

UNLOCKING THE BENEFITS TO END CONSUMERS

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Abstract - *The use of electricity and administration of energy services is radically changing. The UK Government's commitment to the decarbonisation of the economy and considerable advances in technology mean that end consumers are being presented with a growing number of new energy services. To date the industry has operated within the limits of established rules and regulations set out in legislation, licences and the industry codes. However, these established rules and systems are not changing quickly enough to keep up with the pace of innovation.*

ELEXON sits at the heart of the electricity industry. It is the Code Manager and Operator for the Balancing and Settlement Code (BSC). This means we are responsible for managing and delivering the end-to-end services and systems which perform Imbalance Settlement ('Settlement')¹. We also undertake the settlement activities for EMR Contracts for Difference and the Capacity Market on behalf of LCCC/ESC. In fulfilling our role as manager of the Balancing and Settlement Code (BSC), we have been working with a growing number of established and new innovators seeking to establish new technologies and business models in the retail and wholesale electricity markets. We help them register their facilities and participate within the BSC arrangements. In addition to supporting their day-to-day operational interaction with the BSC, we are working with them and the wider industry to improve the BSC and the wider industry arrangements, to facilitate innovative business models and technologies.

We believe that access to effective markets (new and existing) is the best way to maximise the benefits from new opportunities for business and residential consumers. Therefore, we believe it is essential that existing markets and the supporting industry arrangements are effectively changed to accommodate new technologies, business models and markets. Indeed, we believe that effectively updating and consolidating existing shared processes and infrastructure will provide a cost effective way of enabling an enlarged and common marketplace, thereby unlocking the benefits to the end consumer.

While a number of developments are under way already (such as MWHHS, Supplier Hub review, smart meter roll out, joint Ofgem/ELEXON/other codes sandbox process etc), we believe there are further improvements to systems, codes and processes that are at the centre of the energy markets in order to bring the industry transition to a smart and flexible system in a more expedient way. These include an introduction of simple and un-fragmented arrangements for local balancing markets and closer industry code collaboration or even consolidation.

¹ Settlement is the calculation and levying of imbalance charges for differences between electricity suppliers, generators and traders' contracts ('what they said they would do') and their sites' or their customers' sites actual consumption or production ('what they actually did'). We settle around £1.5bn of imbalance charges each year.

The way we consume, produce and trade electricity is changing

“The energy system is undergoing fundamental change.” – Ofgem, October 2016²

“We will see as much innovation in the next eight years as we’ve seen in the last 25.” – EPRI, August 2015³

“The expected growth of low carbon and decentralised generation means the electricity system will need to change.” – National Grid, July 2018⁴

The electricity industry is undergoing considerable change. Not since the late 1990s and early 2000s has the industry experienced such a pace and scale of change. And it shows no sign of letting up.

To us the pace and scale of change appears to be the consequence of several important factors:

- Government policy focused on the decarbonisation of the economy and the move to a smart and flexible energy system;
- improvements in and deployment of distributed, low carbon and smart technologies (in terms of functionality and efficiency, reducing production costs, growing availability);
- a growing consumer and commercial interest in sustainability and using technology to be more sustainable;
- differences in how users are treated depending on how they are connected to the electricity network; and
- consumer mistrust or disenfranchisement.

These different contributing factors overlap, fuel each other and are driving a change in the industry’s centre of gravity – away from the large, thermal, transmission connected generators and system operation to local markets made of smaller, renewable generators, prosumers and consumers connected to the distribution systems.

ELEXON sits at the heart of the electricity industry arrangements. We are the code manager for the Balancing and Settlement Code (the BSC), which defines the rules and governance for the Balancing Mechanism (BM) and imbalance settlement processes in Great Britain⁵. This means we deliver the processes and central systems necessary to perform imbalance settlement and enable participation in the BM by a growing number of participants.

In our role we see first-hand how the industry is changing – both in our day to day operations and in our facilitation of changes to the BSC and wider industry arrangements.

Our own operational statistics show considerable growth in supplier participation - more than any other type of BSC Party. We see a clear growth in the volumes of energy produced by smaller, distributed generators, registered with suppliers, and a growth in the number of suppliers seeking to provide services to consumers and these smaller producers.

