Energy Innovation Summit 2024

LV Engine
Hybrid LV AC / DC networks

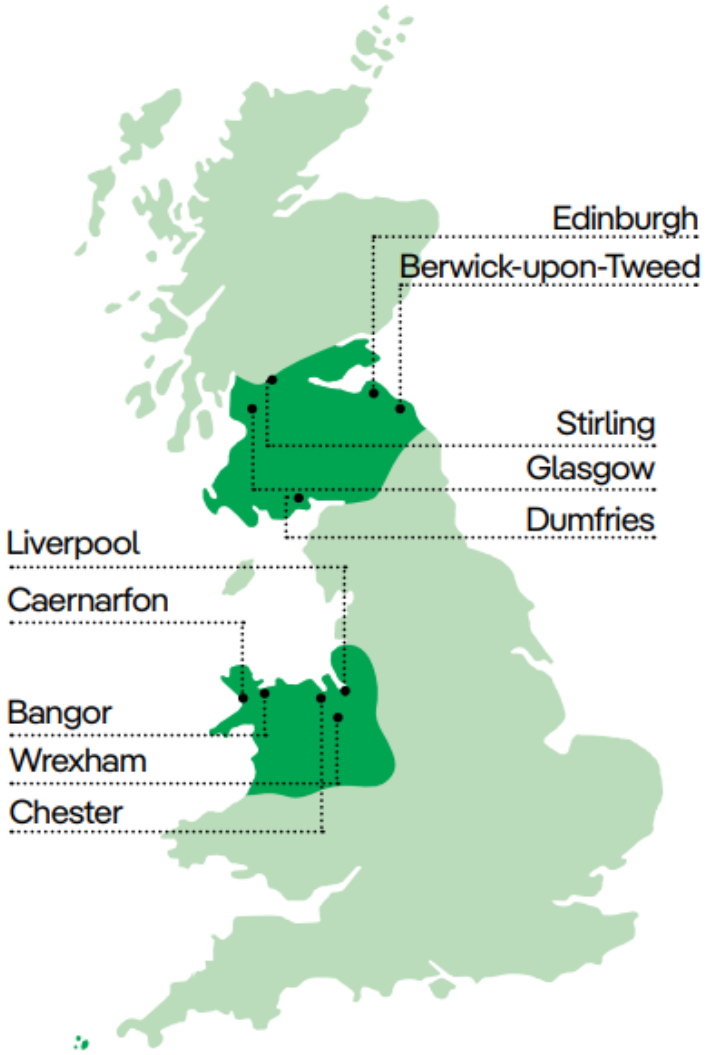
About us

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're 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:

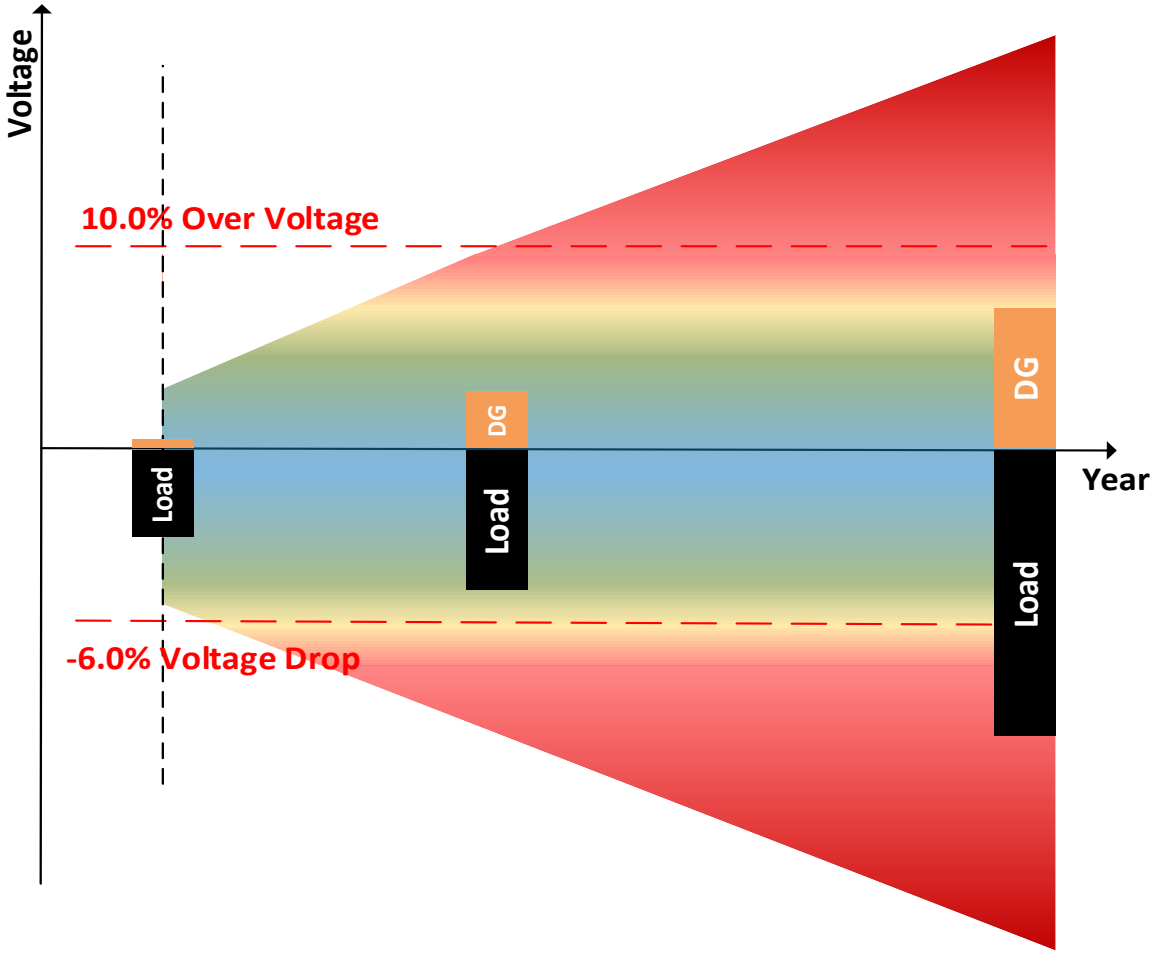
- SP Transmission PLC (SPT)
- SP Distribution PLC (SPD)
- SP Manweb PLC (SPM)



