

Load Profiling Methodologies Consultation

Issues Paper

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aemo.com.au

New South Wales | Queensland | South Australia | Victoria | Australian Capital Territory | Tasmania | Western Australia

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Executive Summary

The publication of this Issues Paper commences the first stage of the consultation process conducted by AEMO (Consultation) to consider proposed changes to load profiling methodologies and other matters (Changes) under the National Electricity Rules (NER).

AEMO has prepared this Issues Paper to facilitate informed debate and feedback from stakeholders regarding the most efficient way to meet Industry objectives relating to the Changes.

In summary, the Changes involve:

- Alternative load profiling methodologies
- Other matters:
 - ICF_055 Clarifying when an embedded network code must be used
 - ICF_064 Addition of the 'HouseNumberToSuffix' field to MSATS
 - ICF_065 Removal of NMI Discovery Type 3 limitations

AEMO invites stakeholders to suggest alternative options where they do not agree that the Changes would achieve the relevant objectives.

AEMO also asks stakeholders to identify any unintended adverse consequences of the Changes.

Stakeholders are invited to submit written responses on the issues and questions identified in this Issues Paper by 5.00 pm (Melbourne time) on Thursday, 27 October 2022 in accordance with the Notice of First Stage of Consultation published with this Issues Paper.

Contents

Executive Summary	3
1. Stakeholder Consultation Process	5
2. Background	6
2.1. NER requirements	6
2.2. Context for this consultation	6
3. Objectives and Principles	8
4. Alternative Methodologies	9
5. Proposed options for consideration	11
5.1. Options Assessment	11
5.2. Methodology Option 5	13
5.3. Methodology Option 5a	14
5.4. Methodology Option 6	15
6. Other Matters	16
6.1. ICF_055 Clarifying the process for obtaining and applying embedded network codes	16
6.2. ICF_064 Addition of the 'HouseNumberToSuffix' field	17
6.3. ICF_065 Removal of NMI Discovery Type 3 validation	17
7. Summary of Matters for Consultation	19
Appendix A. Glossary	20

Tables

Table 1 Options which were excluded.....	9
Table 2 Options which are flagged for further analysis	10
Table 3 Options Assessment.....	11

Figures

Figure 1 5MLP – No Weights.....	7
Figure 2 5MLP with Weights.....	8
Figure 3 5MLP – Option 5 POC.....	13
Figure 4 5MLP – Option 5a POC.....	14
Figure 5 5MLP – Option 6 POC.....	15

1. Stakeholder Consultation Process

As required by the NER, AEMO is conducting this Consultation in accordance with the Rules consultation process in NER 8.9.

AEMO's indicative timeline for the Consultation is as follows.

Deliverable	Indicative date
Issues Paper published	Wednesday, 28 September 2022
Submissions due on Issues Paper	Thursday, 27 October 2022
Draft Report published	Thursday, 1 December 2022
Submissions due on Draft Report	Friday, 20 January 2023
Final Report published	Friday, 24 February 2023

The dates may be adjusted depending on the number and complexity of issues raised in submissions and in any meetings with stakeholders.

Prior to the due dates of the submissions, stakeholders can request a meeting with AEMO to discuss the issues and proposed changes raised in this Issues Paper. Please request a meeting by emailing NEM.Retailprocedureconsultations@aemo.com.au with the details of your request.

A glossary of terms used in this Issues Paper is included at Appendix A.

2. Background

2.1. NER requirements

AEMO is responsible for the establishment and maintenance of retail electricity market procedures specified in NER Chapter 7, except for procedures established and maintained under NER 7.17.

The procedures authorised by AEMO under NER Chapter 7 must be established and maintained by AEMO in accordance with the NER consultation procedures.

