

Elexon's Data and Architecture Capabilities

Summary

In this discussion paper, we demonstrate Elexon's in-house technical capabilities to enhance data transparency and lead technical, industry-wide workstreams. Through multiple instances, we have illustrated Elexon's leadership in making data consistent, discoverable and accessible.

Additionally, we actively promote interoperability by engaging with market participants and wider industry. This approach ensures that not only market participants but also innovators from outside of the sector, can leverage and create valuable use cases from the available data. We believe that the expertise and principles we apply in the Balancing and Settlement Code (BSC), and developing our Elexon Kinnect platform, will be essential for the market facilitator role.

Preface

In Ofgem's consultation on the future of local energy institutions and governance, it was suggested that the market facilitator would have the responsibility of establishing data standards for products, assets, and market information. This includes defining communication protocols for interoperable Application Programming Interfaces (APIs). Considering the growing volume of data resulting from trades in the flexibility market, and in the context of increasing digitalisation, it's important to acknowledge that the market facilitator must possess expertise in ensuring data is consistent, accessible, and easy to find, while also promoting interoperability across the sector.

Context

As the energy sector transitions from managing thousands of energy assets to a system harnessing millions of distributed low-carbon assets, the volume of data is expected to increase exponentially. As a result, there is a growing need to enhance the accessibility and discoverability of these datasets for market participants. Increasing the number of datasets would benefit a wide range of stakeholders including Flexibility Service Providers (FSPs).

As Distribution Network Operators (DNOs) transition to Distribution System Operators (DSOs), DSOs will gain greater visibility and control over their networks. This transition necessitates collaboration among DSOs to ensure interoperability, not only across processes but also across systems and data. A failure to establish common standards and interoperability poses the risk of disconnected data and systems among DSOs, thus creating unnecessary barriers for FSPs that would want to operate across various DSO markets and ESO markets.

In response to this risk, Ofgem, as part of their updates on data best practices, has introduced additional requirements on Network Operators. These requirements aim to ensure that the data they produce is consistent, accessible, and interoperable. Ofgem has also stipulated in their decision document that data associated with flexibility markets should be presumed open and published, alongside the creation of common standards and licences. We also acknowledge that the Energy Networks Association (ENA) Open Networks group has initiated a working group to enhance the quantity of operational data shared by DSOs with market participants.

These are important steps and initiatives to get more standardised and transparent data, however there is a need to go beyond data standards to increase interoperability, usability, and, ultimately, market liquidity.

Data Standards – Interoperability

We fully recognise the value of data accessibility. Elexon has a proven track record of managing and providing large amounts of market data to over 10,000 users globally. In our response to Ofgem's consultation on updates to Data Best Practice Guidance and Digitalisation Strategy and Action Plan Guidance, we emphasised the importance of ensuring energy system data is discoverable, accessible, and interoperable. We have actively integrated these principles within the BSC and our Kinnect platform, our main IT platform, which comprises three parts: the Customer Solution, Settlement Solution and Insights Solution.

The data accessible through the Insights Solution operates on Open API principles, ensuring that all data is exposed and available via APIs. Our commitment to open data principles extends across the BSC, and the new Insights Solution is designed to serve as a vital, free information service to the industry.

Our Insights Solution API Documentation is a comprehensive self-service area for developers and Elexon data users to discover our published API endpoints. The design of the API Documentation makes it easy for developers and Elexon data users to search and use.

In June 2021, we implemented [Modification P398 'Increasing access to BSC Data'](#), in response to the Energy System Catapult's Energy Data Taskforce Report. The report recommended that to maximise the value of data, energy system data should be presumed open. Under P398, all data is presumed to be open unless there is a reason why it cannot be published. We were the first code body to explicitly embed open data principles, under the provisions of the BSC.

We advocate for the incorporation of these principles on any existing or emerging platforms where flexibility market data is published. Transparency and fairness are key elements of market facilitation, as they enable both competition and scrutiny of both market participants and buyers of flexibility services.

We would also like to highlight the success of the Balancing Mechanism Reporting Service (BMRS), a long-standing primary channel for providing operational data relating to the GB Electricity Balancing and Settlement arrangements, which has now been migrated to the Insights Solution. BMRS provided high-quality data on electricity markets and system operation, operated by Elexon. The BMRS, which will be decommissioned in 2024, has seen an average daily request increase from 5.5 million in 2021/22 to 6.9 million in 2022/23. Additionally, the number of individual users has risen from approximately 62,000 to 90,000.

We anticipate further increases in the number of users and interested parties, particularly as the sector and other sectors become more digitalised and interconnected. As anticipated by many research publications, the availability of data across various industries will lead to the emergence of new services and new products.

There needs to be full transparency and data sharing across ESO balancing markets, Balancing Mechanism and maturing DSO markets. Any future neutral market facilitator may be able to utilise this

existing service/platform, providing a 'one-stop-shop' for data related to flexibility markets and allowing complete transparency of its operations and providing valuable information to its customers.