Problem Statement

Growing voltage and thermal issues

- Increase in LV DG connections
- Demand growth by EVs and heat pumps
- Uncertainties in LCTs growth (when, where, how much..)
- Increasing demand for the supply of DC power



LV Engine Project Overview

Latest Timescale: March 2018 – Dec 2024

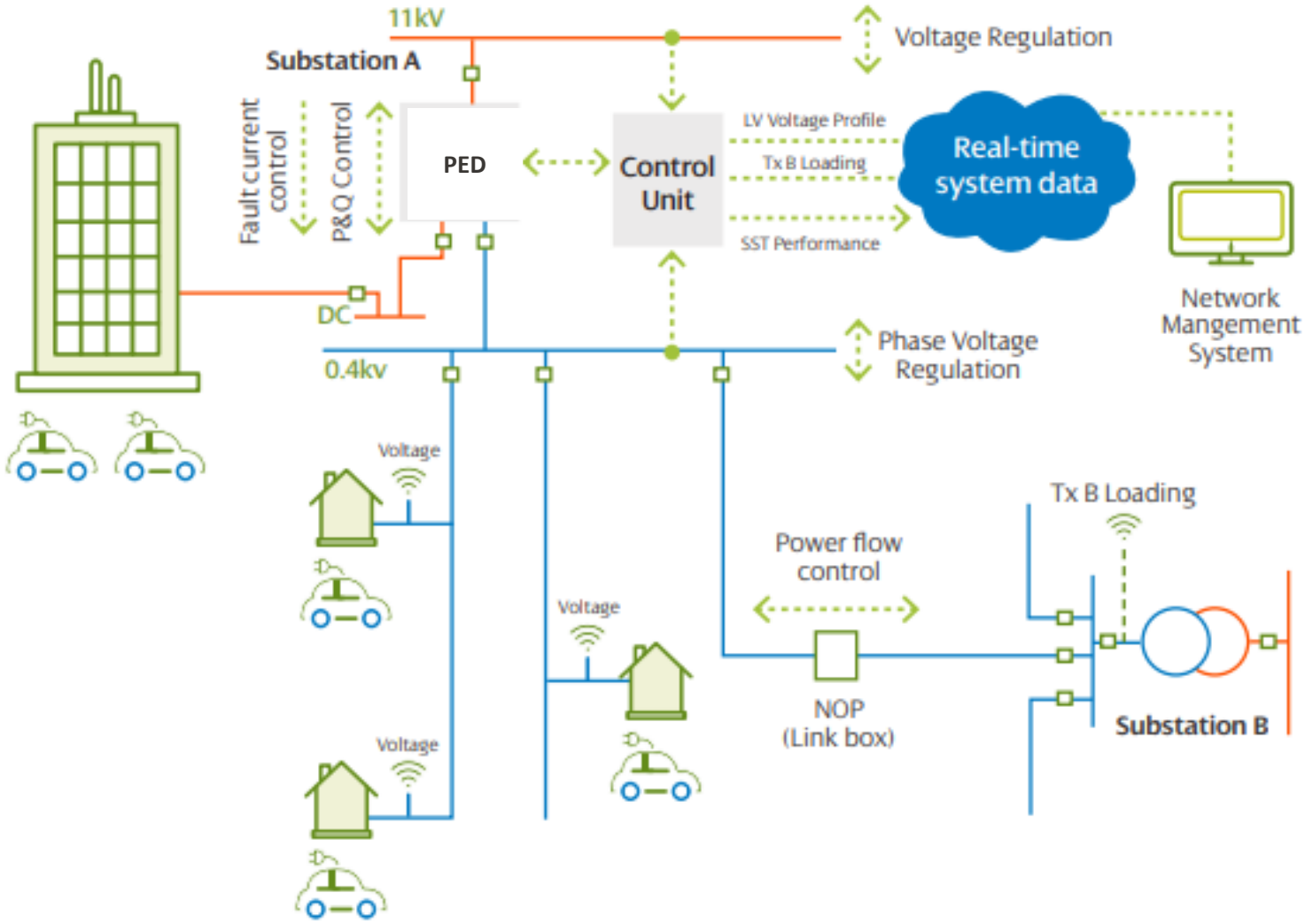
Funding: £8.3m through Ofgem NIC mechanism

