WESTERN POWER DISTRIBUTION INNOVATION TEAM

OPENLV BACKGROUND

BALANCING ACT
NOVEMBER 2019

DAVID RUSSELL
PROJECT MANAGER

TIM BUTLER
TECHNICAL LEAD

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

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OVERVIEW

Project Aims:

- Open up live data from electricity networks
- Trial an open, flexible platform that could be deployed to every LV substation in Great Britain
- Show how 3rd parties can develop software applications to be deployed in LV substations
- Demonstrate the platform's ability to provide benefits to the network, operators, community groups and wider industry

Funding: Network Innovation Competition

Delivery: WPD & EA Technology

Timescales: December 2016 to May 2020

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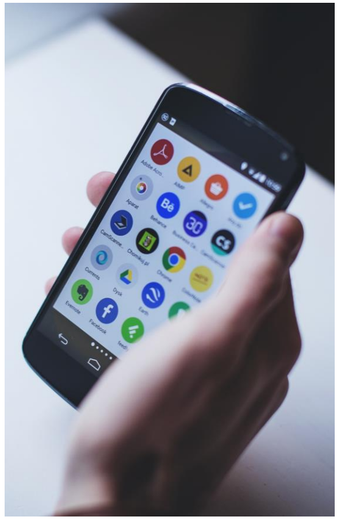
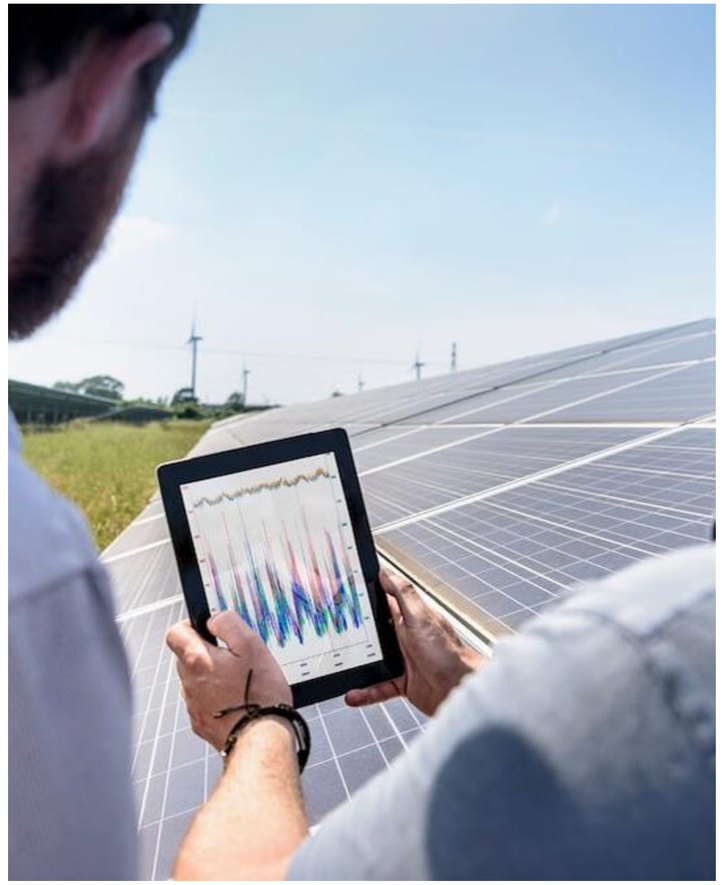
THE CONCEPT





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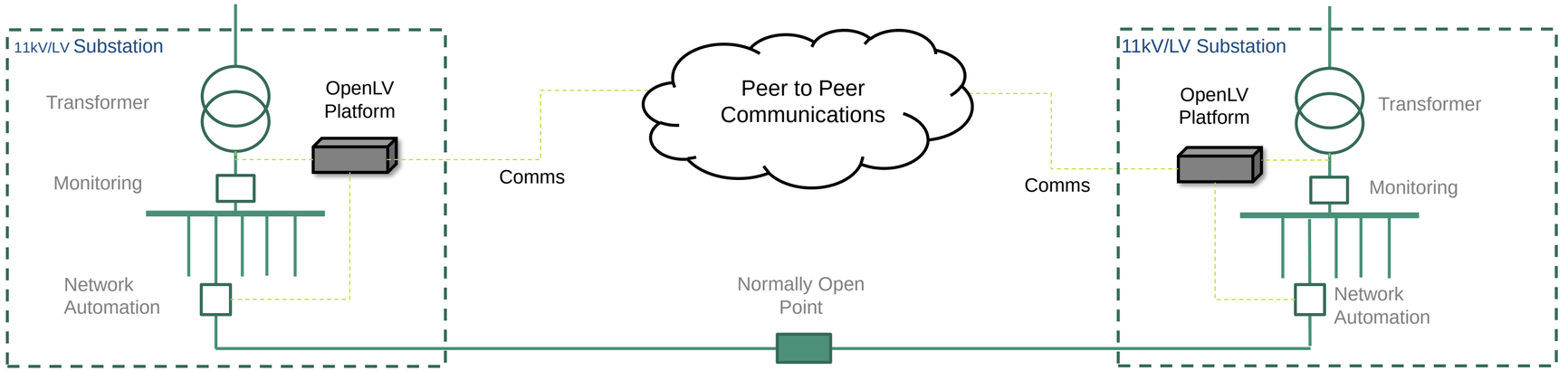
RELEASING ADDITIONAL CAPACITY



What

- Check network capacity against RTTR of transformer; when breached, close two radial circuits to mesh the LV network
- Deploy two proven techniques
  - ‘Dynamic Thermal Ratings app’ and
  - ‘Network Meshing app’

How

- Assess WPD’s network to identify candidate circuits
- Target a range of LV networks
- Deploy LV-CAP™ to 60 substations
- Deploy network automation to 10 substations (5 pairs)
- Monitor how the solution operates over the trial period
- Assess and report on performance

