

Report

Future enabling the market-wide settlement reform Target Operating Model (TOM)

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Overview

One of the key products of the Settlement Reform Significant Code Review (SCR) is the development of a Target Operating Model (TOM) to deliver market-wide settlement reform.

The TOM is being developed at a time of significant change and transition in the energy market. One of the key challenges of the design work will be to ensure that the new TOM settlement arrangements facilitate innovation, by supporting the entry of new business models and technologies into the energy market.

This working paper sets out our considerations to date on the potential future changes which the TOM design work will need to take into account of, and potential features or characteristics which should be incorporated into the TOM to address them.

Although this is not a formal consultation, we would be interested in stakeholder views on the issues discussed in this working paper, and have included some areas of feedback for stakeholders to comment on. Whilst we would welcome responses at any point, it would be most helpful to have these submitted to us by the 16 August 2019. Unless you mark your comments as confidential, we may publish your response. Please contact us at: halfhourlysettlement@ofgem.gov.uk. We would be happy to arrange a meeting or teleconference, or to take comments by e-mail.

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Executive Summary

Market-wide settlement reform is seen as a key enabler of the move to a smarter, more flexible energy system and has a fundamental role in delivering the smart systems and flexibility plan, which could bring £17-40 billion benefits by 2050.¹

One of the key products of our project on market-wide settlement reform is the development of a Target Operating Model (TOM), which sets out the future settlement arrangements to enable the change. A key challenge of the design work is to ensure that the TOM is forward looking. Thus, it is important that the TOM be able to accommodate future changes and not act as an impediment to new energy technologies, products and services which may arise.

Building on discussions with the TOM Design Working Group and Design Advisory Board, this paper explores three potential changes in the energy market which may occur in the future, and how settlement arrangements may adapt to them. Specifically these are:

- a future where multiple providers of energy services enter into arrangements related to a single metering point in the settlement system.
- an increase in storage and electric vehicles, and how they should be metered for settlement purposes.
- the increase in decentralised energy sources and how they interact with settlement.

A common challenge of all three future changes is that there may be more than one energy service associated with a single metering point. Half-hourly meter data by itself will not be sufficient to accurately apportion energy consumed or exported within the half-hour between these different services. It may be necessary for settlement arrangements in future to apportion energy consumed and/or exported within each half-hour using actual behind-the-meter metering (sub-metering) data, or an agreed allocation methodology. The design work should seek to ensure that the TOM is not an impediment to such changes which may occur in future.

The P379 Balancing and Settlement Code modification is considering potential changes to meter volume allocation arrangements that would allow consumers to buy power from multiple suppliers. The working group has identified that the modification will likely surface dependencies and issues that reach across other Codes, and wider-ranging regulatory policy matters. Ofgem will make the final decision on the solution that comes forward, and the desirability of multi-party supply arrangements will ultimately be weighed against wider ranging policy considerations. Our aim is that, if such a policy is approved at some future date, the new settlement reform arrangements should not act as an impediment.

We note that other Ofgem projects are also thinking about future scenarios. As such, this paper represents only the thinking of the Settlement Reform team and should not be taken as a definitive Ofgem view on future scenarios.

The scope of the paper is limited to looking at changes being considered as part of the Settlement Reform Significant Code Review. Additional changes, outside the scope of this

¹ <https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan>

project, will also likely be required to address the potential future developments discussed in this paper. Some of these changes are being explored in other Ofgem projects, such as the Switching Programme SCR and Future Retail Market Design.

This working paper also highlights the potential development of a database of half hourly settlement data, and how – subject to any decision to set one up, made following careful consideration of factors including security and privacy considerations and our Impact Assessment - it could be used more broadly to support innovation and other reforms (such as network charging).

Next steps

We will continue our thinking on how to future-enable the Target Operating Model in discussions with our industry working groups. Whilst not a consultation, we have included some themes for feedback at the end of this working paper. We would welcome stakeholder feedback on these questions, and any other issues raised in this paper. We are open to receive responses to this paper at any time, but it would be most helpful to have these by the 16 August 2019. Unless you mark any comments as confidential, we may seek to publish your response and/or will share your comments.

More broadly, the Target Operating Model design work is currently at stage 2, with the Design Working Group having chosen a preferred TOM, and have consulted on the transition approach. They will then deliver the preferred TOM and transition approach to us in the summer.

1. Context and Related Publications

Context

One of the key products of our project on market-wide settlement reform is the development of a Target Operating Model. We are considering this through a Significant Code Review. Other workstreams within this project include: delivering a Business Case and considering policy issues around access to half-hourly consumption data for settlement purposes, agent functions and impacts on consumers.

The aim of our work on market-wide settlement reform is to facilitate a smarter, more flexible energy system and market, and to empower consumers to take an active role in the energy system transition as the sector decarbonises.

The move to market-wide settlement reform is part of a wider set of reforms looking to facilitate the energy system transition and to improve outcomes for consumers. These reforms cover both work in relation to network charging (eg on electricity network access reforms), and in relation to retail markets (eg the switching programme).

