

D-Suite - BETA



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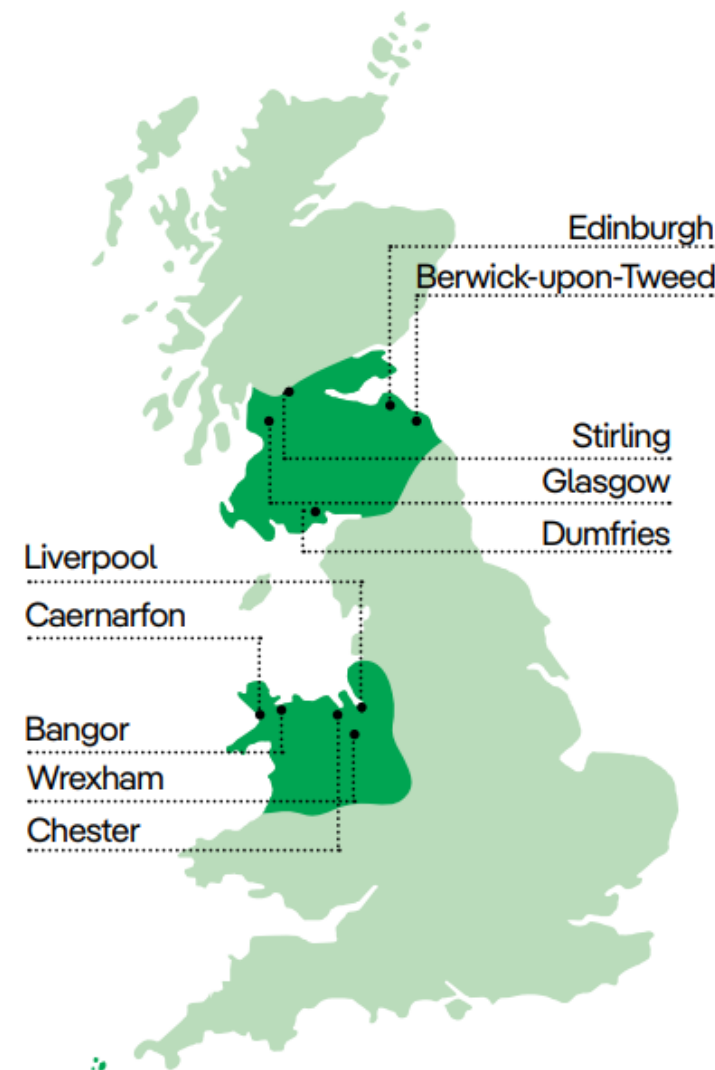
About us

We are SP Energy Networks. As a Distribution and Transmission Network Operator we keep electricity flowing to homes and businesses throughout Central and Southern Scotland, North and Mid Wales, Merseyside, Cheshire and North Shropshire.

We do this through the network of Overhead Lines and Underground Cables which we own and maintain. No matter who you pay your bill to, we are the people to contact if you have a power cut, need a new or upgraded power connection or spot an issue with our equipment.

Our three regulated electricity businesses are:

- SP Transmission PLC (SPT)
- SP Distribution PLC (SPD)
- SP Manweb PLC (SPM)



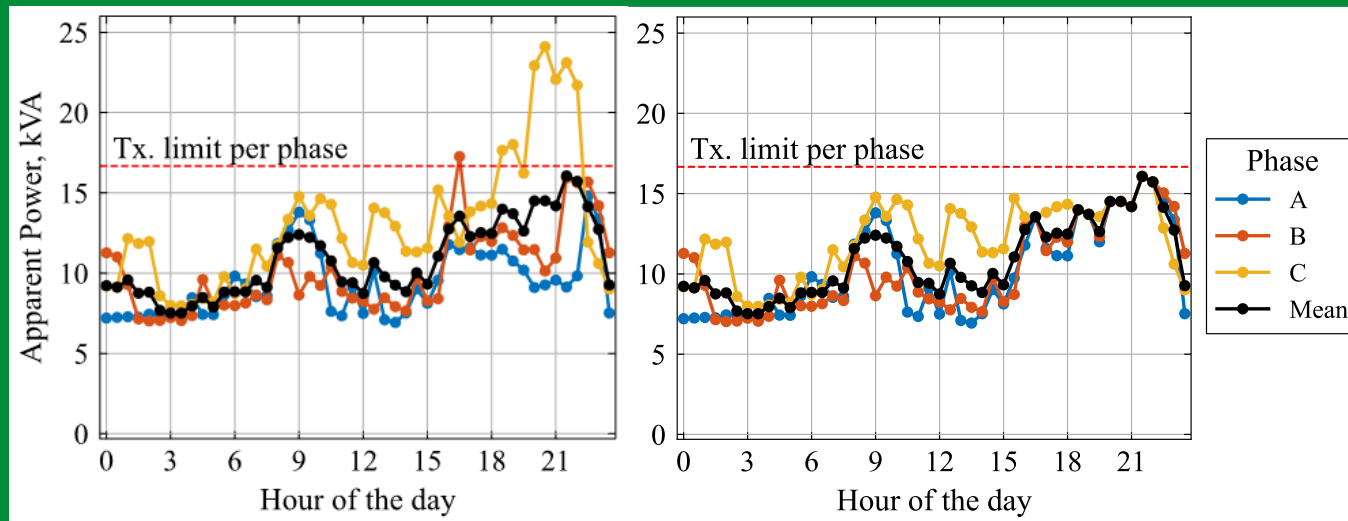
Problem Statement

LV network changes are being driven by decarbonisation technologies and their impacts:

- 600,000 HP/year from 2028.
- 300,00 EV chargers by 2030.
- 85GW peak demand GB wide by 2050.