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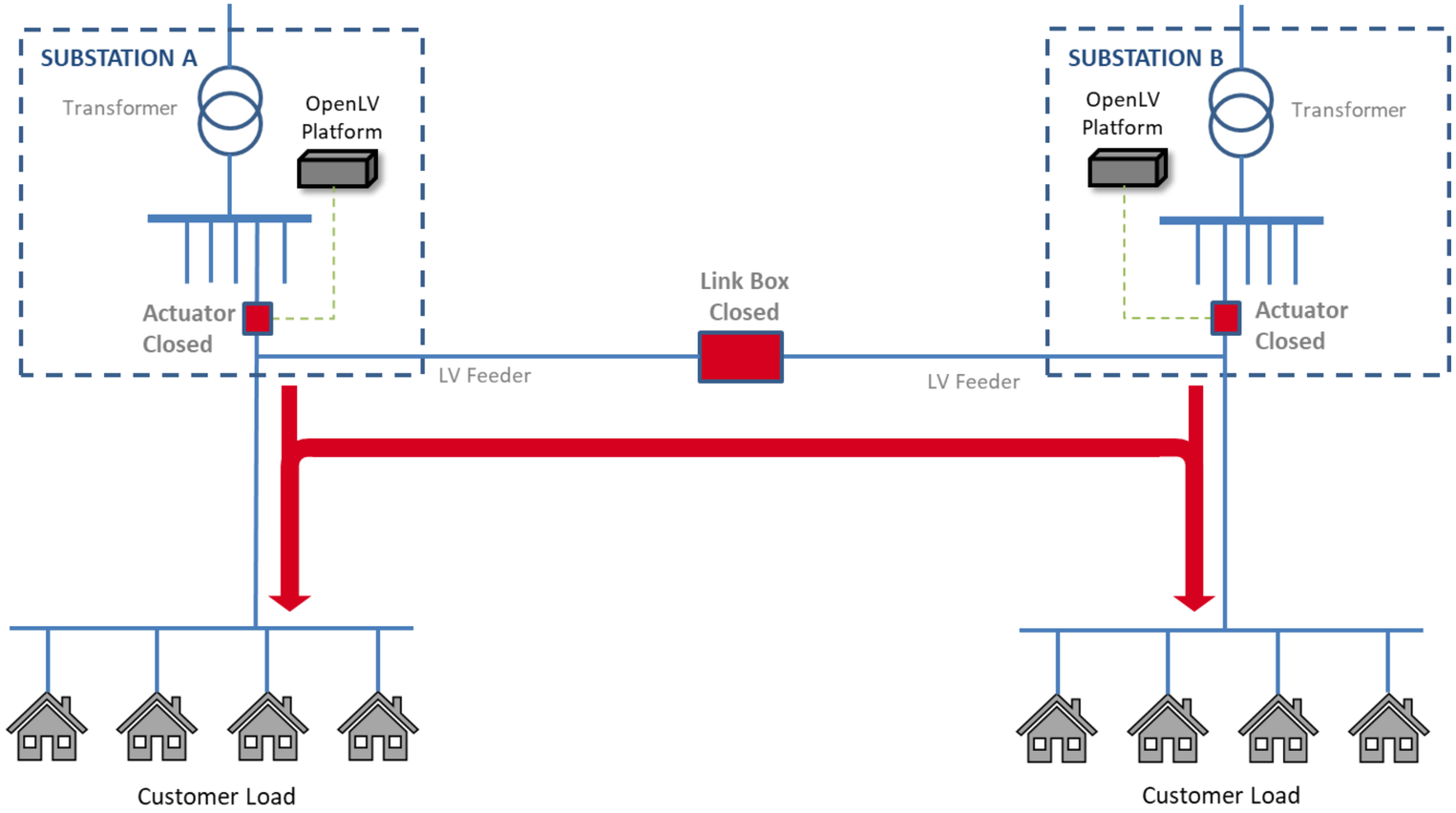
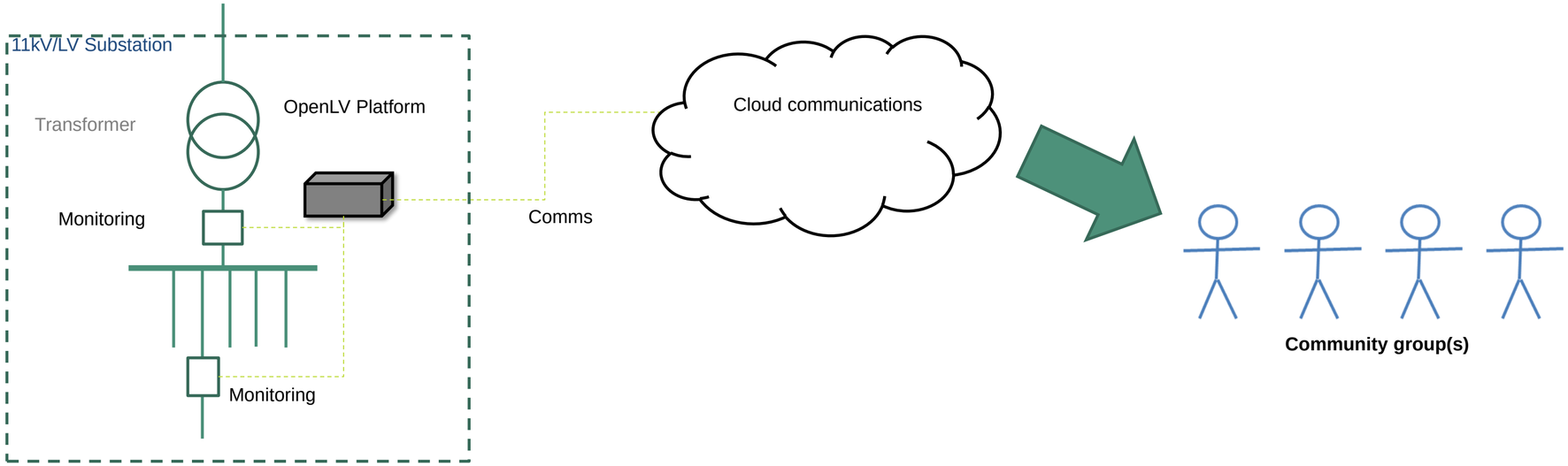
MESHING THE NETWORK



COMMUNITY ENGAGEMENT



What

- To work with key community groups to understand whether apps can be developed and installed on the platform
- Identify funding sources that customers / communities can use to develop specific apps

How

- Community engagement to promote availability of platform / LV network data
- Make available 10 LV-CAP™ units for deployment
- Funding to develop specific apps to be raised outside of the project budget, e.g. public funding / private sector

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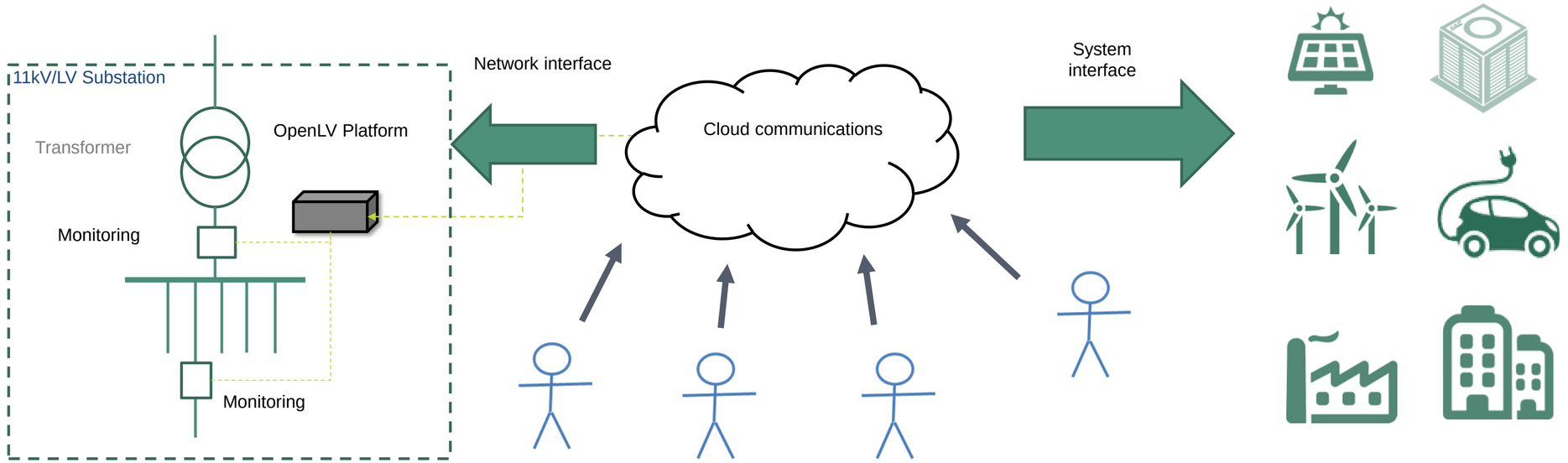
BUSINESS & ACADEMIA



