CASE STUDY: INTEROPERABILITY IN THE ENERGY SECTOR

"Defining interoperability and how enables energy system transformation."

Introduction

Interoperability is the ability of a product/system to cooperate with other products/systems to share resources. It's something of a buzzword in the energy sector – and is widely understood as being essential to creating more flexible transmission, distribution and consumer services.

However, the term means different things to different people – which creates confusion when it comes to solving energy challenges. Energy Systems Catapult conducted research to understand and define the concept, how it's used in the market and how the sector can use it to effect change.

The challenge

Successful flexibility and digitalisation require a broad view of interoperability: The term "interoperability" is often used narrowly to describe compatibility between interfacing pieces of technology. For example, when asking: "Is my smart device compatible with my smart home controller?" we think about whether the device and controller are interoperable.

However, there are wider considerations when it comes to the transforming the energy system into one that's interoperable and flexible – so it takes full advantage of the digital revolution. And there was no effective framework for systematically analysing these complex considerations.

As an independent organisation taking a whole systems approach to energy, the Catapult was well placed to review how stakeholders approach interoperability – and to provide guidance for policymakers and innovators

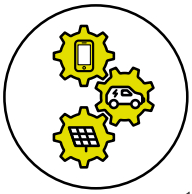
The solution

Moving towards an industry-standard definition: To launch the service, we ran a two-day workshop complete with technical discussions, commercial sessions and networking opportunities. Attendee feedback was overwhelmingly positive, and six companies were selected to work with us in depth as our first cohort.

We surveyed stakeholders from across the sector to discover how they used the term "interoperability". Based on this and a review of existing literature, we identified 19 of the most common definitions. We then grouped them into six categories, creating a framework for understanding the full implications of interoperability. The six categories and their definitions are:

- **Consumer interoperability:** provisions exist for consumers to switch between different commercial offers and technology choices
- **Commercial interoperability:** incentives are aligned across the energy system so that value can flow where it needs to, driven by market forces
- **Data interoperability:** easing the sharing and portability of data between different systems
- **Device interoperability:** devices are swappable, replaceable and exchangeable as needs change and technologies develop, so consumers can make informed choices between open and closed ecosystems
- **Physical interoperability:** end-to-end systems function as changes happen to parts of the system
- **Vector interoperability:** energy provision across gas, electricity, heat and transport fuels are compatible with one another, and coordination occurs in a timely fashion.

The resulting guidance document defined each category and provided case studies. It highlighted the need to consider multiple forms of interoperability simultaneously to achieve the flexibility required to adapt to consumer, technology and systemic changes.



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The impact

Spearheading an essential conversation for market transformation: Our report has provided clarity around interoperability and showcased how the concept can be used. It was intended to start discussion within the sector on this key topic, and market feedback has been overwhelmingly positive. The Catapult's Systems Integration Team has been invited to present our findings to organisations such as Ofgem, Citizens Advice and the Department for Business, Energy & Industrial Strategy. Our framework has been cited in papers, used in bids and pushed out to stakeholders through trade associations.

The research has therefore opened up crucial conversations and encouraged the sector to think in a more standardised way about this essential element of system-wide change.

An industry roundtable hosted by the Catapult included senior figures from National Grid, Good Energy, UKERC, Verv, PassivSystems, Geo, The Faraday Grid and DeltaEE. The main concern was finding the right balance between Government "over-defining" or "over-engineering" interoperability too early, which could prevent innovation; or "leaving the market to its own devices, which could cause issues later down the line" - risking the emergence of new digital siloes.

The Catapult's five-year plan focuses on interoperability and digitalisation as key themes, and we're always looking to partner with companies and organisations interested in tackling this important challenge.

Highlights

- 19 definitions uncovered across the energy industry
- Six categories of interoperability created to systematise debate and digitisation initiatives.

About Energy Systems Catapult

Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth. The Catapult is an independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia and research. We take a whole systems view of the energy sector, helping us to identify and address innovation priorities and market barriers, in order to decarbonise the energy system at the lowest cost.