
4. Regulators & Funders will be engaged through QRMs, Stage Gate packs, Annual Reports and value-for-money narratives.
5. Wider Industry & Academia will be informed conference papers, webinars, open artefacts (M5.1 and at milestone completions).

# Commercials

## Intellectual Property Rights, Procurement and Contracting (not scored)

**Intellectual Property Rights**

The D-Suite Beta Phase will adopt the default Intellectual Property Rights (IPR) arrangement as set out in the Ofgem SIF Governance Document. All foreground IPR generated during the project will be shared with other relevant network licensees in accordance with ENA innovation policy to ensure transparency and replicability across GB networks.

Foreground IPR will primarily include:

- The LV Design Tool algorithms and associated software components (siting and sizing logic, technical benefit calculations, policy flag integration).
- Technical specifications for D-Suite PED hardware (D-ST, D-STATCOM and D-SOP), including connection arrangements, ratings and protection requirements.
- Trial site selection methodology and criteria.
- Control strategy hierarchy for PEDs and Network Level Control System (NLCS).

These outputs represent novel contributions to LV network planning and control optimisation. The LV Design Tool will be provided under a permissive open licence for its reference version, enabling other DNOs to integrate the tool efficiently. The production implementation within SPEN's NAVI platform will remain proprietary to SPEN but will follow agreed dissemination principles.

No alternative IPR arrangements are proposed for the Beta Phase. The project partners have agreed to share relevant IP openly to support wider adoption and accelerate the transition to Business as Usual (BaU). Licensing arrangements for PED designs and modular control architectures will be developed as part of the commercialisation strategy, ensuring multi-supplier engagement and competitive procurement.

**Procurement and Contracting**

All procurement activities will comply with SPEN's governance and Ofgem requirements. Competitive tendering will be used to appoint manufacturing partners for PED hardware development and testing. Procurement documents for PEDs and NLCS will be completed early in the Beta Phase, followed by factory acceptance testing and commissioning at trial sites. Contract execution will precede any expenditure, ensuring compliance with SIF conditions.

## Commercialisation, route to market and business as usual

The D-Suite Beta Phase is designed to transition from an innovation project to a repeatable, scalable capability embedded within SPEN's business functions and transferable across GB networks. The strategy for commercialisation and BaU adoption is built on three interdependent pillars:

**1. Techno-Economic Demonstration**

- Deliver validated trials of partially rated PEDs (D-STATCOM, D-SOP, D-ST) and the LV Design Tool to evidence cost-effective reinforcement avoidance, capacity release and improved voltage compliance.
- Value-engineer PED designs through collaboration with manufacturing partners to optimise unit costs and installation requirements.
- Re-run business case models before and after trials to confirm viability for large-scale deployment, supported by monitored technical benefits and avoided reinforcement costs.

Conduct comprehensive factory and laboratory testing (including testing and Hardware-in-the-Loop) to de-risk trials and ensure compliance with ENA standards.

**2. End-User Readiness**

- Embed the LV Design Tool into SPEN's NAVI platform and planning workflows, enabling planners to identify optimal PED siting and sizing as part of standard reinforcement decision-making.
- Release an open-source reference version of the LV Design Tool to other DNOs, accompanied by anonymised datasets and technical documentation to accelerate cross-GB adoption.
- Develop and codify operational policies, safety documentation, installation method statements and maintenance procedures for

PEDs.

- Use tool outputs and trial evidence to inform SPEN's investment plans for ED3 and ED4 regulatory periods, securing inclusion in Ofgem's uncertainty mechanisms where appropriate.
- Deliver targeted dissemination and training for internal teams and other DNOs/iDNOs to build capability and confidence in the solution.

**3. Competitive and Ready Supply Chain**

- Appoint multiple UK-based manufacturing partners through competitive tendering to ensure resilience and scalability.
- Include contractual commitments for product licensing to at least one additional manufacturer before project completion, fostering a multi-supplier market.
- Engage manufacturers beyond the project consortium through regular dissemination and joint product launch events with UK Power Networks and supply chain partners.
- Assess supplier readiness for commercialisation, including evidence of value-engineering, marketing strategies and funding for manufacturing expansion.

**Route to Market and Post-Beta Vision**

After successful completion of Beta, D-Suite will operate as a standardised, owned capability across SPEN's planning, procurement, delivery and operations functions, without project dependencies. The LV Design Tool (embedded in NAVI), PEDs and the Network Level Control System (NLCS) will form an integrated service delivering measurable benefits such as voltage compliance, imbalance reduction and capacity release for LCT uptake.

Key enablers for route to market include:

- Regulatory inclusion which secures ED3/ED4 investment plan commitments using validated CBA and NPV evidence.
- Commercial viability which will maintain positive business case through value-engineering and competitive procurement.
- Open practices including publish anonymised datasets, reference tool code and benefit metrics via SPEN Open Data and ENA channels.
- Supply chain resilience considerations which establish multi-manufacturer frameworks and licensing arrangements to support scaling across GB networks.

**Business as Usual (BaU) Adoption Roadmap**

BaU adoption will follow a structured playbook defining roles, artefacts and governance across five stages:

- Planning & Siting through which use of LV Design Tool in NAVI to generate design packs will happen (technical benefits, bill of materials, commissioning plans).
- Source through which convert of tool outputs into PED specifications and procure under pre-qualified supplier frameworks will take place.
- Install & Commission as a result of which complete site readiness, install PEDs to approved SOPs, register assets and close out with as-built documentation will take place.
- Operate that includes manage PEDs under NLCS and enforce cyber baselines and maintain telemetry for performance monitoring.
- Assure & Improve which is for tracking benefits (voltage compliance, capacity released, CI/CML reduction) and feed lessons into policies, standards and supplier reviews.