Related Publications

Ofgem (2017), Electricity Settlement Reform Significant Code Review: Launch Statement, revised timetable, and request for applications for membership of the Target Operating Model Design Working Group
<https://www.ofgem.gov.uk/publications-and-updates/electricity-settlement-reformsignificant-code-review-launch-statement-revised-timetable-and-requestapplications-membership-target-operating-model-design-working-group>

ELEXON (2018), Design Working Group Consultation on Skeleton Target Operating Models
<https://www.elexon.co.uk/wp-content/uploads/2018/04/DWG-Consultation-Skeleton-TOMs-30April2018.pdf>

Ofgem (2018), Market-wide Settlement Reform: Outline Business Case
<https://www.ofgem.gov.uk/publications-and-updates/market-wide-settlement-reform-outline-business-case>

Ofgem (2019), Call for Evidence: Potential impacts for consumers following market-wide settlement reform
<https://www.ofgem.gov.uk/publications-and-updates/call-evidence-potential-impacts-consumers-following-market-wide-settlement-reform>

ELEXON (2019), Design Working Group consultation on the Preferred Target Operating Model
<https://www.elexon.co.uk/consultation/dwgs-preferred-tom-market-wide-half-hourly-settlement-consultation-18feb2019/>

Ofgem (2019), Decision for agent functions under market-wide settlement reform
<https://www.ofgem.gov.uk/publications-and-updates/decision-agent-functions-under-market-wide-settlement-reform>

ELEXON (2019), Design Working Group consultation on transitioning to the MHHS Target Operating Model
<https://www.elexon.co.uk/consultation/dwgs-consultation-transitioning-market-wide-half-hourly-settlement/>

Ofgem (2019), Market-wide Settlement Reform: Response to Outline Business Case
<https://www.ofgem.gov.uk/publications-and-updates/market-wide-settlement-reform-outline-business-case>

Ofgem (2019), Decision for access to half-hourly electricity data for settlement purposes
<https://www.ofgem.gov.uk/publications-and-updates/decision-access-half-hourly-electricity-data-settlement-purposes>

Ofgem (2019), Summary of responses to: Call for Evidence: Potential impacts for consumers following market-wide settlement reform
<https://www.ofgem.gov.uk/publications-and-updates/call-evidence-potential-impacts-consumers-following-market-wide-settlement-reform>

2. Introduction

What is settlement?

2.1. The rules that govern trading in the wholesale electricity market are set out in the Balancing and Settlement Code (BSC). Under these arrangements, parties are charged for the difference between the volume of energy that they trade bilaterally or buy via a power exchange and what their sites generate, or their customers consume in each half-hour period. This is known as the imbalance settlement process. Therefore, this process places incentives on parties, say suppliers, to match as accurately as possible the volume of energy that they trade to their customers' demand in each half-hour of the day.

2.2. Settlement is divided between:

- ❖ **Central Volume Allocation (CVA)**, for parties which have sites that are connected directly to the transmission network (and include some generation sites connected via the distribution network). All CVA sites are half-hourly (HH) metered, with processing and aggregation of data procured centrally and fed directly into the central settlement process.
- ❖ **Supplier Volume Allocation (SVA)**, for parties which are connected to the transmission network via the distribution network. The distribution network is split into 14 regions known as grid supply point groups. SVA sites are both HH and non HH metered, and meter data is collected by the suppliers' agents, who are responsible for providing the meter data to central settlement. For each grid supply point group, settlement for SVA compares aggregate supplier metered volumes against metered flows into the grid supply point group to account for any error, and determine each supplier's energy volumes and hence imbalance volumes and charges.

Move to half-hourly settlement

2.3. Currently, many of the SVA sites have traditional meters, which cannot record consumption in each half-hour period (typically they are register reads collected manually on a monthly, quarterly or annual basis and therefore record energy over long periods). To work out half-hourly period energy volumes for the settlement process, an estimate of consumption at a half-hourly granularity needs to be made. This has been achieved through a process called profiling, using an average demand shape for a certain customer type.

2.4. Smart and advanced meters can record the amount of energy consumed or exported within every half-hour period. This enables accurate half-hourly settlement (HHS), where suppliers' contractual purchases of electricity can be reconciled against their customers' actual usage during each half hour. HHS will expose suppliers to the true cost of their customers' usage, incentivising them to take steps to help their customers move their consumption to times of the day when electricity is cheaper to generate and transport, eg by offering Time of Use tariffs and other innovative products. This will build on the platform provided by smart metering to enable a smarter, more flexible energy system.

Settlement Reform Significant Code Review (SCR)

Overview

2.5. In July 2017, we launched the Settlement Reform SCR to introduce market-wide settlement reform. The purpose of the SCR is to 'develop and then (subject to an Impact Assessment, as part of the Business Case) implement an enduring process to enable HHS of domestic and smaller non-domestic consumers' electricity usage. We aim to deliver benefits for consumers by maximising the opportunities smart metering provides in enabling a smart, flexible energy system'.²

2.6. We are using the Treasury's Five Case Model³ to develop a Business Case to support the decision on settlement reform. We have published the second of three iterations of the Business Case,⁴ and are now working towards the Full Business Case, which will include an Impact Assessment.

