Load Profiling

This brief paper has been prepared following a request from the Australian Energy Regulator (AER) to inform the Default Market Offer (DMO) processes. In particular:

- What led AEMO to make the original 2021 adjustments to the Net System Load Profiles (NSLP).
- The approach AEMO took during 2022-23 to deal with the issues, including consultation with retailers, before making a further adjustment in October 2023.
- Describing how the prevailing NSLPs inputs into the settlement calculations for retailers.

To support the AER's DMO considerations, AEMO provides aggregated interval metering data and Net System Load Profile data.

The AEMO settlement process and the role of Load Profiling

The electricity market settlement process ensures market generators are paid for the energy they provide to the National Electricity Market (NEM), and market customers pay for the energy they use, in accordance with the market rules. AEMO's role in settlements includes:

- Calculating financial liabilities of, and credits to, market participants daily.
- Settling all trades in the NEM on a weekly basis.

The settlements process includes revisions for any metering data or standing data changes associated to a settlement period. For a given settlement week, the following settlement processes are undertaken.

- Preliminary statement – three business days after the end of the settlement week.
- Final settlement – 20 business days after the end of the settlement week.
- Revision 1 settlement – 20 weeks after the end of the settlement week.
- Revision 2 settlement – 30 weeks after the end of the settlement week.

Load profiles are used where non-5-minute metering data is required to be converted into 5-minute intervals for settlements. AEMO's Meter Data Management (MDM) system generates two types of load profiles to support its NEM market settlement processes, Five-Minute Load Profiles (5MLP) and Net System Load Profiles (NSLP). The Five-Minute Load Profiles (5MLP) are used to convert 30-minute and 15-minute interval metering data into 5-minute intervals. Whereas the Net System Load Profiles (NSLP) are used to convert accumulation (basic meter) reads, that typically account for consumption over a 90-day period, into 5-minute intervals.

In recent years, NSLP volumes have substantially reduced, predominantly due to the rollout of interval metering across certain parts of the NEM. For example in Queensland, NSW, Victoria and South Australia, interval metering accounts for 33%, 40%, 99%, and 40% of meters, respectively. We expect these volumes to increase as AEMO works with industry to implement the outcomes from the Australian Energy Market Commission's recent metering review.

Load profiling - Interim 'weights' arrangements

After the implementation of the Five-Minute Settlement Rule, on 1 October 2021, AEMO and the industry (through stakeholder enquiries) identified an issue when positive and negative trading interval profile values were present. When this scenario occurred, significant fluctuations/'spikes' were observed in the profiled energy when the 5MLP methodology was applied. These 'spikes' in the profiled non-5-minute

interval metering data had a downstream impact on the NSLP, likewise resulting in significant fluctuations/ ‘spikes’ in profiled values. These ‘spikes’ occurred as a consequence of having a small denominator value in the profiling algorithm.

Although the resulting profiled trading interval data would sum to the correct energy value over the reading period, for both 30-minute and 15-minute interval metering data as well as accumulation metering data, the risk of financial exposure, including potential trading limit breaches, increased for Financially Responsible Market Participants (FRMPs). This was triggering prudential processes unnecessarily.

To mitigate the risk of the issue, an interim solution was sought to prevent these volume spikes as quickly as possible, until a longer-term solution could be identified and implemented. For the interim solution to be implemented quickly, it needed to leverage existing AEMO MDM functionality. The ‘weights’ methodology was selected for this purpose. This methodology increased the system load component of the profiles, which artificially increased the profiles above zero. Prior to any weights being applied, analysis of the system load was performed and confirmed with the respective Transmission Network Service Providers (TNSPs) and the Distribution Network Service Providers (DNSPs). AEMO briefed the AER on both the issue and the interim solution and committed to quarterly updates on progress of a longer-term solution.

In applying this interim solution market participants were notified via Settlement Communication emails. Questions and queries were addressed as they arose. Whilst concerns were raised by one market participant regarding the interim methodology, the participant acknowledged that AEMO did not have any other viable options available to them.

5MLP longer-term methodology

Through engagement with industry participants in the Electricity Retail Consultative Forum (ERCF), the following objectives and principles were established in order to assess potential longer-term profiling methodologies:

- The shape of the curves for each metering type should be correctly representative
  - The profiles align with the expected energy volumes and consumption patterns for interval and accumulation metering data.
- The magnitude of the curves for each metering type should be correctly representative
  - The energy quantities for each of the component curves are consistent with the expected energy volumes for interval and accumulation metering data.
- The gradients of 5-minute values should match the gradients of the profile curves
  - The rate of change or slope of the profiled reads within a 30-minute or 15-minute interval matches the behaviour of the 5MLP.
- The application of the methodology should be consistent and standardised
  - The methodology is consistent and standardised across all system load TNIs and profile areas in all jurisdictions.

AEMO conducted a formal two step consultation[1] commencing September 2022, in accordance with NER 8.9, to determine longer-term a Five-minute Load Profiling methodology. Through pre-formal engagement with stakeholders, including the ERCF, four potential longer-term methodologies were proposed. In response to this consultation, five submissions were received to the first stage and four submissions were

[1] Australian Energy Market Operator, Load Profiling Methodologies Consultation, 2023 (https://aemo.com.au/consultations/current-and-closed-consultations/load-profiling-methodologies-consultation)

received to the second stage (Draft Determination), no material issues were raised. Most respondents supported Option 6 as their preferred methodology.

In recognition of this preference, AEMO determined, in February 2023, that Option 6, a Uniform Allocation Method (UAM) that was applied to intervals where the load profile was negative, would be implemented. This new five-minute load profiling methodology was subsequently developed, industry tested and implemented on 1 October 2023. In parallel with the implementation of this updated methodology the interim 'weights' arrangements were removed.

AEMO has no visibility of how retailers approach pricing risk management of the load profiles but suspect there is no uniform approach.

Retailer drivers for risk management are specific to each business's profile and focus on a number factors which **may** include their total customer load forecasts by jurisdiction, which considers variables such as their forecasted customer mix (C&I, commercial and residential on aggregate), customer acquisition strategies and loss assumptions, weather forecast and any other material elements as well as their spot price forecasts, which considers generation mixes, new technologies, CER penetration, etc.

NSLP longer-term methodology

AEMO conducted a formal two step consultation[2] commencing July 2023, in accordance with NER 8.9, to determine a longer-term NSLP methodology. Through pre-formal engagement with stakeholders, including the ERCF, three potential longer-term methodologies were proposed. In response to this consultation, four applicable submissions were received to the first stage and three to the second stage (Draft Determination), no material issues were raised. Most respondents supported 'Option 1', where NSLP values less than a minimum value, set the NSLP value to a minimum (nonzero) value ("Floor"), as the longer-term NSLP methodology, with the effective date of 29 September.

AEMO envisages that this preferred methodology will remove the likelihood of 'spiked' values in the NSLP profiled energy volume.

It should be noted when the anticipated accelerated interval meter rollout begins in July 2025 (an outcome of the Australian Energy Market Commission's recent metering review) the NSLP values would be expected to reduce.

[2] Australian Energy Market Operator, July 2023 Retail Electricity Market Procedures Consultation, 2023 (https://aemo.com.au/consultations/current-and-closed-consultations/july-2023-retail-electricity-market-procedures-consultation)