

PUBLIC

# The Target Operating Model for Market-wide Half Hourly Settlement Design Working Group's Recommendation to Ofgem

ELEXON  
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# MARKET-WIDE HALF HOURLY SETTLEMENT

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## EXECUTIVE SUMMARY

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### About this report

This is the Design Working Group's (DWG's) report to Ofgem on its preferred Target Operating Model (TOM) for Market-wide Half Hourly Settlement (MHHS). Ofgem will make the final decision on the TOM, and the wider Business Case for MHHS, as part of its Significant Code Review (SCR) on Electricity Settlement Reform.

### Reason for Ofgem's SCR

Smart and Advanced Meters can record a customer's usage in each half hour period. This enables Suppliers' contractual purchases of electricity to be reconciled against their customers' actual usage.

MHHS will expose Suppliers to the true cost of their customers' usage and incentivise them to help their customers move consumption to times of the day when electricity is cheaper to generate and transport. It builds on the platform provided by smart Meters to enable a smarter, more flexible energy system that lowers bills, reduces carbon emissions and enhances security of supply.

### Scope of DWG's work

The DWG is an Ofgem industry group, chaired and facilitated by ELEXON. Its remit, as set out in its Terms of Reference<sup>1</sup>, is to develop a TOM covering the 'Meter to Bank' process for all Supplier Volume Allocation (SVA) Settlement Meters – i.e. those connected to distribution networks. This includes the core Settlement activities governed by the BSC including Meter Registration, Meter Operations, Data Retrieval, Data Processing, Data Aggregation and Volume Allocation for the SVA market.

The existing arrangements separate Settlement processes and data according to whether a Metering System is settled Half-Hourly (HH) or Non-Half Hourly (NHH). The DWG believes that, in a MHHS world where the majority of Meters can record HH consumption, it will be logical to instead segment the market based on Meter type and data availability – into **smart Meters**, **Non-smart Meters**, **Advanced Meters**, and **Unmetered Supplies**. This recognises that different meter types are supported by different BSC processes and communication methods - for example Smart Meters which require access via the Data and Communications Company (DCC) will differ from Advanced Meters with a dedicated communications line.

The TOM sets out the end-to-end Market design for the target end state, when the majority of Meters will be smart Meters. Most Advanced Meters in the current NHH sector will either be replaced with a smart Meter or be settled in the Advanced Market Segment.

The DWG recognises that the Supplier role may change in the future. Customers may contract with multiple energy providers and an electricity Supply contract could become part of a wider bundled service.

### Aligning the TOM with Ofgem's policy

Ofgem has given the DWG a set of Design Principles and strategic objectives for the TOM. Together, these support its measures of success for MHHS<sup>1</sup>. The TOM forms a key output of Ofgem's SCR. There are also two ongoing SCR work streams where Ofgem is still developing policy, in parallel with the TOM design. These are:

- Access to HH data for Settlement purposes; and
- Supplier Agent functions.

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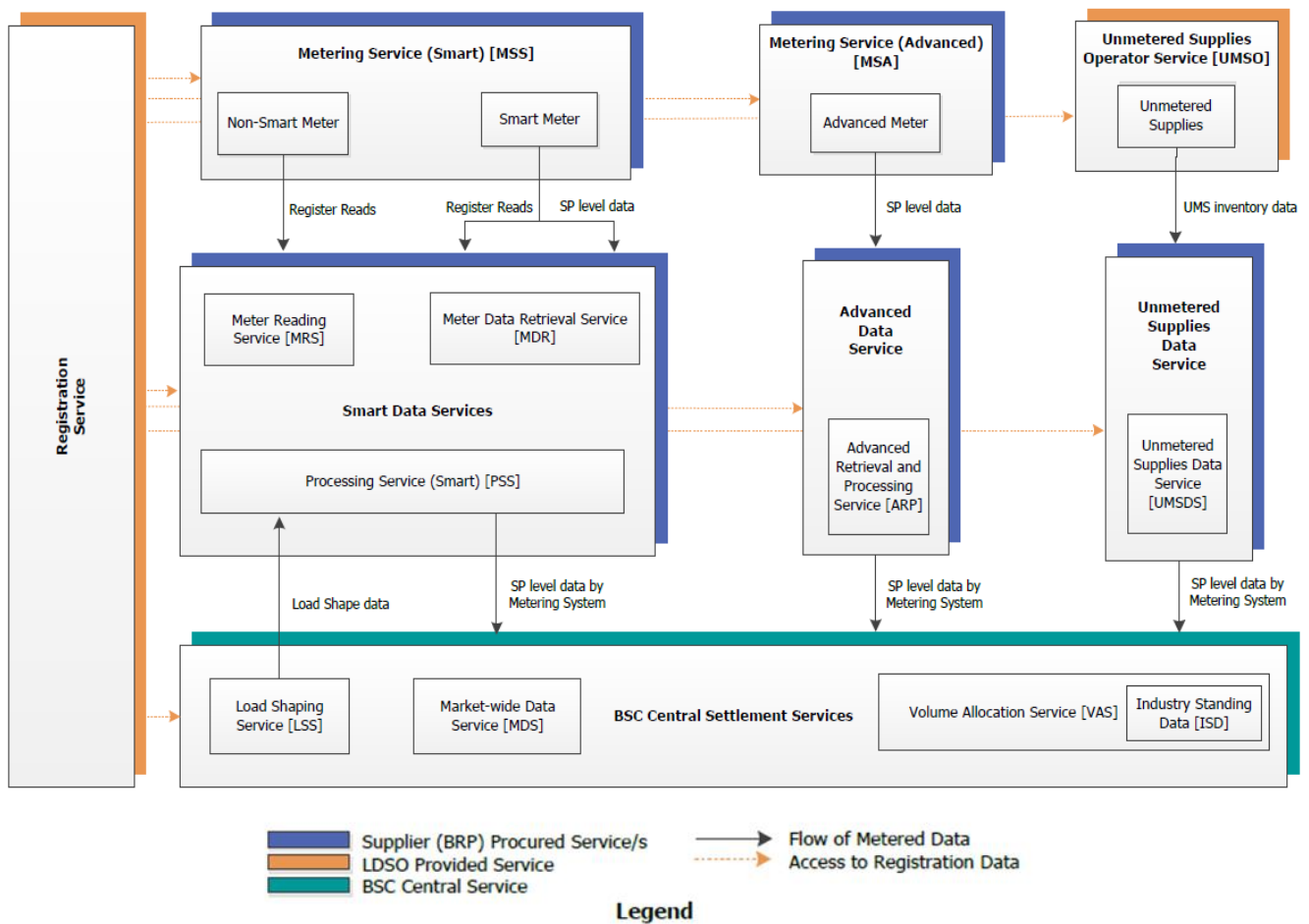
<sup>1</sup> Appendix 2 of Ofgem's [SCR Launch Statement](#) sets out its project objectives, strategic objectives, Design Principles, measures of success and Terms of Reference for the DWG

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Because Ofgem has yet to make its final policy decisions in these areas, it has provided the DWG with '[least-regrets' steers](#) on the TOM design. These do not prejudge Ofgem's final decisions but are intended to enable the TOM development to progress in the meantime, in a way that has least impact on programme timescales while minimising wasted work. The DWG has developed the TOM in line with Ofgem's Design Principles, strategic objectives and 'least-regrets' steers.

## The DWG's preferred TOM

The DWG's preferred TOM is a variant of TOM A "Combined Retrieval and Processing with separate Aggregation" that was presented in its [final report for Stage 1 of the SCR](#) and consultation.



Its key features are the three Data Services that collect data, and supporting information, and submit Settlement Period (SP) level data to the BSC Central Settlement Services. These are the **Smart Data Services**, the **Advanced Data Service** and the **Unmetered Supplies Data Service**.

The Advanced Data Service and the Unmetered Supplies Data Service are fully HH enabled and able to pass data directly to BSC Settlement Services with standardised validation and minimal conversion. Where HH data cannot be obtained from a smart Meter on an ongoing basis, the Smart Data Services will apply "Load Shapes" derived from actual available smart Meter data from similar customers, which replaces the existing Profiling arrangements.

Although these services are defined as separately defined services in the TOM design, this does not seek to restrict or prescribe any commercial arrangements that the responsible party may wish to use in delivering them.

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## New BSC Central Settlement Services

In addition to minor changes to the Volume Allocation Service (currently known as the Supplier Volume Allocation Agent (SVAA)), there are two new services to support the TOM and leverage maximum benefits from MHHS. These are the **Market-wide Data Service** and the **Load Shaping Service**.

The **Market-wide Data Service (MDS)** processes SP level data across all market segments. It provides different summations of data for Imbalance Settlement and other purposes such as network charges and flexibility offerings (if required). The MDS will also be responsible for calculating distribution Line Loss values for different sub-classes of Metering Systems by applying Line Loss Factors (LLFs) to the data. The summed data will then be made available to the Volume Allocation Service (VAS) for use in the Volume Allocation Runs (VARs).

The **Load Shaping Service (LSS)** is responsible for calculating energy consumption (import and export) Load Shapes for a number of defined Categories of Metering Systems. The LSS uses validated actual Settlement Period (SP) level data accessed from the Processing Service (Smart) (PSS). The Load Shapes will then be used by the PSS to convert Register Readings (RRs) or Daily Consumption values into SP level data. The Load Shape data will also be used to estimate invalid SP level data for smart Meters and default where data is missing or unavailable.

## A shorter Settlement timetable

Ofgem's Design Principles and strategic objectives for the TOM, and its measures of success for MHHS<sup>1</sup>, include delivering a shorter and more efficient Settlement timetable. This includes reducing the timing and number of runs, as well as reducing the Credit Cover costs for existing Suppliers and new entrants. Ofgem has encouraged the DWG to pursue an ambitiously-shortened Settlement timetable for the TOM (in the target end state following transition to the new TOM).

The DWG believes that improved quality and availability of Meter data under MHHS will enable a reduction in the timing of the Initial Settlement (SF) Volume Allocation Run (VAR) from its current 15 working days to **5-7 working days** and shortening of the Final Reconciliation (RF) Run from its current timing of 14 months to **4 months**. This will reduce the number of interim reconciliation runs required. To address concerns about recovery of material errors affecting Settlement, the DWG recommends a minimum of **12 months** for the Dispute Final (DF) Run. However, it believes that the qualifying materiality for Trading Disputes should be set significantly higher than today.

## Conceptual system architectures for the TOM

The DWG has deliberately developed the TOM to be agnostic of any particular system architecture. Therefore, the TOM design presented in this report is intended not to pre-judge whatever architectural solution options are put forward for the hosting and transfer of Meter data for Settlement purposes. However, any architecture for the TOM should have a robust governance layer of access controls, auditing and monitoring.

## Next steps and contacts

The DWG will consult on its preferred TOM in spring 2019. It will then develop a transition approach for moving from the current Settlement arrangements to the TOM. The DWG will consult on this and deliver its final Stage 2 report to Ofgem during summer 2019. Ofgem will then make its Full Business Case decision on when and how to implement MHHS.

You can view the DWG's latest Gantt chart plan and its more detailed Forward Work Plan on the [Design Working Group](#) page of ELEXON's website.

For any other inquiries, please email ELEXON's MHHS team at [DWGSecretary@elexon.co.uk](mailto:DWGSecretary@elexon.co.uk).

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## SUMMARY OF ATTACHMENTS TO THIS REPORT

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This report has three attachments:

**Attachment A:** Detailed TOM Service and Data requirements

**Attachment B:** DWG's development of the TOM

**Attachment C:** Risks, Assumptions, Issues and Dependencies

In addition to the attachments; spreadsheet versions of the detailed service requirements and alternative formats of the service and process diagrams are provided.

## GLOSSARY OF TERMS AND ACROYMNS

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A Glossary of Terms can be found in [Appendix A](#) of this document. Acronyms can be found in [Appendix B](#).

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## INTRODUCTION

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### 1. Ofgem's Significant Code Review on Market-wide Half Hourly Settlement (MHHS)

This report sets out the Target Operating Model (TOM) developed by the ELEXON-led Design Working Group (DWG) for Market-wide Half Hourly Settlement (MHHS). The TOM development work forms part of Ofgem's [Significant Code Review \(SCR\) on Electricity Settlement Reform](#). Ofgem's main objective is to develop an enduring MHHS process that delivers consumer benefits, by maximising the opportunities provided by smart metering to enable a smart, flexible, energy system. Appendix 2 of Ofgem's [SCR Launch Statement](#) sets out its project objectives, strategic objectives, Design Principles, measures of success and Terms of Reference for the DWG. The DWG's work has been supported by the Design Advisory Board (DAB) which has reviewed and provided steers on the DWG's outputs. The DWG makes recommendations for Ofgem's approval.

This report to Ofgem outlines the key services of the end-to-end MHHS process. Together these make up the TOM developed by the DWG. The DWG, by majority, recommends that Ofgem adopts this TOM. During 2019 the DWG will consult on the TOM. Following development of the transitional approach to implement the TOM a further consultation will be undertaken.

### 2. What is a Target Operating Model (TOM) for MHHS?

A TOM for MHHS is a set of services required to deliver Settlement Period (SP) level data from a Meter to a central Settlement body, to enable the calculation of the amount of energy a Supplier's customers have consumed (or exported) in each Settlement Period for each Settlement Day (SD). This calculation is then used in the Imbalance Settlement process which compares the Supplier's contracted purchases of energy to the amounts deemed to have been consumed (sales) by each of the Supplier's customers (and recognises any amounts of energy contracted by National Grid under the Balancing Mechanism). Settlement Data is also provided for network charging.

