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Interoperable Demand Side Response

Demonstrations of DSR Systems in
Settings Indicative of the Real World



Department for
Energy Security
& Net Zero

The IDSR programme is part of the up to £65m [Flexibility Innovation Programme](#) within the Department for Energy Security and Net Zero's £1 billion [Net Zero Innovation Portfolio](#)

Commercial-in-Confidence

Project Overview

IDSR – Demonstrations of DSR systems in settings indicative of the real world

Objectives:

- To demonstrate and report on the DSR capabilities of IDSR programme ‘energy smart appliances’ operating according to PAS 1878/1879

Scope:

- Inputs: PAS 1878/1879 (includes OpenADR), IDSR programme use cases
- A mix of ‘energy smart appliances’ (EV chargers, heat pumps, battery storage...) and DSRSP platforms
- Measure and report on performance in delivering a range of DSR services (reduce, increase, delay, or ‘smooth’ energy demand)
- Demos, reports and showcase presentations

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- Consortium lead and project management
- Ensure project deliverables address key target outcomes
- Analysis of DSR scenarios, development of test schemes and processes



- Physical assets and test/demo environment
- Analysis of DSR scenarios and development of test schemes and processes
- Host and manage Performance Testing projects



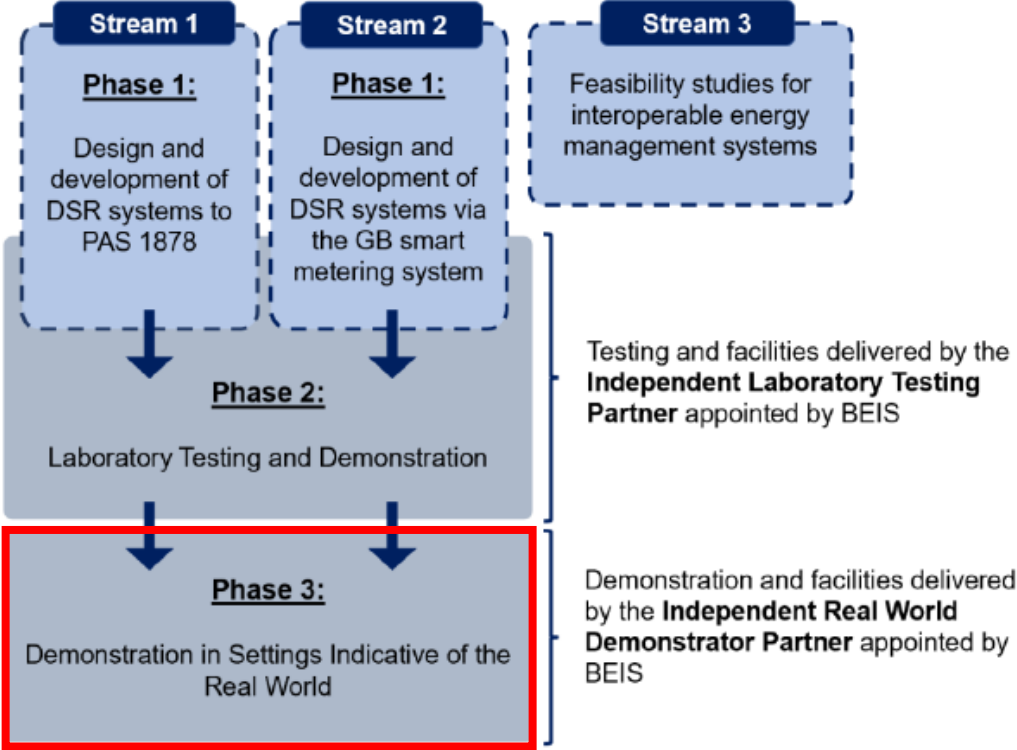
- Provide real-world context with technical and commercial perspectives
- Contribute to analysis of DSR scenarios and test schemes



- Contribute to use case development for specific DSR scenarios
- Support monitoring and verification of OpenADR messages in real-world scenarios