What

- To enable companies to develop innovative algorithms and applications for either the DNO, or its customers

How

- Publicise the opportunity to 3rd parties
- Make available 10 LV-CAP™ devices for substation deployment
- Funding to develop specific apps to be raised outside of the project budget

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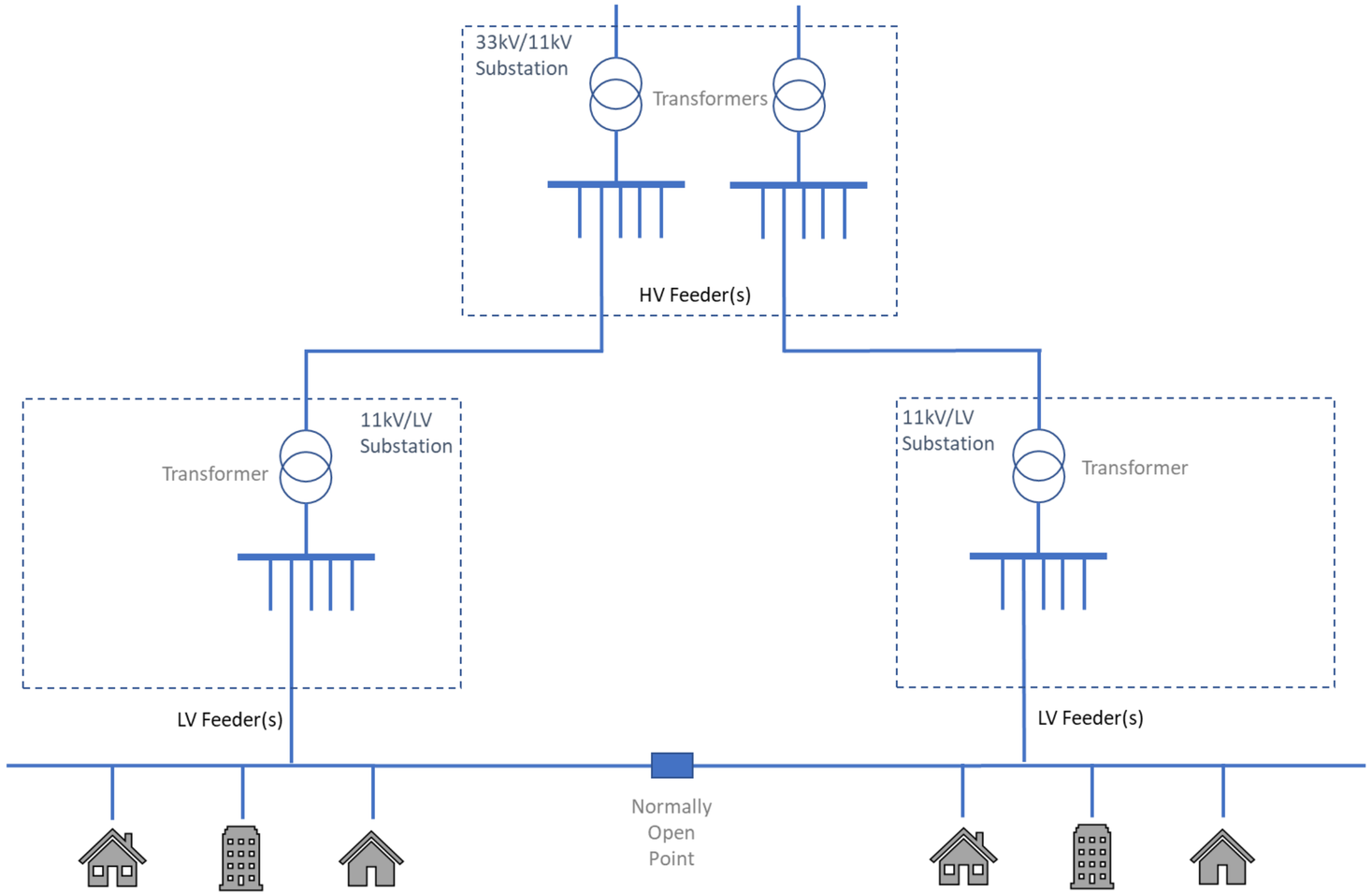
SYSTEM ARCHITECTURE



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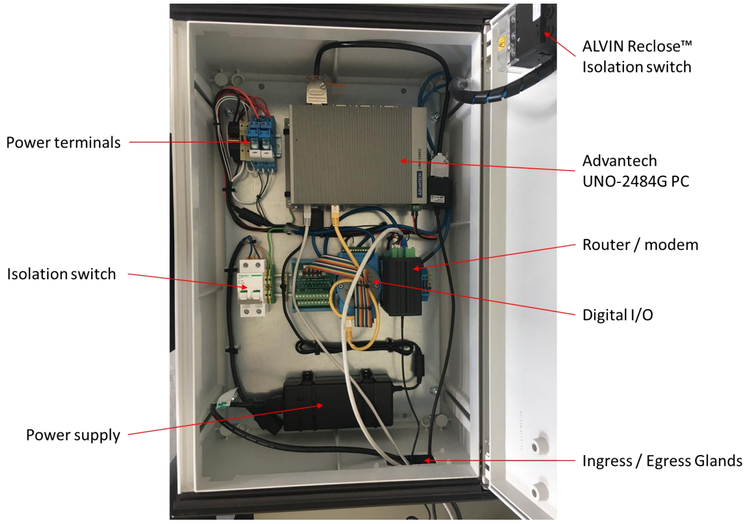
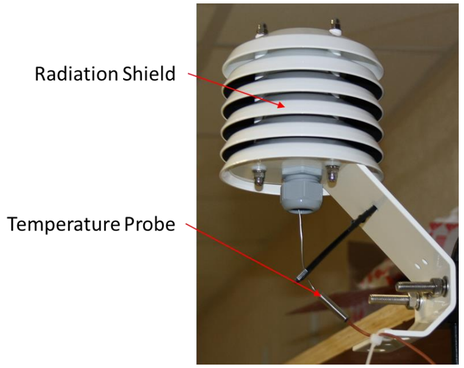
OPENLV HARDWARE

- Intelligent Substation Device (ISD) Enclosure
  - LV-CAP™ platform
  - Communications
- Monitoring
  - Lucy Electric GridKey MCU520
  - Thermocouple sensors
- LV Network Automation
  - ALVIN Reclose™ devices