Additionally, part of Ofgem's strategic objectives and Design Principles is that the TOM should reduce the time taken to complete Settlement. This applies to both the first set of Settlement payments (to reduce Credit Cover requirements for Parties) and the final closing off of any financial liabilities. The smart Meter roll-out enables more frequent collection of consumption data and thereby a reduction from the current 14-month Settlement reconciliation window.

### 3. What are the Objectives for Stage 2 of the DWG's work?

In Stage 1, the DWG developed five potential 'skeleton' TOMs for the [Target End State](#) when most customers will have a Meter capable of delivering Settlement Period level data for Settlement purposes. All the TOMs were evaluated against the [Design Principles](#) set out by Ofgem. Ofgem approved the [DWG's Stage 1 report](#) in April 2018.

The DWG then consulted on these five skeleton TOMs in April-May 2018. The [consultation responses](#) showed all five TOMs to be viable options and that the DWG had not missed any other TOM or significant aspects of design. There was no consensus on an overall preferred TOM. The DWG therefore took all of the TOMs forward for further detailed design and evaluation in Stage 2.

During Stage 2, the DWG has developed the more detailed Service requirements for the TOMs, evaluated the different TOMs in light of Ofgem's Design Principles and policy steers, and chosen a preferred TOM. This work has been supported by four workgroups reporting to the DWG. As part of Stage 2, and during 2019, the DWG will also develop and consult on detailed transitional arrangements for its preferred TOM. This report contains the high-level transition principles and identifies changes to be developed by the DWG.

You can find the [DWG's Forward Work Plan and Gantt chart plan](#) here. These set out the timetable of work being undertaken by the DWG, including planned consultations.



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## 4. What do we mean by a Service?

In the context of the TOM, a Service is a set of requirements and processes required to deliver one function of MHHS. The Service is agnostic of current organisation roles (such as Supplier, Meter Operator, Data Collector, Data Aggregator) and their associated Qualification requirements under the BSC. The Services definition does not preclude an organisation wishing to provide any Service from outsourcing elements of the Service. However, the responsibility for delivery of each overall Service will sit with a single entity.

Therefore each Service:

- defines a single set of rules, inputs and outputs;
- says what needs to be done but doesn't define who will do it;
- could be delivered by a market participant or role; and
- does not preclude Parties providing some Services themselves.

## 5. What do we mean by Meter data?

Meter data is any data that is stored at, or can be collected from, the Meter. This includes Register Readings (RRs) for both cumulative and Time-of-Use (ToU) registers, daily read or consumption logs, and Active Import (AI) and Active Export (AE) data at a Settlement Period level. It may include Reactive Power Meter data where, for example, such data is required for network charging purposes.

Meter data can also include information on how Meters are configured, such as the time of operation of the ToU Registers.

## 6. What do we mean by data for Settlement Purposes?

At a minimum 'Settlement Purposes' means for use in the following areas:

- Calculation of a Supplier Deemed take in each Settlement Period;
- Use of data in the Imbalance Settlement calculations;
- Provision of data for Performance Assurance purposes;
- Use and provision of data by the Load Shaping Service;
- Provision of reports and data as set out [in Section V - Reporting of the BSC](#);

Section V covers:

- Provision of Settlement reports to Suppliers;
- Provision of data to the ESO for network charging;
- Provision of data for LDSO for network charging; and
- Provision of data for EMR purposes (Capacity Market and CFD).

If data for other regulatory purposes is required by Ofgem (for example, for calculating Typical Domestic Consumption Values (TDCVs)) this would need to be in line with the Regulatory Framework.

## 7. What do we mean by Meter data for non-Settlement purposes?

As well as providing Meter data for Settlement, Meter data may be collected for non-Settlement purposes. This could include Meter data that is required for customer billing, energy management services, academic research and public interest initiatives.

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## 8. What are the data requirements for network charging?

Data for network charging is provided via the existing Settlement arrangements. Data for HH Metering Systems is provided directly to Distribution Businesses by the HH agents that collect the Meter data. This data can include data for reactive power for some Metering Systems. The data for charging for use of the Transmission network is provided via central settlement systems. There are presently (January 2019) a number of reviews being undertaken into network charging such as [the Network Access and Forward-looking Charging](#) SCR and [Targeted Charging Review](#) SCR. The reviews may change the data and processing requirements for network charging. In developing the TOM the DWG have assumed that the current baseline data will be required. The DWG have left options open as to whether such data will be provided directly by the service collecting the data or via the central Settlement processes. In finalising the TOM design this will take account of updated progress on these reviews.

## 9. What future innovation could the TOM support?

It is expected that the TOM enables benefits to be realised by the end consumer, by facilitating innovation in technologies, products and energy services.

To achieve this, the TOM is designed to be as flexible as possible (within certain market constraints). For example, future uses of the TOM could include new processes to support Electric Vehicles (EVs) (both charging and discharging), vehicle-to-grid services, Peer- to-Peer trading (P2P), community energy schemes, energy flexibility offerings such as Demand Side Response (DSR), battery storage offerings, innovative ToU tariffs and future services from smart grids. These innovations may require the TOM to support multiple and/or different parties (other than the Supplier) contracting with the consumer.

The TOM could also support the provision of HH Meter data to new participants (with the appropriate access rights), both in aggregate form (new forms of aggregated data) or individual HH Meter data. It should be noted that many of these innovations will require market changes beyond the Settlement system in order to happen.

The DWG's aim has been to ensure that the TOM design facilitates, and does not hinder, innovation. However, it cannot predict all future innovations or be the sole mechanism for delivering these.

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## SECTION 1 - THE VISION

### Reason for the SCR

Settlement reconciles differences between a Supplier's contractual purchases of electricity and the demand (energy use or production) of its customers. Currently, most domestic and smaller non-domestic customers' usage is settled on a Non Half Hourly basis, as they do not have Meters that can record consumption in each half-hour Settlement Period. These customers are currently settled using estimates of when they use electricity, based on a profile of the average consumer (within a given Profile Class).

Smart and Advanced Meters can record a customer's usage during each half hour period, enabling MHHS, where Suppliers' contractual purchases of electricity are reconciled against their customers' actual usage during each half hour. MHHS will expose suppliers to the true cost of their customers' usage and incentivise them to take steps to help their customers move their consumption to times of the day when electricity is cheaper to generate and transport. For example, this could be by offering smart tariffs and other innovative products. This will build on the platform provided by smart Meters to enable a smarter, more flexible energy system that lowers bills, reduces carbon emissions and enhances security of supply.

### SCR Objectives and Outcomes

Ofgem's outcomes for MHHS project are set out in the project objectives, which form part of the Business Case. These are as follows:

#### Outcomes

Ref.	Outcome
01	To promote an electricity system that delivers the Government and Ofgem's objectives in a cost-effective manner, minimising the overall cost to current and future consumers of moving to a low-carbon electricity system while maintaining security of supply and system efficiency.
02	To develop settlement arrangements that incentivise all retailers and suppliers (current and future) to encourage customer behaviour (electricity demand) that contributes to a more cost effective electricity system.
03	Minimise undesirable distributional effects on consumers.

### Ofgem's SCR Business Case work

Ofgem is developing the [Business Case](#) for MHHS iteratively alongside the TOM development. The Business Case will take into account the Settlement design of the TOM and Ofgem's policy development work on [supplier agent functions](#) and [access to half-hourly data for settlement purposes](#). The policy decisions in both these areas impact the design of the TOM and are discussed in more detail below.

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## SECTION 2 - SCOPE, DESIGN APPROACH AND THE FUTURE ROLE OF SUPPLIER

### 1. What is the scope of the DWG's work?

The scope of the DWG's work covers the [Meter to Bank](#) process for all Supplier Volume Allocation (SVA) Settlement Meters – i.e. all Settlement Meters connected to distribution networks. This includes:

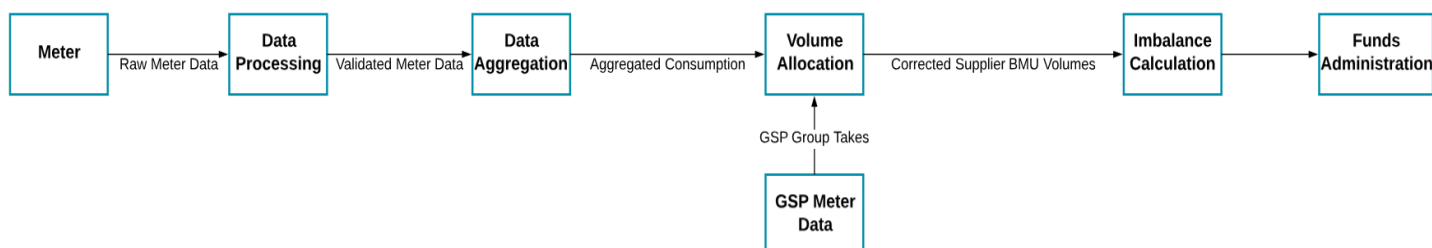
- Meter Registration - the recording of information pertinent to Settlement Metering Systems;
- Meter Operations - fitting and maintaining Settlement Meters;
- Data Retrieval - getting information from Settlement Meters;
- Data Processing – validating and estimating Settlement Meter data;
- Data Aggregation - summing Settlement Meter data to required granularity; and
- Volume Allocation – allocating Meter volumes to Trading Parties that are signatories to the BSC.

Outside scope are Metering Systems connected to the [Transmission System](#) or those that are part of the [Central Volume Allocation \(CVA\)](#) arrangements (these can include generators embedded in distribution networks). Metering Systems at [Grid Supply Points \(GSPs\)](#) are used in the Settlement calculations. The SCR does not seek to change any requirements for these Metering Systems, the definition of [GSP Groups](#) or the defined distribution regions. The definition of [Balancing Mechanism Units \(BMUs\)](#) is out of scope. However, we note that new types are already being [considered by the industry](#). The approach to the application of [zonal transmission losses](#) is also outside the scope.

The TOM will impact the BSC, the Smart Energy Code (SEC), the Master Registration Agreement (MRA)/ Retail Energy Code (REC) and the Distribution Connection and Use of System Agreement (DCUSA). Other agreements such as Meter Operator Code of Practice Agreement (MOCO PA) and the National Terms of Connection may also be impacted. Other consequential changes to Codes and processes are also likely to arise on implementation.

### 2. What is the Meter to Bank process?

The current Meter to bank process is as follows:



The 'raw' Meter data is retrieved from the Meter and provided to a data processor for validation. Any invalid data is rejected and replaced with estimated data. The validated Meter data is passed to an aggregation process that sums data according to defined criteria (and applies losses currently for half hourly data). This data is passed to the volume allocation process. This process sums data from the aggregation process up to 'BMU' level and corrects for any difference between the aggregated BMU data and the net amount of energy known to be on the distribution network. This information is derived from the GSP Meter data (the GSP Group Take). The corrected BMU data is passed to a process that aggregates the BMU data to [Trading Party](#) level and compares the data to the Trading Party's contracted volumes to calculate imbalance. The imbalance payments to and from Trading Parties are undertaken by the Funds Administration process.

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## 3. What are the Market Segments that are covered in the TOM design?

The TOM is designed to cover all Metering Points connected to the distribution networks. These are settled under the BSC in SVA (in England and Wales and Scotland) taking into account the type of Meter data that can be obtained from the Metering System. The five Market Segments are:

- i) Smart Meters with Settlement Period level data available;
- ii) Smart Meters with only Register Readings available;
- iii) Non-smart Meters with Register Readings;
- iv) Advanced Metering Systems with Settlement Period level data available; and
- v) Unmetered Supplies.

The TOM sets out the end-to-end Settlement design for the 'Target End State'. It is assumed that this 'Target End State' is when the majority of Meters will be smart Meters. Therefore, the number of non-smart Meters will be small. Furthermore, most Advanced Meters in the current Non Half Hourly sector will either be replaced with a smart Meter or be settled in the Advanced Market Segment.

## 4. Why does the TOM not explicitly set out the role of the Supplier?

In the context of the TOM, the Supplier is the party currently defined under the Electricity Act 1989 and the holder of an Electricity Supply Licence with these functions/obligations under the BSC:

1. Registrant of Metering Systems;
2. Party liable for settled energy costs;
3. Provider of retail electricity services; and
4. Accessing Smart Meters serviced via the Data and Communications Company (DCC).

The Supplier will be responsible for configuration of smart Meters and collection of data for customer billing. The Supplier could also be the party that is providing, procuring or interfacing with the services defined in the TOM.

It is also recognised that in the future the role of the Supplier may change. For example, new market participants could take on the role traditionally known as Supplier. Furthermore, the customer may contract with new or multiple energy providers in future. It could be that one of these providers is the Supplier as we know it currently for just the customer's demand, while others could be for generation or other specialist energy services (e.g. for an Electric Vehicle). A Supply contract could become part of a wider bundled service to customers.

For the purposes of this report, the Supplier is the party providing the functions and obligations set out in this section. Therefore, in the Service Requirements, the role of the Supplier has been defined as the [Balancing Responsible Party](#) (BRP) meaning a party that is responsible for Imbalance Settlement volumes under the BSC. Hence, in setting out the DWG preferred TOM the report refers to the BRP rather than the Supplier. Existing role titles such as Supplier Agents and Supplier Volume Allocation Agent (SVAA) are retained for clarity.