LV networks will experience:

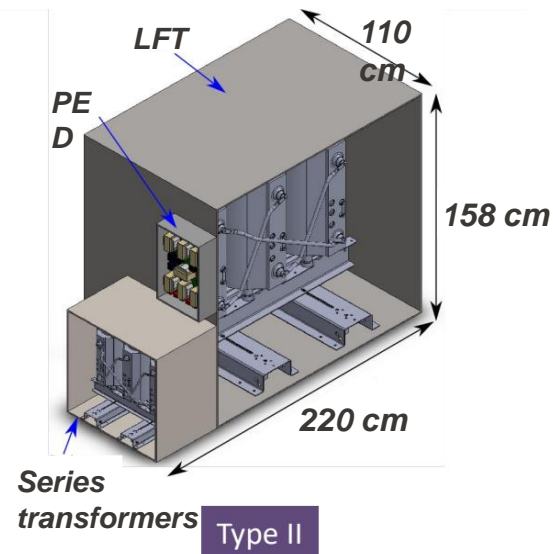
- Increasing voltage excursions.
- High circuit and transformer utilisation.
- All compounded by large phase imbalances.



(Left) Phase imbalance overloads transformer. (Right) D-Suite balancing phase current.

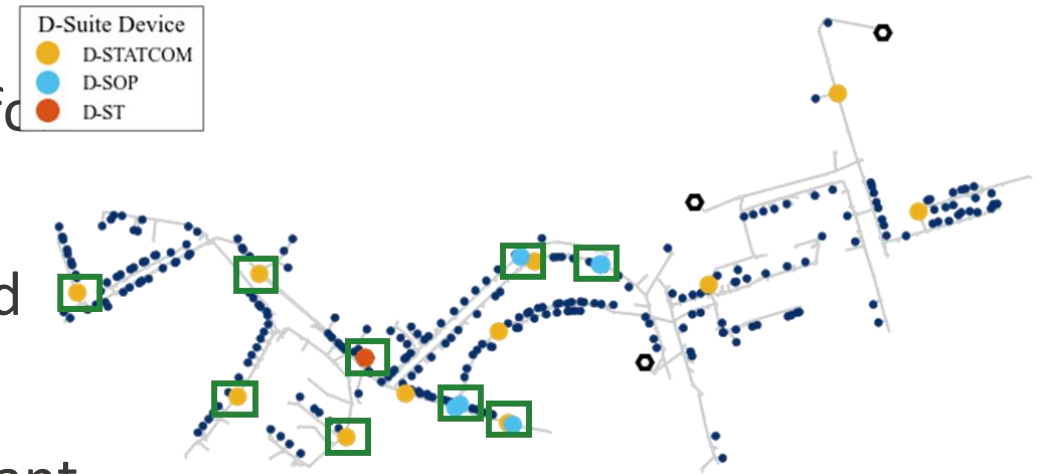
Overview and Deliverables

- **Objective:** Trial partially rated PED and a detailed D-Suite LV design tool.
- **Scope:** Full installation and commissioning of all D-Suite PED and NLCS.
- **Equipment:** Partially rated Smart Transformer (**D-ST**), Soft Open Point (**D-SOP**) and STATCOM (**D-STATCOM**).
- **Testing:** Conduct trials at three locations for min six-month period
- **Monitoring:** LV Hubs and smart meter data to assess device performance.
- **Outputs:** Production Ready LV Design tool. 3 types of partially rated PED



Partially rated D-ST showing compact size of D-Suite Power Electronics.

- **Partial Rating:** Alpha stage demonstrated partial rating requirements between 30 and 120kVA.
- **Applicability:** 4/6 networks showed technical benefits using D-Suite.
- **Scaling:** Volume cost reductions are important for commercialisation.
- **Flexibility:** Partial ratings and 3 PED type expand number of suitable sites.
- **Placement:** Position on LV circuit is very important for operational performance.



Optimum locations of each D-Suite type.

Next Steps

- **Development:** Detailed Technical Specifications and LV Design Tool.
- **FAT Testing:** To be conducted by supplier postproduction.
- **Staff training:** Detailed policy and training manuals for PED and LV Design Tool.
- **Roll-out:** Organic bottom-up LV design driving volumes.
- **Monitoring:** Analysis of trial performance for 6 months.
- **BaU:** Verification of CBA and LV Design tool for BaU rollout in ED3 and beyond.