Between November 2014 and August 2018, the number of Supplier BSC Parties grew from 82 to 178; corresponding Supplier BMU⁶ registrations grew from 1420 to 3023; generation capacity registered for these BMUs increased from 7GW to 28GW and annual metered volumes of energy exported by Supplier BMUs increased from 33TWh in 2014 to

² Ofgem, ‘[Ofgem’s Future Insights Series - Overview Paper](#)’, October 2016

³ Howard, M., ‘[EPRI maps out power system of the future](#)’, August 2015

⁴ National Grid, ‘[Future Energy Scenarios – 2018](#)’, July 2018

⁵ For more information about ELEXON, the BM and imbalance settlement, please visit our [website](#) and watch our video, ‘[What ELEXON does](#)’.

⁶ BMU – Balancing Mechanism Units are used as units of trade within the BM. Each BMU accounts for a collection of plant and/or apparatus and is considered the smallest grouping that can be independently controlled. A Supplier BMU represents all the customers and generators that a Supplier has a contract with and is responsible for Settlement purposes.

45.6TWh in 2017. On the other hand, whilst they still represent the majority, the numbers of dedicated generator Parties has grown much more modestly (339 in 2014, 388 in 2018) and the volumes exported by these larger generators has been falling during the 2010s (from a 92% share of exports to 80%).

According to National Grid's Future Energy Scenarios 2018⁷, the proportion of distributed generation and microgeneration is expected to grow, so that by 2050 its capacity accounts for between 37% ('Steady Progression' scenario) and 65% ('Community Renewables' scenario) of total GB generating capacity.

The scale and nature of the changes in the industry have put considerable pressure on the existing arrangements to adapt. ELEXON actively works with industry participants, interested parties, government and the regulator to progress changes to the BSC and wider industry arrangements. We regularly report to the BSC Panel on the numbers and progress of BSC change, and any cross-code dependencies⁸.

Opportunities for consumers

The change in the industry's centre of gravity is providing new opportunities for consumers – in how they consume, produce and trade their electricity.

The following is a simple overview of the different opportunities that consumers may benefit from:

- **Electric Vehicle (EV)** – EVs will allow consumers to reduce harmful impacts on the environment. They may also enable consumers to take advantage of other opportunities described below (such as V2G, storage, Smart Tariffs, Bundled Services, participation in local energy markets).
- **Vehicle to Grid (V2G)** – in addition to powering an EV, when connected to an electricity network the battery in an EV may be used to export electricity back to the electricity network. This allows the EV owner to sell its output and/or flexibility to other consumers (e.g. P2P) or other market participants (e.g. as a balancing service or through a power purchase agreement). The EV owner may do this as an individual or through an agent, such as an aggregator or a charging station operator.
- **Bundled Services** – retailers are exploring how they can bundle the sale of devices, appliances, EVs and other services with the provision of energy, e.g. to power the device they have sold.
- **Smart/Automated devices** – the development of smart technologies and services are allowing consumers more and different ways of fine-tuning the management or automating the way they and their devices consumer/produce electricity.
- **Electricity storage** – Improvements in efficiency and availability, and falling production costs, are giving consumers, producers and their service providers more flexibility to manage the intermittency and misalignment of their consumption and production, and interaction with the wider electricity system.
- **Smart tariffs (Supply and Network)** – Suppliers and network companies can use new smart tariffs to more effectively signal to consumers the costs of using/exporting energy at different times and in different locations; thereby influencing consumer to use energy and networks more efficiently, and avoiding/postponing infrastructure investment.
- **Aggregation** – aggregators have a growing opportunity to facilitate participation in energy markets, e.g. where the capabilities of individual consumers and producers may be too small to trade in energy markets or where consumers would rather not take an active role. By pooling together the generating or demand response capability (and diversity) of many smaller consumers, aggregators can provide scalable and flexible services, that can be more reliably and cost effectively traded in energy markets.

⁷ National Grid, 'Future Energy Scenarios', July 2018

⁸ Our latest Change Report can be found on our [website](#).