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## SECTION 3 - TOM DESIGN PRINCIPLES AND STRATEGIC OBJECTIVES

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The detailed TOM Design Principles are set out in [Appendix 2](#) of Ofgem's SCR launch statement. They are to be read in conjunction with the following strategic objectives for the TOM, which set out that Settlement arrangements should be designed to:

- maintain and operate efficient, economic and coordinated Settlement processes;
- be as simple and cost-effective as possible;
- promote effective competition in the generation and supply of electricity;
- promote efficiency in the implementation and administration of future balancing and Settlement arrangements;
- promote an electricity system that delivers the Government's objectives cost-effectively, minimising the costs to current and future consumers of moving to a low-carbon electricity system while maintaining security of supply and system efficiency;
- incentivise current and future retailers and suppliers to encourage customers to shift their consumption behaviour, contributing towards a more cost-effective electricity system;
- develop consistently with Ofgem decisions on policies relating to access to half-hourly data for Settlement purposes, consumer protection and the question of whether or not to centralise functions currently performed by supplier agents;
- be mindful of potential customer impacts and experience including interactions with their Supplier and other relevant parties;
- be flexible to deal with future policies and initiatives;
- become faster and more efficient, reducing the barriers to entry in the energy market; and
- should have safeguards in place to deal with the catastrophic failure of Settlement arrangements.

## SECTION 4 - OFGEM POLICY DEVELOPMENT

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### 1. Data Access and Data Privacy

Ofgem has developed the data and access privacy options alongside the development of the TOM. Ofgem consulted on their proposals for data access for both domestic and non-domestic consumers in their [consultation](#) on 'access to half-hourly electricity data for settlement purposes'. Following the consultation Ofgem provided a '[least regrets](#)' steer to the DWG in order that the DWG could progress development of the TOM. Ofgem advised that:

*'For the purposes of the design work at this time, we would like the DWG to proceed with the design of a TOM without Enhanced Privacy.'*

*As previously discussed, the outcome of other decisions on access to data does not materially affect the TOM design at this time, and we are satisfied that we can provide these to you in the future at such a time that they are resolved, without impacting on the TOM design project timeline.'*

### Implications of Opt-out Policy Option

If the Ofgem policy decision is for 'opt-out' (as set out in the consultation) consideration would be needed on how this information is collected and processed under the TOM. The existing opt-out for data collection that is between a day and one month would also need consideration.

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## 2. Supplier Agent Functions

Ofgem have also provided the following least regrets steer on Supplier Agent Functions:

*'For the purposes of the design work at this time, we would like the DWG to work on a design based on our proposed approach, published in our [consultation](#) document of 17 September 2018. Our proposed position was that our work on market-wide settlement reform should not include centralisation of agent functions. Additionally, we said that we think there may well be a case for future models where data is not aggregated for submission into central settlement systems and that the data aggregation role may no longer be required in its current form. For the purposes of the design work at this stage, we would like the Design Working Group to consider the design questions set out at paragraphs 3.14 – 3.16 of our consultation document.'*

## 3. TOM Timetable

The Policy decisions will feed into the TOM design and this will then feed into the Ofgem Business Case. A high level view of the current SCR and implementation timetable is set out below.

Activity	Timing
DWG's report to Ofgem on preferred TOM & requirements	End Jan 2019
DWG's consultation on preferred TOM & requirements	Feb/Mar 2019
DWG development of transition approach	Spring 2019
Ofgem's Request for Information (participant costs/impacts)	Spring 2019
DWG's consultation on transition approach	June/July 2019
BSC impact assessment on implementing/transitioning TOM	June/July 2019
DWG's final report to Ofgem	August 2019
Ofgem's Full Business Case decision	Late 2019
Code & licence changes drafted and made by Ofgem (with industry support / consultation)	Dependent on the Full Business Case
Transition to TOM	Dependent on the Full Business Case
TOM fully effective	Dependent on the Full Business Case
Run-off of previous Settlement Days	Dependent on the Full Business Case

# MARKET-WIDE HALF HOURLY SETTLEMENT

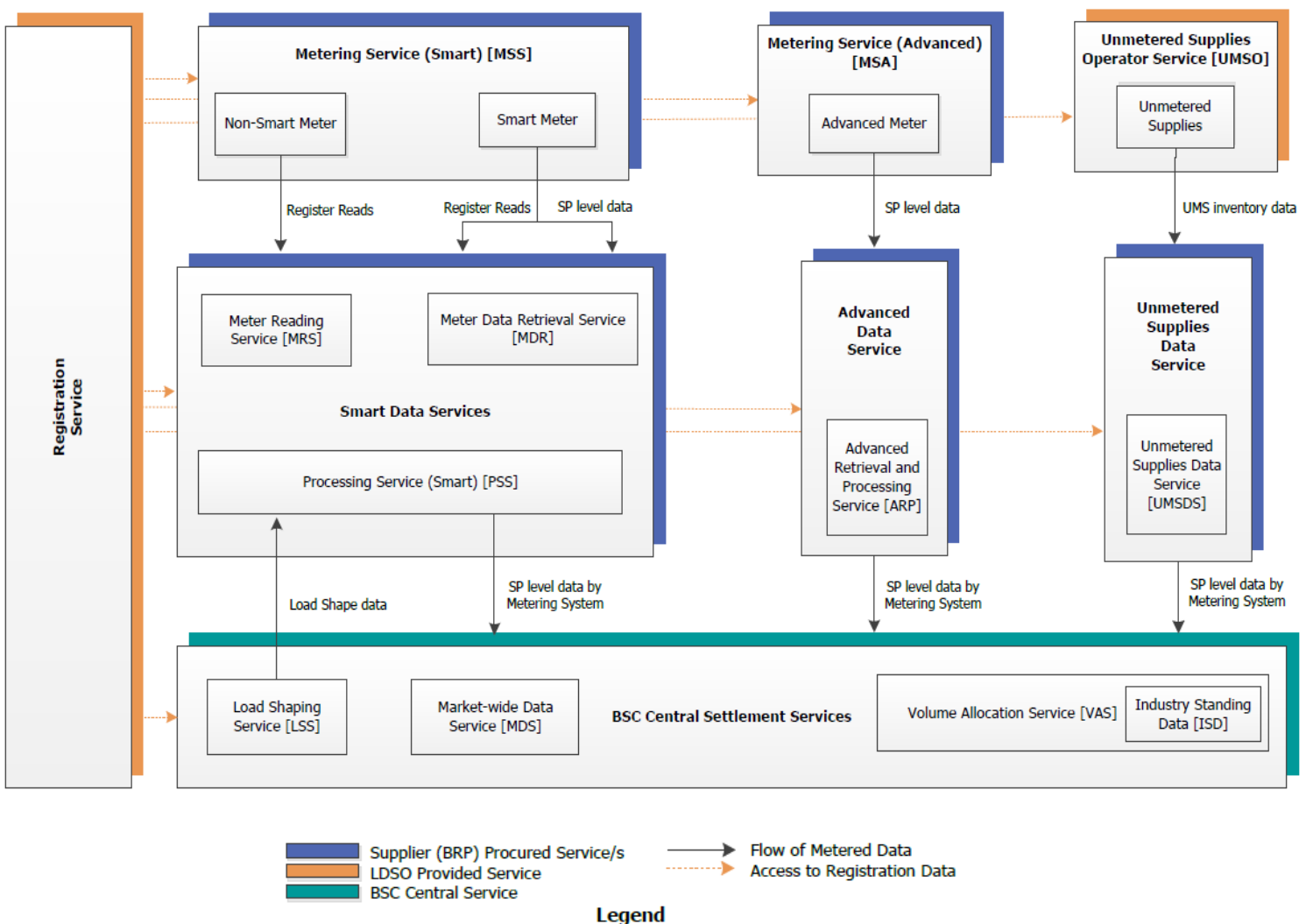
## SECTION 5 - OVERVIEW OF THE DWG RECOMMENDED TOM

The DWG recommended TOM is a variant of TOM A “Combined Retrieval and Processing with separate Aggregation” that was presented in the [DWG final report](#) for Stage 1 of the Ofgem SCR. The key features of this TOM are the three Data Services that collect data and supporting information, and then output Settlement Period (SP) level data to BSC Central Settlement Services. These are:

- The Smart Data Services;
- The Advanced Data Service; and
- The Unmetered Supplies Data Service.

The SP level data received by BSC Central Settlement Services will be used by the Load Shaping Service (LSS) to derive Load Shapes for use where SP level data is not available directly from smart or non-smart Metering Systems. The BSC Central Settlement Services will use the SP level data from Meters or derived using the load shapes in the Settlement calculations.

Two types of Metering Services have been defined - one for smart and non-smart Meters and one for the Advanced Meters. More detail on the TOM Services can be found in the [Service Summary Guides](#) below.





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## The TOM Services

The TOM Services are set out with the following Service Ids to aid navigation of the requirements:

Market Segment/Service	Service Id	Service Name
Advanced Market Segment and Advanced Data Service	MSA	Metering Service (Advanced)
	ARP	Advanced Retrieval and Processing Service
Smart and non-smart Market Segments and Smart Data Services (SDS)	MSS	Metering Service (smart)
	MDR	Meter Data Retrieval Service
	MRS	Meter Reading Service
	PSS	Processing Service (smart)
Unmetered Supplies Market Segment and Unmetered Data Service	UMSO	Unmetered Supplies Operator Service
	UMSDS	Unmetered Supplies Data Service
BSC Central Settlement Services	MDS	Market-wide Data Service
	LSS	Load Shaping Service
	VAS	Volume Allocation Service

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## SECTION 6 - SERVICE OVERVIEW (SUMMARY GUIDE)

The following service descriptions (Summary Guides) provide an overview of the Services, their processes and their inputs and outputs.

### 1. The Metering Service

The principal functions of a Metering Service (Smart (MSS) and Advanced (MSA)) are to install, commission, test, maintain, rectify, energise and remove faults in respect of Metering Equipment (including, where applicable, associated Communications Equipment). The MSS and MSA will also maintain and make available Meter asset information and, where required, Meter configuration information.

#### What types of Meter will the Metering Service be responsible for?

In the target end state, installed Meters are expected to be one of three broad types:

- Smart Meters (SMETS compliant, DCC-enrolled);
- Advanced Meters (Meters with SP level capability that are not DCC-enrolled SMETS Meters); and
- Non-smart Meters (Meters that are neither smart nor Advanced Meters).

Non-smart Meters typically include legacy Meters, but can also include any Automated Meter Reading Meters that do not provide full Advanced Meter SP level capability.

Meters can be installed, operated and maintained by two categories of Metering Service, as follows:

- A Metering Service (Smart) [MSS] will be responsible for smart and legacy non-smart Meters; and
- A Metering Service (Advanced) [MSA] will be responsible for Advanced Meters.

#### What other Industry Agreements cover the activities of the Metering Service?

The Meter Operation Code of Practice Agreement (MOCOPA) is an agreement between Electricity Distribution Businesses and Electricity Meter Operators in Great Britain which defines safety, technical and business interface requirements regarding the provision of Metering Services. MOCOPA is primarily a health and safety accreditation but it also provides a level of assurance that a Metering Service can carry out Settlement functions under the BSC.

#### Why are there two different Metering Services defined under the TOM?

It is expected that most parties wanting to undertake Metering Services will provide both of the defined Metering Services. However, a separate Metering Service for smart Meters has been defined such that a Metering Service provider that only wants to provide services to smart Meters can enter the market without meeting all the requirements for servicing more complex Metering Systems. Hence, there are two different metering services which have different requirements and require different skill set in the field.

#### Who is responsible for appointing a Metering Service to a Metering System?

For smart and most of the non-smart Meters, the Balance Responsible Party (BRP)) will be responsible for ensuring that the appropriate Metering Service is appointed. For Advanced Meters and AMR non-smart Meters fitted at designated premises, the customer is also able to enter into a contract with an Advanced Metering Service. In such cases this may place additional requirements on the MSA for communicating with the BRP and other services like the Processing Service (PSS/ARP) - but this arrangement is outside of settlement obligations.

#### Who do the Metering Services notify information to?

The MSA will notify information to the ARP and the BRP as appropriate. The MSS will notify information to the SDS (PSS) and the BRP.

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## What are the timescales?

The service will operate in line with defined timescales for each relevant request or obligation. Physical site visits may be required for some premises to gain access to install, commission, test, and maintain Meters and rectify faults.

## Service Summary:

This service will be responsible for:

- Installing, removing, commissioning, proving and maintaining Advanced, smart and non-smart Meters;
- Cooperating with Licenced Distribution System Operators at sites fitted with Measurement Transformers;
- Configuration of non-smart and Advanced Meters;
- Maintaining an accurate register of physical Meter Technical Details (MTD);
- Energisation and de-energisation of Advanced, smart and non-smart Meters (excluding large LV & HV);
- Connection and disconnection of Advanced, smart and non-smart Meters; and
- Meter and communication equipment fault investigation where a site visit is required.

## 2. The Advanced Retrieval and Processing Service

The Advanced Retrieval and Processing Service (ARP) is responsible for obtaining raw meter readings (SP level and Register Reads), validating and estimating (where needed) for Advanced Meters. This service will also, on an optional basis, be responsible for complying with the shared metering arrangements - which allocate Metering System data between one or more BRPs.

### How will the ARP obtain the Settlement Period level data?

Following installation, configuration and commissioning of an Advanced Metering System by the MSA, the ARP will undertake a test to prove the data can be accurately collected in conjunction with the Metering Service (Advanced) (MSA). The ARP will then retrieve the Settlement Period level data (and other data as required e.g. reactive power) direct from Meter using approved protocols. The data collected will need to be validated. The validation will include comparisons to Register Read data that is also retrieved from the Meter. The ARP may also need to arrange site visits to collect data where there are communication issues with the Meter.

### How does the ARP process the data?

The ARP will undertake a defined process set out under the Balancing and Settlement Code (BSC) to validate the Settlement Period level data collected from the Advanced Meters. Data failing the validation process will require further investigation. Where data is missing or invalid the ARP will estimate the data using a hierarchy of estimation methods set out in the BSC. The validated and estimated data will then be provided to the Market-wide Data Service (MDS). The ARP will also provide the data to other parties as required.