2.2. Context for this consultation

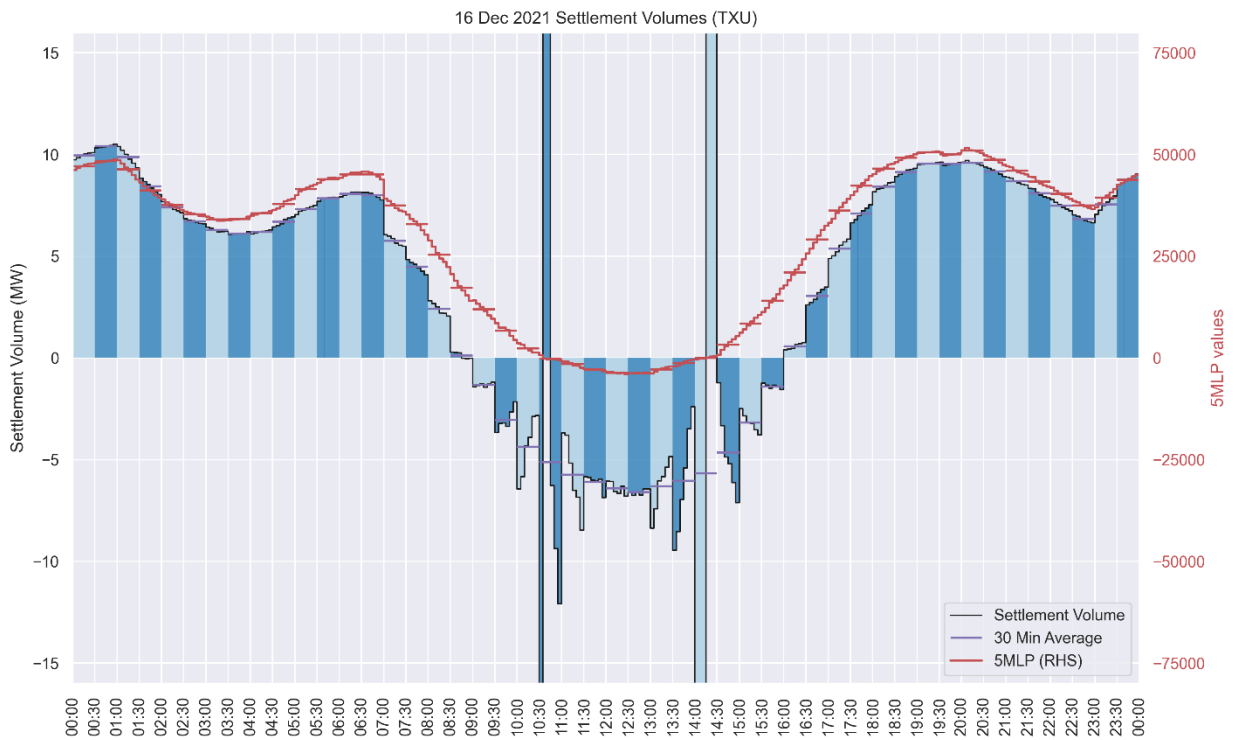
AEMO's Meter Data Management (MDM) system generates the following load profiles, to support market settlement processes:

- The Five-Minute Load Profiles (5MLP) create a profile shape which is used to convert 30-minute and 15-minute interval metering data into 5-minute intervals.
- The Net System Load Profiles (NSLP) create a profile shape which is used to convert accumulation (basic meter) reads, that typically account for consumption over a 90-day period, into 5-minute intervals.

Subsequent to the implementation of the Five-Minute Settlement Rule, on 1 October 2022, an issue was identified where negative load profiling values were present.

A combination of positive and negative values can produce very high or very low profiled values after applying the 5MLP to 30-minute and 15-minute metering data or the NSLP to accumulation metering data (this is a consequence of having a small denominator value in the profiling algorithm).

The metering data would sum to the correct energy value over the period. However, the key risk arises of the potential for coincidental high spot/pool pricing, which result in trading limit breaches for Financial Responsible Market Participants (FRMPs).



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 increases the system load component of the profiles, which artificially shifts the profiles up. Prior to any weights being applied, analysis of the system load is performed and confirmed with the respective Transmission Network Service Providers (TNSPs) and the Distribution Network Service Providers (DNSPs).

AEMO is now seeking stakeholder feedback regarding a preferred longer-term methodology, which will prevent these price spikes from occurring in either the 5MLPs or the NSLPs.

