

279/14 - POTENTIAL BSC IMPACTS OF NEW TECHNOLOGIES AND BUSINESS MODELS

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Summary	This paper describes and categorises some of the new technologies and business models that we expect to impact electricity markets over the next few years, and highlights potential changes to BSC systems and processes that could facilitate these innovations.
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1. Background

- 1.1 At the 12 April 2018 Panel meeting ([Panel 277](#)), a Panel Member requested a paper describing and categorising types of new business models and technologies, in order to facilitate discussion around impacts on the Balancing and Settlement Code (BSC), and promote the BSC as a body that is proactively working to remove barriers to entry and to promote new technologies.
- 1.2 This paper attempts to do that, drawing upon insight ELEXON has gained from discussions with innovators, as well as the following publicly-available information on potential new business models and technologies:
 - Details published by Ofgem of applicants to the energy regulatory sandbox with whom Ofgem entered into sandbox discussions (four in the [first round](#), and eight in the [second round](#));
 - Details [published by the Department for Business, Energy and Industrial Strategy \(BEIS\)](#) of recipients of Energy Entrepreneurs Funding (although the broad scope of this scheme means only a small minority of the products and services receiving funding appear likely to directly impact the BSC); and
 - The [hypothetical scenarios](#) used by the Target Operating Model (TOM) team to test whether potential TOMs for market-wide Half Hourly (HH) Settlement were robust to market change.
- 1.3 Based on sources such as the above, we believe the pressure on BSC processes to support new business models is beginning to ramp up significantly (compared to the historic baseline level). The majority of systems and processes supporting today's electricity market date back to the introduction of supply competition in 1998, and the New Electricity Trading Arrangements (NETA) in 2001. In subsequent years there has been little or no change to the following fundamental principles that underlie these processes:
 - **Supplier Hub:** Licensed energy Suppliers act as the primary interface between customers and the energy system (the 'Supplier Hub' model). Responsibility for installing and collecting data from an appropriate Meter lies with the customer's Supplier, with data from the Meter being made available to other industry processes (such as distribution charging, network charging and collection of final consumption levies);
 - **Balancing Mechanism:** National Grid as System Operator (SO) is responsible for balancing demand and generation on the system. Their primary tool for doing so is the Balancing Mechanism (BM), which allows larger generators to sell flexibility in their output to the SO. Small distributed generation and demand side response (DSR) cannot access the BM, but can in some cases sell flexibility to the SO through contracts for 'ancillary services';

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- **Distribution Network Operator (DNO) role:** DNOs are responsible for managing networks, rather than active power systems, and do not in general contract for changes in the output of demand or generation; and
 - **Non Half Hourly (NHH) Metering:** the majority of customers are settled using NHH Meter advances, with a process of profiling used to convert these to the HH data required for wholesale Settlement purposes.
- 1.4 Of course, there has been a significant volume of incremental change during the seventeen years since NETA Go-Live, as well as some more fundamental change (such as the extension of the NETA Arrangements to Scotland in 2005, changes to imbalance pricing in 2003 and 2015, and the implementation of Electricity Market Reform (EMR) in 2015). None of these changes have significantly impacted the principles outlined above; but over the next few years we expect to see growing pressure for all of them to change.
- 1.5 Key forces driving change to the Supplier Hub principle include:
- Technological innovation and the rise of the 'prosumer'. Consumers who adopt technology such as microgeneration, battery storage and electric vehicles are interacting with the energy system in different and more complex ways than previously, and these may not fit easily within the Supplier Hub model. For example, they may wish to trade their excess generation with their neighbours ('peer-to-peer trading') or buy electricity for their electric vehicle from a variety of different locations; and
 - A potential loss of trust in the fairness of the supply market (evidenced for example by the government's introduction of the Domestic Gas and Electricity Bill to cap prices for customers on standard variable tariffs).
- 1.6 Key forces driving change to the way that National Grid uses the BM include the following:
- Changes to the generation mix (such as the growth in distributed renewable generation and the closure of coal plant) mean that there is less large thermal generation for National Grid to call upon;
 - European legislation (in particular the Electricity Balancing Guidelines (EB GL)) requires National Grid to open markets for balancing services to DSR and independent aggregators;
 - Pressure from embedded generators to open up markets (as Ofgem's decision to approve CUSC Modifications [CMP264: Embedded Generation Triad Avoidance Standstill](#) and [CMP265: Gross charging of TNUoS for HH demand where embedded generation is in Capacity Market](#) removes an existing income stream for embedded generation); and
 - Changes to the DNO role (see 1.7 below).
- 1.7 The growth of distributed generation, battery storage and electric vehicles means that users' requirements of the Distribution System are becoming ever more complex, so that the traditional model of a Distribution System carrying power in one direction (from the Transmission System to end users) no longer applies. In response to this, DNOs have begun projects to transition to Distribution System Operators (DSOs), coordinated through the Energy Networks Association (ENA) Open Networks Project. DSOs are characterised by active participation in market based solutions to network problems. In particular, they aim to contract flexibility services from customers on their networks to reduce system constraints and therefore the use of curtailment or system reinforcement.