The ARP may initiate a Metering System investigation with the BRP and the MSA where anomalies are identified with the data or collection processes, e.g. a loss of communications.

### What are the estimation processes?

Where data has been deemed to be invalid or no SP level data is available the ARP will need to estimate SP level data. The ARP will use a set of defined 'Estimation Methods'. The estimation Method to be used will depend on the available data at the time of estimation.

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## Who does the ARP notify validated or estimated meter data to?

Valid Settlement Period level data will be notified on to the Market-wide Data Service (MDS). The data notified will be at MPAN level with appropriate identifiers to enable the MDS to further process the data. Following estimation the ARP will notify the estimated SP level data to the MDS.

## What are the timescales?

The service will operate according to the agreed Settlement timetable. Data retrieval for Advanced Metering Systems will be scheduled such that the ARP can comply with the VAS Settlement timetable.

## Service Summary:

This service will be responsible for:

- Retrieving the Settlement Period level Active Import and Active Export data (and other data as required e.g. reactive power) from Advanced Metering Systems;
- Receiving and storing Meter Technical Details data from the Advanced Metering Service;
- Validating Settlement Period Level data for Active Import and Active Export (and other data as required) using a common set of agreed validation rules (to be implemented electronically where possible);
- Estimating Settlement Period Level data for Active Import and Active Export (and other data as required) where such data fails validation or is missing or unavailable;
- Maintenance of standing data as appropriate;
- Exception reporting for any Metering Systems where data is deemed to be invalid or where access/issues with Metering Systems are identified;
- Providing access to validated Settlement Period Level data to the Market-wide Data Service; and
- Providing validated Settlement Period Level data to the other parties as appropriate.

## 3. Smart Data Services

There are three Services defined under the Smart Data Services (SDS):

- i) Meter Data Retrieval Service (smart);
- ii) Meter Reading Service (non-smart); and
- iii) Processing Service (smart).

The SDS Services may be provided by the BRP or by commercial Services to the BRP. The TOM does not seek to identify any commercial arrangements that a BRP may wish to develop in delivery of the SDS Service.

### **The Meter Data Retrieval Service (MDR)**

The Meter Data Retrieval (MDR) Service is the Service that submits Service Requests for settlement data via the Data and Communications Company (DCC). The Service Request type and schedule are provided by the Processing Service (PSS) for each Metering Point Administration Number (MPAN) for which the PSS is responsible. The MDR will be required to accede to appropriate industry Codes such as the Smart Energy Code (SEC) to fulfil its responsibilities. The MDR will have read-only access to the smart Meter data and will not be able to configure the meter (for example for tariff related information). This may need to be a new SEC role as the existing 'Other User' DCC role will not have access to all the Meter data required for the TOM. The MDR will also notify the PSS of data that is returned from the meter or the DCC in response to these service requests

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## What is a Service Request?

A Service Request is a request to the DCC to undertake actions relating to a smart Meter. Valid request types are set out the DCC User Interface Speciation (DUIS). The type of Service Request submitted by the MDR will be read-only requests for various types of Meter data. Most requests will be future dated although instantaneous requests maybe required in some circumstances e.g. for closing reads on removal of Metering Systems.

## How will the MDR obtain the smart Meter data for Settlement?

The MDR will access the required scheduling for new MPANs or MPANs where the Service Request requirements have changed, from the PSS. The Service Request will include requests for data from the Active Import and Active Export data logs, the daily consumption log, the daily read log and the cumulative register where appropriate. The schedule will also be set (e.g. for daily, weekly or Monthly schedules). The MDR will address service request to the device associated with the MPAN.

According to the schedule, the MDR will receive the requested data from the smart Meter via the DCC and process it. The MDR may also receive and forward data quality alerts and request failures, e.g. request timeouts. The MDR may also receive instruction from the Smart Metering Service (MSS) to obtain opening, closing or up to date readings before a Meter is removed or decommissioned.

## How does the MDR process the data?

On receipt of the scheduled data from the DCC the MDR will open the Service Request data and convert it into the format required by the PSS. This will include mapping the data back to the MPAN to which the data relates, as the DCC system uses an alternative identifier. The MDR will then provide the data to the PSS (and Balancing Responsible Party (BRP) if required).

## What are the timescales?

The MDR will process data received from the DCC according to the scheduled Service Requests. The data will be notified to the PSS as soon as it is available.

## Service Summary:

This service will be responsible for:

- Retrieving the Active Import and Active Export profile data log (Settlement Period level) data from smart Meters where required for Settlement. This retrieval will be achieved via the Data and Communications Company;
- Retrieving Register Readings for Active Import Registers and the Active Export Register and Daily Consumption data from smart Meters. This retrieval communication method will be achieved via the Data and Communications Company; and
- Providing access to the retrieved data to the Processing Service (smart) (PSS).

## The Meter Reading Service (MRS)

The Meter Reading Service (MRS) is the service that provides Register Readings (RRs) for Meters where Settlement Period Level data is not available or cannot be accessed from the Meter by the MDR. The MRS will operate on a transactional basis providing RRs to the Processing Service (Smart) (PSS). The MRS can obtain RRs by making a physical site visit or has the optionality to provide a service to collect remote readings where appropriate communications are available. The MRS may also provide the Service to other Parties (such as the BRP on a commercially agreed basis).

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## What is a transactional request for Meter Register Readings?

The PSS will submit a request to the MRS to obtain RRs. The request will contain the Metering Point Administration Number (MPAN) and all pertinent data to allow for the Metering system to be read. This data includes the Metering Technical Details (MTDs), Meter location (if available and not in MTDs), the address, and a Meter reading schedule if not a one-off request.

## How will the MRS obtain the Register Readings?

Most Meters will require a physical site visit to obtain the RRs. The request may specify that multiple site visits to the same site may be required in order to obtain access to the Meter. The MRS can obtain RRs by collecting remote readings where it chooses to provide a remote Service and appropriate communications are available to the Meter. The customer may also pass 'customer own reads' where appropriate arrangements are in place (although it is expected that these will be provided directly to the BRP).

## How does the MRS process the data?

When visiting a site MRS will make such checks as are required, prepare an exception where those checks indicate abnormality and pass relevant information to the appropriate parties for investigation and to the PSS.

The MRS will record details of any meter readings which are considered to be invalid as a result of suspected faults in a Metering System. The checked readings will then be passed onto the requesting Party and the PSS.

The MRS will also record events where the MRS has not been able to collect Register Readings including detail of why they could not be collected, e.g. if a site has been demolished or access to the Meter could not be obtained.

## What are the timescales?

The service will operate a service in line with the transactional request received. Physical site visits may be required at evenings or weekends for some premises in order to gain access to read Meters.

## Service Summary:

This service will be responsible for:

- Obtaining Meter Register Readings from smart or non-smart Meters either via a site visit or remotely as applicable (but not via DCC); and
- Providing Meter Register Readings, to the PSS.

## The Processing Service (Smart) [PSS]

The Processing Service (Smart) is responsible for obtaining, validating and estimating Settlement Period level data from smart and non-smart Meters. It receives remotely received data from the Meter Data Retrieval (MDR) Service (smart Meters) and meter reader reads from the Meter Reading Service (MRS) (non-smart Meters) then passes validated Settlement Period (SP) level data to the Load Shaping Service (LSS) and the Market-wide Data Service (MDS).

The PSS processes meter data from:

- i) Smart Meters that are registered with the Data and Communications Company (DCC). The PSS will process Settlement Period Level data collected from the smart Meter. The PSS will also process Register Readings and daily consumption values for smart Meters where SP level data is unavailable e.g. because of customer opt-out;
- ii) Non-smart Meters (e.g. legacy or dumb) not accessed via the DCC (e.g. manually read). The PSS will process Register Readings (RRs) from any non-smart Meters that are still in the population

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following the end of the smart Meter roll out. Some smart Meters may also require RRs provided by the Meter Reading Service on an interim basis where there are communications issues;

- iii) Data provided by other parties such as the BRP.

The PSS will also need to access and maintain Meter Technical Details (MTDs) from the Metering Service.

There are 3 main elements to the service: obtaining the meter data from the Meter Data Retrieval (MDR) and Meter Reading (MRS) Services, validating and estimating the meter data (including the application of Load Shapes to Settlement Periods) and notifying it to the Market-wide Data Service (MDS). These main elements are described below:

## How will the PSS obtain the smart and non-smart Meter data?

The PSS will be responsible for defining and sending a schedule of Meter data requests to the Meter Data Retrieval (MDR) service for settlement and to avoid bias in the load shapes. The schedule will specify the Metering Point Administration Numbers (MPANs) for which data is to be collected. The schedule will define which type of Service request is required for each MPAN. These requests may be for Settlement Period level data, daily consumptions, daily register reads or reading of the total cumulative register. The MDR will schedule the request from the PSS with the DCC. Once the MDR has received the Meter data it will provide access to the data to the PSS. There may also be requirements to obtain and process additional data such as Maximum Demand data or Reactive Power data that may be required for network charging.

For non-smart Meters and smart Meters with communication issues the PSS may also require RRs from the Meter Reading Service (MRS). The PSS will request RRs on a transactional basis (i.e. as and when they are required). The PSS will provide the MRS with the MPAN and associated Meter Technical Details (MTDs) together with the timescales in which the RRs are required. The MRS will obtain RRs from the non-smart Meters and provide the PSS access to this data.

## How does the PSS process the data?

Upon accessing the data, from the MDR or the MRS, the PSS will perform validation. The PSS will follow a set of validation rules designed to identify missing or erroneous data. Any data identified as erroneous will be reported to the originating service for investigation, and will not be used in settlement. Where RR data has been accessed the PSS will calculate Meter Advances by differencing the latest RRs from the previous RRs for the same MPAN. Where data has originated from a non-smart Meter (via the MRS), the PSS will calculate Meter Advances for each register on the Meter.

For Meters with more than one register, the PSS will sum the Meter Advances for each register into a single Meter Advance. Meter Advances for smart Meters can also be used to reconcile and validate SP level data by comparing the Meter Advance to the sum of the SP level data over the same period. Following the calculation of a Meter Advance, the PSS will calculate a Daily Advances Estimate (DAE) using the Meter Advance and the Meter Reading Period. The DAE is used in the estimation process where no Meter data is available for a Settlement Day.

## What are the estimation processes?

Where SP level data has been deemed invalid or no SP level data is available but Meter Advances have been calculated, the PSS will need to estimate SP level data. The PSS will use a set of defined 'Estimation Methods'. The estimation Method to be used will depend on the available data at the time of estimation. If no data or DAE is available for estimation the PSS will default to the most appropriate Load Shape from the LSS. Estimations will be updated or replaced when new data becomes available (e.g. when a new load shape, for the same settlement day, is produced).



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## Who does the PSS notify validated or estimated meter data to?

Valid Settlement Period level data will be provided to the Market-wide Data Service (MDS). Valid SP level data will also be notified to the Load Shaping Service (LSS). In both cases, the data notified will be SP level data at Metering System level with appropriate identifiers to enable the LSS and MDS to process the data. The LSS will process the data and provide Load Shapes back to the PSS for use in their estimation processes.

## What happens to estimated Settlement Period Level data?

Following estimation the PSS will notify the estimated SP level data to the MDS.

## What are the timescales?

The service will operate according to the agreed Settlement Timetable. The processing service will validate, estimate meter data and provide SP level data as it is available to the MDS and LSS. Load shape data from the LSS will be available between [4]<sup>2</sup> and [10]<sup>2</sup> calendar days after the Settlement Date to which the data relates.

## Service Summary:

This service will be responsible for:

- Accessing Settlement Period level data, for Active Import and Active Export, from smart Meters via the Meter Data Retrieval Service where required for Settlement;
- Accessing Register Readings for Active Import Registers and the Active Export Register, for smart Meters, from the Meter Data Retrieval Service where required for Settlement;
- Accessing Meter Register Read data for non-smart Meters from the Metering Reading Service (MRS) according to the PSS defined reading schedule.
- Validating Settlement Period level consumption data for Active Import and Active Export, or Register Readings, for smart and non-smart Meters using a common set of agreed validation rules to be implemented electronically where possible;
- Estimating or defaulting Settlement Period Level consumption data for Active Import and Active Export where such data fails validation or is missing or unavailable;
- Calculating Meter Advances for Register Read data;
- Conversion of Register Readings into Settlement Period level data using Meter Advance and Load Shapes data provided by the Load Shaping Service;
- Maintenance of standing data as appropriate;
- Exception reporting to other services or interested parties (such as the BRP) for any Metering Systems where data is deemed to be invalid or where access or issues with Metering Systems are identified;
- Providing validated Settlement Period level data to the Load Shaping Service and Market-wide Data Service; and
- Providing access to validated Settlement Period level data to any other parties such as Distribution businesses or BRPs as appropriate.

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<sup>2</sup> *Subject to further discussion and DCC capacity considerations*



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## 4. Unmetered Supplies Services

There are two unmetered supplies services:

- i) The Unmetered Supplies Operator Service; and
- ii) The Unmetered Supplies Data Service.

### **The Unmetered Supplies Operator (UMSO)**

The Unmetered Supplies Operator (UMSO) is responsible for validating the detailed unmetered supplies inventory data for equipment attached to its Distribution network and providing information to other industry stakeholders. It interfaces with the customer who owns/operates the unmetered equipment (referred to as the Unmetered Supplies customer). The provision of the UMSO Service is responsibility of the Distribution Business. The UMS customers provide information on the unmetered equipment connected to the Distribution network.

The UMS Customer provides a Detailed Inventory to the UMSO; the UMSO validates this information (such as the Charge Codes and Switch Regimes) and then provides a Control file for Central Management Systems (CMS) equipment and a Summary Inventory for non-CMS controlled equipment to the Unmetered Supplies Data Service (UMSDS). The UMSDS uses this data to calculate Settlement Period Level consumption data in kWh.

