

DWG WORKGROUP 2 – RECOMMENDATIONS ON THE LOAD SHAPING SERVICE

MEETING NAME	Design Working Group (DWG)
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Purpose of paper	Decision
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Summary	Workgroup 2 has discussed options for the Load Shaping Service and invites the DWG to agree its proposed approach.

1. Background

- 1.1 The Load Shaping Service (LSS), as defined in each of the Target Operating Models (TOMs), will provide load shapes to the Processing Service. This will enable the Settlement of Metering Systems that use Register Readings, or where Settlement Period-level data is missing or unavailable.
- 1.2 DWG Workgroup 2 ('Processing and Load Shaping Services and Registration Interaction') has met twice to discuss how the LSS will function and how the Processing Service will allocate volumes to the load shapes.

2. What is the LSS responsible for?

- 2.1 The TOMs define the LSS as being responsible for:
 - Receiving smart Meter Settlement Period data for Active Import and Active Export from the 'Processing Service for Smart and non-smart Meters' according to an agreed schedule;
 - Deriving 'Load Shape' data for an agreed number of categorisations relating to the type of Metering Systems for which Load Shaping information is required; and
 - Providing 'Load Shape' data for the agreed categorisations to the Processing Service for Smart and non-smart Meters according to an agreed schedule.

3. What are the workgroup's views on the data required?

Original options considered

- 3.1 The workgroup has discussed how and when data will be sourced for the LSS.
- 3.2 It initially considered two options:
 - a) Providing the Processing Service with a sampling fraction and getting the Processing Service to ensure that data is collected for the sample in time for the initial Settlement run; or
 - b) Undertaking a special, additional aggregation run to provide data to the LSS using full-width data¹ held by the Aggregation Service.

¹ All the Settlement Period-level data that is available for the population of Meters.

DWG WORKGROUP 2 – RECOMMENDATIONS ON THE LOAD SHAPING SERVICE

- 3.3 The workgroup has identified a number of issues with both of these initial suggestions. The first option requires the Processing Service to manage and maintain the samples, to ensure that data is collected to a specific timescale for that group of customers. An issue with the second option is that the timescales to collect full-width data (which could take months) are not compatible with the requirement to have load shapes for the initial Settlement run (which would ideally be circa 10 Working Days). Additionally, the second option requires the Aggregation Service to hold or access data on the categorisations required to undertake the aggregation run.
- 3.4 The workgroup notes that DWG Workgroup 1 (‘Metering, Meter Reading and Retrieval Services’) has agreed that the Processing Service should be responsible for scheduling smart Meter data access. It notes that the scheduling will need to spread Meter readings across the population of Meters on each day of the month, to avoid overloading the Data Communications Company (DCC) with requests for data.

Proposed approach

- 3.5 The workgroup has developed a model that requires the Processing Service to provide the LSS with (or allow the LSS access to) whatever validated, actual Settlement Period data it holds. This will be in accordance with a given schedule with two iterations: one for the initial Settlement run and one for the first reconciliation run. The group notes that the validation will be undertaken on receipt of the data (same day). Attachment A shows a version of the model developed by the workgroup.
- 3.6 The workgroup proposes that, for the initial Settlement run, the Processing Service will provide all the validated, actual Settlement Period-level data (in kWh) on the fourth working day following the Settlement day to the LSS. It also proposes that:
- The LSS will have one day to process the data and provide the load shapes back to the Processing Service;
 - The Processing Service will have one day to allocate the Meter Advances to the load shapes and provide the data to the Aggregation Service; and
 - The Aggregation Service will have one day to marshal the data, another day to aggregate it and then one more day (so three in total) to notify the aggregations to the Volume Allocation Service.

This allows the initial Settlement run to occur 14 calendar days (10 Working Days) after the Settlement Day:

Settlement Day	Processing Service provides validated actual data to LSS	LSS process data and provides Load Shapes back to the Processing Service	Processing Service allocates volumes and provides data to the Aggregation Service	Aggregation Service marshals data and performs aggregation run	Aggregation Service notifies the Volume Allocation Service	Volume Allocation Run would occur on a Working Day following receipt of the data	Initial Settlement run
Day 0	Day 4	Day 5	Days 6 and 7	Days 8 and 9	Day 10	Day 11,12 or 13	Day 14