2. Details of New Technologies and Business Models

- 2.1 The following table categorises some of the specific new technologies and business models of which ELEXON is aware (through discussions with potential innovators, or from public sources such as those listed in paragraph 1.1 above). It is not intended as a complete or exhaustive list of new business models that may

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impact the BSC (and we expect to learn more about new business models and their impact on the BSC once the sandbox process introduced by Modification [P362 'Introducing BSC arrangements to facilitate an electricity market sandbox'](#) is operational). The table also identifies specific regulatory barriers that are impacting the introduction of each business model (where we are aware of them):

New Business Model / Technology	Regulatory Barriers
NEW BUSINESS MODELS IN THE ELECTRICITY SUPPLY MARKET	
Community Energy Schemes (selling Export from one or more generation assets to local customers). Examples of such schemes included in Ofgem sandbox round 2 include: <ul style="list-style-type: none"> Isles of Scilly Smart Islands Programme Gower Power Solar Storage 	RB1. Industry codes do not include standardised processes for a community energy scheme and a licensed Supplier to jointly supply a customer. In practice this means the community energy scheme must negotiate a bespoke arrangement with a licensed Supplier, and their customers cannot then access the competitive supply market (without losing access to the community energy scheme). RB2. If the community energy scheme is supplying customers as an exempt supplier (under the Class A exemption for small suppliers), the supply falls outside the scope of final consumption levies (such as those levied for EMR by the Low Carbon Contracts Company (LCCC) and the Electricity Settlements Company (ESC)). But BSC processes cannot currently exclude these volumes from the EMR Settlement Data used to charge the levies. RB3. Distribution Use of System (DUoS) tariffs do not incentivise community energy schemes to sell their export locally, rather than into the larger power market.
Peer to peer trading e.g. prosumers selling (or giving) excess generation to other local consumers.	Regulatory barriers are essentially the same as those for community energy schemes i.e. RB1 to RB3.
Rapid switching services that allow a customer to change who they buy their electricity from very frequently (e.g. every five minutes). This was one of the scenarios considered by the team looking at TOMs.	RB4. The current Change of Supply process (including the improvements to be introduced by the Ofgem Switching Programme) does not support change of Supplier within a day (only at midnight).
Electricity bundled with other services / products e.g. a company might sell Electric Vehicles or other appliances as a package, including the electricity used.	RB5. Current market arrangements do not easily allow a consumer to buy electricity from different parties depending on the purpose for which it is used.

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New Business Model / Technology	Regulatory Barriers
NEW BUSINESS MODELS IN PROVISION OF BALANCING MARKETS TO NATIONAL GRID	
<p>Use of aggregated assets in the BM. Up until now, all BM Units participating in the BM have been individual sites, rather than aggregations of sites.</p> <p>Some market participants are currently planning to go down this route as Suppliers, which the BSC currently allows (e.g. Flexitricity). Others wish to do so as independent aggregators, but the BSC does not currently allow this (pending implementation of P344 'Project TERRE implementation into GB market arrangements').</p>	<p>RB6. The BM is currently not open to independent aggregators (i.e. parties who bundle changes in consumer's loads or distributed generation output for sale in organised markets but who do not simultaneously supply the customer with energy).</p> <p>RB7. The BM currently requires that delivery is verified using metered data from settlement metering at the Boundary Point. This contrasts with other balancing markets (such as Short Term Operating Reserve (STOR)), which allow delivery to be verified using operational metering close to the asset providing the service, and may create a barrier to participation in the BM by generating units and DSR that shares a network connection with other demand or generation.</p> <p>RB8. The BM requires Lead Parties to provide a Physical Notification against which delivery is measured. This is not the way DSR markets typically work, and may create additional risk for some participants.</p>
<p>Use of new storage technologies (e.g. battery storage) to provide balancing services.</p>	<p>Barrier RB7 above applies. In addition the following barrier is specific to storage:</p> <p>RB9. BEIS and Ofgem have been clear (in the Smart Systems and Flexibility Plan and elsewhere) that storage (or other generation) that has a generation licence should not be subject to final consumption levies (such as those levied for EMR by LCCC and ESC) on power imported from the grid for subsequent re-export. But BSC processes cannot currently exclude these volumes from the EMR Settlement Data used to charge the levies.</p> <p>Additional information on regulatory barriers faced by storage is available in the BEIS/Ofgem Smart Systems and Flexibility Plan (July 2017).</p>
BUSINESS MODELS RELATED TO THE DSO TRANSITION	
<p>Provision of flexibility services to DSOs.</p> <p>For example, Open Utility has secured Energy Entrepreneur Funding for a platform that allows DSOs "to access location-specific flexible resources ... in a highly</p>	<p>RB10. The BSC does not currently include any specific provisions relating to the interaction between Imbalance Settlement and actions taken by DSOs. This means that DSOs are not subject to Energy Imbalance, and Suppliers' Imbalance positions are not adjusted for actions taken by DSOs (which has the potential to create market distortions).</p>