Context

IDSR programme has 2 test phases



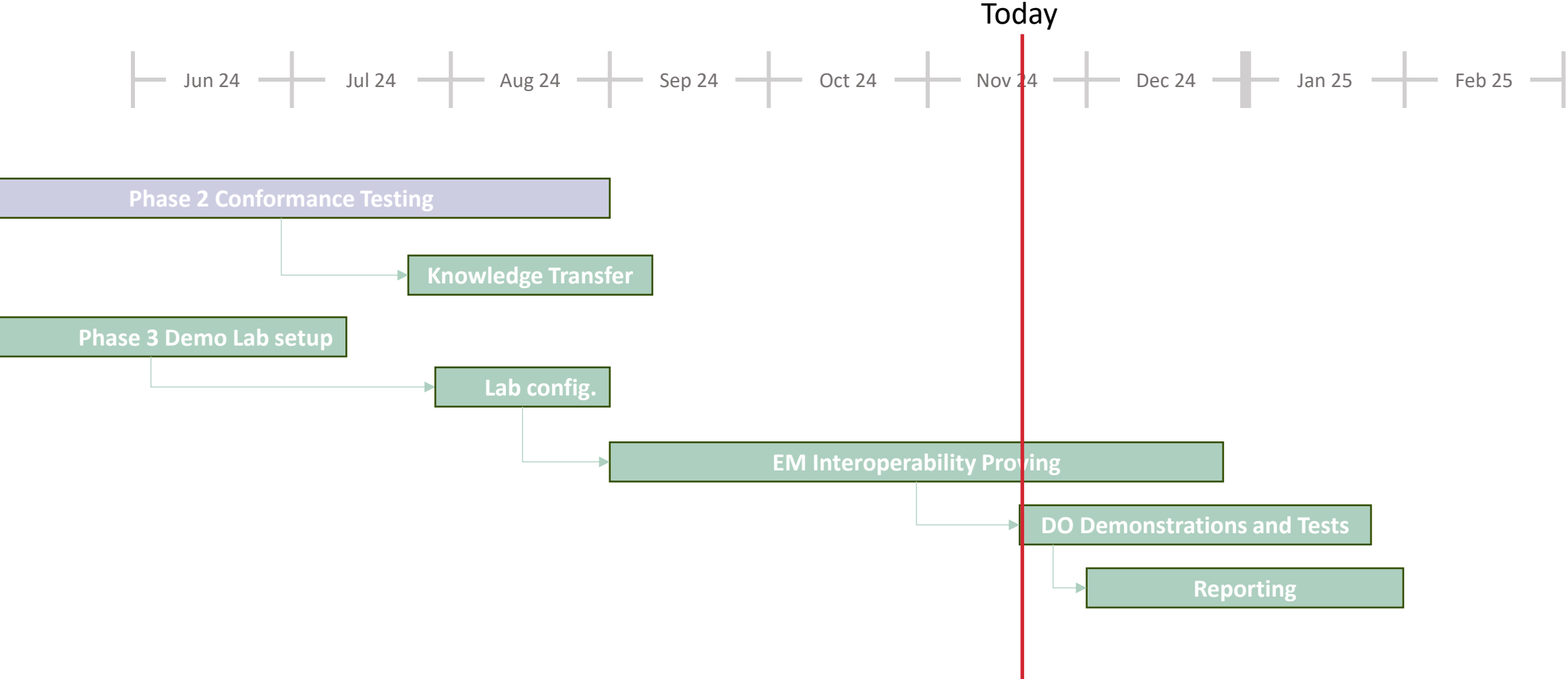
Phase 2 / Lot 1 Testing

- Individual products: ESA, DSRSP
- Validate compliance with specifications and standards
- Basic interoperability