Key achievements to-date:

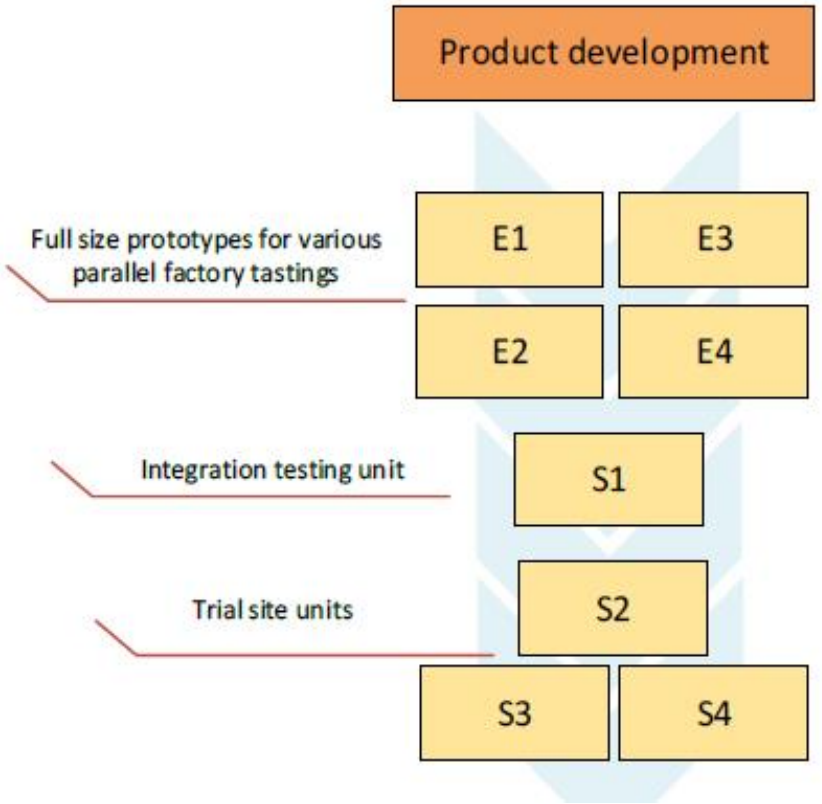
- Manufactured all equipment
- Carried out testing at PNDC
- Installed and commissioned three substations (SPM and SPD)
- Established IT system integration