Target Operating Model design work

2.7. The detailed design of the TOM is being undertaken by an ELEXON-chaired Design Working Group (DWG) that will deliver TOM options and recommendations to the Ofgem Senior Responsible Owner (SRO) for decision. The DWG membership consists of technical experts from a diverse range of industry backgrounds (large suppliers, small-medium suppliers, supplier agents and distribution networks). The DWG also has seats for BEIS and consumer representatives. Ofgem attends all DWG meetings as an observer.

2.8. The TOM design work consists of two stages. In stage 1, the DWG put together a range of high level TOM options (skeleton TOMs) and undertook an assessment of them against a range of criteria developed by ELEXON. The criteria are based on Ofgem's TOM design principles and previous industry settlement reform working groups. At the end of stage 1, we approved the five skeleton TOMs, and the DWG undertook stakeholder consultation on the BSC website.⁵ Responses to this consultation were considered at the start of stage 2,⁶ from which the DWG developed the detailed service requirements for the TOM options and narrowed down the number of TOMs, taking into account Ofgem policy

² SCR Launch Statement, p.3. Available at:

https://www.ofgem.gov.uk/system/files/docs/2017/07/electricity_settlement_reform_significant_code_review_launch_statement.pdf.

³ The Five Case Model is a methodology for producing business cases for spending proposals. See Green Book guidance:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/469317/green_book_guidance_public_sector_business_cases_2015_update.pdf

⁴ The Outline Business Case. Available at: <https://www.ofgem.gov.uk/publications-and-updates/market-wide-settlement-reform-outline-business-case>

⁵ Available at <https://www.elexon.co.uk/news/say-consultation-skeleton-target-operating-models/>.

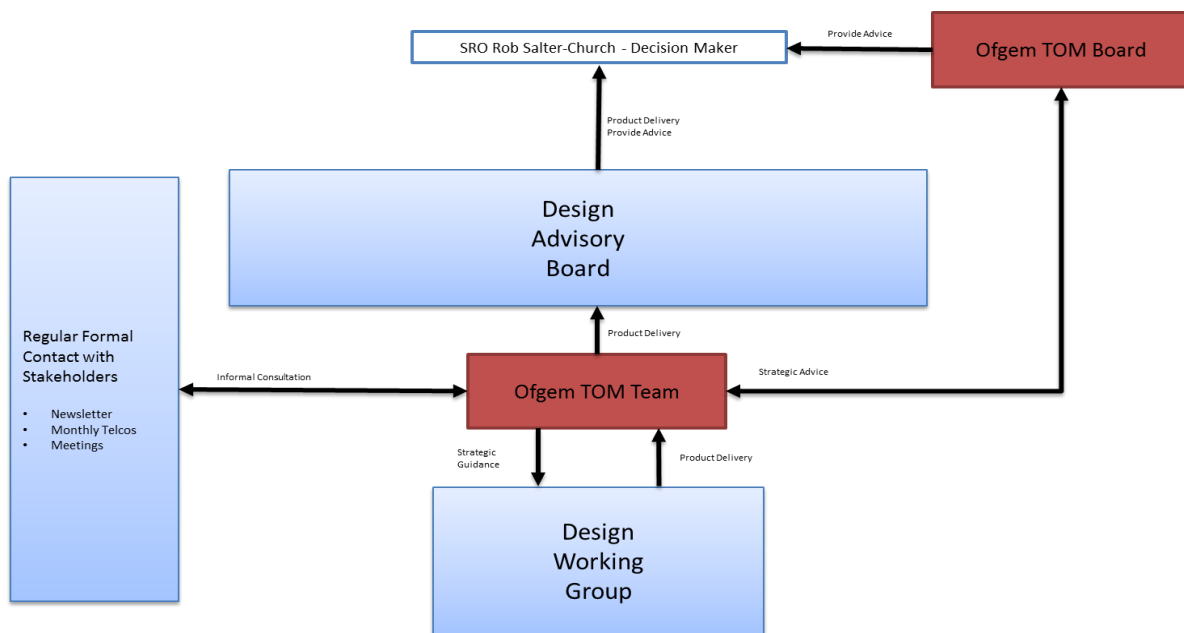
⁶ See collated responses at <https://www.elexon.co.uk/documents/groups/dwg/dwg-responses-to-the-skeleton-tom-consultation/>. Summary of DWG consideration of consultation responses available at: <https://www.elexon.co.uk/documents/groups/dwg/2018-meetings-dwg/july-2018/dwg08-headline-report/> and DAB consideration at https://www.ofgem.gov.uk/system/files/docs/2018/09/dab_4_mins_final.pdf.

least regret steers.⁷ The DWG delivered the preferred TOM to us⁸ and undertook a stakeholder consultation on the preferred TOM on the BSC website.⁹ After considering the responses, the DWG agreed that no major changes needed to be made to the preferred TOM, and developed and consulted on the transition approach requirements.¹⁰ The DWG will look to deliver a final TOM to us in August 2019. Ofgem will make the final decision on the TOM and the transition approach.

