Laboratory Testing & Demonstration IDSR-S4 Lot 1 Project

Overview and Learnings

OpenADR++ Users Conference Europe

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ELECTRICITY | GAS | INDUSTRY EXPERTS

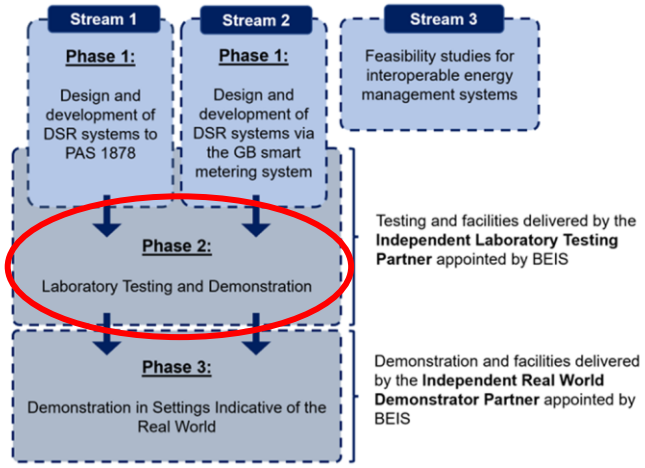
The Lot 1 Consortium
Laboratory Testing and Demonstration

Engage Consulting is a subject matter expert consultancy that provides advisory and project management services throughout the energy sector, specialising in the regulatory, commercial and technological aspects of the evolving energy and retail market landscapes.

NMi is the leading independent specialist for testing, certification and training in the field of metrology.

SMS provides end-to-end services offering smart metering, data & energy management, and utility infrastructure solutions.

The IDSR Programme



The four categories of energy smart appliance (ESA) are:

1. Electric vehicle charge points (including vehicle-to-X devices)
2. Battery storage
3. Electric heating, ventilation, and air conditioning (HVAC), including heat pumps, storage heaters and heat batteries
4. White goods*

*White goods in this Programme refers to cold and wet appliances such as refrigerators, freezers, washing machines, tumble dryers, and dish washers.

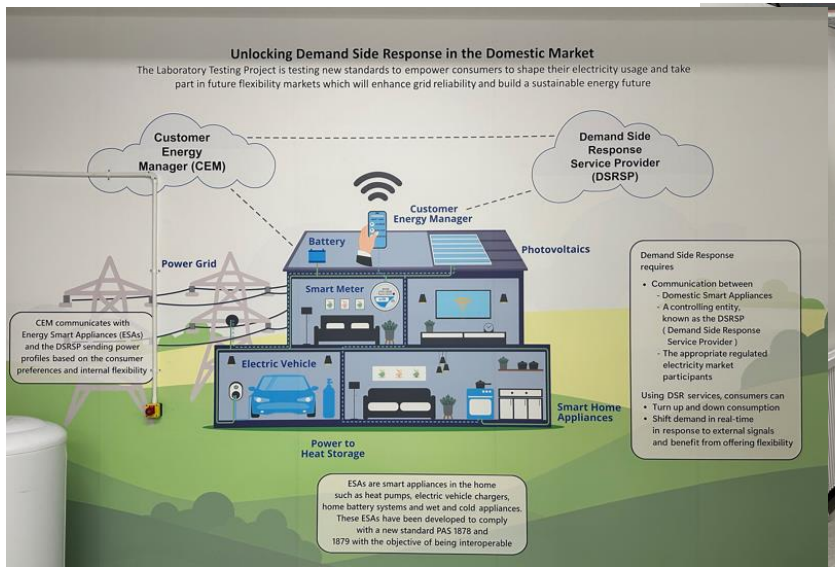
- **Stream 1:** development and demonstration of energy smart appliances to deliver interoperable demand side response according to **PAS 1878 and 1879 (6 Projects).**
- **Stream 2:** development and demonstration of energy smart appliances to deliver interoperable demand side response via the **GB smart metering system (2 projects).**