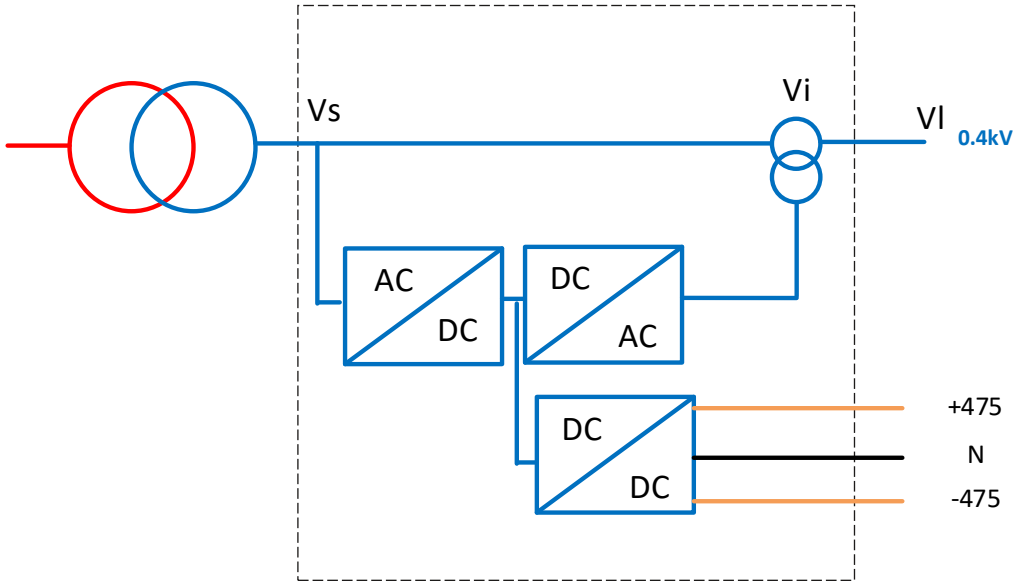
Key upcoming activities (6 months):

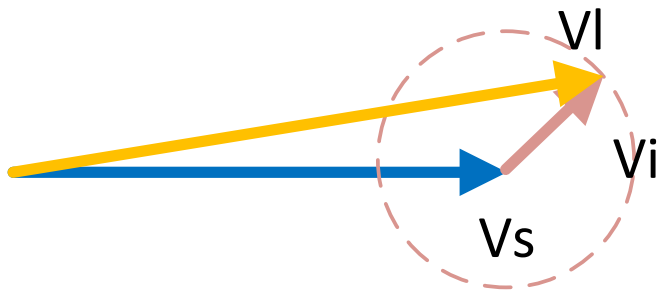
- Performance monitoring and BaU integration