- **Community Energy Schemes** – In the context of this paper, we consider CES as community investment in and supply by a local source of generation, e.g. a small wind, solar or battery scheme. Such a scheme means that the local community can be supplied entirely or partially by its own source of electricity.
- **Peer to Peer trading (P2P)** – rather than simply buy or sell electricity to/from a traditional supplier, P2P trading would match consumers and producers and directly trade between the two.
- **Wider access to Energy Markets** – National Grid and the DNOs recognise that the growth in distributed energy resources provide new challenges for managing the electricity system⁹ and so are exploring how they improve access to energy markets for balancing services by a growing number of market participants and smart services acting on behalf of consumers and distributed energy resources. National Grid noted that while studies suggested a wide range of consumer benefits (£110-500m per annum by 2020), they all point to significant benefits resulting from increased liquidity and competition in the BM¹⁰. We expect new and existing participants to develop services to bring consumers enhanced abilities to market.

Established market design principles

Many of the core principles, processes and systems that underpin today's electricity industry date back to the privatisation and liberalisation of the wholesale and retail markets following the Electricity Act 1989 and the Utilities Act 2001.

The electricity retail and wholesale market arrangements are based on principles that were appropriate at the time of these significant legislative changes. These principles are now enshrined in an established licensing and industry codes framework:

Centralised generation - In general the system was designed and operated on the assumption that large, transmission connected power stations would dominate. It was also assumed that demand would be passive, exogenous and unlikely to be affected by short term market prices¹¹.

Single Transmission System Operator - currently a single, independent System Operator is responsible for balancing generation and demand on the total system. National Grid performs this role. The Balancing Mechanism (BM) is their primary tool for balancing supply and demand. Traditionally the BM has operated by being supported by a fleet of large, thermal generators. However, this fleet is shrinking as old carbon intensive generators are not replaced and displaced by a growing number of smaller distributed generators. The original design of the BM did not expect to rely on Small distributed generation and demand side response (DSR) (e.g. they are either too small for NG to effectively use or they are not 'controllable'). However, there has been a considerable growth in these smaller providers selling flexibility to the SO through contracts for non-BM balancing services, e.g. non-BM Short Term Operating Reserve (STOR).

Distribution Network Operators (DNOs) invest in and manage the lower voltage distribution networks but do not actively manage their systems in the same way National Grid does as the SO. For example, in general they do not procure balancing services to manage the balance of energy on their networks or system constraints¹².

Supplier Hub - a licensed electricity supplier is often, intentionally the primary interface between the rest of the electricity industry and customers. This is known as the 'Supplier Hub' principle. Suppliers are responsible for supplying electricity to consumers' premises, for installing and maintaining meters and collecting metered data from

⁹ For example, managing the 'duck curve' - [Icis.com](https://www.icis.com), 5 May 2017.

¹⁰ National Grid, '[Wider Access to the Balancing Mechanism Roadmap](#)', August 2018.

¹¹ Wright, A. C., 'Reform of Power System Governance in the Context of System Change', 2018, IET Smart Grid, 1 (1)

¹² Although we are aware that as part of their price control innovation funding, some DNOs are trialling active network systems and equivalents to balancing services.

these meters for billing and Settlement purposes. This data is then made available for other processes in the industry, such as the calculation of network charges and Final Consumption Levies (FCL), the cost of which the supplier then passes on to its customers.

Non Half Hourly (NHH) Metering - the majority of domestic customers are settled using NHH meter advances. That is, NHH meter readings are collected infrequently, and a process of profiling is used to convert the meter advance (i.e. the difference between meter readings) to Half Hourly (HH) values, which are required for Settlement and other charging purposes. The principle for using NHH meters was to avoid the disproportionately high costs and impracticalities of installing and managing HH meters for small and relatively predictable domestic and small business consumption.

There has been little substantive change to these principles. However, the scale and nature of change in the energy system is challenging the validity of these principles. There is concern that these principles, the established industry structure and governance create a regulatory inertia¹³ that is slowing the realisation of government policy, innovation and greater participation by consumers.

Government focus: clean growth, smart systems and flexibility

The Government and Ofgem are responsible for a wide range of initiatives aimed at decarbonising the economy and ensuring the effective transition to a smart and flexible system. Government and Ofgem intend that these initiatives enable the delivery of legal carbon reduction targets.