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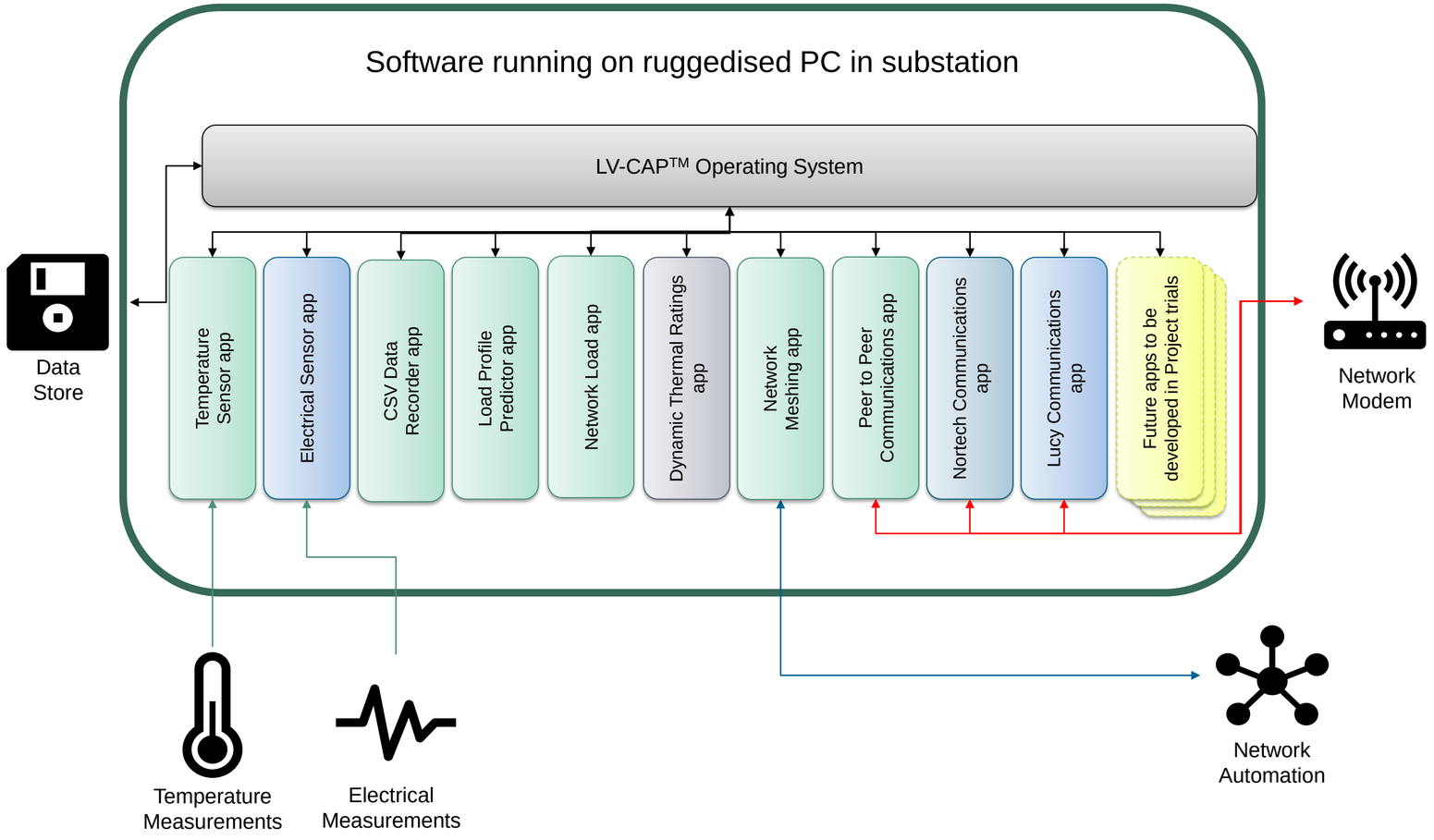
OPENLV SOFTWARE



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WHEN ARE WE DOING IT?

Phase 1 Mobilise & Procure

- Set Up full Project Team (Jan-17 to Jul-17)

Phase 2 Design & Build

- Central Infrastructure (Mar-17 to Sep-17)
- Initial Field Tests (Oct-17 to Jan-18)
- Hardware Available for All Methods (Dec-17)

Phase 3 Trial, Consolidate & Share

- Project Trial Period (Mar-18 to Oct-19)
- Reporting and Dissemination (Nov-19 to Apr-20)

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CORE DELIVERABLES

1. Specification, design and Factory Acceptance Testing of the overall Solution (Oct-17)

2. Detailed trial design identification of target networks and assessment of market potential (May-18)

3. Learning from deployment of the Solution & standard guidelines for app development (Feb-19)

4. Learning from the project trials (Jan-20)

5. Knowledge capture, dissemination & transfer to BaU (Apr-20)

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KEY COMPANIES/SUPPLIERS

WESTERN POWER DISTRIBUTION

regen
transforming energy

Centre for Sustainable Energy

nccgroup

impulse
INDUSTRIAL COMPUTING | EMBEDDED SOLUTIONS

nortech
... simple and elegant solutions for monitoring remote assets reliably and economically