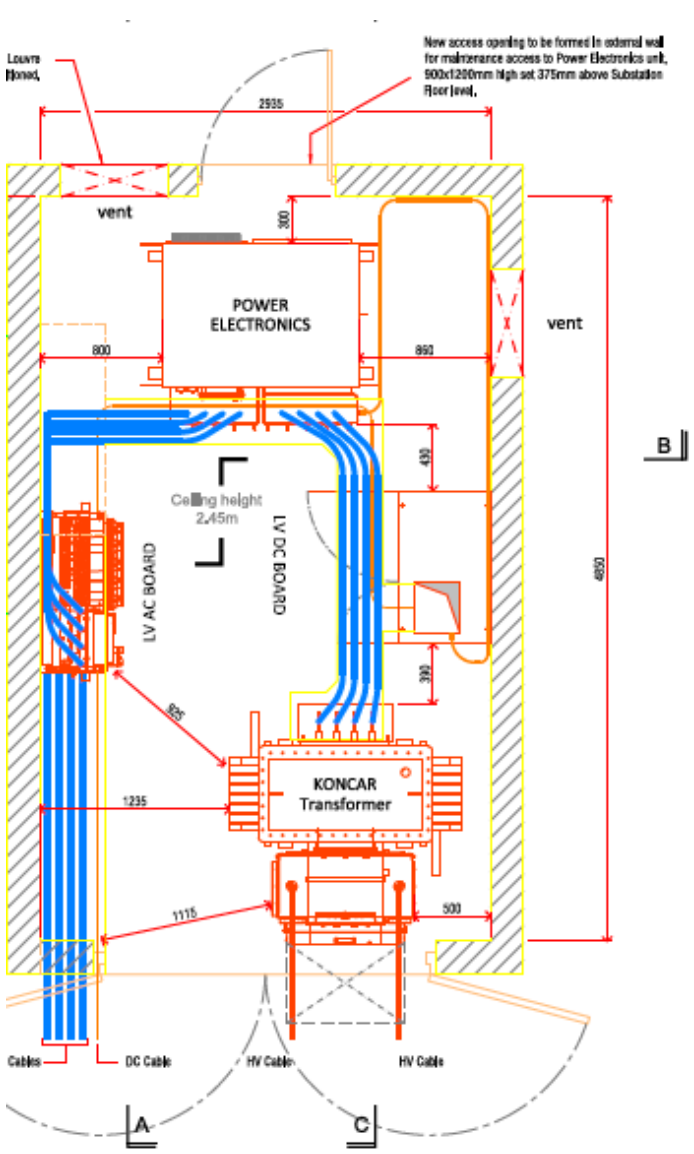
LV Engine Solution

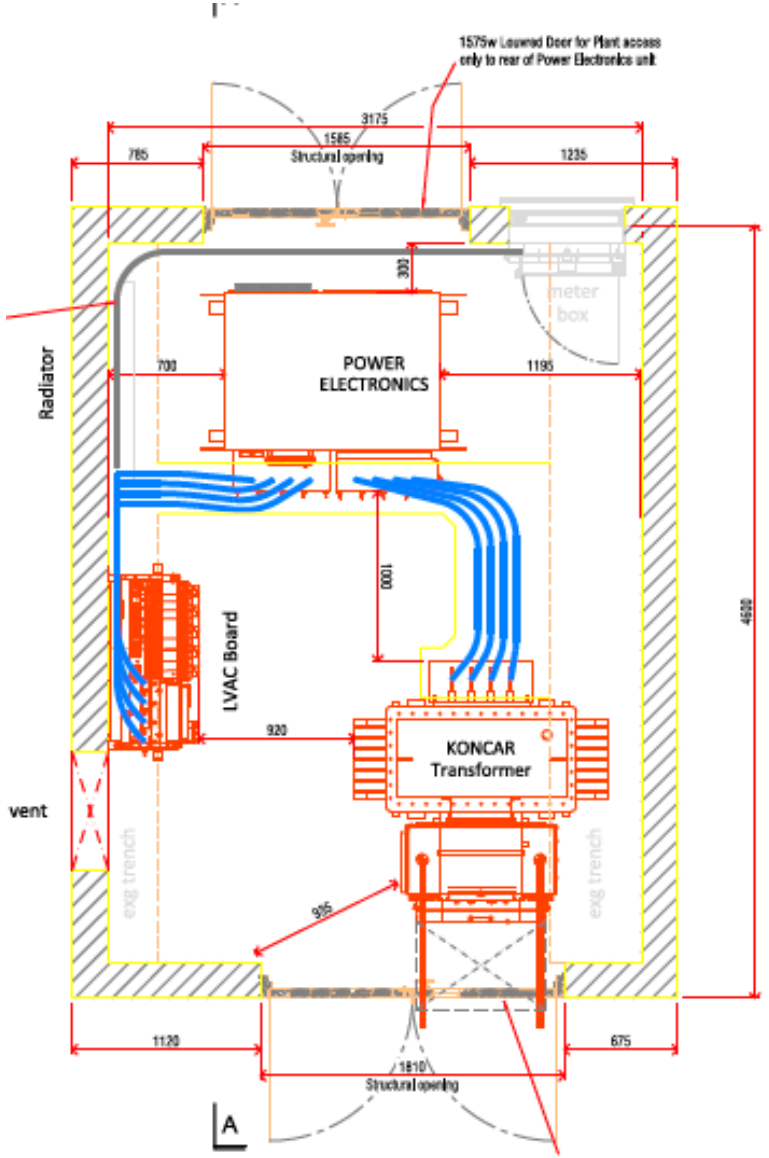


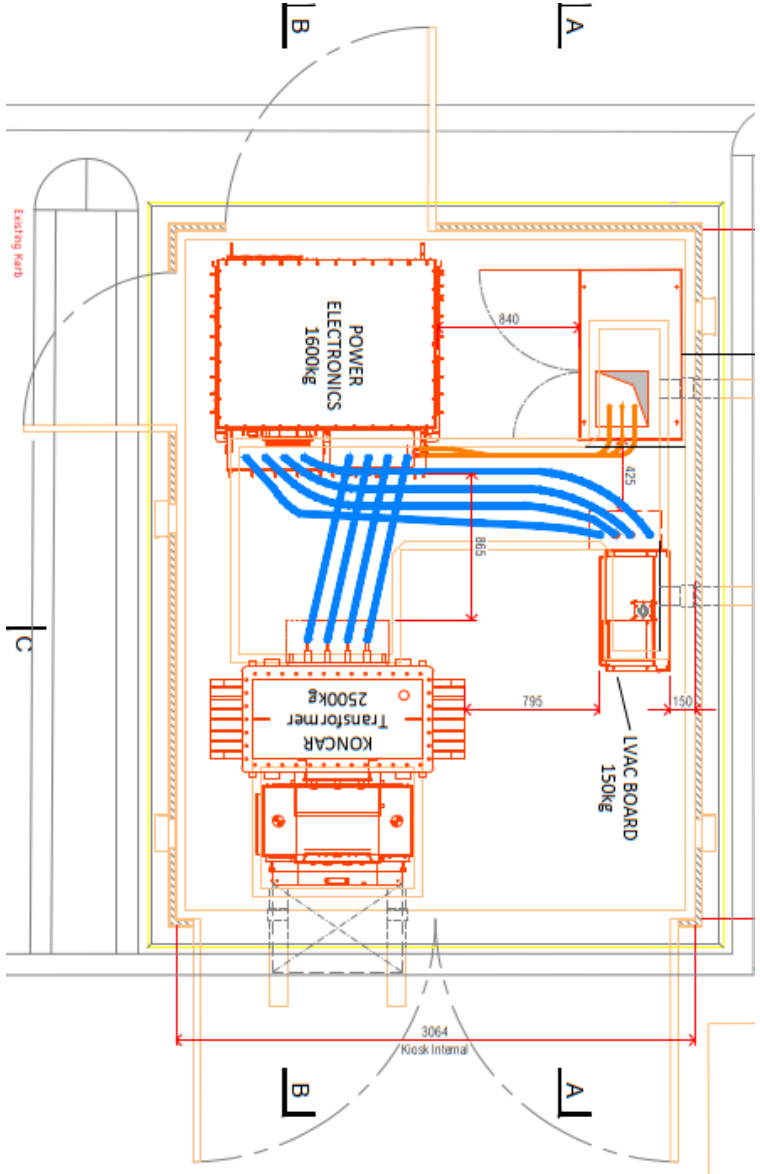




LV Engine Solution







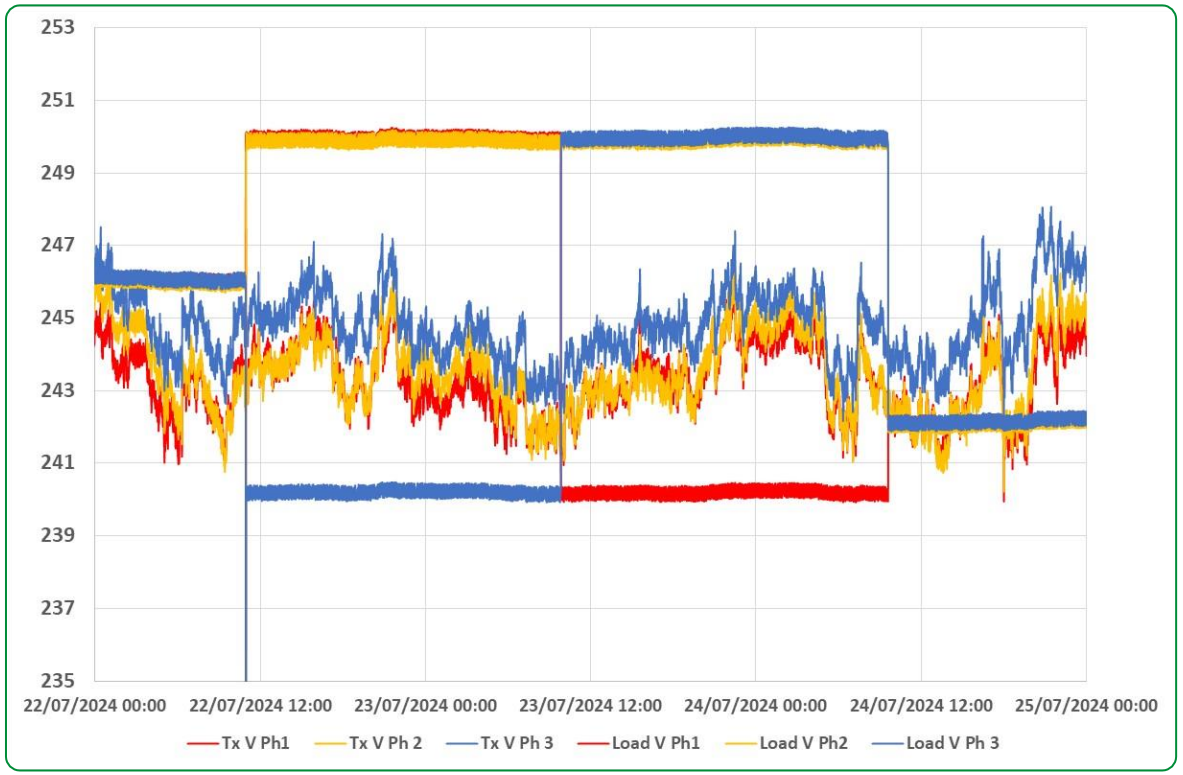
Pre-trial Testing