In order to provide context, we have summarised key initiatives below:

- **Smart Meter Implementation Programme** – BEIS¹⁴ and Ofgem – the government requires that suppliers roll-out Smart Meters to their customers by the end of 2020.
- **Smart Systems and Flexibility Plan** – Ofgem and BEIS – The plan seeks to remove barriers to smart technologies, enable smart homes and businesses and to make markets work for flexibility.
- **Clean Growth Strategy** – BEIS – in order to achieve the emissions reduction targets of the Climate Change Act 2008, the strategy sets out proposals for decarbonising all sectors of the UK economy through the 2020s. In particular, by delivering smart, clean and flexible energy system and accelerating the shift to low-carbon transport.
- **Industrial Strategy: Building a Britain fit for the future** – BEIS – the strategy sets out how Government will help businesses create better, higher-paying jobs with investment in the skills, industries and infrastructure of the future. In particular, they make commitments to invest in EVs and EV charging infrastructure.
- **The Road to Zero** – DfT – sets out new measures to clean up road transport and lead the world in the developing, manufacturing and using zero emission road vehicles.
- **Retail Market reform** – Ofgem – is an ongoing body of work to review and recommend reforms to the retail market. This includes Ofgem's work on Future Supply Market Arrangements (the Supplier Hub) and on Electricity Settlement Reform (Market-wide Half Hourly Settlement).
- **Network Charging reform** – Ofgem – is a comprehensive review distribution and transmission network charging arrangements. In general it is split in two: Review of Access and Forward Looking Charges (i.e. the cost-reflective setting of network charges) and the Targeted Charging Review:

¹³ In his guest blog, Soutar noted that possibly biggest challenge facing industry is overcoming inertia of existing, centralised governance – Soutar, I., '[New Thinking: Overcoming inertia is the key to unlocking a sustainable energy future](#)', January 2015. Also see Lockwood, M. et al, '[Innovation and the Governance of Energy Industry Codes](#)', August 2016

¹⁴ Department for Business, Energy and Industrial Strategy

Significant Code Review (i.e. the means by which network companies ensure the full recovery of their allowed revenues).

- **Third Energy Package** – Ofgem – introduced the need to develop a range of European Network Codes. These codes are designed to provide a sustainable, secure and competitive electricity market across Europe.

As we pointed out in our Business Plan for 2018/19¹⁵, ELEXON is committed to supporting the Government and Ofgem's initiatives by facilitating and supporting the necessary innovation to modernise the ways that consumers interact with the energy markets.

Unlocking benefits to consumers

Whilst there has been a significant volume of incremental change to market rules since 2001, none of these changes have significantly changed the market design principles or structure¹⁶. Yet the use and operation of the physical system, advancements in low carbon and smart technologies, innovative business models and the expectations of society are changing faster than most industry governance and regulatory arrangements.

ELEXON believe that effectively updating and consolidating existing industry arrangements will better enable an enlarged, cost effective and forward thinking common marketplace.

		Enabling initiative					
		HHS	BTM	Multiple supplier	Access to energy markets	Sandbox	Code simplification and Consolidation
Opportunity	EV	✓	✓	✓	✓	✓	✓
	V2G	✓	✓	✓	✓	✓	✓
	Bundled services	✓	✓	✓		✓	✓
	Smart/Automated devices	✓	✓	✓	✓	✓	
	Storage	✓	✓	✓	✓	✓	✓
	Smart Tariffs	✓	✓	✓		✓	✓
	Aggregation	✓	✓	✓	✓	✓	✓
	P2P	✓	✓	✓	✓	✓	✓
	Community Energy Schemes	✓	✓	✓	✓	✓	✓
	Wider access to energy markets	✓	✓	✓	✓	✓	✓

Market-Wide Half Hourly Settlement (HHS)

Smart meters will enable HH measurement of consumption and generation, remote management and reading.

¹⁵ Please visit our [website](#).