Figure 1 5MLP – No Weights

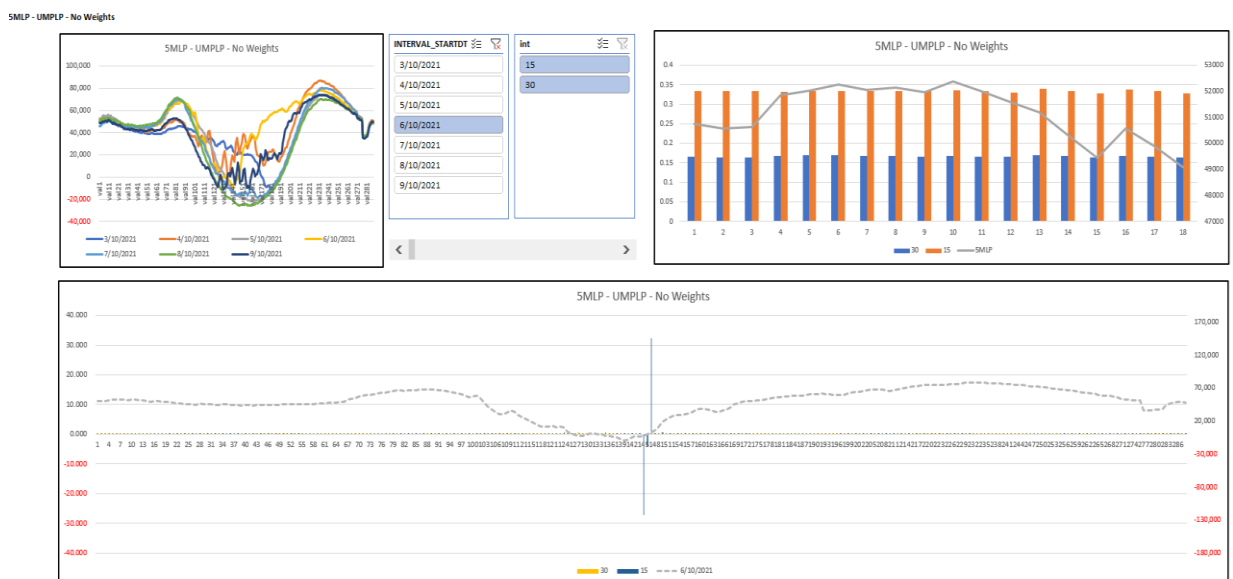
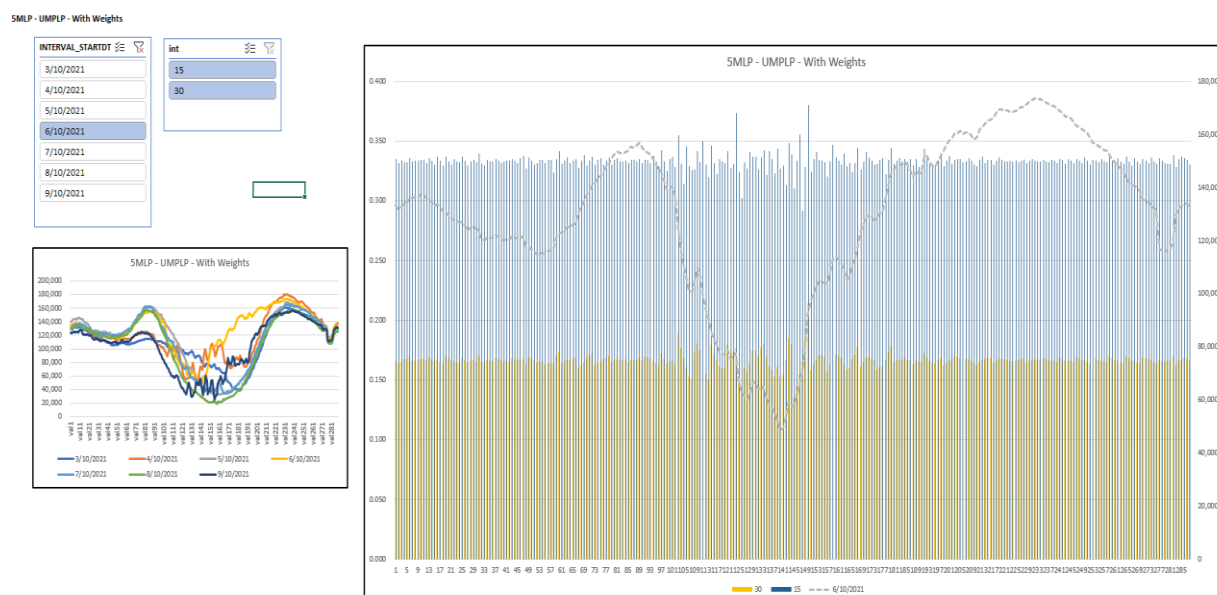


Figure 2 5MLP with Weights



3. Objectives and Principles

Through engagement with industry participants in the Electricity Retail Consultative Forum (ERCF), the following objectives and principles were established in order to assist in the assessment of any potential longer-term 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 consumption 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 consumption 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.

Questions

1. Do you agree with the proposed objectives and principles?
2. Are there any other objectives and principles you believe should be considered?