ea technology

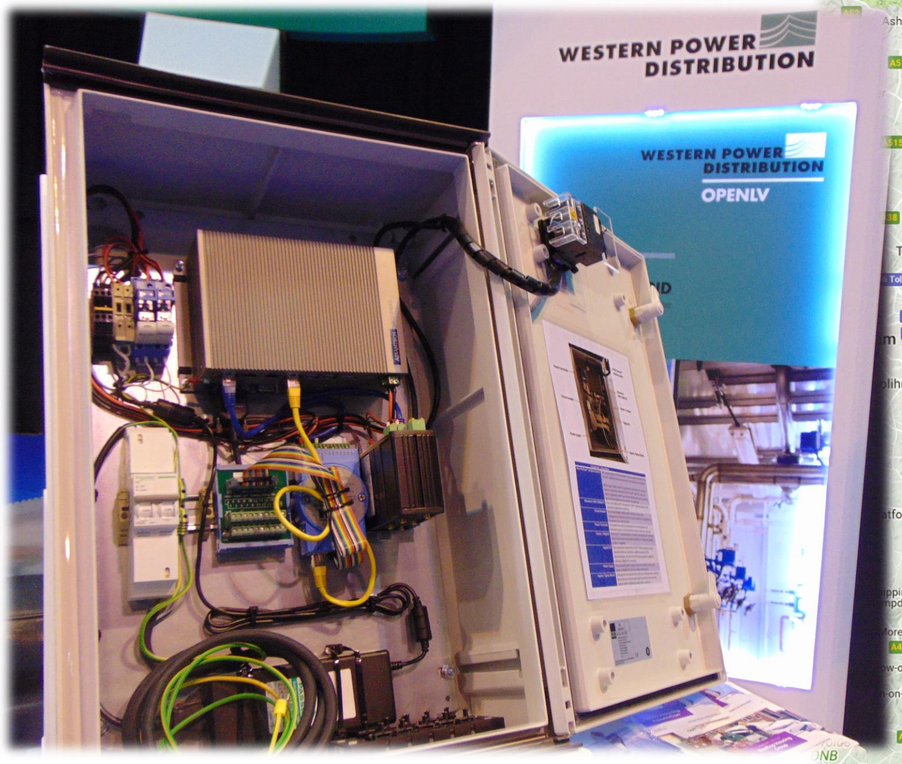
Promote
Marketing & communication

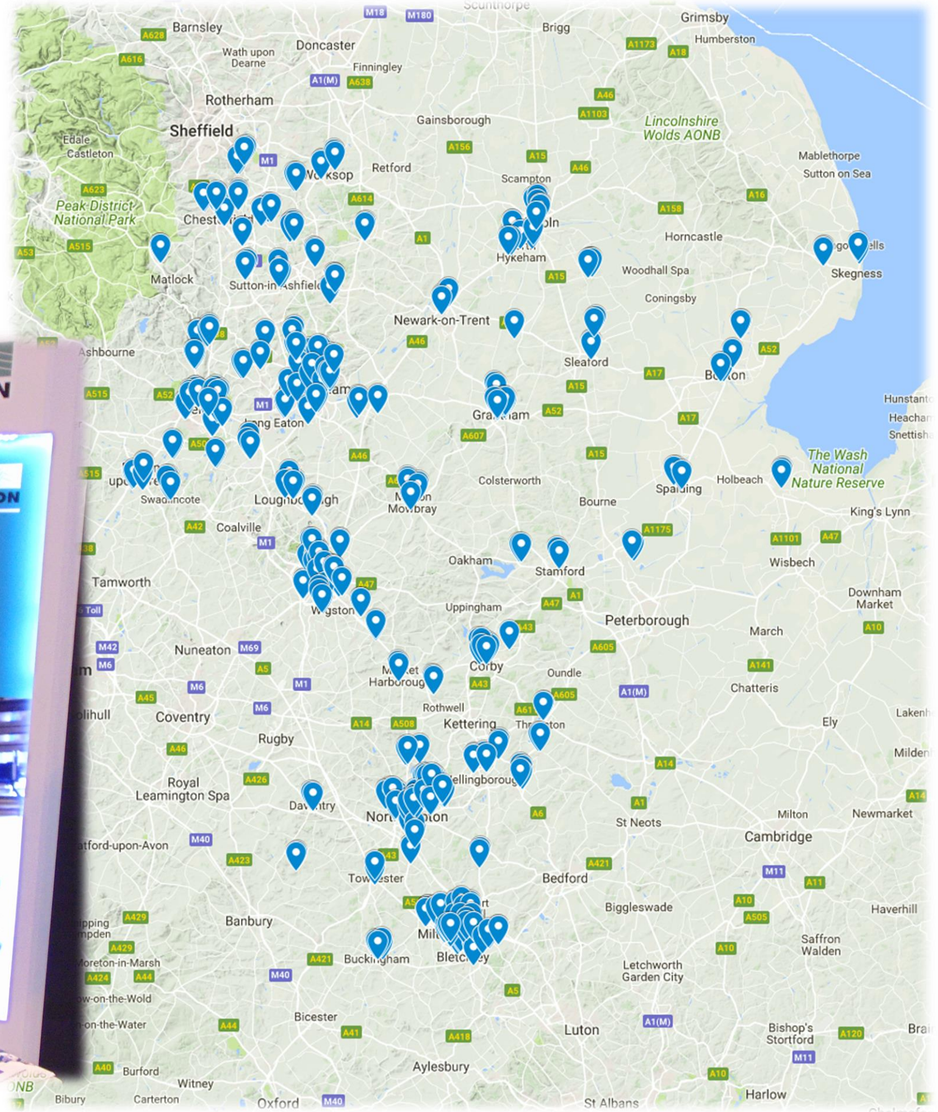
Lucy Electric

GRIDKEY

OPENLV : METHOD 1 – PURPOSE

- Network Assessment
- Capacity Release
- BAU Comparison
- Plus additional specific technical learning.





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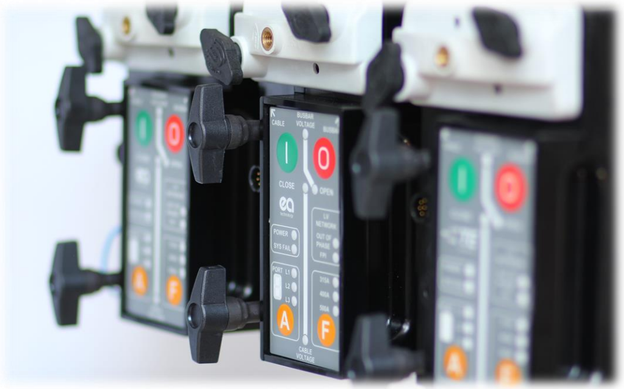
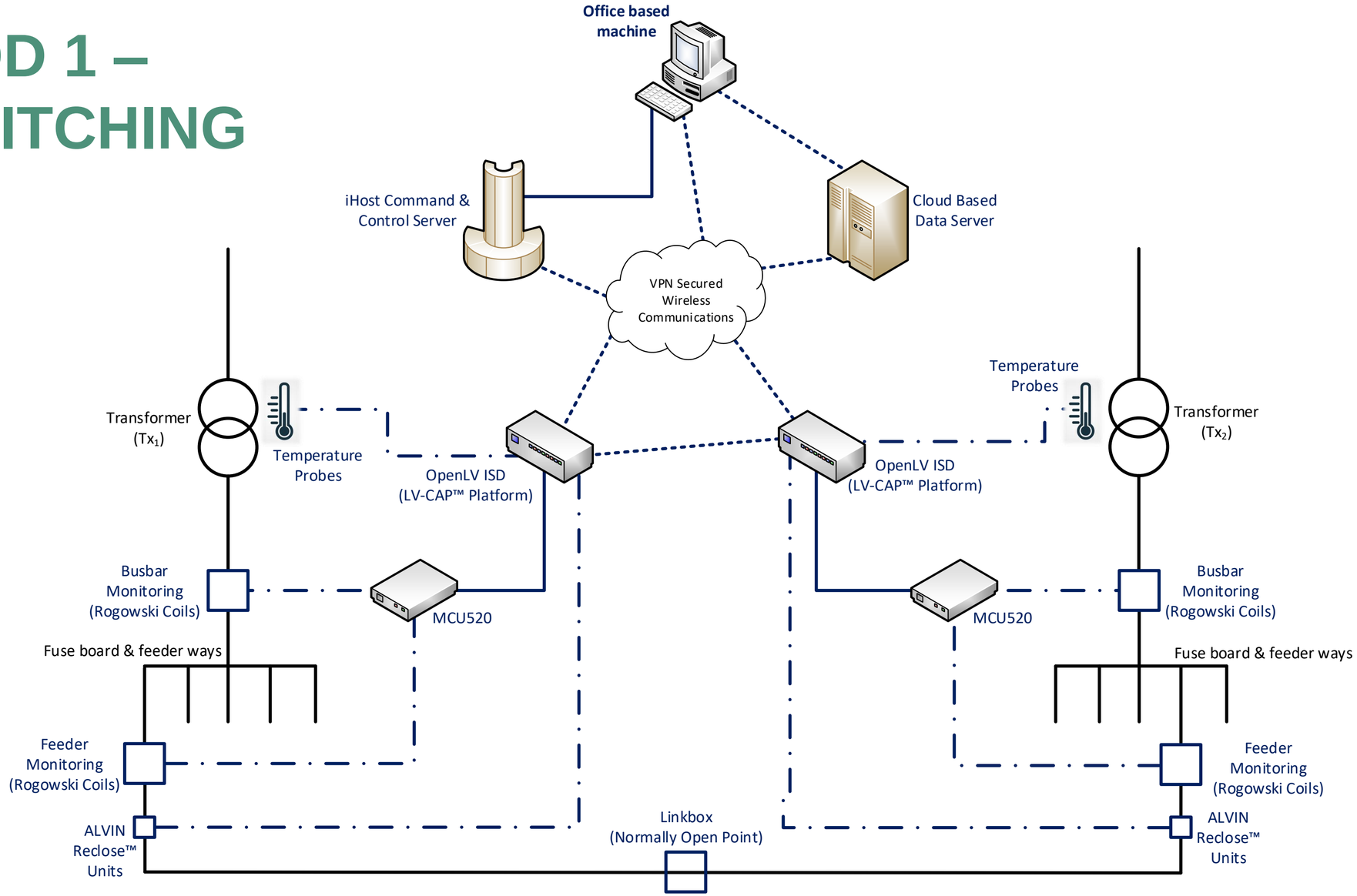
OPENLV: METHOD 1 – DEPLOYMENTS