¹⁶ Ofgem, '[Ofgem's Future Insights Overview Paper](#)', October 2016

However, simply installing smart meters is not an end in itself. The wider industry arrangements must be updated to take advantage of the wealth of HH metered data that smart meters will provide access to.

The operation of the Settlement process defined in the BSC is highly dependent on accurate metered data. Because the BSC requirements put in place a framework for collecting, aggregating and assuring the accuracy of metered data, many other industry arrangements rely on the metered data collected for Settlement – e.g. the calculation of network charges and FCLs. We are interested in ensuring HH data from smart meters is used to improve the accuracy and timeliness of Settlement and the calculation and settlement of other charging arrangements.

We envisage that all of the consumer opportunities identified above will depend on HH metered data. We believe that it makes sense to use centrally collected, aggregated and assured metered data. Such a source would keep costs to a minimum, by avoiding the duplication of similar systems and processes, and ensure industry uses a consistent, comparable source of data.

Based on our leadership in providing recommendations for Settlement reform¹⁷, ELEXON was tasked by Ofgem to lead the development of new market wide processes for half hourly Settlement¹⁸. In April 2018, we consulted on five Target Operating Models (TOMs). We are now in the process of further developing these TOMs. ELEXON will provide a final report to Ofgem in Summer 2019.

Behind the meter – ELEXON leading

Traditionally the net effect of different activities at a consumer's premises would be measured by a Settlement meter at the boundary between the consumer's premises and the electricity network. However, there is a growing need to be able to identify, differentiate between and measure different activities at a consumer's premises – i.e. 'behind the meter' activity.

Effective measurement of 'behind the meter' activity is likely to be necessary to facilitate consumer agreements with multiple suppliers/service providers, to buy 'bundled services', to access energy markets (directly or via an intermediary, such as an aggregator), to enable more targeted and cost reflective smart tariffs and network charges.

This issue has become most prominent in the context of implementing a change to the BSC, Modification P344 'Project TERRE'¹⁹. That is, P344 will allow consumers and small generators registered with a Supplier to participate, through a Virtual Lead Party, in Project TERRE and the BM. However to facilitate effective participation we invited BSC Parties to consider the use of secondary metering, rather than conventional boundary metering, which would measure the specific activity of controllable assets providing services into Project TERRE or the BM ('Issue 70'²⁰).

Whilst ELEXON's Issue 70 is focused on facilitating P344, the ideas it presents could be used to support the metering and settlement of other initiatives. For example, ELEXON is exploring how secondary metering could be used to support the calculation of FCLs²¹, by differentiating between imports to a consumer's premises that are used for the explicit operation of on-site generation (or storage) and for other final consumption purposes. Similarly, ELEXON proposed a recently proposed a change to the CUSC that would exclude specific volumes of electricity used to operate generators registered by Suppliers from the calculation of certain transmission use of system charges²².

¹⁷ ELEXON, '[Recommendations of the BSC Panel's Settlement Reform Advisory Group: Improving Half Hourly Settlement for smart metered customers and the impacts of export spill from distributed generation](#)', February 2016.

¹⁸ For more information on ELEXON's Design Working Group please visit our [website](#).

¹⁹ For more information on this modification please visit our [website](#).

²⁰ For more information on Issue 70, please visit our [website](#).

²¹ ELEXON, '[280/11 – Proposed approach to providing metered data for calculation of Final Consumption Levies](#)', July 2018.

²² More details on CMP280 can be found on National Grid's [website](#). However, please note that ELEXON's response to the Workgroup Consultation, including our request for an alternative solution, have not been published yet.

The Multiple Supplier Model – ELEXON leading

There is a growing belief, voiced by Ofgem and others²³, that consumers should be provided with more choice in how they buy (and sell) their energy. For example, it could allow Community Energy Schemes, Bundled services, P2P and rapid switching.

In light of Ofgem's ongoing review of the retail market arrangements we proposed a practical interim solution that we believe we could implement by 2020 - the Multiple Supplier Model²⁴. In summary, our interim solution would work as follows. Where a customer agreed to buy and/or sell its electricity from more than one supplier or provider, our interim solution would amend the main supplier's energy imbalance (to remove the volume for which another party is responsible), and the main Supplier would be notified of the volume (in order that they can adjust their customer billing). It is expected that the main Supplier would want to share these adjustments with the customer, by way of a consolidated bill for information purposes. This would show the volume (but not the cost) of energy bought from other Suppliers.