DWG WORKGROUP 2 – RECOMMENDATIONS ON THE LOAD SHAPING SERVICE

- 3.7 The workgroup notes that, providing no specific scheduling is made for specific type of customers or regions, this approach will net at least 10% of the population of Metering Systems for the LSS (3/30ths assuming each Metering System is read at least monthly). The workgroup notes that this approach will create large random samples that will be churned each day, giving robust load shapes. For example, if regional profiling is implemented and 70% of customers have Settlement Period-level data available:

*30,000,000 * 0.7 * 3/30 divided by 14 GSP Groups provides approx. 150,000 data sets per GSP Group prior to any other categorisation.*

Categorisation

- 3.8 The workgroup agreed that the categorisation should be made on available registration data initially; noting new categories can be defined in the future. Regional load shapes are preferable due to illumination and temperature effects, so a GSP Group split is desirable. Additionally, load shapes will need to be derived for a domestic/non-domestic split and for Active Import and Active Export. The workgroup recommends that these should be the initial set of categories.
- 3.9 The group notes that further categories can be defined by adding new data to the registration systems. It considers that it would make sense to at least require such a field to be present for future population.
- 3.10 In addition to the GSP Group split, this creates four categories. So the likely sample sizes for the initial Settlement run would be around:

150,000/4 = 37,500 data sets

In reality the number of Metering Systems for some categories would be smaller, due to variation in GSP Group size and the number of customers with Active Export.

Second iteration

- 3.11 The workgroup also proposes that a second iteration should be undertaken for the first reconciliation run, with data provided to the LSS after 10 Working Days. This increases the likely sample size to a third of the population 10/30ths. So the LSS would undertake two runs per day: an initial Settlement run and a first reconciliation run for an earlier Settlement day. This increases the regional data sets to circa. 500,000 before categorisation. It was suggested that comparison to the earlier load shapes may prove there is little added value in the second iteration and that it could be discontinued at a later date.

4. How will the load shapes be used?

- 4.1 Using the GSP Groups and initial categorisations, the LSS will deliver $14 * 4 = 56$ sets of Settlement Period values in kWh for each iteration (i.e. $56 * 48$ 'if Settlement Period remains half-hourly' * 2 iterations).
- 4.2 The Processing Service will access daily consumption values from the SMETS² 2 Meters. It will source these from the Daily Consumption log, which has a 731 day buffer (we will seek clarification to ensure this is for both Active Import and Active Export and that it is not netted). Cumulative register reads may be required for SMETS 1 Meters, and dumb meters will require Meter Advances to be aggregated across Settlement registers where multi-rate, if daily advances are to be applied.

² Smart Metering Technical Specifications.

DWG WORKGROUP 2 – RECOMMENDATIONS ON THE LOAD SHAPING SERVICE

4.3 The Processing Service will normalise the load shapes according to each Meter's Meter Advance period. It will do this by summing the load shapes across the Meter Advance period and then dividing each Settlement Period by the total, to create a set of load shape coefficients that sum to one across the Meter Advance period. The volume can then be allocated by multiplying the Meter Advances by the coefficients. Where daily consumption values have been sourced, the daily consumption (in kWh) will be allocated to the load shape that matches the day of consumption retrieved.

5. Why are the Time of Use registers not being used?

5.1 The workgroup has discussed using the Time of Use (ToU) registers to achieve a more accurate allocation of the energy. It agreed that this would require the Meter Configurations to be retrieved at the same time as the ToU register data; however the Meter Configurations could change at any time during the retrieval period. This would significantly complicate the calculations if effective dates of configurations start and end readings are required for each Metering System on change of configuration. As such, the workgroup has ruled out using this data.

6. What about data that is missing or not retrieved?

6.1 When calculating Meter Advances, a daily value will also be calculated for each Metering System to be used until the next Meter data is retrieved. This will be achieved by dividing the Meter Advance period by the number of days in the advance period. If this calculation cannot be made, the average load shapes will be used as the default.

7. What further work is needed on understating the Meter data?

7.1 The workgroup still needs to understand the available Meter data to explicitly define which data is the most appropriate for each Meter type. We will liaise with the Smart Energy Code Administrator and Secretariat (SECAS) on this.

8. DWG view and next steps

8.1 We invite the DWG to agree that the workgroup's recommended approach should form the basis of the service requirements, and/or provide further guidance if necessary.

9. Recommendations

9.1 We invite you to:

- a) **AGREE** Workgroup 2's proposed approach to the Load Shaping service, for inclusion in the TOM service requirements.

Attachments

Attachment A – Load Shaping Service diagrams

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