2.9. To help in the consideration of products delivered by the DWG, the Ofgem SRO is being advised by the Design Advisory Board (DAB), which consists of a range of experts from industry (GB and international), consumer bodies, academia and Government. The DAB reviews the progress of the TOM design work at key stages and undertakes a strategic and forward-looking assessment of the TOM options.

2.10. The TOM design work governance and decision-making framework is set out in figure 1 below.

Figure 1 – TOM decision making and governance framework



⁷ Available at <https://www.ofgem.gov.uk/publications-and-updates/policy-decisions-settlement-reform-least-regrets-steer-design-working-group>

⁸ Available at <https://www.ofgem.gov.uk/publications-and-updates/design-working-group-preferred-tom-report>. To note, there is a minority view against the preferred TOM in the report to Ofgem, in which the minority favours an alternative TOM where settlement aggregation continues to be a competitively provided service outside of central settlement systems. This minority view is also reflected in the responses to the consultation on the preferred TOM. Ofgem will make the final decision on the TOM.

⁹ Available at <https://www.elexon.co.uk/consultation/dwgs-preferred-tom-market-wide-half-hourly-settlement-consultation-18feb2019/>

¹⁰ Available at <https://www.elexon.co.uk/consultation/dwgs-consultation-transitioning-market-wide-half-hourly-settlement/>

3. Future Enabling the TOM

Section summary

It is important for the Target Operating Model to be forward looking and flexible to changes in the energy system. This chapter sets out the innovation design principles, the consideration of future proofing that has been done by the Design Working Group and Design Advisory Board, and the potential future changes that might occur and the extent to which the Target Operating Model should address them.

3.1. One of the key priorities which has been identified for the design work is the need for the Target Operating Model (TOM) to be forward-looking. The TOM design work and the Settlement Reform Significant Code Review (SCR) are occurring in the context of significant change in the energy system in which market-wide settlement reform is seen as a key enabler of the move to a smarter, more flexible energy system. Market-wide settlement reform has a fundamental role in delivering the smart systems and flexibility plan,¹¹ which could bring benefits of £17-40bn by 2050. As such, it is important that the TOM be able to accommodate future changes and not act as an impediment to new energy technologies, products and services which may arise.

3.2. Additionally, the commencement of the joint Government and Ofgem future energy retail market review¹² has brought an added dimension to this issue. The TOM must be able to accommodate changes to energy market arrangements which may come out of this work, or any future developments in this area.

3.3. To guide the TOM design work, we published a Design Principles document setting out the TOM objectives and design requirements.¹³ While many of the design principles relate to the improvement of existing Supplier Volume Allocation (SVA) settlement processes resulting from the use of more half-hourly (HH) data (eg reduced settlement timescales, more accurate data estimation), the design principles also state the need for the TOM to be forward-looking. This is captured in the innovation design principle, extracted in the box below.

¹¹ Ofgem/Government (2017), Upgrading our Energy System – smart systems and flexibility plan. Available at <https://www.ofgem.gov.uk/publications-and-updates/upgrading-our-energy-system-smart-systems-and-flexibility-plan>.

¹² Latest review updates can be found on the Government’s website at: <https://www.gov.uk/government/publications/future-energy-retail-market-review>.

¹³ Ofgem (2018), Design Principles, https://www.ofgem.gov.uk/system/files/docs/2018/01/updated_target_operating_model_design_principles.pdf

Innovation design principle

- It is expected that new technologies and energy business models will offer customers a range of new energy services and smooth the transition to a smarter energy market. The TOM should enable, and not impede the entry of these new energy services into the market.
- Specific consideration should be given in the TOM design work to how settlement arrangements could interact, and facilitate new technologies and business models. For example, demand side response, peer to peer networks, micro-generation, storage and electric vehicles.
- Consideration should also be given to how new arrangements will be monitored and adapted as needed in response to future innovation (such as distributed ledger technology).

Consideration of 'future-enabling' to date by the DWG and the DAB

Role of HH data in supporting innovation

3.4. As part of the TOM design work, the Design Working Group (DWG) have discussed how the TOM could support innovation. Some stakeholders have identified that one of the impediments to innovation in the existing SVA settlement arrangements is that meter data is compartmentalised by supplier, and therefore individual half hourly data is not available across the whole market. (For example, data from a customer of Supplier X is aggregated with all other Supplier X customers in that Grid Supply Point group, before it can be compared with a neighboring customer of Supplier Y). This makes it difficult for new energy services such as Peer to Peer (P2P) trading or Demand Side Response (DSR) to access HH data from customers across suppliers, as it is only available in individual form within a particular supplier.