### **What are unmetered supplies?**

An Unmetered Supply is any electronic equipment that draws a current and is connected to the Distribution Network without a meter recording its energy consumption. For example - street lights, traffic signs, zebra crossings, etc. Each piece of unmetered equipment is listed on a Detailed Inventory with an associated Charge Code and Switch Regime.

### **What are Charge Codes and Switch Regimes?**

A Charge Code is used to look up the power value (known as Circuit Watts) associated with the equipment and used to calculate the consumption.

The Charge Code itself also contains information in its structure. The first two digits (first three digits for miscellaneous equipment) provide an indication of the type of equipment, for instance whether it is a light-emitting diode (LED) street light or a high pressure sodium lamp.

Switch Regimes determine the operating hours for equipment. This information together with the power information obtained from the Charge Code allows Settlement Period Level Consumption Data (kWh) to be calculated.

The detailed structures and processes are explained in the Operational Information Document (OID).

### **What is a detailed UMS Inventory?**

The Customer provides the UMSO with a Detailed Inventory which contains all the information associated with the UMS equipment. It includes the type of equipment, its location, Charge Code and Switch Regimes. The UMSO will validate the Detailed Inventory against the Industry Standing data which specifies the valid Charge Codes, Switch Regimes, and their combinations.

### **What is an Unmetered Supplies Summary Inventory and Control file?**

A Summary Inventory is a version of the detailed inventory, containing less information than the detailed inventory, which pinpoints the exact location of the UMS equipment. The Summary Inventory provides the quantities of each Charge Code and Switch Regime combination for non-CMS controlled equipment. A CMS Control file is only created for CMS controlled equipment and contains a list of unmetered apparatus control by the CMS. The UMSO provides the UMS Summary Inventory and/or Control file to the UMSDS.

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## What are the timescales?

The service will operate to meet the agreed Settlement timetable and will be a working day service. Customers will update their detailed inventories from time to time as UMS equipment is connected or disconnected from the Distribution network. Each time the UMSO will validate the detailed inventory and provide a Summary Inventory and/or Control file to the UMSDS.

## Service Summary:

This service will be responsible for:

- receiving detailed inventory information from the customer;
- validating inventory against Industry Standing Data;
- providing Summary inventory data to the UMSDS; and
- responding to queries about the data.

## The Unmetered Supplies Data Service (UMSDS)

The Unmetered Supplies Data Service (UMSDS) is responsible for calculating Settlement Period (SP) level consumption data for unmetered equipment, for example street lights and traffic signals. The UMSDS operates software approved by the BSC known as an Equivalent Meter (EM). The EM uses information on the amount of energy drawn by different types of unmetered equipment and the duration that energy is supplied. The EM can also receive information from other software which provides more dynamic data on the amount of energy and duration the equipment is switched on. Currently this is from Central Management Systems that control street lighting, telecommunications equipment and Electric Vehicle charging points. Other inputs to the EM can be from Photo-Electric Control Unit (PECU) arrays (which contain a number of photo-electric cells). PECU arrays provide energy duration information (i.e. 'on/off' times for each cell in the array) and are located around the country to reflect different switching times due to weather and location. The UMSDS uses Industry Standing data for Charge Codes and Switch Regimes in the calculation of SP level consumption data.

## What are Charge Codes and Switch Regimes?

A Charge Code is used to look up the power value (known as Circuit Watts) associated with the equipment and used to calculate the consumption.

The Charge Code itself also contains information in its structure. The first two digits (first three digits for miscellaneous equipment) provide an indication of the type of equipment, for instance whether it is a light-emitting diode (LED) street light or a high pressure sodium lamp.

Switch Regimes determine the operating hours for equipment. This information together with the power information obtained from the Charge Code allows Settlement Period Level Consumption Data (kWh) to be calculated.

The detailed structures and processes are explained in the Operational Information Document (OID).

## What is an Unmetered Supplies Summary Inventory or Control file?

The Customer who owns/operates the unmetered equipment provides a Detailed Inventory to the Unmetered Supplies Operator (UMSO). The UMSO validates this information and then provides a Control file for CMS equipment and a Summary Inventory for non-CMS controlled equipment to the UMSDS. The UMSDS will validate the Summary Inventory and the Control file against the Industry Standing data which specifies the valid Charge Codes, Switch Regimes and their combinations.

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## How does the UMSDS calculate the Settlement Period Level Consumption data?

The UMSDS uses the EM to calculate SP level consumption data. It does this by inputting the Charge Code and Switch Regime information from the Summary Inventory and/or Control file together with any dynamic information received from CMS or PECU arrays. The calculated SP level consumption data is provided to the Market-wide Data Service (MDS).

## What are the timescales?

The service will operate to meet the agreed Settlement timetable. Dynamic information from CMS or PECU arrays will normally be accessed on the following calendar day. The Settlement Period Level Consumption data will be revised from time to time as updated information (e.g. Inventory data, CMS or PECU data) is received.

## Service Summary:

This service will be responsible for:

- Receiving and validating the Summary Inventory and/or Control files from the relevant UMSO;
- Accessing other dynamic information relating to the operation of Unmetered Supplies;
- Accessing Industry Standing Data relating to Unmetered Supplies;
- Calculating Settlement Period Level consumption data for Unmetered Supplies according to a defined schedule;
- Providing access to calculated Settlement Period Level consumption data to the Market-wide Data Service; and
- Providing data to other parties such as the Supplier or Distribution Business as appropriate.

# MARKET-WIDE HALF HOURLY SETTLEMENT

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## 5. BSC Central Settlement Services

There are three BSC Central Settlement Services:

- i) The Market-wide Data Service;
- ii) The Load Shaping Service; and
- iii) The Volume Allocation Service.

### **The Market-wide Data Service (MDS)**

The Market-wide Data Service (MDS) is responsible for processing Settlement Period level data from the Processing Services (PSS) for smart and non-smart Meters, Advanced Retrieval and Processing Services (ARP) for Advanced Meters and Unmetered Supplies Data Services (UMSDS) for unmetered equipment. The MDS will provide data aggregations for Imbalance Settlement and other purposes (such as network charges and flexibility offerings (if required)).

For Settlement purposes the MDS will aggregate by Grid Supply Point Group (GSPG) and Balancing Mechanism Unit (BMU). The MDS is responsible for calculating Distribution Line Loss values, for different sub-classes of Metering Systems (e.g. Meters on Low Voltage (LV) networks), by applying Line Loss Factors (LLFs) to the data. The aggregated data will then be clock changed from Coordinated Universal Time (UTC) to Clock Time and made available to the Volume Allocation Service (VAS) for use in the Volume Allocation Runs (VARs).

### **What is a Balancing Mechanism Unit (BMU)?**

A Balancing Mechanism Unit (BMU) is a grouping of Metering Systems allocated to a Trading Party within the Balancing and Settlement Code (BSC). It can relate to metering at a single physical site or be a non-physical grouping of Metering Systems for a BRP (or other party such as Aggregators) within a region.

### **What are Line Loss Factors?**

Line Loss Factors are 'multipliers' applied to consumption data in order to calculate losses for inclusion in a Volume Allocation Run (VAR). They typically vary by time of day and season. Each Metering System is allocated a Line Loss Factor Class Id (LLFC) within the Registration Service. The LLFC Id identifies which set of LLFs are applied during the aggregation process.

### **How does the MDS process the data?**

The MDS will access information from the Registration Service for each Metering System to be aggregated. The MDS will identify the GSPG, whether the Metering System is at domestic or non-domestic premises and whether the Metering System is Active Import (AI) or Active Export (AE). The MDS also identifies the LLFC Id. It will identify the Supplier for the Metering System and the Measurement Class (a categorisation of different Meter types).

The MDS will also identify, from flags against the relevant Settlement Period level data, whether the data is actual or estimated. With this information, the MDS will identify which of the valid Consumption Component Classes (CCC) the Metering System data should be allocated to. The data is then added up by CCC and the LLFs are applied with the calculated consumption allocated to the specific CCCs. The aggregated data is then passed to the VAS.

### **What are the timescales?**

The service will operate according to the VAS Timetable which schedules Aggregation Runs.

### **Service Summary:**

This service will be responsible for:

- Maintenance of standing data as appropriate;
- Accessing registration data from the Registration Service;

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- Obtaining validated Settlement Period level data from the Processing Service for smart and non-smart Meters (PSS);
- Obtaining validated Settlement Period level data for Advanced Metering Systems from the Advanced Retrieval and Processing Service (ARP);
- Obtaining validated Settlement Period level data for Unmetered Supplies from the Unmetered Supplies Data Service (UMSDS);
- Identifying duplication or omission of Metering System data;
- Defaulting data where missing according to Settlement timescales;
- Aggregating the Settlement Period level data based on defined aggregations for the calculation of Imbalance Settlement purposes based to defined Settlement timescales;
- Aggregating the Settlement Period level data based on defined aggregations for the calculation of network charging (as appropriate) based on defined Settlement timescales;
- Aggregating the Settlement Period level data based on defined aggregations for other purposes (e.g. flexibility or for future smart grids) where appropriate information has been provided;
- Applying distribution network loss factors as appropriate using data provided by distribution businesses;
- Clock changing the data;
- Providing aggregated consumption volumes and losses to the Volume Allocation Service according to Settlement timescales;
- Providing data for Performance Assurance purposes; and
- Providing aggregated consumption volumes and losses to other parties such as distribution Businesses and Suppliers as required.

## **The Load Shaping Service (LSS)**

The Load Shaping Service (LSS) is responsible for calculating energy consumption (import and export) Load Shapes for a number of defined Categories of Metering Systems. The LSS uses validated actual Settlement Period (SP) level data accessed from the Processing Service (Smart) (PSS). The Load Shape data will then be used by the PSS to convert Register Readings (RRs) or Daily Consumption values into SP level data. The Load Shape data will also be used to estimate invalid SP level data for smart Meters and default where data is missing or unavailable.

## **What is a Load Shape?**

A Load Shape is a set of values for each Settlement Period in a Settlement Day in kilowatt hours (kWh) and Coordinated Universal Time (UTC) for a Category of Metering Systems for a single day. The Load Shape is derived by calculating a simple mean of available actual SP level data for each category. In addition to the Load shape the number of Metering Systems in the calculation, the daily total and a seven (7) day rolling total will be provided. The seven (7) day rolling total will be used by the Processing Service in calculation of estimated SP Level data where RRs are not available.

## **What is a Category?**

The initial set of Categories will be defined in Industry Standing Data (ISD) as part of the Volume Allocation Service (VAS). The Categorisations will be defined follows:

- The Grid Supply Point Group (GSPG) in which the Metering System is located; and
- whether the Metering System is for Domestic or non-domestic sites; and
- whether the Metering System is for Active Import (AI) or Active Export (AE).

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This gives fifty six (56) Load Shapes (14 GSPGs x 2 (domestic/non-domestic) x 2 (AI or AE)). All of the information to identify the categories will be available in the Registration System. It is noted that additional Categories may be required in the future.

## How will the LSS obtain the smart Meter data?

The LSS will access actual Settlement Period level data, identified by the Meter Point Administration Number (MPAN), from the PSS. The LSS will ensure that it always uses the maximum number of Metering Systems available for each Settlement Date. The LSS will access all the required Registration Information for each MPAN to identify the category for each MPAN. These processes are called Data Marshalling.

## How does the LSS process the data?

Once the Data Marshalling process is complete the LSS will calculate a simple average for each defined Category, the daily totals, seven day total and a count of the number of MPANs included in the calculation for each average. Once complete the Load Shapes, totals and MPAN counts will be notified to each of the PSSs.

## What are the timescales?

The service will operate according to the Settlement Timetable and operate on all calendar days. The LSS will process at least 2 runs per day for each Settlement day. For example, this could be for a Settlement Day [4] days previous and from a day [10] days previous.

## Service Summary:

This service will be responsible for:

- Accessing smart Meter Settlement Period data for Active Import and Active Export from the 'Processing Service for Smart and non-smart Meters';
- Deriving 'Load Shape' data for an agreed number of categories; and
- Providing access to 'Load Shape' data for the agreed categories to the Processing Service for Smart and non-smart Meters according to an agreed schedule.

## **The Volume Allocation Service (VAS)**

The Volume Allocation Service (VAS) is responsible for accessing aggregated Settlement Period (SP) level data from the Market-wide Data Service (MDS). The VAS accesses SP level data (Grid Supply Point Group Takes) from the Central Data Collection Agent (CDCA). Using these two data sets the VAS calculates SP level energy volumes for [Balancing Mechanism Units \(BMUs\)](#). The data is processed for each Settlement day in a scheduled run called a Volume Allocation Run (VAR). The processed BMU data is used in the Imbalance Settlement calculations. The VAS will also allocate or aggregate data for other purposes and provides a wide range to reporting on the Settlement data. The VAS also manages Industry Standing Data (ISD) which is provided to the other services for use in their processes.

## What does the Central Data Collection Agent (CDCA) provide to the VAS?

The Central Data Collection Agent (CDCA) is a BSC Agent that collects SP level data from large Metering Systems registered in Central Volume Allocation (CVA). The CDCA collects data from Metering Systems at Grid Supply Points (GSPs) that are located at the boundaries of Distribution Networks and the Transmission System (and at embedded generators registered in CVA). This allows the CDCA to calculate GSP Group Takes for each Distribution Network. The GSP Group Take is the net volume of energy entering the Distribution Region for each Settlement Period. This data is provided to the VAS.

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## What SP meter level data does the VAS obtain from the Market-wide Data Service (MDS) Service?