De-risking the live trial

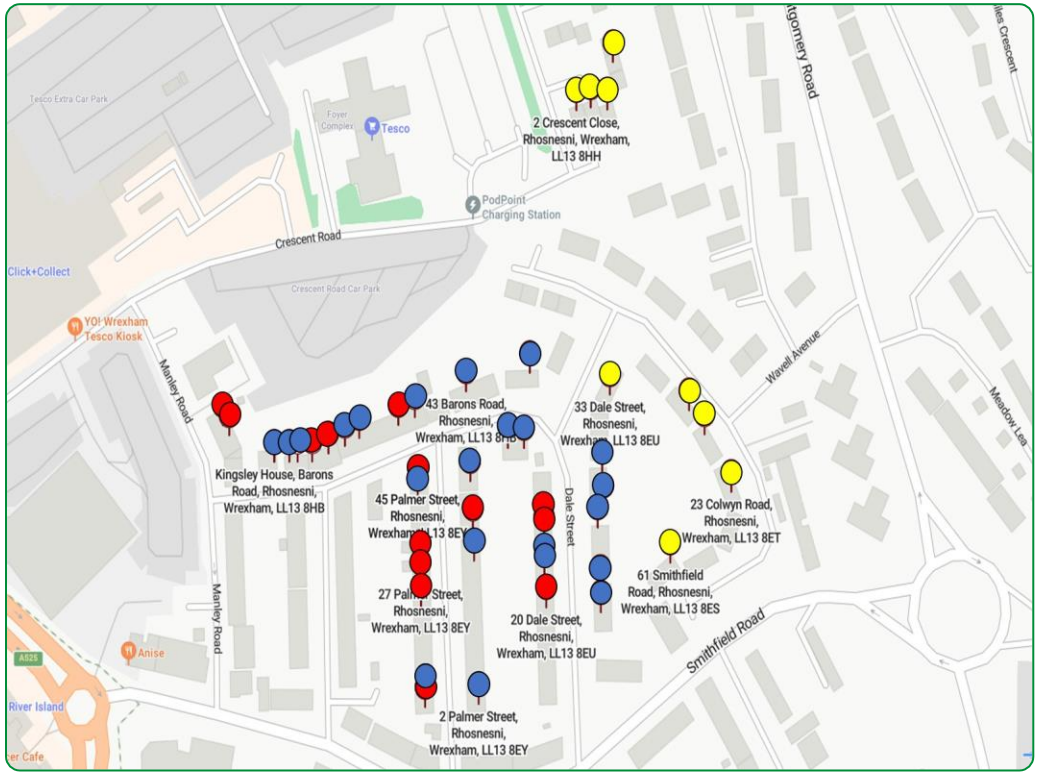
Live Trial – AC functionalities

Supply to residential and commercial customers

Live Trial

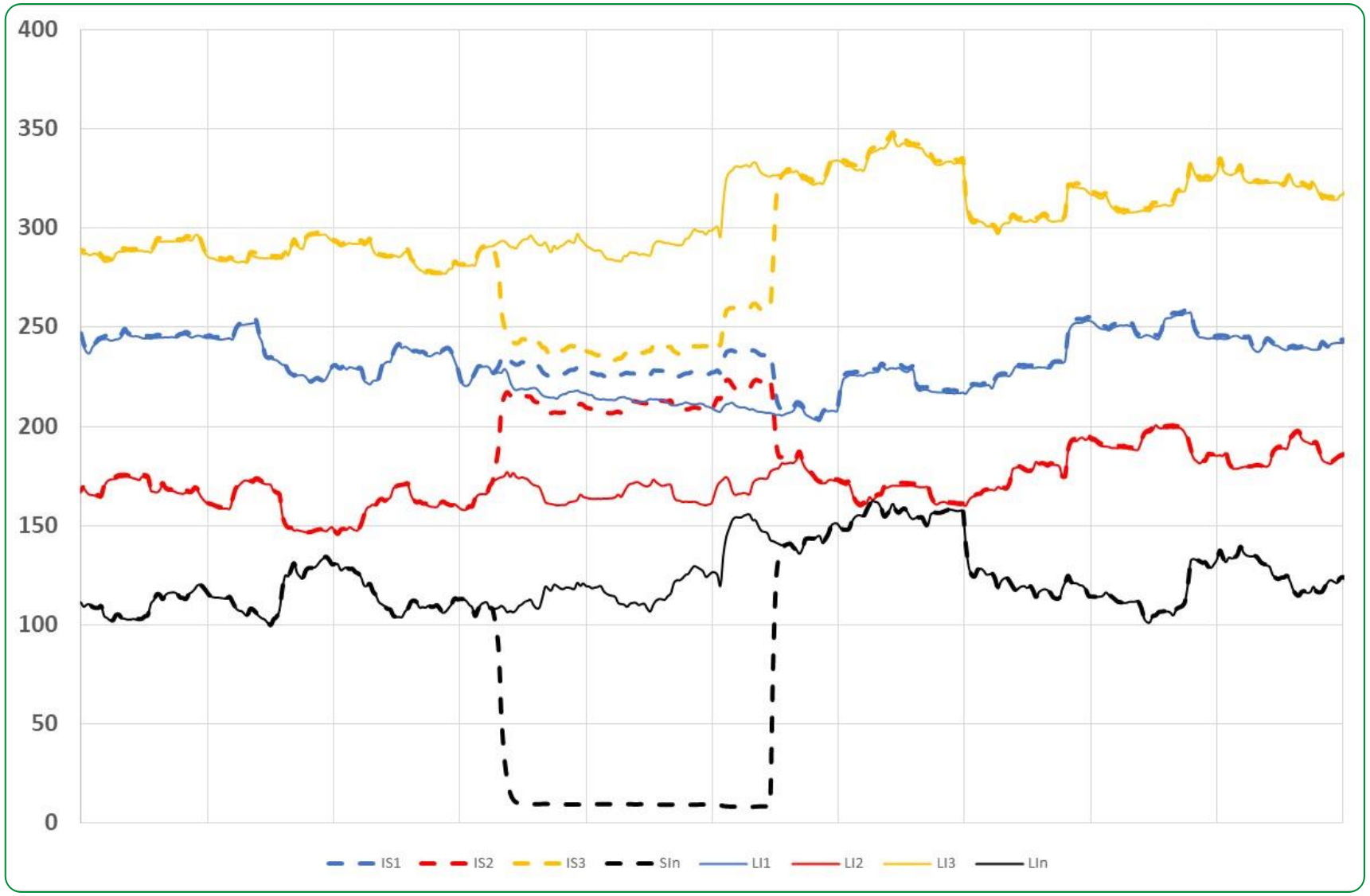


Customer phase identification