3.5. The DWG have sought to address this issue in the preferred TOM¹⁴ design in two ways:

- ❖ by having HH meter data available earlier in the settlement process (instead of waiting until central settlement to create HH data for those meters which only have register reads). This allows existing and new parties to gain early access (if allowed) to individual HH meter data.
- ❖ by proposing that HH data will enter BSC central systems non-aggregated. This would create a repository of market-wide data which could be accessed by

¹⁴ For further information see the preferred TOM report at <https://www.ofgem.gov.uk/publications-and-updates/design-working-group-preferred-tom-report>

market participants (with the requisite permissions) and drive the creation of new and varied energy services.¹⁵

3.6. However, it is important to emphasize that any such central repository would ultimately be dependent on Ofgem's assessment of the costs and benefits, including security issues, impacts on competition, and impacts on organisations in the market.

Interaction with new energy services and market changes

3.7. At the first Design Advisory Board (DAB) meeting, Ofgem staff sought the views of DAB members on how to assess whether the TOM designs are sufficiently future-enabled. The DAB directed Ofgem staff to develop a range of future scenarios to stress test TOM options, to see if they will impede the entry of market services and be able to accommodate changes in market arrangements. The DAB also commented that in addition to the scenarios, it would be useful to develop some more practical direction on how the TOM can interact with new energy services in the immediate future.

3.8. Before the preferred TOM was selected, the TOM design work initially produced five 'skeleton' Target Operating Model options. Each of the skeleton TOM options set out the services required for settlement, and primarily differ in how the key identified settlement services of retrieval, processing and aggregation are grouped together. Information on the skeleton TOMs can be found on the BSC website.¹⁶

3.9. Both the DWG and DAB undertook an assessment of the skeleton TOMs, including against the Innovation Design Principle. The DWG assessment found that all the skeleton TOM options could provide for the flexible aggregation of settlement period (half-hourly) level data from smart meters regardless of the consumer's supplier. This could be used to support innovative offerings such as community energy schemes or Peer to Peer platforms. The DWG noted that such innovations will require other market changes beyond the settlement system in order to happen.¹⁷ The DWG also consulted on both the skeleton TOMs and the preferred TOM to understand if there was any hindrance to innovation with the proposed designs.

3.10. The DAB review found that as currently described, the skeleton TOMs and therefore the subsequent preferred TOM are not likely to restrict innovation. However the DAB noted that it will be the detailed design and implementation of the TOM that will determine if the TOM constrains future innovations. So the next phase of the design work and subsequent implementation will be important.¹⁸

3.11. As part of the Detailed TOM Service and Data Requirements¹⁹ the DWG specified the requirement for the TOM Services to be able to accommodate the possibility of a change to 15 minute settlement periods in future. All future design work will specify that systems

¹⁵ There is a minority view against the preferred TOM in the report to Ofgem, in which the minority favours an alternative TOM where settlement aggregation of meter data continues to be a competitively-provided service outside of central settlement.

¹⁶ Available at <https://www.elexon.co.uk/news/say-consultation-skeleton-target-operating-models/>

¹⁷ Design Working Group TOM Consultation, p.32, 35. Available at <https://www.elexon.co.uk/wp-content/uploads/2018/04/DWG-Consultation-Skeleton-TOMs-30April2018.pdf>.

¹⁸ Design Advisory Board meeting 3 minutes, p. 4-6. Available at <https://www.ofgem.gov.uk/publications-and-updates/design-advisory-board-meeting-3>.

¹⁹ Available here: <https://www.ofgem.gov.uk/ofgem-publications/147898>

must be capable of handling quarter-hourly data if in the future the definition of a settlement period changes to 15 minutes.

Subsequent consideration by the Ofgem TOM team

3.12. The discussions with the DWG and DAB have shown there is a need to clarify:

- ❖ What are the potential broad future changes we want to 'future-enable' for the TOM?
- ❖ To what extent can these be addressed in the TOM, or are they reliant on changes outside the scope of the Settlement Reform SCR?
- ❖ How do we see the HH data collected for settlement as being an enabler for innovation and supporting the transition to a smarter, flexible energy system? What implications does this have for the design of the TOM?

What potential future changes we want to 'future-proof' against and what is the scope of the TOM to address them?

3.13. While we are not able to predict how the energy market will evolve, there have been a number of broad themes which have arisen from discussions to date. These are:

- ❖ A future where multiple providers of energy services enter into arrangements associated with a single metering point in the settlement system (**multiple providers**). For clarity, a provider is used here in a broad sense and is intended to capture both traditional suppliers and new types of participants which buy and/or sell energy (such as local energy schemes/trading arrangements).
- ❖ The increase in storage and Electric Vehicles (EVs), and how they should be metered for settlement purposes (**storage and EV metering**).
- ❖ The primary purpose of settlement is to provide meter data to use in the calculation of imbalance charges incurred on the wholesale electricity market. However, decentralised energy (such as microgeneration or storage trading via peer to peer networks, local energy schemes/trading arrangements) will become more prevalent (**decentralised energy**).

3.14. We think that the TOM should be designed in such a way as to ensure that it does not impede or act as a barrier to these potential future changes. This will assist in the TOM meeting the innovation design principle, and help achieve Ofgem's objective of creating an enduring settlement process.

3.15. We would be interested in hearing stakeholder views on whether they agree with the future themes identified in this paper, and if there are other future changes or scenarios which should be added to the future themes. See Chapter 5 for how to send us your views.