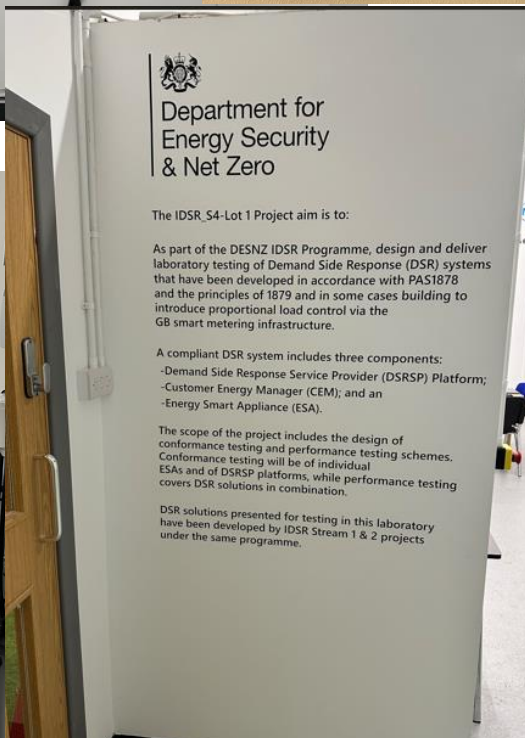
- **Stream 4 Lot 1: Design and delivery of laboratory testing** of DSR systems, including the design of conformance testing and performance testing schemes. Conformance testing will be of individual products (ESAs) and of DSRSP platforms, while performance testing will cover products and platforms in combination.
- **Stream 4 Lot 2: Design and delivery of demonstration of DSR systems in a setting indicative of the real world**. Demonstration will be of multiple products and platforms in combination to produce a meaningful change in demand for grid control purposes.

Lot 1 Project Overview
Design and delivery of laboratory testing

- Phase 1 (Sept 2022 > June 2023)
  - **Stream 1 & 2 projects designed, developed and tested their DSR solutions prior to presenting for Lot 1 testing.**
  - **The Lot 1 project was initiated in September 2022 taking 2/3 months to fully mobilise.**
  - **NMi designed and developed Conformance and Performance Testing Schemes to independently test the DSR solutions.**
  - **SMS and Engage designed the Test Environment and the practical implementation of the scheme, the Test Plan, supported by a Detailed Implementation Plan (DIP)**
- Phase 2 (July 2023 > August 2024)
  - **Projects were delayed leading to NMi and Engage initiating an extended self assessment of pre-conformance process to understand the level of conformance being achieved.**
  - **The Lab was built, and test rigs installed and commissioned.**
  - **Some pre-testing activity was initiated with the first project to validate our process and test stubs in January 2024.**
  - **The first Conformance test was run in February 2024 and ended of August 2024, and we supported a transition of knowledge to Lot 2 through August and September.**
  - **Final reporting was developed through September and finalised in October.**