Simulation Units

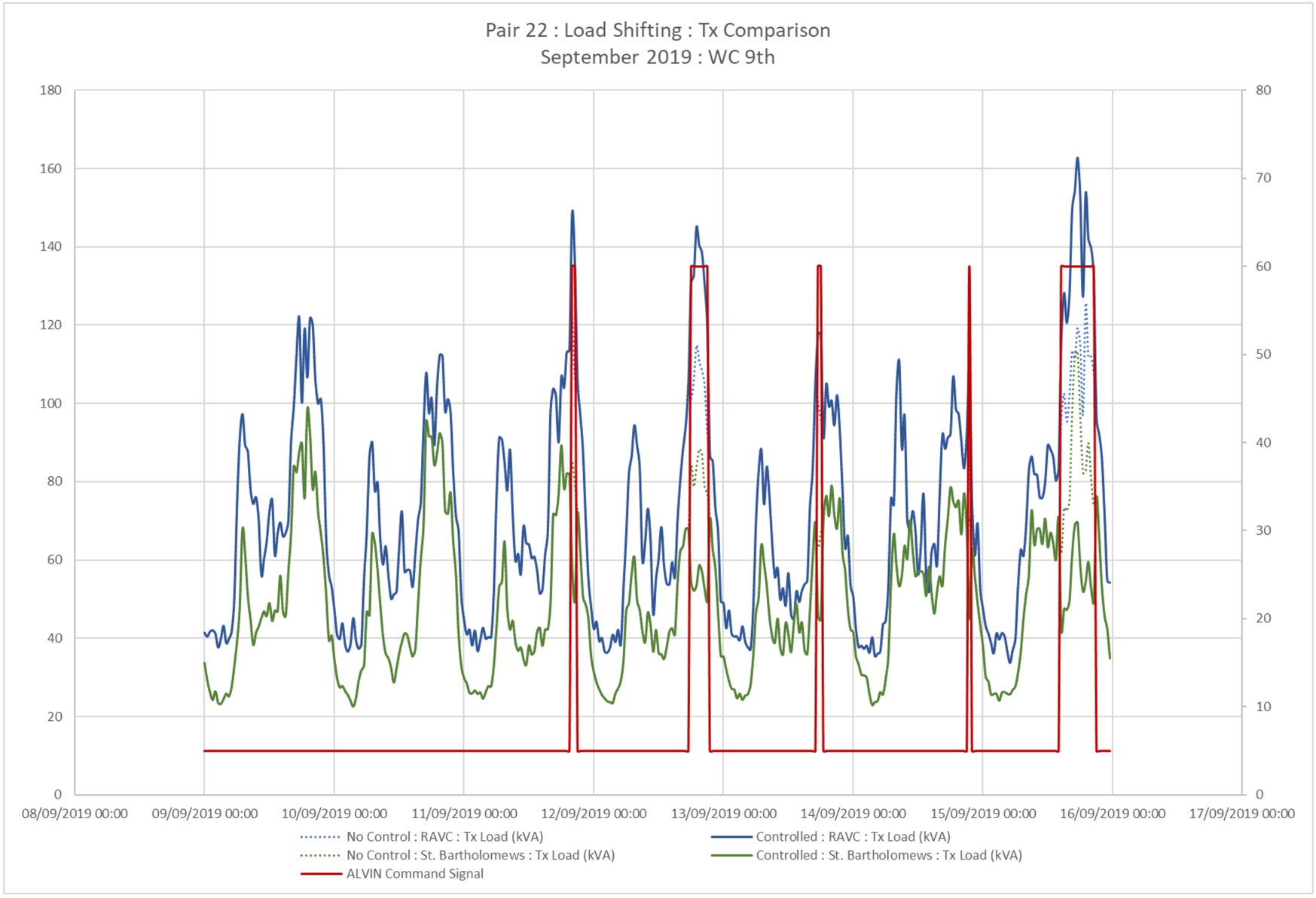
Autonomous Control

OPENLV: METHOD 1 – AUTOMATED SWITCHING METHODOLOGY





OPENLV: METHOD 1 – AUTOMATED SWITCHING