3.16. The next section of the working paper discusses to what extent the TOM can address these future changes.

4. Addressing Future Change

Section summary

This chapter explores further the three broad themes identified in Chapter 3 (multiple suppliers, storage and Electric Vehicle metering and decentralised energy). This chapter also explores the possibility of having a database of half-hourly settlement data.

Multiple providers

4.1. One future theme is a world where multiple providers supply energy services to a customer site. Broadly, this could work in two ways:

- ❖ A customer may contract with two or more energy providers separately to provide energy at different times of the day (this could be static or dynamic²⁰). This would mean that there is only one supplier or energy provider²¹ serving a metering point for a given settlement period but that this could change (for example, each settlement period). (**different providers at different times**)
- ❖ A customer may contract with two or more energy providers separately to simultaneously provide services to their premises within the same half-hour settlement period. For example, a customer could have a separate supply contract for their home and for their Electric Vehicle (EV) charger which are both measured at the same metering point for settlement. (**different providers at the same time**)

4.2. For different providers at different times, we understand that settlement is capable of doing this, provided that the registration system supporting settlement, currently the Meter Point Registration Service (MPRS), holds the details of the energy service providers. Currently, MPRS limits the majority of customers to only one supplier per day. If MPRS is expanded to allow for more than one supplier or energy service provider to a customer site, either through the proposals from the P379 workgroup or other industry changes, a process in either registration or settlement could be introduced to identify which energy provider is the active provider in each defined settlement period. Such a change to registration arrangements would likely be outside the scope of this Significant Code Review (SCR).

4.3. A new registration system is currently being developed as part of Ofgem's Switching Programme.²² This system will replace the switching processes currently in place in MPRS, but will not replace MPRS. The Switching Programme SCR is introducing, and then implementing, radical changes to customer switching arrangements in both electricity and gas to enable customers to switch energy supplier reliably and quickly. As part of these

²⁰ For example, a consumer could be supplied by a specialist renewable energy supplier but be supplied by another supplier when renewables are scarce.

²¹ 'Energy providers' is used here to capture providers of physical energy services in future that may not fall within the definition of a supplier

²² More details on the Switching Programme SCR can be found here on the Ofgem website: <https://www.ofgem.gov.uk/gas/retail-market/market-review-and-reform/smarter-markets-programme/switching-programme>

changes, the Switching Programme SCR is considering how the new switching arrangements could support multiple suppliers and other potential innovation scenarios.

4.4. For different providers at the same time, MPRS would again be one of the main barriers. If MPRS was changed to allow multiple suppliers (and potentially providers in future) to be registered, settlement could develop a process for each block of half-hourly meter data collected from a smart meter to be divided between suppliers and/or providers. Smart meters do not have this function. This could be done accurately if there is additional metering behind the smart meter (sub-metering), as proposed in the P375 Balancing and Settlement Code modification,²³ or a form of estimation could be used. We understand from ELEXON that the Target Operating Model (TOM) design could allow for sub-metering data to be collected. This would also require new arrangements beyond settlement (such as requirements for sub-metering) to ensure accurate allocation of energy.

4.5. One long term solution, though outside the scope of this SCR, may be to obtain consumption data for settlement from a consumer access device. The device may be able to retrieve and process the consumption data of different meter and sub-metering points in a customer's home or business.

4.6. A mechanism²⁴ currently exists in the half-hourly market to provide for multiple suppliers. In summary, this mechanism works by allocating the half-hourly data from a customer between multiple suppliers,²⁵ either via fixed energy blocks or energy percentages. This allocation must be notified before the start of the settlement period (Submission Deadline²⁶). We understand this arrangement is rarely used. We consider any future arrangements to allocate half-hourly data across multiple suppliers would need to be more dynamic.

4.7. As a minimum, we consider that the TOM design should not impede the multiple provider arrangements set out in 4.1 above.

4.8. Further, there may be merit in the TOM working groups considering how settlement could accommodate processes in future to sub-divide half-hourly metered data between energy providers based on sub-metered data or an agreed allocation methodology, and ensure the TOM is not an impediment to such arrangements occurring in future. Such processes could be used not only to divide half-hourly energy consumption between Balancing and Settlement Code (BSC) parties, but also to allocate energy purchases from decentralised energy sources (see discussion below in decentralised energy section). We recognise that further work outside the TOM design work would be needed to develop sub-metering arrangements, such as the development of technical requirements for any sub-metering equipment.

²³ More details of the proposal can be found on the ELEXON website here:

<https://www.elexon.co.uk/mod-proposal/p375/>

²⁴ This is set out in BSCP 550 – SVA shared meter arrangements for half hourly impact and export active energy.

²⁵ Each supplier for the customer is registered under a different pseudo-MPAN.

²⁶ Suppliers will contract with Generators (and other market participants) up to the start of the settlement period to meet the electricity demand of their consumers, this is called the submission deadline. After the deadline, suppliers and generators are expected to deliver or consume their contracted electricity volumes unless instructed to deviate by the Electricity System Operator.