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New Business Model / Technology	Regulatory Barriers
efficient and scalable way".	
Local balancing of demand and generation	RB11. Distribution Use of System (DUoS) tariffs do not incentivise local balancing.

3. BSC initiatives to address barriers to entry

- 3.1 The table in paragraph 2.1 above identifies a number of potential regulatory barriers to the adoption of new business models, many of them arising from the BSC and other industry codes. The following table outlines specific steps that are being (and could be) taken to remove barriers from the BSC, cross-referencing them to the specific regulatory barriers identified in paragraph 2.1 above. Some of these initiatives are already underway, while others have not yet started:

Potential BSC Initiative	Barriers Addressed	Current Status
Introduction of a regulatory sandbox into the BSC (as proposed by Modification P362).	Various	Assessment Report presented to BSC Panel on 14 June 2018.
Potential Modification to BSC (and other industry codes) to allow customers to more easily purchase power from multiple providers.	RB1, RB4, RB5	ELEXON has published a white paper setting out how this could work, and is engaging with a number of interested BSC Parties, one of whom will we hope raise a Modification Proposal.
BSC changes to open the BM to independent aggregators.	RB6	Change is included in solution to Modification P344 .
Settlement metering of 'behind the Meter' assets i.e. changes to allow data from non-Boundary Point metering to be collected and processed using industry processes and data flows. Currently such metering ('operational' and 'non-settlement' metering) falls outside the scope of industry processes, reducing the value that can be obtained from metered data.	RB7, RB9	The P344 Workgroup was supportive of progressing this as a BSC Issue, in the specific context of BM participation (RB7). Once developed a solution may assist in solving other issues, such as a long-term solution to the double charging of final consumption levies (RB9).

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Potential BSC Initiative	Barriers Addressed	Current Status
Changes to the BSC processes that provide EMR Settlement Limited (EMRS with aggregated metered volumes, to ensure that the volume allocated to a Supplier does not include Imports on which that Supplier is not required to pay final consumption levies (such as exempt supply, and Imports to licensed generation or storage).	RB2, RB9	An enduring solution to this issue is likely to require BSC processes for metering 'behind the Meter' assets – see above. In the short term, there may be scope for an interim workaround (for the relatively small number of sites affected by such issue). ELEXON to discuss with LCCC and EMRS in the first instance.
Introduction into the BSC of a 'baselining methodology' for DSR, against which the delivery of Bid Offer Acceptances (BOAs) can be measured (rather than requiring Lead Parties to provide a Physical Notification for this purpose).	RB8	This issue was raised at the P344 Workgroup by the Association of Decentralised Energy (ADE). The Workgroup was supportive of progressing it, outside the scope of P344. ELEXON proposes to raise a BSC issue, to be progressed in parallel with the 'behind the Meter' issue (see above).
Potential BSC Modification to address interactions between Imbalance Settlement and actions taken by DSOs.	RB10	ELEXON will monitor ENA's Open Networks work this year and wait until Ofgem has decided on the appropriate models for DSOs to purchase flexibility.

4. Recommendations

4.1 We invite you to:

- a) **NOTE** the potential new business models and associated regulatory barriers identified in paragraph 2.1 above; and
- b) **NOTE** the BSC initiatives to address these regulatory barriers identified in paragraph 3.1 above.

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