The VAS obtains the SP Level data from the MDS, aggregated by Consumption Component Classes (CCCs) (which are categories of Metering System). The CCC categories are based on the type of data (HH or Load shaped register reads) the Measurement Type (Active Import or Average Export), consumption or losses and whether the data is actual or estimated.

## What is Industry Standing Data (ISD)?

Industry Standing Data (ISD) is reference data used by the services to validate information relating to a Metering System. The VAS will maintain updates to ISD and provide access to services for use in their processes.

## How does the VAS process the data?

The VAS takes the data provided by the MDS and allocates the data to each BRP BMUs. Once complete the data is totalled across the BMUs for a Distribution Region and compared to the GSP Group Take for the same region for each Settlement Period. The allocated energy is then adjusted for differences using a process called GSP Group Correction - which allocates the differences to the BMUs according to a defined calculation which includes different weightings depending on the CCC. This process ensures that the allocation of energy matches the net volume in each GSP Group for each Settlement Period. This data is then passed on to the Settlement Administration Agent for use in the Imbalance Settlement calculations. The VAS will prepare a large range of reports on the data allocated and parameters used in the calculations.

## What are the timescales?

The service will operate according to the VAS Timetable defined in the ISD which schedules Volume Allocation Runs (VARs).

## Service Summary:

This service will be responsible for:

- Accessing aggregated Settlement Period level data from the Market-wide Data Service;
- Accessing information from other central services on the net volume of energy entering a distribution region for each Settlement Period (as currently provided by the Central Data Collection Agent);
- Aggregating data for Balancing Mechanism Units;
- Aggregating all data within a distribution region;
- Calculating the differences between the aggregated BM Unit data and the information on net volume of energy entering a distribution region for each Settlement Period;
- Applying corrections and/or adjustments to BM Unit data within a distribution region as appropriate;
- Aggregating the corrected BM Unit data across distribution regions for use in the Imbalance Settlement calculations;
- Providing out-turn data to the service responsible for the Imbalance Settlement calculation;
- Maintaining and providing access to Industry Standing Data as appropriate; and
- Providing reports and other relevant data to other parties as appropriate.

## SECTION 7 - DETAILED SERVICE REQUIREMENTS AND TOM DEVELOPMENT

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The detailed TOM Service and data requirements developed by the DWG can be found in **Attachment A**. The DWG discussion and development of the TOM is set out in **Attachment B**.



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## SECTION 8 - SETTLEMENT TIMETABLE

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The DWG, DAB and the DWG Work Groups discussed and developed their proposals on the Settlement timetable. For the avoidance of doubt the agreed Settlement Timetable is for implementation at the Target End State when most Meters are either smart or Advanced Meters. The timetable is aspirational and based on the premise that the majority of Metering Systems in the Target End State will be able to provide good quality Meter data both remotely and frequently.

Ofgem provided a steer that an aggressive reduction in Settlement timescales should be developed. Ofgem also highlighted the desirability of reducing the amount of Credit Cover that Parties need to lodge, to cover their liabilities, in the period before the SF Run. ELEXON advised that the workgroup balanced the desire to shorten Settlement timescales against:

- The need to derive initial load shapes and then obtain actual reads for 'dumb' Meters, or for smart Meters where the customer has opted out of sharing its Meter data for Settlement;
- The need for a window in which to identify and correct Meter faults and Settlement Errors (noting that identification may take longer than correction);
- The desirability of aligning the cut-offs for billing and Settlement adjustments; and
- The risk that shorter collection timescales for Meter data may result in significant costs arising from changes required at the Data and Communications Company (DCC) for collecting data. This could negatively impact the Business Case for MHHS.

DWG agreed that the existing Settlement timetable is inefficient by design, being built around 20-year old Settlement arrangements. The DWG agreed that the design of the MHHS timetable should be unconstrained by concerns about DCC capability and that the DWG should assume the DCC has service levels to deliver MHHS.

The DWG asked for further details on the analysis undertaken by the workgroup on existing Settlement performance, and whether any further analysis can be undertaken in this area – in particular for the existing Half Hourly (HH) / Advanced Meter market. A member suggested analysing the movement in energy volume and money between Parties at different Settlement Runs, and comparing this to the cost of undertaking the runs. There were differing views between DWG members on whether analysing existing Non-Half Hourly performance can provide any meaningful insights for MHHS. Some members commented that NHH performance is driven by the existing NHH estimation process and that an actual read may not necessarily be correct or more accurate than an estimate.

The DWG discussed the trade-off between shortening the timing of RF and increasing the potential number of Trading Disputes. It also considered that shortening the cut-off for Trading Disputes could result in uncorrected Settlement Errors. It asked the workgroup to ensure that it has considered the following, and not just Disputes relating to the Supplier Volume Allocation (SVA) metered market:

- Central Volume Allocation (CVA) errors, for example in Grid Supply Point metering or Aggregation Rules, which can have a significant materiality but may remain undetected for a long time; and
- Unmetered Supplies (UMS) data can change up to a year after the Settlement date.

A DWG member suggested that there might be merit in reviewing the scope of the Dispute service more widely, for example the Settlement Error criteria. They also suggested that Disputes could be easier to settle following the introduction of a single cash-out price. ELEXON agreed to feed this back to its PAF Review team for consideration and confirm to what extent the PAF Review is considering the Disputes process.



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## ELEXON letter to the PAB

ELEXON has written to the [Performance Assurance Board](#) asking for clarity on:

- What high-level assurance framework/principles will be needed to support MHHS?;
- What elements of the PAF (Performance Assurance Framework) are no longer required, need to change, or needed to be introduced under the TOM?; and
- What DF Run cut-off and Disputes materiality threshold (or principles to determine the threshold) are appropriate for MHHS?

This will enable the DWG to include this information in its transition approach consultation scheduled for June/July 2019, as well as feeding into ELEXON's impact assessment of the costs and impacts of the TOM. In turn, this will support Ofgem's Full Business Case decision in the second half of 2019.

## DWG view on analysis of changes between Settlement runs

Following analysis of current Settlement data on performance and disputes the DWG set out their proposals and for the Settlement timetable together with the benefits and risks of the proposals. The DWG discussion and analysis are discussed in **Attachment B**:

Run name	Current timing	DWG's proposed timing	Purpose of run	Pre-requisites for run under MHHS	Benefits of shortening	Risks of shortening
Interim Information (II) Run	4 WDs	4 WDs	To detect CVA errors so that these can be corrected before the first financial run.	CVA Meter readings need to be collected.	Could enable quicker SF Run.	Could reduce ability to identify/ correct errors before SF Run.
Initial Settlement (SF) Run	16 WDs	5-7 WDs	First financial run.  Up to this point, BSC Parties must lodge Credit Cover for their estimated energy indebtedness.	Meter readings need to be collected (dependent on DCC capability), and load shapes calculated to apply to Meters where readings aren't available.	Reduces the amount of Credit Cover that Parties need to lodge.	Overly shortening the run could: <ul style="list-style-type: none"> <li>• Result in significant DCC costs;</li> <li>• Impact the ability to undertake the II Run;</li> <li>• Create volatility between runs, if it means the SF Run is less accurate – thereby increasing the risk of bad debt; and/or</li> </ul>

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Run name	Current timing	DWG's proposed timing	Purpose of run	Pre-requisites for run under MHHS	Benefits of shortening	Risks of shortening
						<ul style="list-style-type: none"> <li>Negate the benefit of the reduced timing if it means the run is less accurate and results in excess Credit Cover.</li> </ul>
1st Reconciliation (R1) Run	39 WDs (~2 months)	33 WDs (renamed as Interim Reconciliation Run)	Reconciliation against previous run as more SVA Meter readings become available.	Readings from 'dumb' SVA Meters and any other SVA Meters where errors prevented data collection at SF.	See RF below.	NA
2nd Reconciliation (R2) Run	78 WDs (~5 months)	NA – would not exist	Reconciliation against previous run as more SVA Meter readings become available.	Not required under MHHS on assumption that smart Meters will be read monthly and 'dumb' Meters quarterly.	See RF below.	Less runs may create more volatility between runs?
3rd Reconciliation (R3) Run	148 WDs (~7 months)	NA – would not exist	Reconciliation against previous run as more SVA Meter readings become available.	Not required under MHHS on assumption that smart Meters will be read monthly and 'dumb' Meters	See RF below.	Less runs may create more volatility between runs?

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Run name	Current timing	DWG's proposed timing	Purpose of run	Pre-requisites for run under MHHS	Benefits of shortening	Risks of shortening
				quarterly.		
Final Reconciliation (RF) Run	14 months	4 months	<p>Final financial run.</p> <p>Reconciliation against previous run based on final SVA Meter readings.</p> <p>After this point, Trading Charges can only change as a result of a Trading Dispute.</p>	<p>Readings from 'dumb' SVA Meters and any other SVA Meters where errors prevented data collection at SF.</p>	<p>Quicker settlement of liabilities:</p> <ul style="list-style-type: none"> <li>Gives earlier certainty of charges.</li> <li>Enables quicker market exit.</li> </ul> <p>Current R2 performance in HH market shows vast majority of Meters read by this point.</p>	<p>Overly shortening could lead to more Trading Disputes, if timescale insufficient to detect/resolve Settlement Errors.</p> <p>While Parties could invest more resources in error detection/resolution, the costs of this could outweigh the benefits of a shorter timetable.</p> <p>There is a risk that remaining non-smart Meters that require site visits will not be read by the proposed timing of the RF Run.</p>
<p>Post-Final Settlement (DF) Run</p> <p>Also known as 'Disputes Final' Run</p>	28 months	12 months or longer	<p>To correct Settlement Errors that could not be detected and/or resolved before the RF Run, and which meet specified BSC criteria.</p>	<p>Existence of Settlement Error that meets the criteria (including materiality threshold) for a Trading Dispute.</p>	<p>Gives incentives to Parties for timely detection and resolution of errors.</p> <p>Less uncertainty for Parties of their final liabilities.</p>	<p>Overly shortening could:</p> <ul style="list-style-type: none"> <li>Result in significant uncorrected Settlement Errors (particularly in CVA market) that negatively impact Parties who did not cause them; and/or</li> <li>Create an asymmetry</li> </ul>

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Run name	Current timing	DWG's proposed timing	Purpose of run	Pre-requisites for run under MHHS	Benefits of shortening	Risks of shortening
						<p>between the cut-offs for billing and Settlement adjustments (as BRPs can back-bill by up to 12 months).</p> <p>Parties causing errors that financially benefit them are not incentivised to correct them. A shorter cut-off may give less time for impacted Parties to raise Disputes.</p>

The DWG noted the need to baseline the current Data and Communications Company (DCC) baseline capabilities and any additional capacity required to meet the recommended timetable. The DWG also noted that the TOM would provide advanced sight of Meter data prior to the defined Settlement Runs. This could improve data quality and maximise the amount of actual data available at each Settlement Run.

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## SECTION 9 - DWG DISCUSSION ON CONCEPTUAL SYSTEM ARCHITECTURE

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The DWG has discussed conceptual System architectures that could deliver the preferred TOM to ensure that it's chosen TOM is feasible. The DWG intentionally developed the TOM to be agnostic of architecture. However, they wanted to understand what types of architectures are possible to ensure the proposed TOM design is feasible.

ELEXON presented the DWG with options for the SP level data to be held in centralised or distributed data stores. Both options required common interfaces between the relevant Processing Services (PSS, ARP and UMSDS) and BSC Central Services. Options to stream data via Application Programming Interfaces (APIs) or for file transfer for ingestion of data to BSC Central Services were common features of both options. Likewise, APIs and file transfer options were set out for access to the data by other appropriate parties such as BRPs and Distribution Businesses. It was noted that, whichever architecture was eventually adopted, it would not prevent Processing Services using or sharing the data they held for other non-settlement purposes provided the appropriate permissions were in place.

The DWG noted that any architecture for the TOM should have a robust governance layer which governed policies, role based access controls, auditing and monitoring. It was also noted that encryption of data may also be required when communicating data between the system users.

BSC Central systems would require access to Market-wide SP level data in order to undertake the Settlement calculations using the MDS and VAS services. BSC Central systems would also require access to registration data for both the MDS and LSS processes.

It was noted that the ability to access to Market-wide SP level data would also allow future innovative options for parties to access Meter level data for flexibility, community energy or other initiatives that require data from multiple sources rather than via a single Processing Service or BRP.

The DWG noted that its members were selected on the basis of their expertise in Settlement and not in system architecture. It would need to be designated by Ofgem who should be responsible for developing the system architecture once the final TOM design was approved

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## SECTION 10 - HIGH LEVEL DEVELOPMENT OF TRANSITIONAL APPROACH

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The DWG will be developing the transitional approach and plan from moving to the new TOM in the next stage of the SCR. A consultation on the transitional approach will be held during 2019. The DWG have initially set out the following detail to help in the development of the approach:

- High-level transition principles;
- Transitional pre-requisites;
- What's new and what existing things need to be changed?; and
- Transitional Milestones.

### High-level transition principles

The DWG have set the following nine high level principles to be followed in the development of the transitional approach:

- i) The transition approach shall not degrade the quality of Settlement data;
- ii) Transition shall be phased in order to minimise impacts and risks;
- iii) Different market segments can transition at different times;
- iv) If the Department for Business, Energy & Industrial Strategy (BEIS) decides that Export must be registered for Settlement, then the transition approach for Export may be different to – and shall not slow down – the transition for Import;
- v) The transition to MHHS shall not prevent customers using the existing elective HH process;
- vi) The transition approach needs to balance the efficiencies of making HH Settlement a 'one-way gate' (i.e. preventing HH customers switching back to NHH during the transition) with not creating undue barriers to customers switching BRP;
- vii) During transition, there shall not be dual processes operating at the same time for a single Meter on the same Settlement Day;
- viii) The transition approach shall recognise when the existing arrangements are no longer viable.; and
- ix) There shall be appropriate monitoring, reporting and enforcement of participants' progress during transition.