Our Multiple Supplier Model is dependent on other industry initiatives. In particular, it would rely on timely HH data that our work on HHS will ensure.

Developing enduring flexible supply arrangements clearly requires further consideration of the practical and commercial implications. We also believe consideration should be given to how a future supply model would be fair to both participating and non-participating consumers.

Access to energy markets

As the number of distributed energy sources grow, there is growing interest from market participants, including the SO and DNOs, in making better use of this resource.

Access to TERRE and the BM

Project TERRE (Trans European Replacement Reserve Exchange) is a European project to introduce an exchange for trading a new Replacement Reserve (RR) balancing product.

BSC Modification P344 will ensure the BSC enables GB participation in Project TERRE. The solution will enable participating providers to submit bids to National Grid. In addition to traditional market participants, the solution will allow customers and independent aggregators to participate in the TERRE balancing product (using embedded generation or demand side response to deliver RR, independently of their electricity Supplier) and remove barriers to customers and independent aggregators participating directly in the existing BM.

ELEXON will implement P344 on 28 February 2019. As part of its Foundation Programme (see below), ELEXON is developing considerable improvements to the BSC central systems to support the operation of P344. Project TERRE also requires considerable changes to National Grid's systems and to the Grid Code and CUSC²⁵. ELEXON is actively working with National Grid and BSC Parties to ensure the efficient delivery of changes necessary to facilitate Project TERRE and improved access to the BM.

Reform of Balancing Services

In June 2017, National Grid published its System Needs and Products Strategy (SNAPS). As the SO, National Grid recognised its need to facilitate the transition to a more smart and flexible energy system and concerns by industry

²³ Ofgem, ['Future supply market arrangements – response to our call for evidence'](#), July 2018

²⁴ ELEXON, ['ELEXON White Paper: Enabling customers to buy power from multiple providers'](#), April 2018.

²⁵ National Grid's ['Wider Access to the Balancing Mechanism Roadmap'](#) summarises the different initiatives being delivered to give access to the BM and TERRE.

over the transparency, complexity and access to Balancing Services. It therefore proposed measures to facilitate changes in what Balancing Services it procures and how it procures them.

ELEXON fully supports National Grid's work in this area. In our response to SNAPS²⁶, we argued that National Grid should consider making best use of established and accessible arrangements and central systems, e.g. the BSC and the Balancing Mechanism Reporting Service (BMRS), for supporting the operation of Balancing Services. We also noted that National Grid needed to be clearer about how it sees overall reform to its Balancing Services affecting the operation of the BM and the calculation of Imbalance Settlement.

Local markets and the emerging role of the DSO

The evolution of relatively passive Distribution Network Operators to more active Distribution System Operators is critical for unlocking the value of energy resources embedded all across the lower voltage distribution networks. ELEXON advises the Open Networks project, and we have been helping to develop cooperation models.

We appreciate that each distribution network is likely to have its own particular challenges to manage. However, we believe standardising an overall approach to operating as a DSO is necessary to drive efficiency both in the implementation of DSO arrangements and systems, and the development of products and services (i.e. DSO balancing services). Standardisation will minimise complexity in these evolving arrangements and better enable market participation, innovation, transparency and interoperability. It should also, avoid the costs of developing systems that largely duplicate functions.

ELEXON already provides services that support the operation of the BM and Settlement, and we are implementing a new technical architecture to deliver more flexible future services (e.g. participation in TERRE and wider access to the BM). We believe we are well placed to deliver a common end to end service that supports Distribution System Operation.

ELEXON will continue to contribute to the Open Networks project and argue for standardisation, consolidation and simplification of emerging requirements.

Clarifying the rules for Storage

Demand to resolve the challenge of intermittent renewable generation (e.g. the 'duck curve') and the growth in the EV market have led to considerable improvements in battery storage technology and falling costs, which have improved the range and availability of storage facilities. Whilst the installed capacity of battery storage is still relatively low, some network operators have reported considerable interest to connect storage – e.g. UKPN reported they had received applications to connect 12GW of storage²⁷.