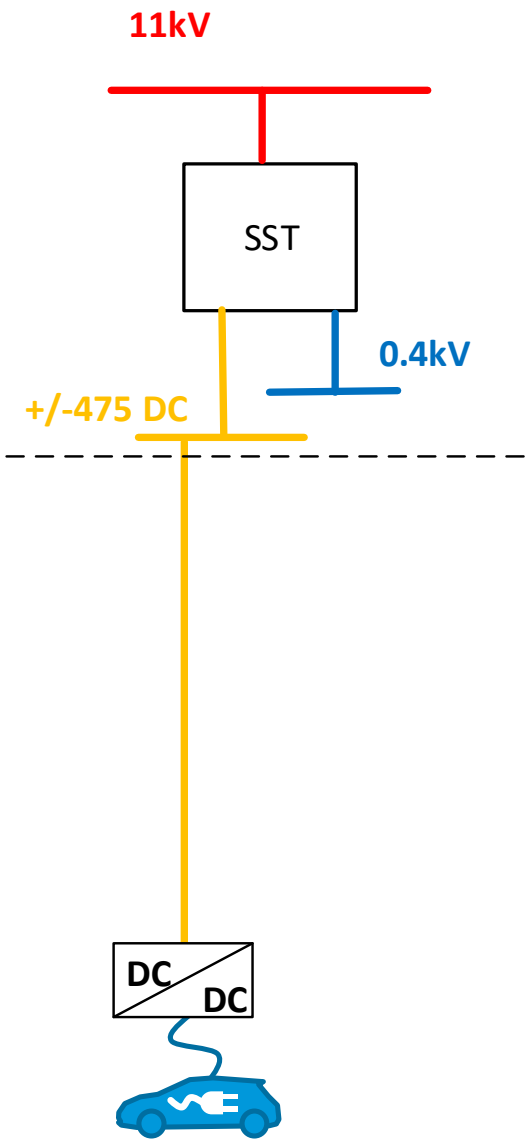
Phase voltage control

Live Trial



Imbalance load cancellation

Live Trial – DC functionality



LV Engine applications

Substation Deployment Use Cases

1- Voltage control, PF correction and harmonic compensation, power flow control within interconnected network

Circuit Deployment Use Cases

Voltage control, PF correction, load imbalance cancellation, harmonic compensation, power flow control within interconnected network