4. Alternative Methodologies

Since the implementation of the interim solution, AEMO has identified and assessed the potential viability of various methodologies, based on the agreed objectives and principles in section 3 of this Issues Paper.

The analysis AEMO can perform is limited with respect to understanding the potential consequential impacts to NSLPs and to Unaccounted for Energy (UFE) allocations due to:

- Issues in data quality in the early stages of 5MS
- Unavailability of the latest data in lower testing environments
- The need for 365 days of data to scrutinise NSLP outcomes
- The impact of the timing of methodology implementation on the profiling or allocation of the reads among the methodologies
- The different trends and behaviours in respect of the several profile areas – the impact to UFE and the impact to NSLP may differ in different profile areas depending on the volume of five-minute meters
- The different impacts on different NSLPs of the methodology applied to the 5MLPs.

AEMO and ERCF concluded that the following methodologies should be excluded, based on the objectives and principles.

Table 1 Options which were excluded

Option	Description	Reason for Exclusion
Option 2	The value is floored, such that a negative value is set to a defined value e.g., 1	The spikes were still possible due to energy being allocated to the non-negative (non-floored) intervals.
Option 3	For each 30-minute or 15-minute interval with negative values, the profile value is shifted above the x-axis by a constant (the constant determined by minimum value for each 15-minute and 30-minute interval)	The variations between intervals resulted in a profile that is like a sawtooth wave for some intervals.
Option 3(a)	For each day with negative values, profile values are shifted above the x-axis by a constant (the constant determined by minimum value for the day)	The option results in fewer dips and spikes when compared to Option 3 but exhibits a sawtooth wave for some intervals. There is potential to introduce variations and step changes in the NSLP.
Option 4	For each day with negative values, the BoundaryCurve is shifted above the x-axis (the constant determined by the minimum value for the day)	The gradient is flattened.
Option 4(a)	For each day with negative values, the BoundaryCurve is shifted below the x-axis (the constant determined by the minimum value for the day)	The gradient is reversed.

AEMO and ERCF concluded that the following methodologies warranted further analysis for substantiation as potential options.

Table 2 Options which are flagged for further analysis

Option	Description
Option 1	The Uniform Allocation Method (UAM) is applied to all intervals associated to the effected day.
Option 5	The UAM is applied to specific intervals that have crossed the x-axis i.e., there is a combination of positive and negative values in the specific 30-minute or 15-minute interval.
Option 5(a)	The UAM is applied to the specific intervals that have crossed the x-axis. Additionally, the UAM is applied to the immediately preceding and following 30-minute and 15-minute intervals (number of intervals configurable). This is a variation of Option 5 with an additional buffer.
Option 6	The UAM is applied to intervals where the load profile is negative i.e., all intervals below the x axis. This results in a flat profile while the profile is negative.

5. Proposed options for consideration

5.1. Options Assessment

The proposed options were scored against the objectives and principles as follows. A proof of concept (POC) has been developed by AEMO for each methodology to demonstrate its validity.

Table 3 Options Assessment

Option	Shape of curves	Magnitude of curves	Gradients of curves	Consistency of application	Total Score	Observations
Option 1 - The UAM is applied to all intervals associated to the effected the day.	Not Available	Not Available	Not Available	Not Available	Not Available	No assessment has been able to be completed due to a lack of comparable data in lower testing environments
Option 5 - The UAM is applied to the specific intervals that have crossed the x-axis.	4	4	3	5	16	Shape <ul style="list-style-type: none"> - Reverse shape for negative intervals Magnitude <ul style="list-style-type: none"> - Small spikes still possible in periods directly before and directly after the 5MLP crosses the x-axis Gradient <ul style="list-style-type: none"> - Negative gradient (30min and 15min)
Option 5(a) - The UAM is applied to the specific intervals that have crossed the x-axis. Additionally, the UAM is applied to the immediately preceding and following 30-minute and 15-minute intervals (number of intervals configurable).	3	4	3	5	15	Shape <ul style="list-style-type: none"> - Flat beyond the negative intervals - reverse shape for negative intervals possible for 15 Magnitude <ul style="list-style-type: none"> - Magnitude not representative of curves where flat Gradient <ul style="list-style-type: none"> - Negative gradient is possible for 15min - Flat beyond negative intervals

Option	Shape of curves	Magnitude of curves	Gradients of curves	Consistency of application	Total Score	Observations
Option 6 - The UAM is applied to intervals where the load profile is negative.	4	3	4	5	16	Shape <ul style="list-style-type: none"> - Flat for longer periods (middle of the day) Magnitude <ul style="list-style-type: none"> - Magnitude not representative of curves where flat - Small spikes still possible in periods directly before and after the 5MLP crosses the x-axis Gradient <ul style="list-style-type: none"> - Flat for more intervals but the gradient is consistent where the 5MLP is positive