4.9. In 2018 ELEXON published a white paper exploring how BSC central services could be adapted to enable customers to buy energy from more than one supplier.²⁷ A BSC modification proposal, P379,²⁸ was subsequently raised and a workgroup is currently developing a solution. If the proposal is approved and subsequent code changes are introduced prior to market-wide settlement reform, they should be incorporated into the design of the new settlement arrangements.

4.10. As the P379 workgroup is in its early stages, the white paper and information from the workgroup could be used by the TOM working groups as a starting point to consider how multiple provider and sub-metering arrangements could work in the future, and how the TOM can be designed to not be an impediment to such developments.

Storage and EV metering

4.11. The increase in storage and EV up-take present substantial opportunities and challenges for the electricity grid. Due to this, it is ultimately important that storage and EVs are accurately captured, and settlement should support this.

4.12. Under the current settlement arrangements:

- ❖ Storage and EV's export and import would be captured as part of the consumption and export of the metering point where it is connected. Unless there was sub-metering it would not be possible to settle storage or EV export and import separately from the metering point.
- ❖ One additional challenge with settling EV's is that they can move between grid supply point groups. One of the assumptions of the current registration system, the Meter Point Registration Service (MPRS), is that metering points are in a fixed location.

4.13. We note that the proposed mechanism in the ELEXON white paper to facilitate multiple providers could provide an avenue for storage and EVs export and import to be separated out for settlement under current regulatory arrangements.²⁹

4.14. It will help support the take-up of storage and EVs if settlement ensures that the import and export activities of such technologies are captured by the metering point they are associated with. This will allow the impact of such technologies on the energy system to be accounted for and managed. This would likely require changes to the existing rules around export settlement, which is currently optional for licence exempt generation.

4.15. Both SMETS 1 and 2 meters are capable of recording half-hourly export. Therefore customers with smart metering installed will be able to record both their import and export energy at half-hourly intervals. As part of this SCR we are considering mandating half-

²⁷ Available at: <https://www.elexon.co.uk/wp-content/uploads/2018/04/ELEXON-White-Paper-Enabling-customers-to-buy-power-from-multiple-providers.pdf>.

²⁸ <https://www.elexon.co.uk/mod-proposal/p379/>

²⁹ See ELEXON white paper, p5-6. Available at <https://www.elexon.co.uk/wp-content/uploads/2018/04/ELEXON-White-Paper-Enabling-customers-to-buy-power-from-multiple-providers.pdf>.

hourly export settlement, and we sought stakeholder views on the costs and benefits of doing this as part of the Outline Business Case.³⁰

4.16. If there is a move to multiple provider arrangements in future then customers may choose to enter into energy supply arrangements relating to their storage and/or EV separate to their 'traditional' supplier contract. For example, one potential future product which has been suggested is the linking of an EV or EV supply point with a separate supply contract. Sub-metering or smart charging arrangements which allow for the consumption of an EV to be separated out from other parts of a customer's domestic supply would further facilitate this, allowing for a separate supplier (or energy provider) to be directly responsible for the settlement of consumption associated with the EV. With the advent of smart home technologies and the much expected internet of things, we can expect that product manufacturers may seek to supply and settle their devices in similar ways to EV providers.

4.17. As noted above, one additional challenge associated with EVs is that they can move between grid supply point groups while MPRS assumes fixed metering points. This means that settlement cannot account for EV consumption separately when the EV is charged from a different charging point to the one it is associated with. One approach to this limitation is the use of unmetered arrangements to settle EV consumption from street side chargers. The central management system arrangements that support unmetered sites can be used to create logs of different points on the network where an EV charges. However, in the long term the use of unmetered settlement arrangements to settle mobile EV consumption may not be desirable.

4.18. The development of settlement arrangements to include mobile metering is outside the scope of this SCR. However, to the extent possible, we still think it would be desirable to consider whether the TOM design (for example, implicit assumptions in service requirements or definitions) might impede a future move to mobile metering.

Decentralised energy

4.19. While customers have traditionally been supplied via energy purchased from the wholesale electricity market, decentralised energy and platforms that support trading of decentralised energy (such as Peer to Peer networks, local energy schemes, vehicle to grid) are expected to increase in the future. Accordingly, customers may source energy in the future from a mix of wholesale and decentralised energy sources.

4.20. Under the current regulatory framework, a provider of decentralised energy services directly to consumers would, in most cases, need to become, or partner with, a supplier. The requirement to be a supplier has been recognised as a potential barrier for decentralised energy providers entering the market. This is due to the regulatory complexity of directly participating in the energy market, and the up-front costs associated with establishing a licensed supply business – requirements that might lead some providers to determine that a small-scale decentralised scheme is not viable.

³⁰ See our response to the OBC feedback from stakeholders about export settlement on pages 3-7 of: <https://www.ofgem.gov.uk/publications-and-updates/market-wide-settlement-reform-outline-business-case>

4.21. One potential solution to this limitation is the multiple provider proposal, discussed in 4.8 above. The P379 workgroup is considering use cases which could include providers of decentralised energy and trading platforms.