### Transition pre-requisites

The DWG discussed whether there are any external events (outside the Significant Code Review (SCR)) that need to have occurred before the transition to MHHS can begin. For example, ELEXON suggested the following:

- Implementation of the Faster Switching arrangements;
- Adoption of SMETS1<sup>3</sup> Meters by the Data and Communications Company (DCC);
- Percentage of smart Meters rolled out; and/or
- Clarity on network charging requirements for Settlement data.

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<sup>3</sup> Smart Metering Equipment Technical Specifications.

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The DWG agreed that Version 2 of the Retail Energy Code (REC) will need to have been implemented for Faster Switching before the MHHS transition can begin. However, it considered that full implementation of Faster Switching does not necessarily need to have occurred.

The DWG considered that there will be sufficient smart Meters installed by 2021, which is the earliest point that transition is likely to begin. It therefore believed that no specific pre-requisite is needed in this area. ELEXON noted that it is not just about the total installed as, to start the Load Shaping Service, there needs to be sufficient numbers installed in each category (GSP Group split by domestic/non-domestic and then by Active Import/Active Export) for which Settlement can access data. If Ofgem decides that customers can opt-out of sharing their smart Meter data for Settlement, this could make this more challenging.

## Transition end-point

The DWG agreed that the end point for transition, when the TOM is considered to be fully implemented, shall be the first Settlement Day that all Meters are settled using the TOM.

## Code Changes

It is envisaged the Code changes will be drafted during 2020. The level Code changes may be significant to implement the preferred TOM. An initial view of type of Code changes are set out below:

Code	What's New?	Complexity Rating	Dependency Rating	Dependencies
BSC Changes	New services and systems	H	H	Enabling code changes need to be in place for when new services begin operating under the TOM.
SEC Changes	New SEC and DCC user roles and any associated qualification	M	H	New SEC parties and associated DCC permissions need to be in place before Smart data can be retrieved.
MOCOPA Changes	Recognising new roles (if required)	L	L	No real dependency and no fundamental change. Cutover should be relatively seamless.
DCUSA Changes	Dependent on data requirements for TCR/DUoS	L	M	TCR requirements need to be agreed before any DUoS reports can be specified.
MRA/REC Changes	Changes to registration and appointments process for new services Change of Change of Supplier process	H	H	New interfaces need to be defined before Data Catalogue changes can be made. Changes to MPRS registration processes need to be progressed concurrently in

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Code	What's New?	Complexity Rating	Dependency Rating	Dependencies
	DTC/DTN changes			BSC/MRA. New LDSO/SMRA requirements need agreement under MRA/REC and BSC.

## What's new and what existing things need to be changed?

There are a number of new services and other services will need to be adapted. Some existing Market Roles will no longer be required in the new TOM:

### New Services

Milestone	What's New?	Complexity Rating	Dependency Rating	Dependencies	Impacted Codes
Meter Reading Service	New Service under Smart Data Service Similar to existing Meter Reading processes for NHHDC	L	L	Dependent on development of PSS which will schedule requests for Meter Readings.	BSC
Meter Data Retrieval	New Service under Smart Data Service: New Service will need to qualify as a party to the SEC and the BSC. New Systems required to compile GBCS requests, creating schedules via DCC, unpacking data and initial validation checks and formatting	M	L	Dependent on development of PSS which will schedule requests for Meter Readings.	BSC, SEC, MRA
Processing Service (Smart)	New Service under Smart Data Service	H	H	Dependent on development of MDR which will provide the schedule Meter Data. New external interfaces required to Registration Services. MSS and BSC	MSC, MRA



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Milestone	What's New?	Complexity Rating	Dependency Rating	Dependencies	Impacted Codes
				Central Settlement Systems and BRPs.	
MDS	New Service within BSC Central Settlement	M	L	Registration Services Upgrades. Development of the PSS, ARP and the UMSDS services.	BSC, DCUSA, MRA
Load Shaping Service	New Service within BSC Central Settlement	L	M	Needs access to SP-level actual data from PSS.	BSC, MRA

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## Adapted Services

Service	What's Changing?	Complexity rating	Dependency Rating	Dependencies	Impacted Codes and Agreements
<b>Registration Service</b>	Adapted version MPAS with new data items, new interfaces	M	M	Will need to interface with new services once available: PSS, ARP, UMSDS, UMSO, MSS and MSA.	DCUSA? MRA BSC
<b>Metering Services (MSS and MSA)</b>	Adapted versions of HHMOA	L	L	Rebranding and requalification? New interfaces (PSS, ARP and BRP)	MOCOPA BSC MRA
<b>Distribution Businesses</b>	Consequential changes to Common Distribution Charging Mechanism, rebadging of Line Loss factors from NHH	M	L	Can be progressed unilaterally?	DCUSA, MRA, BSC
<b>UMSO Service</b>	Removal of NHH Processes, new UMS certificates for smaller customers, Changes to produce summary inventories for smaller customers	L	L	Dependency on UMS customer interaction. New Registration Services interface?	DCUSA National Terms of connection, MRA BSC
<b>UMSDS</b>	Adapted version of Meter Administrator role New Interfaces, System changes, New Equivalent Meter output file formats	L	L	Dependency on UMSO changes and new interface to Registration and BSC Central Settlement Systems.	BSC, MRA, DCUSA

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<b>Advanced Retrieval and Processing Service</b>	Adapted Version of existing HHDC role: Potential system upgrades	L	L	New Interfaces with Registration Services, MDS and BSC Central Systems.	BSC, MRA, DCUSA
<b>Volume Allocation Service</b>	Adapted Version of Supplier Volume Allocation Agent: New Reporting	M	H	BSC Central Settlement System upgrades.	DCUSA, MRA, BSC

## Existing Roles not required in Target End

The following Market Roles will not be required in the target end-state but will need to persist for the transition and run-off of the current arrangements:

Market Role	Transition Requirements
Non-Half Hourly Data Collector (NHHDC)	Needed for run-off of NHH arrangements.
Non-Half Hourly Data Aggregator (NHHDA)	Needed for run-off of NHH arrangements.
Half-Hourly Data Aggregator (HHDA)	Not required for run-off as data can be passed to MDS by the ARP.
Profile Administrator (PrA)	May not be required. Profile data could be frozen for run-off.

## Transitional Milestones

It is expected that following the Code changes each service will progress a number of steps:

- Design of new systems and processes;
- Build or adaption of systems;
- Testing (including acceptance testing);
- Deployment of systems and processes;
- Testing including operational acceptance testing; and
- Qualification of Services and Systems (where appropriate).

## SECTION 11 - RISKS, ASSUMPTIONS, ISSUES AND DEPENDENCIES

**Attachment C** contains the DWG developed RAID log that sets out the Risk, Assumption, Issues and Dependencies (RAID) identified by the DWG.

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## APPENDIX A: GLOSSARY OF DEFINED TERMS

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### A

#### **Advanced Meter**

The electricity supply licence defines an Advanced Meter as electricity Meter that, either on its own or with an ancillary device, and in compliance with the requirements of any relevant Industry Code:

- a) provides measured electricity consumption data for multiple time periods, and is able to provide such data for at least half-hourly time periods; and
- b) is able to provide the licensee with remote access to such data.

#### **Advanced Market Segment**

The Advanced Market Segment is the Market Segment where Settlement Level Period data is collected for Settlement purposes from Advanced Meters. For the avoidance of doubt where the Advanced Meter communications are faulty, the Advanced Meter would remain in this Market Segment, processed by the Advanced Retrieval and Processing Service (ARP). The communications' fault would be fixed by the Advanced Metering Service (MSA).

#### **Advanced Retrieval and Processing Service (ARP)**

The Advanced Retrieval and Processing Service (ARP) is the service that retrieves and processes Settlement Period Level data from Advanced Meters that are in the Advanced Market Segment.

### B

#### **Balancing and Settlement Code (BSC)**

The [BSC](#) is the document that sets out the terms for electricity balancing and Settlement in Great Britain, including the governance process for modifications to the BSC.

#### **Balancing and Settlement Code (BSC) Panel**

The Balancing and Settlement Code (BSC) Panel is established and constituted pursuant to and in accordance with Section B of the BSC. It is responsible for ensuring that the provisions of the BSC are given effect fully, promptly, fairly, economically, efficiently, transparently and in such a manner as will promote effective competition in the generation, supply, sale and purchase of electricity.

#### **Balancing and Settlement Code Procedures (BSCPs)**

Balancing and Settlement Code Procedures (BSCPs) are a type of Code Subsidiary Documents (CSDs) used under the BSC that set out procedures relating to Settlement activities.

#### **Balancing Mechanism Unit (BMU)**

Balancing Mechanism Units (BMU) are used as units of trade within the Balancing Mechanism. Each BMU accounts for a collection of plant/apparatus and is considered the smallest grouping that can be independently controlled. It can relate to metering at a physical site or be a non-physical grouping of Metering Systems for a Balancing Responsible Party (BRP) (or other party such as flexibility aggregators) within a region. As a result most BMUs contain either a generating unit or a collection of consumption Meters. Any energy produced or consumed by the contents of a BMU is accredited to that BMU.

#### **Balancing Responsible Party (BRP)**

The Balancing Responsible Party is used in these requirements to refer to the future party that provides the role currently undertaken by the Supplier. This could potentially be a bundled services company where the provision of electricity is only one of the services provided.

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## C

### Categories

A set of categories defined for which Load Shapes are to be provided by the Load Shaping Service (LSS).

### Categorisation

The process of mapping MPANs to categories for Load Shaping processes.

### Central Data Collection Agent (CDCA)

The Central Data Collection Agent as the BSC Agent that collects Meter data from Central Volume Allocation (CVA) registered Metering Systems.

### Central Volume Allocation (CVA)

Central Volume Allocation refers to the allocation of active energy from:

- a) BM Units other than Interconnector BMUs and BRP BMUs;
- b) Interconnectors;
- c) Grid Supply Points; and
- d) GSP Groups.

### Code Subsidiary Document (CSD)

Code Subsidiary Documents (CSDs) sit under the BSC that set out more detail on the requirements of the BSC and can be changed from time to time in accordance with BSCP 40.

## D

### Daily Advance Estimate (DAE)

The Daily Advance Estimate (DAE) is the consumption or export value used by a smart Processing Service (PSS), in estimating SP level data, where a Meter Advance is not available. It is a value derived for each MPAN based on the latest available meter advance divided by the number of days in the Meter Advance. It could also be a default value where no Meter Advance is available for an MPAN.

### Data Aggregator (DA)

As part of the current Settlement process, the agent appointed by an electricity supplier in accordance with Section S of the BSC to aggregate metered consumption data to meet the requirements set out in the BSC.

### Data Access and Privacy framework

The government has developed a [data access and privacy policy framework](#) to determine the levels of access to energy consumption data from smart Meters which BRPs, network operators and third parties may obtain. It also establishes the purposes for which data can be collected and the choices available to consumers.

### Data Collector (DC)

As part of the Settlement process, the agent appointed by an electricity supplier in accordance with Section S of the BSC to retrieve, validate and process Meter readings to meet the requirements set out in the BSC.

### Data and Communications Company (DCC)

The DCC is the company that manages the data and communications to and from domestic consumers' smart Meters.

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## **Demand-side response (DSR)**

Actions taken by consumers to change the amount of energy they take off the grid at particular times in response to a signal, such as a price.

## **DCC User Interface Specification (DUIS)**

DCC User Interface Specification (DUIS) is the specification the document that set out in the communications interface designed to allow the communications with smart Meters. The DUIS set out valid Service Request types and the data items returned for each request type.

## **Dynamic time-of-use tariff**

A dynamic time-of-use tariff is one that provides for price or pricing structures for consumers to vary at short notice their energy usage, in response to market events, (subject to contractual terms with the BRP).

## **E**

### **Electricity Supplier**

A company licensed by Ofgem to sell energy to and bill customers in Great Britain.

## **ELEXON**

ELEXON (as BSC Co) is the organisation responsible for administering the BSC and provide and procure the services needed to implement it. The role, powers, functions and responsibilities of ELEXON are set out in Section C of the BSC.

## **F**

### **Faster Switching Programme**

The Faster Switching Programme is the Ofgem initiative to deliver next-day switching (of gas or electricity supplier) as a new industry standard. It also aims to improve reliability of the switching process through better management and oversight of industry data.

## **G**

### **Globally Unique Identifier (GUID)**

The GUID is the unique identifier associated with each smart Meter serviced by the DCC.

### **Great Britain Companion Specification (GBCS)**

The Great Britain Companion Specification (GBCS) for smart metering describes the detailed requirements for communications between smart metering Devices in consumers' premises, and between these Devices and users of the smart metering system (such as Energy Suppliers and Network Operators) via the Data and Communications Company (DCC).

### **Grid Supply Point (GSP)**

A Grid Supply Point (GSP) is a point at the boundary of Transmission and Distribution Networks, where Metering Systems measure import to, and export from, the Distribution Network.

### **Grid Supply Point Group (GSPG)**

There are currently 14 GSP Groups consisting of: (i) the Distribution System(s) which are connected to the Transmission System at (and only at) Grid Supply Point(s) which fall within one Group of GSPs, and (ii) any Distribution System which: (1) is connected to a Distribution System in paragraph (i), or to any other Distribution

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System under this paragraph (ii), (2) is not connected to the Transmission System at any Grid Supply Point and the total supply into which is determined by metering for each half hour.