Score Legend:

5 = Highest alignment to objectives/principles

1 = Lowest alignment to objectives/principles

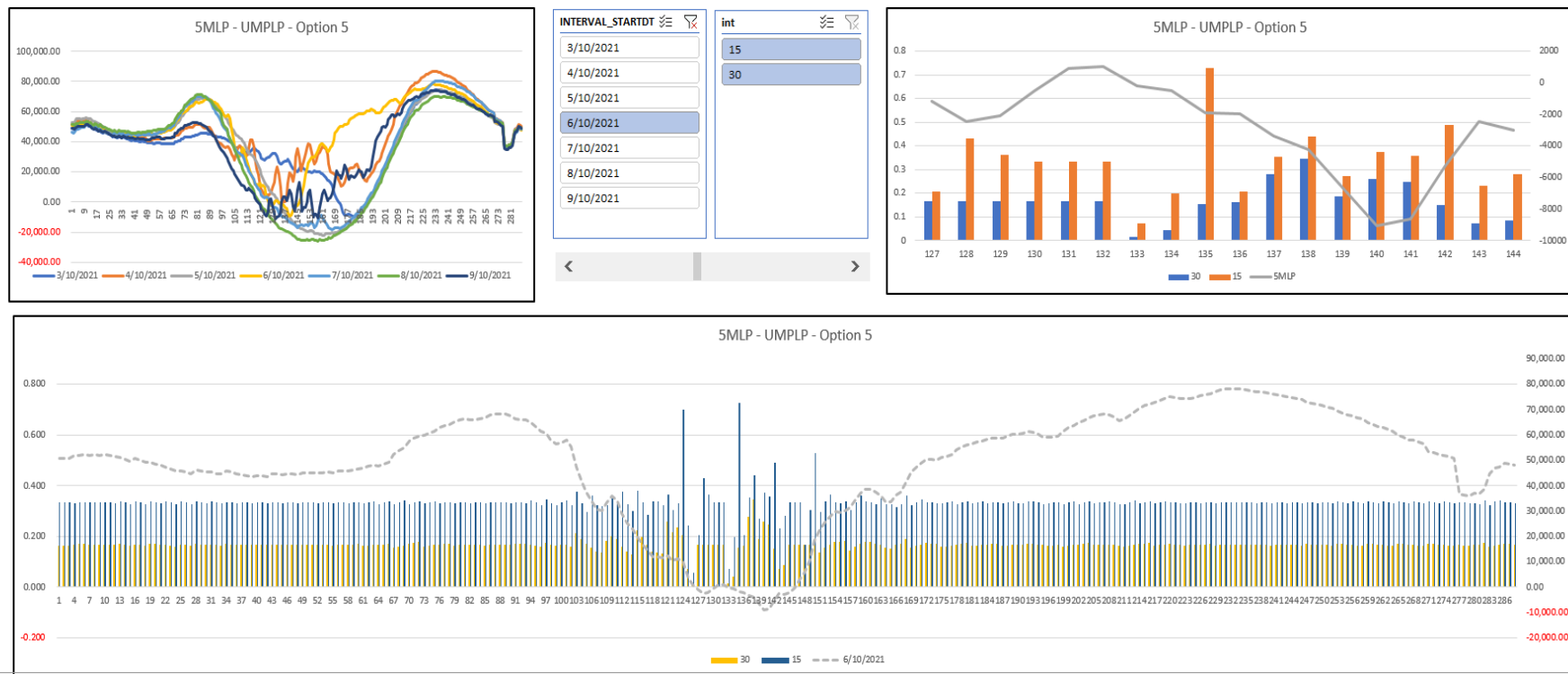
5.2. Methodology Option 5

Methodology Option 5 applies the UAM approach to the profile for the interval where it crosses the X axis and then divides this interval by three for 15-minute intervals or by six for 30-minute intervals. For intervals between the crossing of the X axis, a profile is still applied.

The observations made regarding Option 5 were as follows:

- The intervals that are negative, have a negative gradient.
- Small spikes are still a possibility due to low denominator occurrences.