The variety of storage technologies and proposed uses has put pressure on the arrangements to clarify the roles and opportunities for storage. Ofgem and BEIS recognised the need to provide clarity in their Smart Systems and Flexibility Plan²⁸. They committed to making changes to the legislative and licensing arrangements to make the role of storage clearer. As part of its Targeted Charging Review, Ofgem has also challenged the industry to resolve concerns it has with how certain network charges may put storage providers at a disadvantage compared to other generators.

ELEXON is actively involved in initiatives seeking to clarify the role of storage:

- Changes to the Generation Licence - we contributed to Ofgem's developing thinking changes to the generation licence to clarify the role of storage²⁹.
- Calculating FCLs – we are working with LCCC to develop a solution that supports the exclusion of certain supplies to storage facilities from the calculation of CM and CFD Charges³⁰.

²⁶ ELEXON, '[ELEXON's response to National Grid's System Needs and Products Strategy Consultation](#)', July 2017

²⁷ The Energyst, '[Energy storage boom: UK Power Networks receives 12GW of connection applications](#)', January 2017

²⁸ BEIS and Ofgem, '[Upgrading our Energy System: Smart Systems and Flexibility Plan](#)', July 2017

²⁹ ELEXON, '[ELEXON's response to Ofgem's consultation on the regulatory framework for storage](#)', November 2017

- Residual demand network charges - we are actively contributing to the development of changes to the CUSC^{31 32} and DCUSA³³ to resolve concerns raised by Ofgem in its Targeted Charging Review with how certain network charges are levied on storage providers.
- GC0096 'Energy Storage' – which seeks to clarify the role of storage in the Grid Code.

Whilst it is positive that there are a variety of initiatives seeking to clarify the role and treatment of storage, we are concerned that there is a risk that these initiatives develop solutions that are inconsistent with each other. There is a need for a clear overall vision for storage and coordination of its implementation, otherwise there is a risk that the current initiatives are not progressed in a timely manner as they each seek to align with the other. In light of these concerns, by actively contributing across the initiatives we are doing what we can to ensure they are developed effectively and consistently with each other.

The Electricity Market Sandbox – ELEXON leading

Many of the industry processes and systems found today date back to their original design during the 1990s. As such the industry arrangements tend to have specific, technical and institutional limitations. On the one hand, these provide certainty and clarity to participants, and protection to consumers. However, it also means that they are not always capable of timely changes, e.g. in response to rapid developments in smart and flexible technologies or innovative business models.

Following the creation of Ofgem's Regulatory Sandbox (The Innovation Link)³⁴, ELEXON developed the concept for an Electricity Market Sandbox (the BSC Sandbox). It will provide a route for innovators to apply to the BSC Panel for temporary derogation of BSC obligations in order to trial new products or business models in a controlled, timely environment. An advantage of the Sandbox is that if a trial is successful, the process for formally changing the BSC should move faster.

On 28 August 2018, ELEXON became the first code manager to implement a sandbox³⁵³⁶.

Since publishing our original plans for a BSC Sandbox, ELEXON has been actively engaged with a range of innovators. To date we have had discussions to use the BSC Sandbox to trial ideas related to: faster switching, multiple suppliers, P2P, Community Energy Schemes, new ways of billing, battery storage and Electric Vehicle infrastructure.

Industry code simplification and consolidation

The industry codes are regularly criticised for not being flexible enough to change in order to enable and support innovation. In 2016, Ofgem consulted on its plans to implement the CMA's recommendations following the conclusion of the CMA's Energy Market Investigation³⁷. Ofgem noted 'that the current arrangements have a negative

³⁰ ELEXON, '280/11 – Proposed approach to providing metered data for calculation of Final Consumption Levies', July 2018.

³¹ [CMP280 'Creation of a New Generator TNUoS Demand Tariff which Removes Liability for TNUoS Demand Residual Charges from Generation and Storage Users'](#) and [CMP281 'Removal of BSUoS Charges From Energy Taken From the National Grid System by Storage Facilities'](#)

³² We responded to the CMP280 Workgroup Consultation and proposed an alternative solution that seeks to build on the original proposal by ensuring generators registered by suppliers are also included in any solution. Please note that National Grid has not yet published responses to the consultation. A copy of our response can be provided on [request](#).