4.22. Future changes to the market could enable customers to enter into decentralised energy arrangements independent of any 'traditional' supply arrangements they may have. The TOM should be able to facilitate and support this potential future change.

4.23. The Design Advisory Board (DAB) has discussed the interaction with settlement and new types of decentralised energy services which may emerge. The DAB has highlighted that many decentralised energy services could provide products which are required to be metered at below half-hourly granularity. However, market-wide settlement reform could still have an important role by providing data which could be used for auditing or financial purposes by decentralised energy service providers or other innovators.

4.24. The increase in decentralised energy services combined with multiple provider arrangements may require additional interaction between decentralised energy providers (including platforms) and settlement, to ensure the accurate allocation of energy purchases. For example, ELEXON's white paper on multiple suppliers proposes a new role, the customer notification agent, to notify BSC central services of decentralised energy trades outside of settlement. Alternatively, details of decentralised energy arrangements could be included in MPRS or other future registration databases so settlement can accurately account for such purchases when allocating metered volumes. The TOM design is intended to not create barriers to increased interaction in the future between decentralised energy services and settlement systems.

4.25. One of the other ways decentralised energy services could be supported under the TOM is the development of a market-wide database. This is discussed in the section below.

Development of a database of HH settlement data

4.26. As discussed in 3.4 – 3.6, in the preferred TOM design the DWG have proposed that HH data enter central settlement systems non-aggregated. Subject to Ofgem's decision on the final TOM, our Impact Assessment, and governance arrangements to protect consumers' privacy, this design could allow for data to be accessed by those wishing to offer services to consumers as part of the new system architecture.

4.27. Currently, meter data is divided in the energy market by suppliers (ie individual data is aggregated by supplier within each Grid Supply Point Group before data for consumers of different suppliers could be compared). Having a store of market-wide data would be able to cut across all market segments. This could be used (subject to data privacy and governance) to facilitate innovative products at both the wholesale and decentralised level (demand side response, peer to peer & community/local energy trading), to support the calculation of network charges and have broader value, such as aiding in policy-making and academic research.

4.28. Any decision to set up such a market-wide store would be subject to careful assessment of the costs and benefits, including security implications, impact on competition and impacts on organisations in the market.

5. Areas for feedback

5.1. This is not a consultation document but we would be keen to receive any comments. We are particularly interested in hearing from stakeholders about where they believe the TOM design might not be adequately future-proof and any future changes we have not considered that stakeholders believe we should. We have set out some questions to help guide any feedback.

1. Do stakeholders agree with the future changes identified, and does the design of the preferred TOM ensure that MHHS settlement arrangements will not impede or act as barrier to them?
2. Are there any other potential future changes/scenarios which the TOM design should take into account?
3. Do you have any further comments on this paper?

5.2. If you have any comments, please contact us at: halfhourlysettlement@ofgem.gov.uk. We would be happy to arrange a meeting or teleconference, or to take comments by email. Whilst we are open to receive comments at any time, it would be most useful to have these by 16 August 2019.

5.3. Unless you mark any comments as confidential, we may seek to publish your response on our website, include information from it as part of any subsequent publications and/or will share your comments with others including the Department for Business Energy and Industrial Strategy (BEIS), the [Design Working Group](#), the [Design Advisory Board](#) and/or future industry groups working on the TOM design.

5.4. You can ask us to keep your comments confidential, and we'll respect this, subject to obligations to disclose information, for example, under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004. If you want us to keep your comments confidential, you should clearly mark your response to that effect and include reasons. If you are including any confidential material, please put it in the appendices. If the information you give in your comments contains personal data under the Data Protection Act 2018, the Gas and Electricity Markets Authority will be the data controller. Ofgem uses the information in responses in performing its statutory functions and in accordance with section 105 of the Utilities Act 2000.

6. Next Steps

6.1. We are publishing this working paper to update stakeholders on our thinking to date and provide transparency. We also see this as an opportunity to test our thinking with a broader audience and prompt further stakeholder input into the TOM design work.

6.2. We intend to continue working with our industry working groups on how to best future enable the TOM and ensure options can meet the criteria set out in the Innovation design principle.

6.3. The Target Operating Model design work is currently at stage 2, with the Design Working Group having chosen a preferred TOM. The preferred TOM consultation has closed and the responses have been published on the BSC website.³¹ The DWG have consulted on the transition approach³² and will deliver the preferred TOM and transition approach to us in a final report in the summer.

6.4. The development of the TOM is just one area of the SCR and feeds into the Full Business Case (FBC), which will support the final decision on MHHS. To develop the FBC we will carry out a Request for Information, and a consultation on an Impact Assessment. It is by using the FBC that we will take the decision on the final TOM, and our decision will be informed by all the relevant evidence available to us, including stakeholder responses to the Impact Assessment and advice from the Design Advisory Board.

³¹ The public responses can be found here: <https://www.elexon.co.uk/documents/groups/dwg/dwg-public-consultation-responses-on-preferred-tom/>

³² <https://www.elexon.co.uk/consultation/dwgs-consultation-transitioning-market-wide-half-hourly-settlement/>