Figure 3 5MLP – Option 5 POC



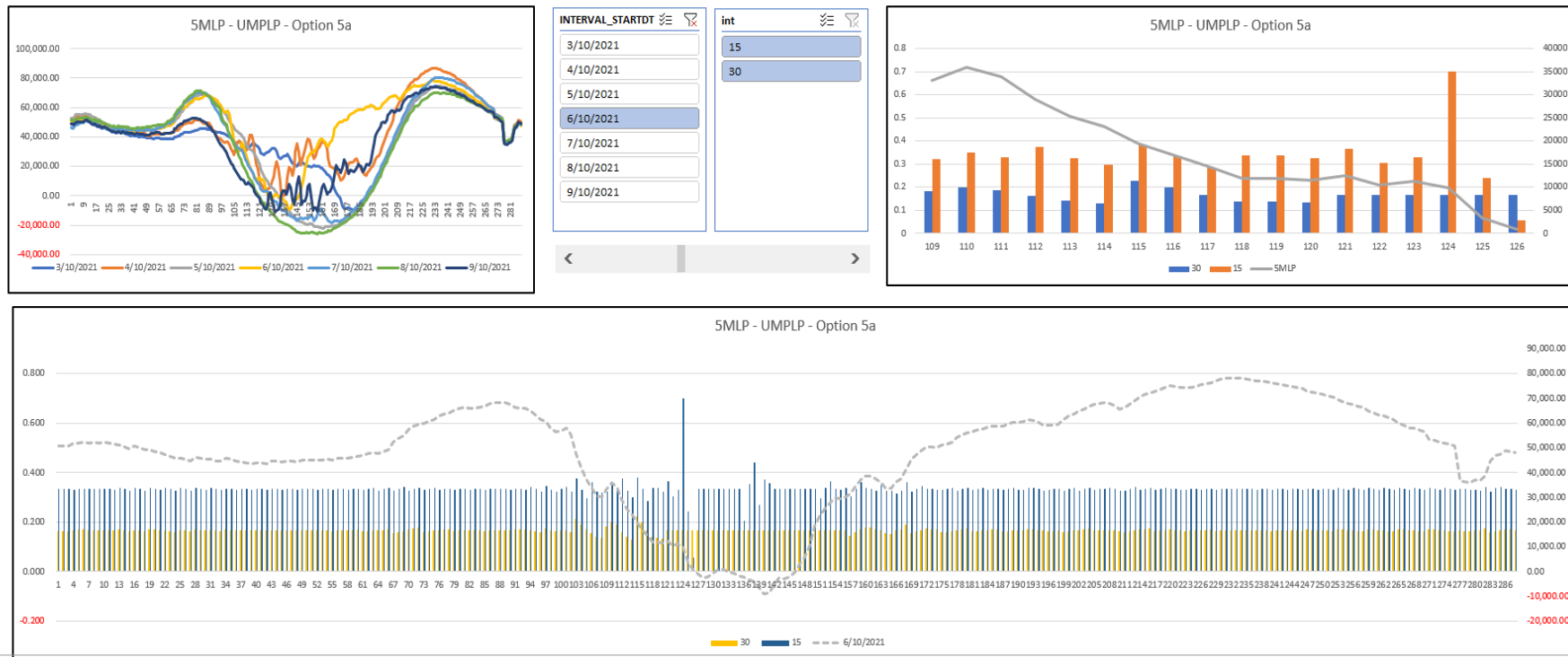
5.3. Methodology Option 5a

Methodology Option 5a provides an additional buffer to methodology Option 5. The UAM would not only be applied on intervals where the X axis is crossed but would go back three (for 15-minute intervals) or six (for 30-minute intervals) intervals prior to where the X axis is crossed in order to flatten out the period just before and just after where the X axis was crossed.

The observations made regarding Option 5a were as follows:

- 15min intervals that are negative can have a negative gradient.