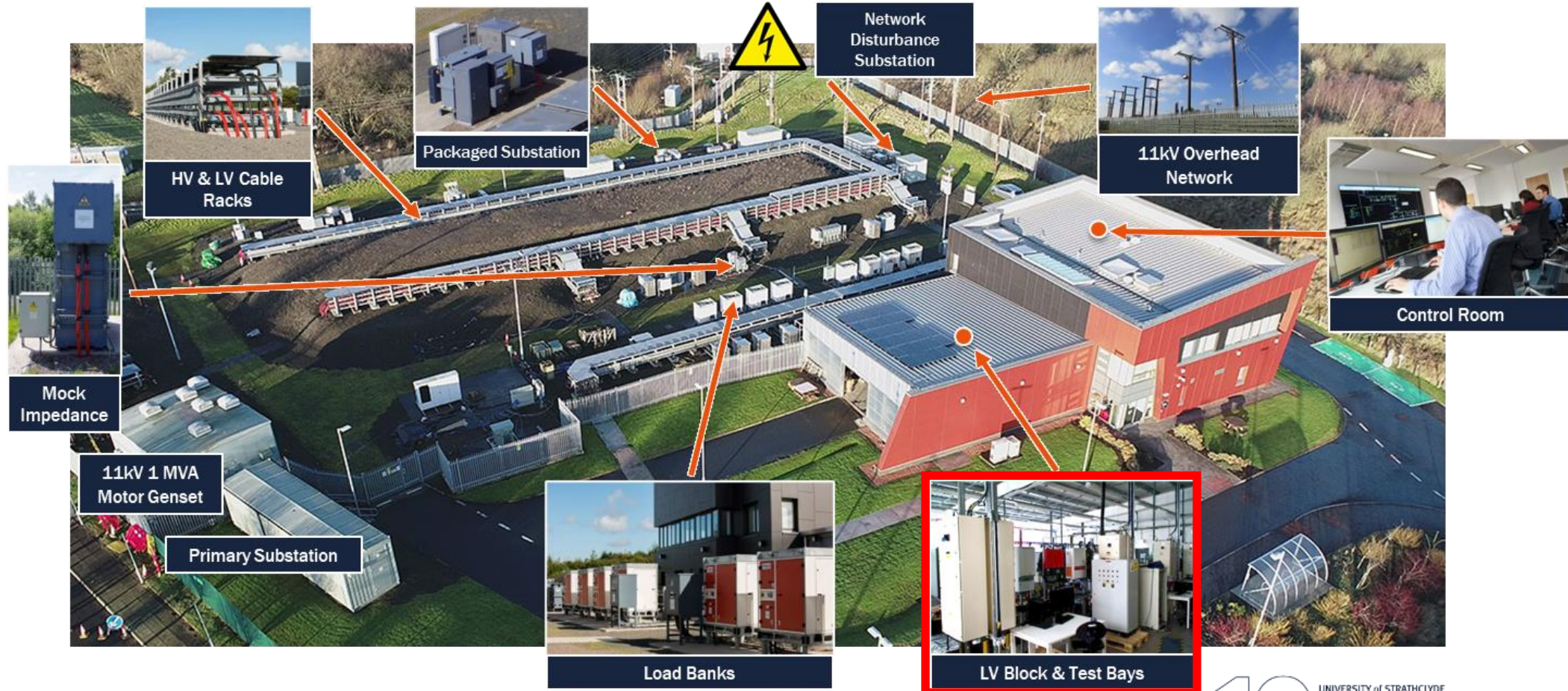
Phase 3 / Lot 2 Demonstrations

- Multiple ESAs
- Larger interoperability groups
- System-level scenarios and use cases

Timeline and Status



Settings Indicative of the Real World?