Market-Wide Half Hourly Settlement

The Market-Wide Half Hourly Settlement (MHHS) Programme is scheduled to be fully implemented by 2026. However, market participants who are prepared to transition earlier will have the option to do so in March 2025. The implementation of MHHS is widely acknowledged as a critical enabler in facilitating the transition to a smarter, decarbonised, and decentralised energy system. MHHS will lay the foundation for accurate, real-time data from smart meters to become available instantly, supporting stakeholders to tap into demand side response opportunities (subject to necessary aggregation and consent rules/framework).

Elexon has been partnering with Ofgem and the industry throughout the whole journey. In the initial Target Operating Model (TOM) design phase, Elexon chaired two industry-wide working groups. Under the Code Change and Development Group (CCDG), we provided technical leadership in developing the MHHS TOM. We also chaired the Architecture Working Group (AWG), which in 2021, recommended the development of an event driven architecture to support the MHHS requirements. Following ratification of the recommendations, Elexon was appointed to implement and roll out the new Data Integration Platform (DIP), a new industry-wide data transfer service, which will facilitate half-hourly smart meter data flows. Furthermore, Elexon will be responsible for the operation of the DIP, once the platform is fully developed and commissioned to operate, and there will be an emphasis on its data governance framework and roadmap for future non-MHHS use cases.

We believe there are opportunities that need to be considered and discussed with Ofgem and the industry to utilise the DIP capabilities for potential new processes to be developed by the market facilitator.

Kinnect – Cloud Migration

Elexon has been actively developing its new Kinnect platform. Kinnect is a 'cloud native' platform comprising three parts: the Customer Solution, Settlement Solution and Insights Solution. This will be the culmination of five years of effort to re-architect Elexon's core BSC settlement systems. The final phase of this transition involves decommissioning the remaining legacy systems, which is set to be completed in 2024.

A combination of Microsoft Azure and Salesforce, the platform leverages many of the benefits of cloud technologies including scalability, flexibility and resilience.

The Kinnect platform was designed with the knowledge and anticipation of the evolving needs associated with the energy transition and to accommodate the scale necessary to effectively support MHHS. The MHHS programme means that we will receive around 1.5bn meter readings from smart meters each day, in contrast to aggregated meter readings, which we receive at present. This has led to an internal Elexon programme, alongside the MHHS Programme, for re-designing our systems, called Helix. Helix delivers a large scale, cloud Data Acquisition Hub (DAH) and a number of new applications, which aggregate and process all of GB's consumption data. Our Kinnect and Helix programmes will deliver the following benefits:

Customer Solution

- Simpler and quicker online process for our customers, including Suppliers and FSPs entering the market, replacing the need for manual form filling.
- Companies active in the market can manage their Settlement account online, including registering assets, or registering for new roles.
- Processes that used to take days now take minutes, effectively removing barriers to quicken up entry into the market.

Settlement Solution

- Cloud-based technology allows for rapid expansion of our services when needed.
- By using modular technology, we can respond more quickly to deliver regulatory changes and the services our customers want.
- Scalable Settlement calculation systems will future proof the arrangements and help us support our customers to meet net zero.
- Quicker and better support for innovators, as Kinnect allows for multiple, concurrent '[Sandbox](#)' trials. The BSC sandbox allows market participants and innovators to trial concepts in a live market environment without having to meet all the usual BSC rules.

Insights Solution

- Using cloud-based technology to develop a more comprehensive data and insights service to replace the BMRS.
- Based on open-data principles and accessible to everyone.
- We can respond quickly to customers' data needs and allow them to 'self-serve' data requests and draw insights to make more effective business decisions.

We have consistently advocated for these cost-effective solutions based on best practices, existing processes and systems, to be considered in order to standardise and simplify market functions and deliver consistent experiences to all market participants. This supports any industry change to be implemented as smoothly and quickly as possible. We believe there is a strong case of potential alignment to be achieved between processes and systems operating at the national level and emerging processes and systems for the distributed flexibility markets.

Data Governance

In the development of the DIP and Kinnect platforms, we have adopted two of the core principles of Ofgem's Data Best Practice recommendation. Specifically, the adoption of Dublin Core metadata standards in the cataloguing of new data flows, as well as the implementation of an enterprise data catalogue solution. This cloud hosted catalogue will enable us to remove outdated versions of data previously published and will enhance accessibility and discoverability of the data we hold for market participants. Furthermore, the catalogue will support Elexon's internal users by delivering a cohesive data fabric, where data discoverability is enhanced. We see the sharing of data catalogues and the adoption of common standards as a key enabler for increased interoperability. This will also allow us to better collaborate with other industry stakeholders on digital twin initiatives, such as ESO's Virtual Energy System.

We will continue to proactively track any new policy changes in data and data governance, not only to stay aligned with new data requirements introduced for the industry but also to anticipate and offer cost-effective and easy to implement solutions to the industry, as it continues to evolve on the transition to net zero.