## **GSP Group Take (GSPGT)**

GSP Group Take is the data provided to the Volume Allocation Service (VAS), by the CDCA, giving the net volume of energy within a GSPG for each Settlement Period.

## **H**

### **Half-Hourly Settlement (HHS)**

Half-Hourly Settlement (HHS) is the process that covers the services and governance procedures from the electricity meter to the imbalance settlement function (meter-to-bank process). This describes the processes of using half-hourly usage (and longer time periods of energy usage) data collected from an electricity meter for use in Imbalance Settlement.

## **I**

### **Imbalance Settlement**

Imbalance Settlement is the process for determining if the total energy produced or consumed by a participant in the electricity market (mainly a generator or supplier) matches with energy they have purchased/sold in the forward market. Any mismatches incur 'imbalance' charges; therefore participants are incentivised to match their contracted and actual positions

### **Industry Standing Data (ISD)**

Industry Standing Data (ISD) is the data used by the Services to interpret the information relating to each Metering System. This data will include some of the data in the current Market Domain Data (MDD) and will have new standing data included.

## **L**

### **Load Shape**

A Load Shape is a set of daily average consumption or export data for each Settlement Period in Coordinated Universal Time (UTC) for a Categorisation of Metering System in the population. It is derived and provided by the Load Shaping Service.

### **Load Shaping Service (LSS)**

The Load Shaping Service (LSS) is the service that calculates load shapes from valid Settlement Period level data accessed from the Processing Services. The Load shape data will then be used by the Processing Services (PSS) to convert Register Readings (RRs) or Daily Consumption values into Settlement Period level data.

### **Licensed Distribution System Operators (LDSOs)**

LDSOs are the companies that are licensed by Ofgem to maintain and manage the electricity distribution networks in Great Britain.

## **M**

### **Market Participants**

Market Participants are any party that interact with Settlement or other industry process. Each valid participant has a Market Participant Identifier (MPID) defined in [Market Domain Data \(MDD\)](#). MDD will be replaced by revised or new standing data which is referred to as Industry Standing Data (ISD) in the TOM design.

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## Market Segments

The five Market Segments are:

- i) Smart Meters with Settlement Period level data available;
- ii) ii) Smart Meters with only Register Readings available;
- iii) iii) Non-smart Meters with Register Readings;
- iv) iv) Advanced Metering Systems with Settlement Period level data available; and
- v) v) Unmetered Supplies.

## Market-wide

Market-wide in the context of the Significant Code Review (SCR) means the Settlement of Settlement Period data where such data can be accessed subject to data privacy and data access policy. Market-wide in the context of Services means a service which would provide cross-segment-aggregation.

## Market-wide Data Service (MDS)

The Market-wide Data Service (MDS) is the service that provides integrity checks and calculations on Settlement Period level data ingested by BSC Central Settlement Systems from the Processing Service(s) (Smart), the Advanced Retrieval and Processing Service and the Unmetered Supplies Data Service.

## Meter Advance

The Meter Advance is the energy value (kWh) calculated by differencing the latest Register Reading from the previous Register Reading obtained from a Metering System.

## Meter Point Administration Number (MPAN)

A Meter Point Administration Number, also known as MPAN, Metering System Identifier (MSID) under the BSC, Supply Number or S-Number, is a 21-digit reference used in Great Britain to uniquely identify electricity supply points.

## Meter Reading Service (MRS)

The Meter Reading Service (MRS) is the service that provides Register Readings (RRs) for Meters where Settlement Period Level data is not available or cannot be accessed from Meter in the smart and non-smart Market Segments.

## Metering Service (Advanced) (MSA)

The Metering Service (Advanced) (MSA) is the service that is responsible for the installation and maintenance of Meters in the Advanced Market Segment.

## Metering Service (Smart) (MSS)

The Metering Service (Smart) (MSS) is the service that is responsible for the installation and maintenance of Meters in the smart and non-smart Market Segments.

## N

## National Grid Electricity System Operator (NGESO)

NGESO is the System Operator for the electricity transmission system in Great Britain, with responsibility for making sure that electricity supply and demand stay in balance and the system remains within safe technical and operating limits.



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## Non-Half Hourly Settlement (NHH)

As part of the Settlement process, NHH Settlement is the arrangement for estimating how much energy a supplier's customer's use (or export) in each Settlement period (where their meter is not capable of recording energy usage for a Settlement Period)in). The arrangement uses Meter readings spanning longer intervals, e.g. days, weeks and months.

## Non-smart Market Segment

The non-smart Market segment covers all the Meters that are not in the smart, Advanced or unmetered supplies Market Segments. This Segment include legacy non-smart Meters for customers refusing smart Meters, premises where smart Meters cannot be fitted, Meters with Advanced capability that cannot be moved into the Advanced Market Segment due to communication issues or Ofgem policy requirements.

## Non-smart Meter

A non-smart Meter is a Meter that is either not compliant with the Smart Metering Equipment Technical Specifications (SMETS) or one where only Register Readings can be collected due to Meter functionality or data privacy and data access policy. These Meters include legacy non-smart Meters for customers refusing smart Meters, premises where smart Meters cannot be fitted, Meters with Advanced capability that cannot be moved into the Advanced Market Segment due to communication issues or Ofgem policy requirements.

## O

### Ofgem

The Office of Gas and Electricity Markets (Ofgem) is responsible for protecting gas and electricity consumers in Great Britain. It is governed by the Gas and Electricity Markets Authority (GEMA).

## P

### Processing Service (Smart) [PSS]

The Processing Service (Smart) is responsible for obtaining and validating and estimating (where needed) raw meter readings (both Settlement Period and Register Reads) from smart and non-smart Meters.

## Profile Class (PC)

Consumers that are not settled using actual Meter readings for each Settlement period are grouped into one of eight Profile Classes. For each Profile Class, a load profile is created that estimates the consumption shape of the average consumer. This load profile (or variations of it) is used to determine the consumption in each half hour for all consumers assigned to the Profile Class. See also non-half hourly (NHH) Settlement.

## Q

### Qualification

Qualification is the BSC process that assures that systems and processes (developed outside of BSC Central Systems control) which may interact with BSC Systems and other participant's systems will not introduce significant risks or issues to Settlement. This process currently applies to Supplier Agents. This process is part of the BSC performance assurance framework to manage settlement risks.

## R

### Registration Service

The Registration Service is the LDSO service that holds Meter point standing data information about each MPAN within its distribution Region. Data includes the BRP the processing and metering services appointed to the MPAN. It

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also includes information on the type of customers, the Measurement Class, Energisation Status and Line Loss Factor Class.

## **Register Readings (RRs)**

Register Readings are the Meter readings obtained from a Settlement Meters tariff registers. This could be the cumulative register, daily consumption log data or daily readings these readings may be taken remotely or read from the meter.

## **S**

## **Settlement Period (SP)**

The period over which contracted and metered volumes are reconciled. This is currently defined as a period of 30 minutes. See also Settlement process.

## **Settlement Period level data**

Settlement Period level data is consumption or export meter data that is the granularity of the Settlement Period. This is either actual data (as recorded by the Meter), or data derived from Register Readings, or data derived from the Unmetered Supply (that is calculated for a Settlement Period).

## **Settlement Period Level Consumption data**

Settlement Period Level Consumption data is consumption data that is the granularity of the Settlement Period this could be actual data obtained directly from the Meter or data derived from Register Readings or Unmetered Supplies that is processed to Settlement Period granularity.

## **Settlement process**

In the context of this report Settlement process refers to the Imbalance Settlement arrangements. Settlement places incentives on generators and suppliers to contract efficiently to cover what they produce or their customers consume (or produce) respectively. For suppliers, it operates by charging for any difference between the volumes of electricity that they buy and the volume that their customers consume.

## **Significant Code Review (SCR)**

The SCR process is an Ofgem led process that is designed to facilitate complex and significant changes to a range of industry codes. It provides a role for Ofgem to undertake a review of a code-based issue and play a leading role in facilitating code changes through the review process.

## **Smart Data Services (SDS)**

The Smart Data Services comprise the Meter Data Retrieval Service, Processing Service (Smart) and Meter Reading Service, which together enable settlement of the Smart and Non-smart Market Segments.

## **Smart Energy Code (SEC)**

The Smart Energy Code (SEC) is a multi-Party agreement, coming into force under the DCC Licence, which defines the rights and obligations of energy suppliers, network operators and other relevant parties involved in the end to end management of smart metering in Great Britain.

## **Smart Market Segment**

The Smart Market Segment is the Market Segment that covers smart Meters serviced by the DCC. This covers smart Meters with Settlement Period level data available and smart Meters where only Register Readings are available.

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## Smart Meter

A smart Meter is a Meter which is compliant with the Smart Metering Equipment Technical Specifications (SMETS). In addition to traditional metering functionality (measuring and registering the amount of energy that passes through it), a smart Meter is capable of providing additional functionality such as recording consumption/export in each half hour of the day and of being remotely read and configured.

## Smart Meter Technical Specifications (SMETS)

Smart Meter Technical Specifications (SMETS) are the specifications that set out the minimum technical requirements for smart Meters. The SMETS are governed by the Smart Energy Code (SEC).

## Static time-of-use tariff

A time-of-use tariff is a price or pricing structures for consumers that are fixed in advance (as set by the Supplier). Typically they set the peak and off-peak periods for electricity consumption (or export) and the prices applied at these times.

## Supplier Volume Allocation (SVA) arrangements

Within the BSC, the SVA arrangements provide the mechanism for determining the allocation of energy volumes to Suppliers in each Settlement Period of the day.

## T

### Target End State

The Target End State is deemed to be when the majority of customers will have a Meter capable of delivering Settlement Period level meter data for Settlement purposes.

### Target Operating Model (TOM)

The Target Operating Model is the set of services and settlement arrangements designed to deliver Market-wide half-hourly Settlement.

### Time-of-use (ToU) tariffs

Energy tariffs that charge different prices at different times of the day, week, month or year are known as time-of-use tariffs. See also dynamic time-of-use tariff and static time-of-use tariff.

### Trading Party

Under the BSC a Trading Party means a Party, other than the Transmission Company, which holds energy accounts. These are typically suppliers, generators and energy traders.

### Transition Plan

The Transition Plan is the plan that set out the approach for moving to the new TOM from the existing market services and settlement arrangements.

## U

### Unmetered Supplies

Unmetered Supplies (UMS) means a supply of electricity to a particular inventory of equipment in respect of which a Licensed Distribution System Operator (LDSO) has issued an Unmetered Supply Certificate. For example, this equipment could be any electrical equipment that draws a current and is connected to the Distribution Network without a Meter, i.e. there is no Meter recording its energy consumption, e.g. street lights, traffic signs, zebra crossings, etc.

# MARKET-WIDE HALF HOURLY SETTLEMENT

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## **Unmetered Supplies Data Service (UMSDS)**

The Unmetered Supplies Data Service (UMSDS) is the service that calculates Settlement Period Level consumption data for unmetered supplies.

## **Unmetered Supplies Market Segment**

The Unmetered Supplies Market Segment is the Market Segment for Unmetered Supplies, e.g. street lights, traffic signs, zebra crossings, etc.

## **Unmetered Supplies Operator (UMSO)**

The Unmetered Supplies Operator (UMSO) is the service that interfaces with the Unmetered Supplies (UMS) customer and other industry stakeholders. The UMSO Service is provided by the Distribution Business.

## **V**

## **Volume Allocation Service (VAS)**

The Volume Allocation Service (VAS) is the service that processes Settlement Period level data provided by the Market-wide Data Service (MDS). The processed data is allocated to Balancing Mechanism Units (BMUs).

## **Volume Allocation Run (VAR)**

A Volume Allocation Run (VAR) is a scheduled Settlement run that allocated Supplier Metered volumes to BMUs for each GSP Group. The VAR ensures the BMU allocated energy is corrected such that the total volume matches the energy in the GSP Group Take for each Settlement Period.

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## APPENDIX B: ACRONYMS

Acronyms used in this document are listed in the table below.

Glossary of Defined Terms	
Acronym	Definition
AE	Active Export
AI	Active Import
BMU	Balancing Mechanism Unit
BRP	Balancing Responsible Party
BSC	Balancing and Settlement Code
BST	British Summer Time
CLK	Clock Time
CoA	Change of Agent
CoMC	Change of Measurement Class ( <i>process</i> )
DAE	Daily Advance Estimate
DCC	Data and Communications Company
DLSC	Default Load Shape Coefficients
DSR	Demand Side Response
DUIS	DCC User Interface Specification
DWG	Design Working Group
EV	Electric Vehicle
GBCS	Great Britain Companion Specification
GUID	Globally Unique Identifier
HH	Half Hourly
ISD	Industry Standing Data
NHH	Non Half Hourly
kWh	kilo-Watt hour
LDSO	Licensed Distribution System Operator
LLFs	Line Loss Factors
MHHS	Market-wide Half Hourly Settlement
MPAN	Metering Point Administration Number

# MARKET-WIDE HALF HOURLY SETTLEMENT

## Glossary of Defined Terms

Acronym	Definition
MRA	Master Registration Agreement
MTD	Meter Technical Details
MWh	Mega-Watt hour
PARMS	Performance Assurance Reporting and Monitoring System
P2P	Peer to Peer
RPU	Revenue Protection Unit
RR	Register Readings
SEC	Smart Energy Code
SD	Settlement Day
SDS	Smart Data Services
SMETS	Smart Metering Equipment Technical Specification
SP	Settlement Period
SVA	Supplier Volume Allocation
SVAA	Supplier Volume Allocation Agent ( <i>BSC Agent</i> )
TOM	Target Operating Model
ToU	Time-of-Use
UTC	Coordinated Universal Time
UMS	Unmetered Supplies