Demonstration Environment Status



Main distribution board

EV Charger test rigs in
background

Demonstration Environment Status



EV charger test rig control circuits



Controllable load bank for EV test rig

Demonstration Environment Status



EV Charge Points



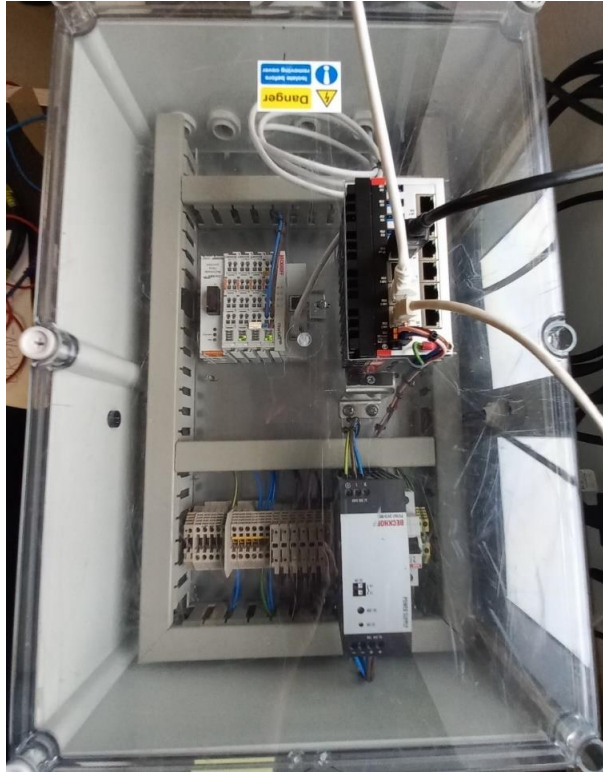
Heating Systems

Demonstration Environment Status



Thermal test rig for wet ESAs

Demonstration Environment Status

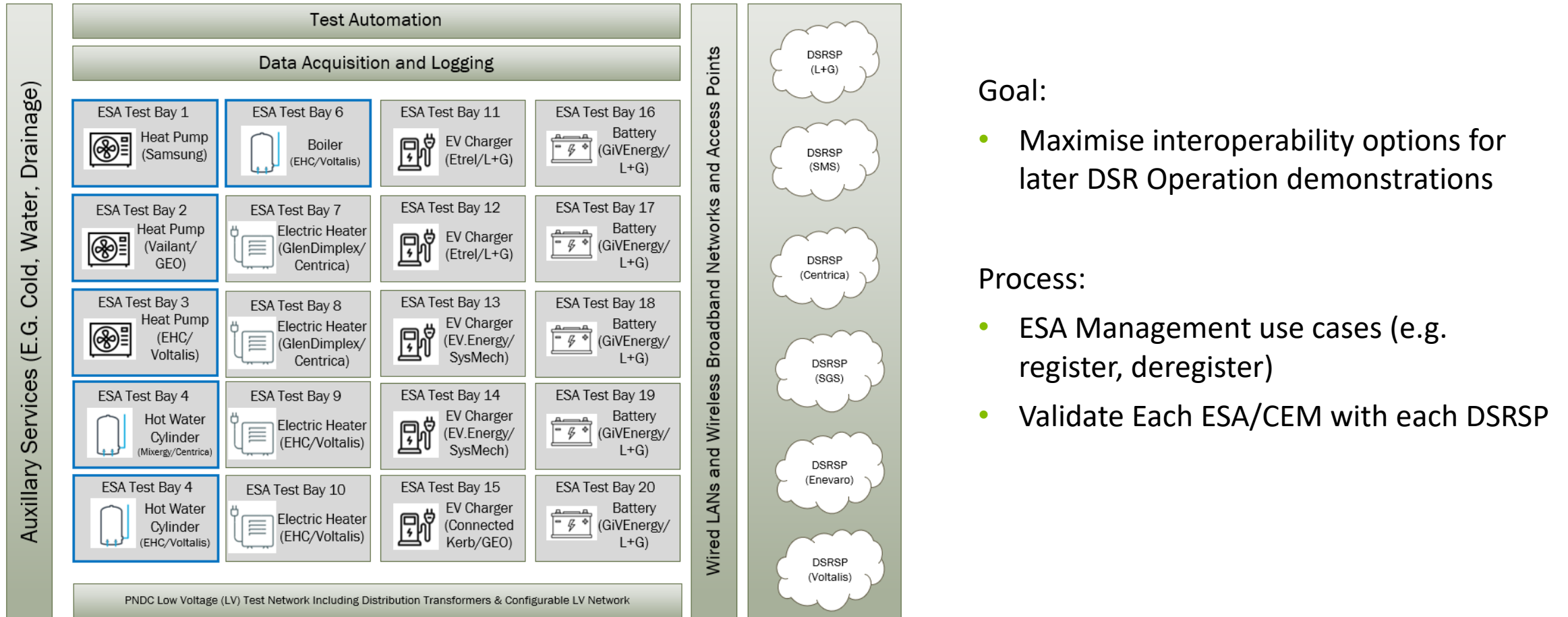


Data acquisition



Monitoring and analysis

ESA Management Interoperability Phase



Detailed Demonstration Cases

Every Use Case - Every DSRSP - All Available ESAs

IDSR Programme Use Cases	
A	Consumer registering DSR appliance with CEM (where not integrated)