The SMS IDSR Lab in Bolton





Lot 1 Project Overview
Design and delivery of laboratory testing

IDSR-S4 Lot 1 Testing Framework

Phase 2

		Conformance Testing Test Run 1: ESA / CEM				Conformance Testing Test Run 2: DSRSP			Performance Testing in Group Test Run 3: ESA / CEM & DSRSP				Interoperability Demonstration Test Run 4: Interoperable Groups			
Stream 1 PAS 1878	Samsung	ESA(s)	CEM 1	Test Cycles	DSRSP (Stub)	DSRSP Platform 1	Test Cycles	CEM (Stub)	DSRSP Platform 1	CEM 1	ESA(s)	Test Cycles	DSRSP Platform 1	CEM 2	ESA(s)	Test Cycles
	GEO	ESA(s)	CEM 2	Test Cycles	DSRSP (Stub)	DSRSP Platform 2	Test Cycles	CEM (Stub)	DSRSP Platform 2	CEM 2	ESA(s)	Test Cycles	DSRSP Platform 2	CEM 1	ESA(s)	Test Cycles
	Landis + Gyr	ESA(s)	CEM 3	Test Cycles	DSRSP (Stub)	DSRSP Platform 3	Test Cycles	CEM (Stub)	DSRSP Platform 3	CEM 3	ESA(s)	Test Cycles	DSRSP Platform 3	CEM 4	ESA(s)	Test Cycles
	Systems Mechanics	ESA(s)	CEM 4	Test Cycles	DSRSP (Stub)	DSRSP Platform 4	Test Cycles	CEM (Stub)	DSRSP Platform 4	CEM 4	ESA(s)	Test Cycles	DSRSP Platform 4	CEM 3	ESA(s)	Test Cycles
	Centrica	ESA(s)	CEM 5	Test Cycles	DSRSP (Stub)	DSRSP Platform 5	Test Cycles	CEM (Stub)	DSRSP Platform 5	CEM 5	ESA(s)	Test Cycles	DSRSP Platform 5	CEM 6	ESA(s)	Test Cycles
	Voltalis	ESA(s)	CEM 6	Test Cycles	DSRSP (Stub)	DSRSP Platform 6	Test Cycles	CEM (Stub)	DSRSP Platform 6	CEM 6	ESA(s)	Test Cycles	DSRSP Platform 6	CEM 5	ESA(s)	Test Cycles
*Stream 2 Projects are Out of Scope of Conformance Testing																
Stream 2 Smart Metering System Projects	Landis + Gyr*	ESA(s)	SAPC Project Review 1						DSRSP Platform 7	CEM 7	ESA(s)	Test Cycles	DSRSP Platform 7	CEM 8	ESA(s)	Test Cycles
	Chameleon*	ESA(s)	SAPC Project Review 2						DSRSP Platform 8	CEM 8	ESA(s)	Test Cycles	DSRSP Platform 8	CEM 7	ESA(s)	Test Cycles

Conformance Testing

- **Test Run 1: CEM/ESA** are under test, to test this component the SMS DSRSP Test Stub was used to emulate the DSRSP connectivity and messaging.
- **Test Run 2: DSRSP** is under test, to test this component the SMS CEM Test Stub was used to emulate the CEM connectivity and the ESA messaging.

Performance Testing

- **Test Run 3: DSR Solution** is under test, validating the DSR Solution the project has developed (CEM/ESA(s) and DSRSP) is capable of performing a DSR Service.
- **Test Run 4: Interoperability Demonstration**, a replication of the scenario of a consumer switching their ESA to a different DSRSP, validating this is possible by connecting CEM/ESA from Project A to a different DSRSP Platform from Project B.

Achievements

1. There were many delays impacting projects timescales to present solutions for testing, despite that we undertook a reasonable amount of testing with all 6 Stream 1 projects.
2. We developed a scheme and broke down the PAS1878 into requirements and developed a set of Technical Use Cases providing a reference point for the development projects.
3. We developed test stubs, tools and process and continued to evolve the testing approach to reflects the learnings about PAS1878 and test stubs were made available to support project own testing.
4. We engaged with all projects throughout, implementing collaboration agreements to agree the approach to sharing information and completing pre-conformance statements.
5. Provided secure communications and to support collaborative issue resolution and exchange of information, established the first cross project connections in support of interop demonstrations.
6. Provided support and advice to the IDSR Programme, creating an open environment and transparent pathway for projects to enter testing through a governance framework.

5 Key Challenges and Learnings

1. **PAS 1878 was a good starting point; the programme and its projects have learnt valuable lessons and DESNZ have lots of valuable feedback for the future of the PAS 1878 and achieving the programme objectives.**
2. **The most challenging functional areas where we spent the majority if our available time was registration and response mode, we didn't find anything insurmountable, but it took more time than expected to understand the issues and resolve them.**
3. **The testing demonstrated that a level of interoperability could be achieved with the PAS 1878 from a message exchange perspective but not to a level that will support the use case of a consumer seamlessly switching their ESA to a new DSRSP, more definition is required to achieve that level of interoperability.**
4. **A large proportion of issues encountered where related to the implementation of OpenADR and not with OpenADR itself, it became clear that the PAS 1878 requires greater definition of optional and mandatory features, report naming, and payload structure and which service rules that should apply to be PAS compliant.**
5. **There were differing implementations of the PAS 878 architecture, in premises CEMs, cloud based CEMs and cloud-based ESA smart function and some blurring of CEM/ESA functionality, the implications to interoperability and the consumer journey may need further consideration in the next edition.**

Thank You

Questions ?