Figure 4 5MLP – Option 5a POC



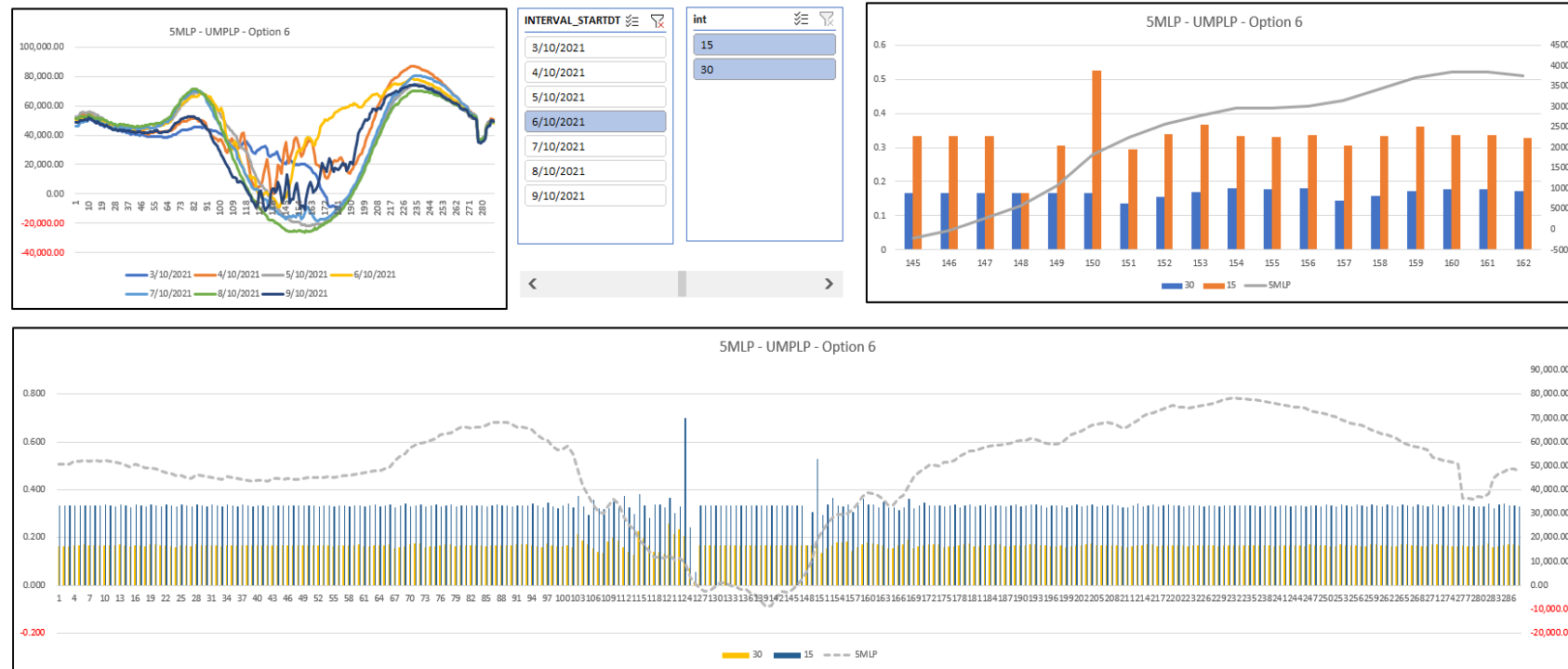
5.4. Methodology Option 6

Methodology Option 6 applies the UAM for all intervals below the X axis, including the 15-minute or 30-minute periods in which the crossing has occurred, in order to produce a flat profile while negative. The UAM is continued to be used for all the intervals where the curve is below the X axis and for the last 15-minute or 30-minute period where the curve comes back above the X axis.

The observations made regarding Option 6 were as follows:

- The gradient where the interval is positive, is positive and consistent,
- It is still possible to have small spikes due to low denominator occurrences, although this is less likely.

Figure 5 SMLP – Option 6 POC



Questions

1. Which methodology do you consider would best achieve the objectives and principles? Why?
2. Do you consider that an alternative methodology would better achieve the objectives and principles? Why?
 - Please note that the selection of an alternative methodology would likely result in a delay to the longer-term methodology being implemented, as AEMO would need to develop, analyse and test this alternative.
3. Do you believe the preferred methodology should be applied to both 5MLPs and NSLPs where the observed conditions have been met? If no, why?
4. When do you consider the preferred methodology should be implemented? On 30 May 2023?

6. Other Matters

6.1. ICF_055 Clarifying the process for obtaining and applying embedded network codes

MSATS requires each embedded network to be given a code, called the embedded network code, which is used to identify the parent NMI(s) and child NMIs.

The CATS Procedure defines a process for obtaining and applying this embedded network code into MSATS, along with who is responsible for each step and the time frame for each step. In summary, the current clauses are as follows:

- Clause 4.12(b): within 5 business days of a request, LNSP must provide AEMO with the embedded network code.
- Clause 2.10(e): within 2 business days of notification from the LNSP, AEMO must populate the embedded network code in MSATS.
- Clause 4.12(d): within 2 business days of MSATS being updated with the embedded network code, LNSP must populate the parent NMI(s) with the embedded network code.
- Clause 2.11(f): ENM must populate the child NMI with the embedded network code (note that there is no timeframe for this obligation).