Smart Meter Data

As previously stated Elexon is developing a “data lake” - Data Acquisition Hub, to ingest all domestic GB smart meter consumption data. This has allowed us to work with Ofgem on the development of a smart meter data repository, which is planned for delivery in alignment with MHHS Programme timelines.

We are collaborating with Ofgem in the development of use cases for smart meter data and are designing the governance and data accessibility framework required. We have recently responded to Ofgem’s Data Sharing in a Digital Future CFI and have supported their recommendation for the implementation of a single technical solution, to handle consumer consent. Our smart meter repository will be designed in adherence to the outcomes of the consultancy, scheduled for spring 2024.

The smart meter repository will be accessed via our Insights solutions, a key component of our Kinnect platform (subject to necessary aggregation rules and consent rules/framework).

We understand there may be requirements from the network operators as licensed entities to have access to the smart meter consumption data for network planning and operation activities. It will be important to discuss such requirements during the design phase. We foresee a separate workstream under the market facilitator’s umbrella to focus on the information flows and digital infrastructure, which could collect requirements and formulate business cases.

Industry Initiatives – shaping the policy agenda and sharing Elexon’s experiences and best practices

Ofgem anticipates the market facilitator to have a Strategic leadership/coordination function. This function, among other activities, will see the market facilitator leading on the following activities:

- “Monitor developments across policy, regulation, innovation, and energy markets and proactively identify upcoming challenges, opportunities and risks that may require intervention.
- Identify if changes are required to the market facilitator's functions, engaging with Ofgem where necessary to update roles and responsibilities.
- Provide advice to government and Ofgem where regulatory or policy gaps are identified or where there is a need for joining-up and coordination.”

We have consistently shared best practices and contributed to Ofgem, Government, and industry initiatives focused on data and digitalisation. Some of the initiatives we have supported over the past 12-18 months include:

- **Future of Distributed Flexibility** – In our initial consultation response to both the governance and systems publications on flexibility, we emphasised the importance of considering roles

and responsibilities together to uncover potential synergies. Since submitting our input last May, we have consistently supported this workstream through ongoing engagement, including direct calls and workshops. Most recently, we shared a system use case example with the Ofgem team, focusing on our customer registration process, illustrating how it could contribute to the future development of a Common Digital Energy Infrastructure.

- **Energy Data Best Practice** – While these principles may not directly apply to market participants beyond network operators, as demonstrated earlier, we have proactively incorporated them into both the BSC and our Kinnect Platform. In our feedback to Ofgem's consultation on updates to Data Best Practice, we proposed expanding the scope of these principles to encompass other areas of the sector. This expansion could yield beneficial outcomes by enhancing the discoverability, accessibility, and interoperability of data across the sector.
- **Data Sharing in a Digital Future** – We acknowledged the necessity of developing a consumer consent solution and identified several beneficial use cases associated with sharing consumer energy data. As previously mentioned, our smart meter repository will be designed in accordance with the results of the consultancy, slated for spring 2024.
- **Flex Markets Unlocked Innovation Programme** – We shared expertise with Arup and partners on their project focusing on the protocols necessary for future flexibility. We exchanged ideas regarding the governance necessary for the data standards established and identified possible overlaps with other workstreams.
- **Partnership with Icebreaker One to provide Net Zero data** – The Insights Solution has been developed to simplify the process of accessing our data through our APIs, making it as user-friendly as possible for anyone to utilise. This commitment to accessibility was demonstrated through our collaboration with Icebreaker One, a not-for profit organisation dedicated to transforming data sharing within the energy sector to support the UK's net zero targets. In partnership with Icebreaker One, we provided access to our data sets via our APIs on the Insights Solution, which were made available through Icebreaker's Open Energy service. This collaboration serves as a prime example of how Elexon has actively engaged with industry initiatives to enhance the accessibility and usability of our data.

Conclusion:

As the volume of data resulting from trades in the flexibility market grows, and the level of datasets produced by Distribution System Operators (DSOs) on their networks increases, there is a significant role for the market facilitator in data governance. The market facilitator will ensure that the data emerging from these markets and networks are consistent, accessible, and discoverable. We strongly advocate for the development of a centralised platform, similar to Elexon's BMRS/Insights Solution, that encompasses all data flows related to the distributed flexibility markets.

One area where we see significant potential for improvement is in the datasets made available by DSOs. Some DSOs are quite progressive and host numerous datasets on their platforms, while others may not have advanced as quickly. With the initial efforts yielding some good results, further focus is required to establish and embed common standards, and common data governance practices to ensure consistency among DSOs, and between DSOs and ESO. This will be an essential pre-requisite for maximising the value of the data.

As demonstrated within the paper, we possess capabilities and expertise not only in data transparency, but also in digital transformation programs and leading technical cross-industry workstreams. If appointed to deliver the market facilitator role, we can leverage these capabilities and expertise effectively within local markets to streamline data governance and enhance accessibility.