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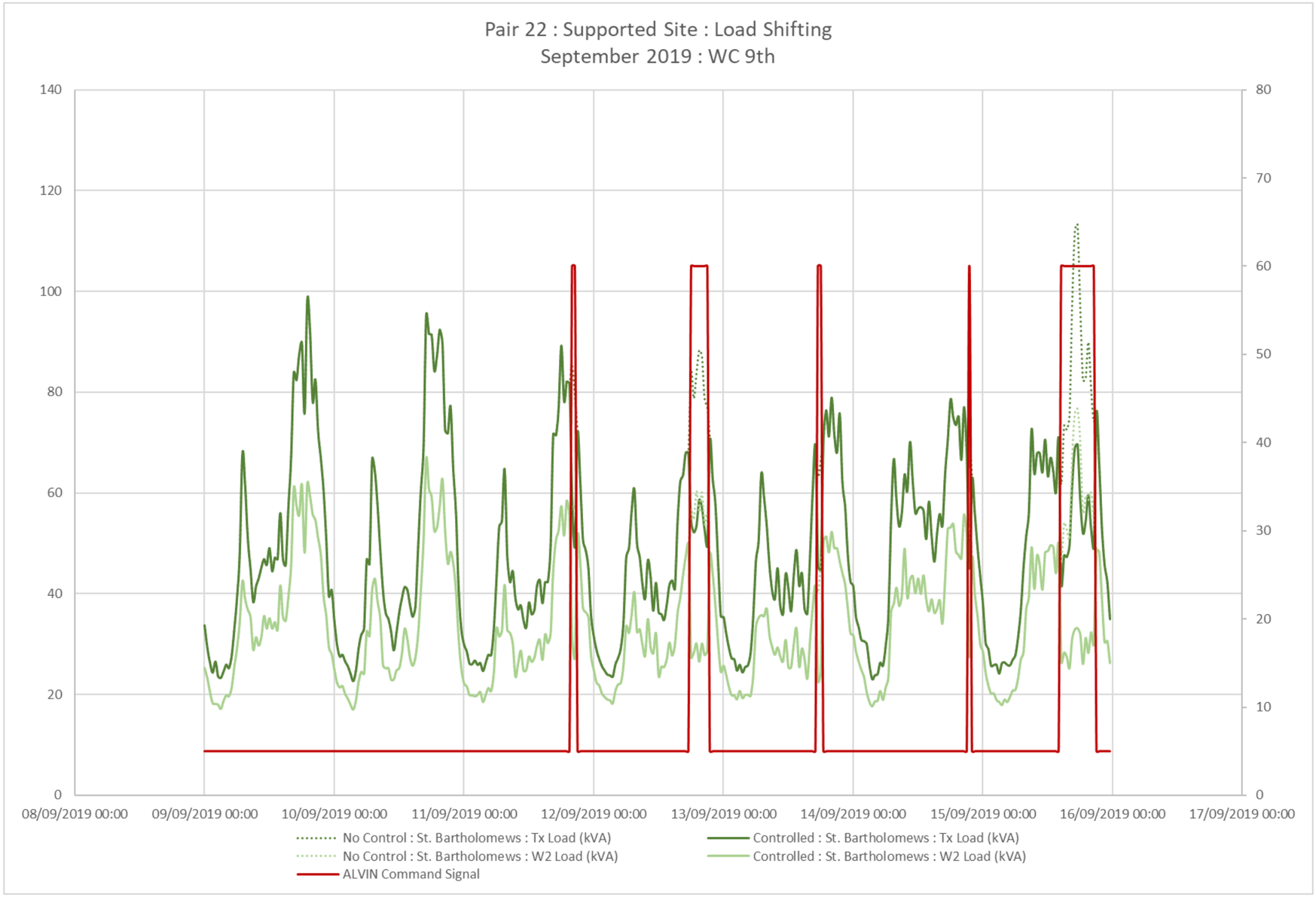

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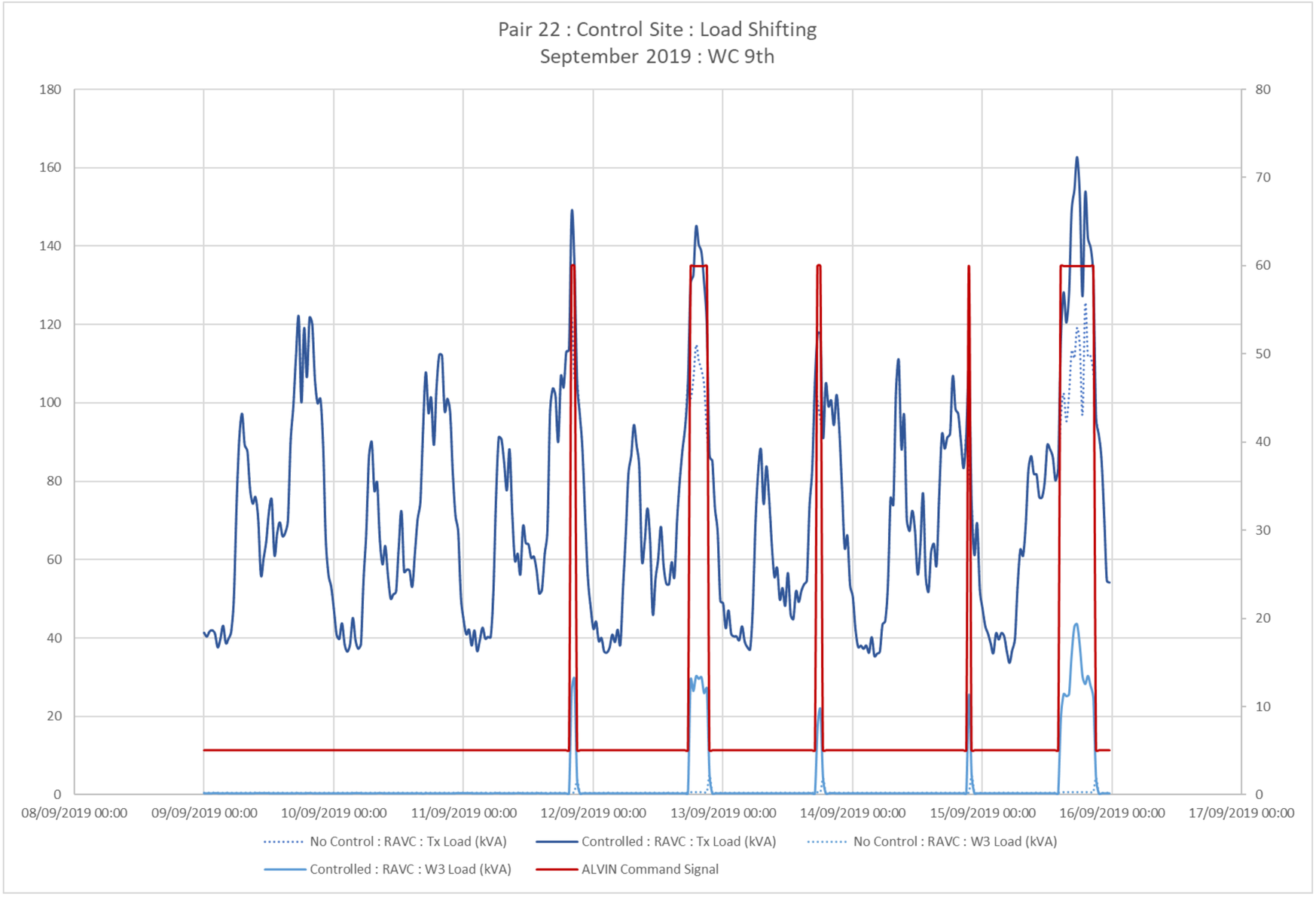