However, the issue has arisen that participants are observing two different interpretations of the current clauses:

1. The clauses are only applicable when the Distributor approves the parent connection point for a greenfield embedded network application or approves an existing market connection point to be a parent connection point for a brownfield embedded network application.
2. The clauses are applicable regardless of the Distributor's embedded network application process.

AEMO considers that the first interpretation is correct. Accordingly, AEMO proposes to delete the CATS Procedure Section 4.12(b)(iv) and insert the following new Section 4.12(b)(iv):

(iv) once all obligations have been met under the NER [Chapter 5 and 5A](#) and jurisdictional documentation, the LNSP must provide the Embedded Network Code to AEMO within five business days from the time it receives the request from the embedded network owner or the ENM acting on behalf of the embedded network owner, where the site is:

- (A) a Greenfield Site;
- (B) a Brownfield Site that for all intents and purposes has been set up as an embedded network but all consumers were purchasing energy from the embedded network owner; **and**
- (C) a Brownfield Site that may require network infrastructure changes.

6.2. ICF_064 Addition of the 'HouseNumberToSuffix' field

The 'House Number To Suffix' is a part of the Australian structured address standards and was reviewed during the MSATS Standing Data Review (MSDR) consultations. The 'HouseNumberToSuffix' was added to the r42 schema in November 2021 by the aseXML Standards Working Group (ASWG), which is the body that ensures the technical accuracy of the aseXML schemas. At the time, ASWG industry representatives suggested that, from an aseXML perspective, it would be prudent to add the 'HouseNumberToSuffix' element as a logical extension of 'HouseNumberTo'.

This ICF proposes that the 'HouseNumberToSuffix' element be included in the market procedures for use in MSATS, due to its availability in the schema, to enable better quality site addresses to be recorded for energy participants.

The absence of this field in the procedures restricts the site address to be recorded without this information e.g. if a site address is 14A-14B, MSATS is unable to record the address accurately, and instead, the address may appear inaccurately as 14A-14.

6.3. ICF_065 Removal of NMI Discovery Type 3 validation

The NMI Discovery Type 3 is utilised by retailers to ascertain the previous FRMP in the case of a 'won in error' scenario. The 'Won in Error' process is being impacted by MSATS NMI Discovery Type 3 showing an error message where a transfer is completed more than 130 business days ago.

This MSATS constraint forces market participants to rely on manual processes and results in retailers having to obtain the 'previous FRMP' details from the relevant network via email.

NER 7.15.5 (c) and (e) provide for retailers to access to energy data, including NMI Standing Data, in order to comply with its obligation. Since there are no restrictions in the NER, ICF_065 proposes the removal of the current validation from MSATS.

Questions

1. Do you agree that the proposed amendments associated with obtaining and applying embedded network codes provide for the correct interpretation of the procedures, as well as achieving industry objectives? If no, then please provide a better alternative.
2. Do you agree that the inclusion of the 'House Number To Suffix' element enables a better quality site address to be recorded for energy participants? If not, please specify your reasoning.

Questions

3. Do you agree with the proposal to removal of the current NMI Discovery Type 3 validation? If not, please specify your reasoning.

7. Summary of Matters for Consultation

In summary, AEMO seeks comment and feedback on the following matters:

1. Proposed longer term load profiling methodologies to prevent spikes in five-minute and net system load profiles
2. ICF_055 Clarifying the process for obtaining and applying embedded network codes
3. ICF_064 Adding of the 'HouseNumberToSuffix' field to the market procedures and MSATS
4. ICF_065 Removal of the specified NMI Discovery Type 3 validation

Submissions on these and any other matter relating to the Changes which are discussed in this Issues Paper must be made in accordance with the Notice of First Stage of Consultation published with this Issues Paper by 5.00pm (Melbourne time) on Thursday, 27 October 2022.

Appendix A. Glossary

Term or acronym	Meaning
CATS	Consumer Administration and Transfer Solution, a part of MSATS.
ERCF	Electricity Retail Consultative Forum
FRMP	Financially Responsible Market Participant
ICF	Issue / Change Form
LNSP	Local Network Service Provider
MSATS	Market Settlements and Transfer Solution
NEM	National Electricity Market
NER	The National Electricity Rules made under Part 7 of the National Electricity Law
NMI	National Metering Identifier
POC	Proof of Concept
UAM	Uniform Allocation Method