³³ [DCP319 'Removal of residual charging for embedded generators in the CDCM'](#) and [DCP321 'Removal of residual charging for embedded generators in the EDCM'](#)

³⁴ 'a 'one stop shop' offering support on energy regulation to businesses looking to introduce innovative or significantly different propositions to the energy sector.' For more information visit Ofgem's [website](#).

³⁵ Ofgem approved BSC Modification P362 'Electricity market sandbox' on 20 August 2018. Ofgem's decision letter and related P362 documentation can be found on our [website](#).

³⁶ For more details on the BSC Sandbox, including how to apply, please visit our [website](#).

³⁷ Please visit the CMA's [website](#).

and material impact on consumers' interests and competition. Like the CMA, we believe that the current system has been unable to handle the growing need for coordinated code change well enough.³⁸

Today's industry codes were designed based on principles over twenty years' old and while codes have been able to deliver incremental change, they are not equipped to deal with strategic and transformational changes, such as is required today. Furthermore, the complexity and fragmentation of the codes increases the regulatory burden and cost on market participants, particularly new entrants and smaller participants.³⁹

We conclude that a much closer alignment between wholesale/settlement, network charging and retail code arrangements is required to enable innovation and fully support emerging business models.

Ofgem recently stated its overriding intention that the Retail Energy Code (REC) should ultimately allow for consolidation of all retail energy code provisions⁴⁰. In our response to Ofgem's consultation⁴¹, we made it clear that we firmly believe that consolidation (be it of codes themselves or code administrative functions) is a necessary step if the energy industry, Government and Ofgem are to collectively deliver on BEIS and Ofgem's joint Smart Systems and Flexibility Plan and unlock and maximise the benefits to end consumers. We believe an even greater alignment of central code services and systems is possible, bringing a 'whole systems' approach to life.

We believe the introduction of the Retail Energy Code provides a good opportunity for the industry to begin the transition towards greater simplification and consolidation.

Foundation Programme – ELEXON leading

ELEXON actively supports innovation in the electricity market that enables openness and transparency. By creating a data platform that is open and accessible we can collaborate to bring about consolidation of market data.

The Foundation Programme, which is part of our 2018-19 business plan and 2018-2025 corporate strategy⁴², will help us continue to respond to industry needs as the administrator and operator of the BSC. We aim to adapt our services and technology platforms to meet the future needs of our customers and continue to support innovation in the industry. Our new architecture will replace monolithic applications with flexible, scalable, secure and modular services that can be more easily and quickly adapted to changing industry needs.

Conclusion

The principles that shaped the overall design of the electricity industry arrangements are more than twenty years old and have not been substantively changed in that time.

The electricity industry is undergoing considerable change. If we are to effectively move to a smart and flexible energy system we need to refresh our market design principles and governance arrangements. We believe there is a need for much greater cooperation and that existing arrangements must be simplified and consolidated.

We are committed to supporting Government, Ofgem, existing and new industry participants and innovators by developing practical and timely 'whole system' solutions that enable innovation and participation. To this end we will continue to contribute to the wide range of initiatives summarised in this paper and are ready to provide further support in shaping future policy and identifying solutions to common industry issues.

We look forward to collaborating with established and new market participants, innovators, Government, Ofgem and academia. We have much to do but strongly believe that collectively we can unlock the benefits to consumers of a smart and flexible energy system.

³⁸ Ofgem, '[Industry Code Governance: Initial consultation on implementing the Competition and Markets Authority's recommendations](#)', November 2016

³⁹ For a useful summary of concerns with governance see Lockwood, M. et al, '[Innovation and the Governance of Energy Industry Codes](#)', 2016.

⁴⁰ Ofgem, '[Switching Programme: Proposed modifications to regulation and governance](#)', June 2018

⁴¹ ELEXON, '[Switching Programme: Proposed modifications to regulation and governance – ELEXON response](#)', July 2018

⁴² Please visit our [website](#).