B	Consumer registering with the appointed DSRSP
C	Consumer defining DSR preferences
D	Routine DSR mode of operation based on preferences tariff (ToU)
E	Sending power profiles from ESA to CEM and to DSRSP
F	Response DSR mode of operation
G	Consumer over-ride of DSR response mode and routine mode
H	DSRSP maintaining DSR service delivery despite availability changes
I	Consumer de-registers ESA from CEM and DSRSP
J	Change of incentive information
K	Consumer changes DSRSP

ESA Management Cases

DSR Operation Cases

Starting conditions

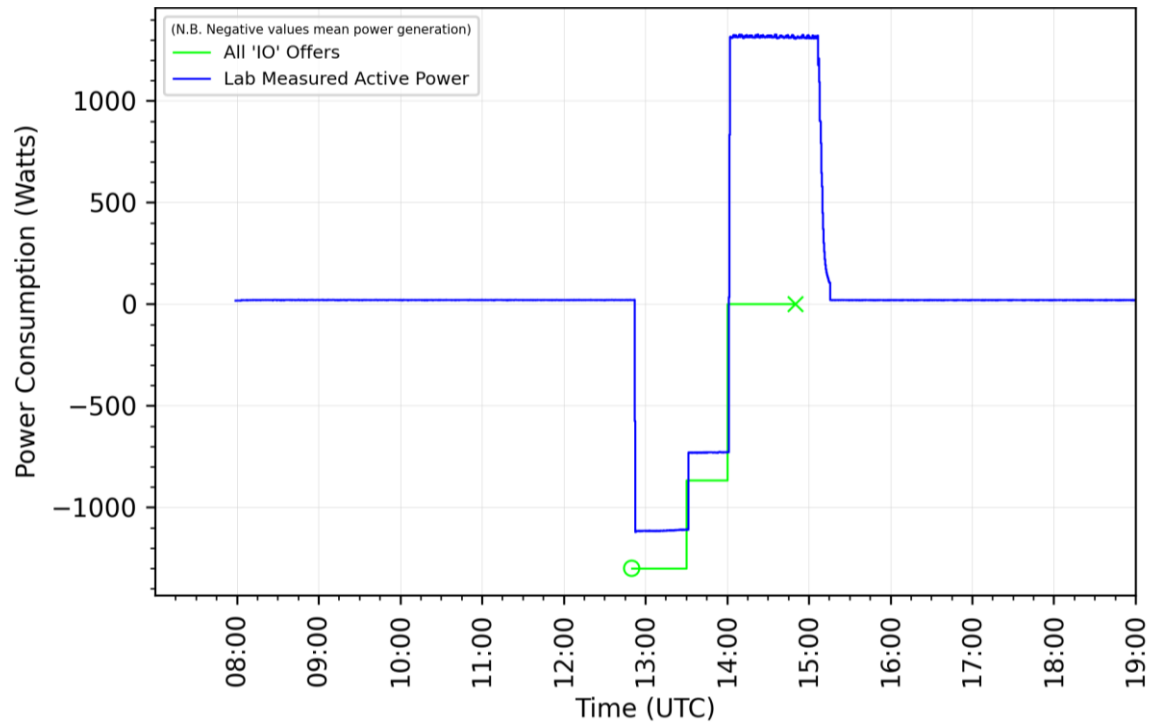
- ESAs are commissioned and registered with a DSRSP
- ESA user settings have been configured
- ESAs have provided flexibility offers to the DSRSP
- Demand under Intended Operation is known/predictable