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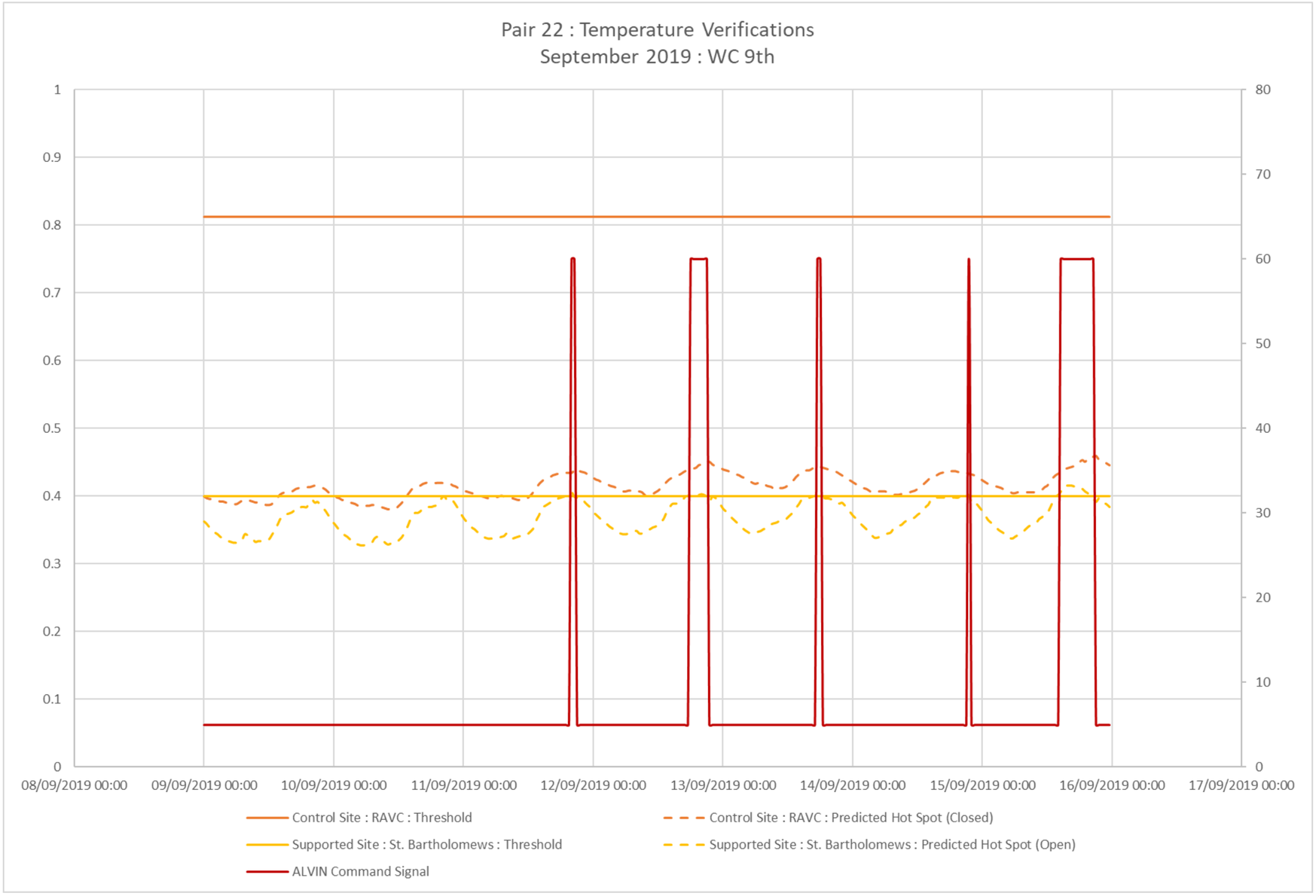

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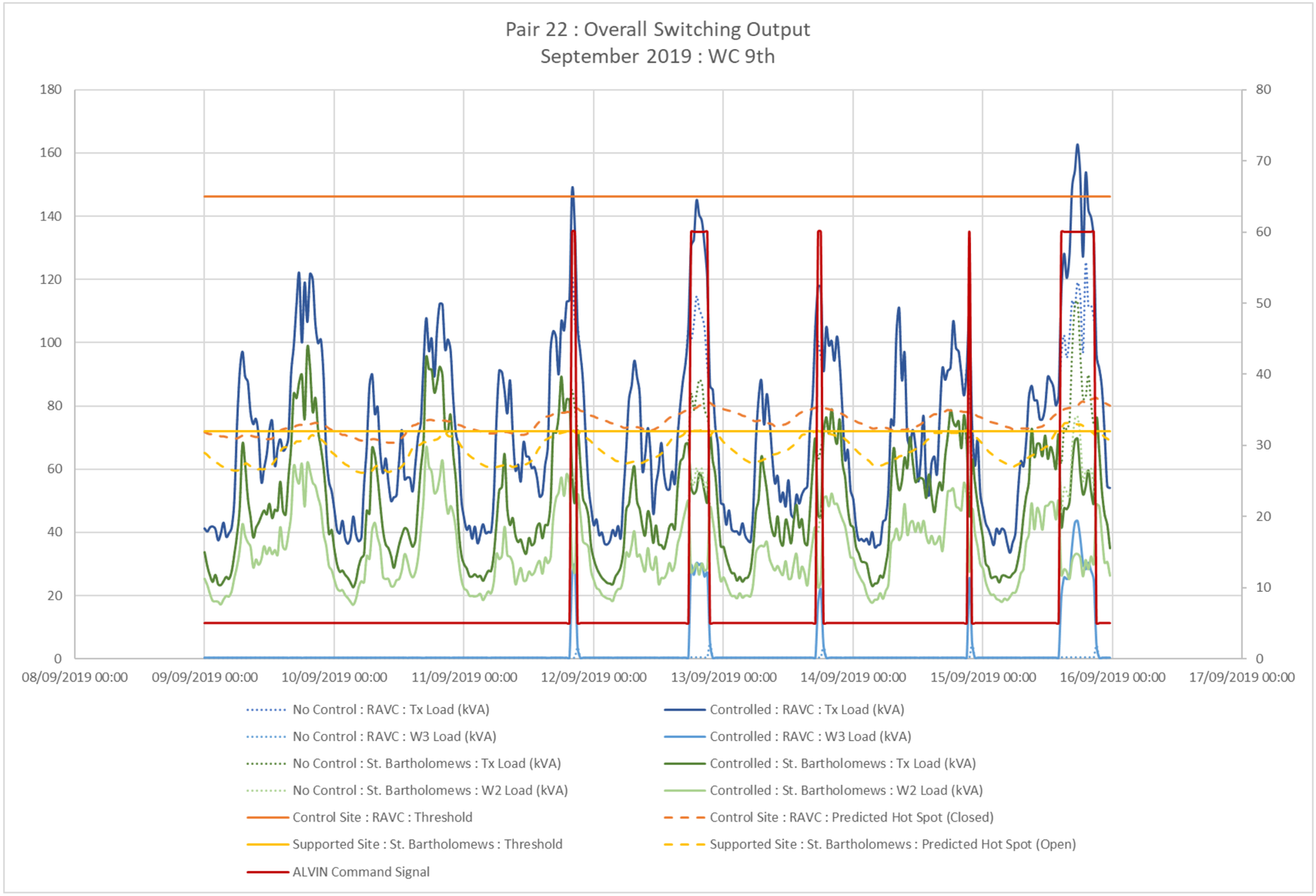

OPENLV: METHOD 1 – LEARNING

- Method 1 specific:
  - Meshing network as a standalone operation.
  - Dynamic Thermal Rating.
  - Predicting and responding.

- But…
  - Active control sites were chosen to test the ‘proof of concept’ in a safe manner.
  - Not representative of locations that may require support.

- Distributed Intelligence works
  - Reduced data transmission.
  - Deployable to areas with suboptimal communications.
  - Configurable to suit the needs of individual substations.
  - Measurable benefits without human interaction.