**Partner Strategy for Commercialisation**

- SPEN leads governance, investment planning, procurement and BaU integration and maximises influence on market readiness and regulatory engagement.
- Newcastle University provides LV Design Tool analytics, validates technical benefits and prepares open-source artefacts for wider adoption.
- Integrated Power Tech (IPT) supports modular PED design, value-engineering and technical validation; contributes to supply chain readiness.
- UK Power Networks acts as a cross-DNO validation partner, ensuring interoperability and adoption potential across other networks.

## Policy, standards and regulations (not scored)

At present, the D-Suite project does not anticipate any active regulatory or standards-related barriers that would impede Beta

Phase delivery. All technical specifications and safety requirements for PEDs and control systems are being developed in alignment with ENA guidelines and IEC standards to minimise compliance risk.

However, potential challenges may arise during full BaU integration, including:

- Policy gaps for LV power electronics ,as a result, existing standards may not fully cover advanced PED functionalities such as phase imbalance correction and dynamic feeder interconnection.
- Cybersecurity and telemetry compliance , as a result, NLCS integration requires adherence to evolving OT security frameworks, which may introduce additional validation steps.
- Regulatory approval for investment planning, as a result, inclusion of DISuite in ED3/ED4 regulatory periods depends on timely engagement with Ofgem and alignment with uncertainty mechanisms.
- Restrictions on IPR transfer under current Ofgem policy, as a result, DNOs are not permitted to establish a new company and transfer project IPR to that entity. This limits flexibility in creating dedicated commercial vehicles for scaling and may slow down market development.

These factors could delay widespread adoption if not addressed proactively. The project is mitigating these risks by:

- Engaging ENA and Ofgem early to inform policy updates based on trial evidence.
- Designing PED specifications and NLCS architecture to meet current ENA and IEC standards.
- Preparing comprehensive safety documentation and installation procedures to support regulatory approval.

## Consumer impact and engagement

The DISuite project is designed to deliver tangible benefits to consumers by improving reliability, reducing costs and supporting the transition to lowIcarbon technologies. Engagement and impact will be addressed through the following approaches:

**Consumer Engagement**

- To increase local awareness SPEN will engage residents near trial sites through information sessions, newsletters and dedicated contact channels to explain the purpose of the trials, expected benefits and safety measures.
- To have transparency updates will be shared via SPEN’s website, webinars and ENA forums, ensuring consumers and stakeholders understand progress and outcomes.
- Feedback mechanisms will be estbalished to create opportunities for consumers to provide feedback during and after trials will be offered, particularly in areas with vulnerable customers.

**Addressing Consumer Needs and Preferences**

- in terms of reliability and power quality PEDs will reduce voltage excursions and phase imbalance, improving supply stability for all customers, including those reliant on sensitive equipment.
- considering affordability having PEDs deployed will result in deferring costly reinforcement, moreover, DISuite helps limit future network charges, supporting long term bill stability.
- to promote equity the LV Design Tool will prioritise areas with high concentrations of vulnerable customers, ensuring benefits are distributed fairly.

**Consumer Benefits**

- First, improved service quality as a result, fewer voltage issues and interruptions, reducing exposure to CI/CML penalties.
- second, accelerated lowIcarbon connections which enables faster integration of EV chargers, heat pumps and solar PV without disruptive reinforcement.
- Third, environmental and societal gains by supports Net Zero targets and reducing streetworks and minimises disruption during network upgrades.

## Value for money

The Beta Phase of the DISuite project is forecast at £8.9 million, covering design, development, procurement, testing and trial deployment of partially rated Power Electronic Devices (PEDs) and the LV Design Tool. This cost is proportionate to the scale and complexity of the challenge, which involves creating a replicable, productionIgrade solution for LV network flexibility across GB.

- Traditional LV reinforcement typically costs £50,000–£100,000 per feeder, and for 100 feeders this equates to £5–10 million. D-Suite offers a scalable alternative that reduces capital expenditure and minimises disruption.
- Conservative Net Present Value (NPV) estimates indicate £98.38m benefit for SPEN and £795.4m GB-wide, with best-case potential exceeding £5.8bn. These benefits include deferred reinforcement, improved reliability and accelerated LCT connections.
- By reducing network upgrade costs, D-Suite helps limit future charges passed to consumers, supporting long-term bill stability. The project supports Net Zero by enabling faster EV and heat pump adoption, reducing carbon emissions and avoiding disruptive streetworks.

The project's cost is justified by its ability to deliver a step-change in LV network management, replacing costly, passive reinforcement with active, flexible solutions. Rigorous trials, value-engineering and competitive procurement ensure that every pound spent maximises consumer benefit and accelerates readiness for Business-as-Usual adoption.

## Associated Innovation Projects

- (●) Yes (please remember to upload all required documentation)
- ( ) No (please upload your approved ANIP form as an appendix)

# Supporting documents

## File Upload

SIF Beta Round 2 Project Registration 2026-01-19 3_58 - 105.9 KB

## Documents uploaded where applicable?

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