Demonstration initiation: DSR Service Request is submitted to the DSRSP, specific to a Programme Use Case

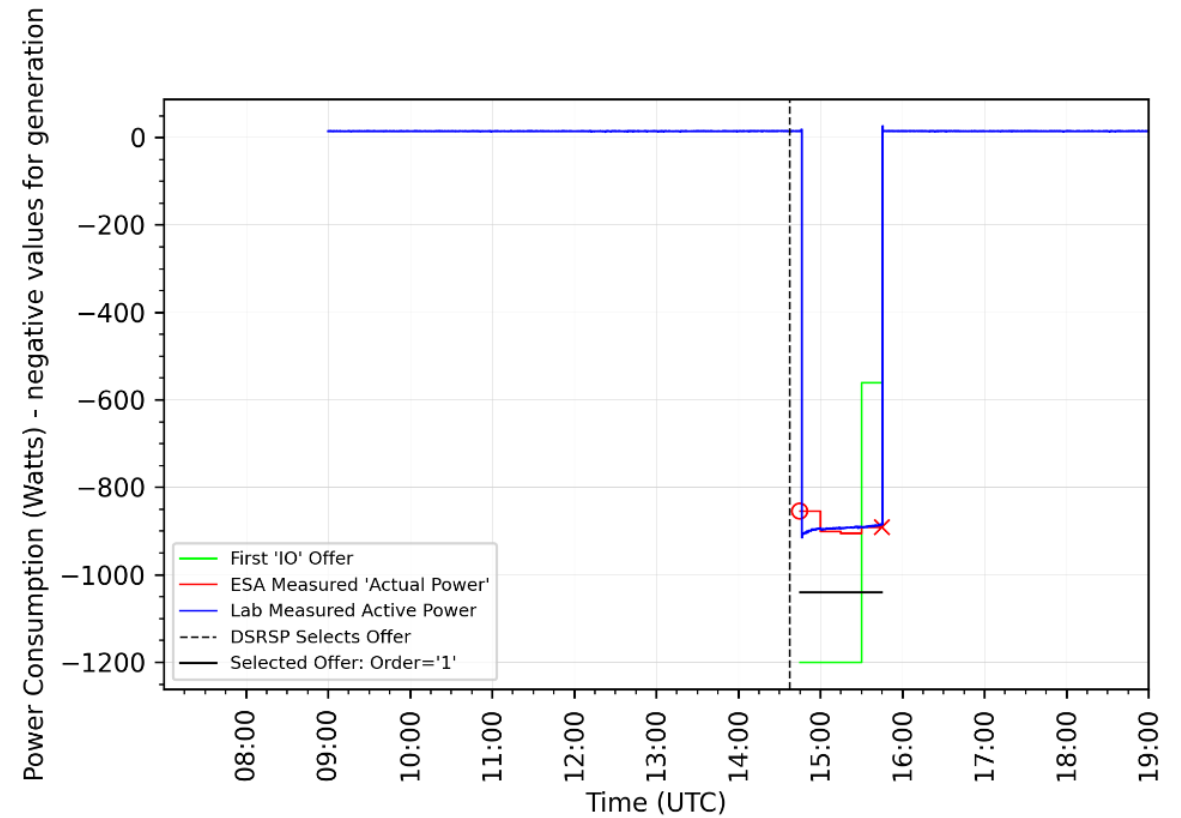
Performance assessment is a comparison between:

- ESA/CEM aggregated Intended Operation forecast
- Forecast demand of selected offers
- ESA/CEM reported power usage during DSR event
- Lab measured power usage during the demonstration

Example DSR Operation Output Data (single ESA)



Routine Mode



Response Mode

Target Outcomes & Outputs

In support of accelerated adoption of domestic DSR

- Feedback to funded projects on interoperability and performance of ESAs and DSRSPs in simulated real-world conditions
- Contribute to lessons learned, for continuing standards development – future PAS 1878 revisions and regulatory intervention
- Data and summary findings from the study will be available to extrapolate to larger scale and inform design work on future energy networks

