15 March 2019

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John Pierce
Chair
Australian Energy Market Commission

By on-line submission at www.aemc.gov.au

Dear Mr Pierce

Five-minute settlement and global settlement implementation amendments rule change proposal

The Australian Energy Market Operator's Five-Minute Settlement implementation program was initiated in early 2018 to implement the changes set out in the AMEC's five-minute settlement and global settlement rules. Through this, AEMO has identified six areas of the National Electricity Rules that it considers need changing to assist in implementing five-minute settlement and global settlement effectively and efficiently. Consequently, AEMO is seeking changes to the NER to improve clarity, reduce unnecessary administrative burden and avoid unintended consequences of implementing five-minute settlement and global settlement.

AEMO considers the proposed changes will not have a significant effect on the NEM and are therefore non-controversial. It therefore requests that the AEMC considers this proposal as a request for a non-controversial Rule under the expedited rule change process.

I look forward to working with you and your team as you consider this proposal. Please do not hesitate to contact Chris Muffett, 5MS Business and Industry Lead, at chris.muffett@aemo.com.au should you wish to discuss any aspect of the request.

Yours sincerely

Peter Geers

Chief Strategy and Markets Officer

Attachment: Rule Change Proposal - Five Minute Settlement and Global Settlement Implementation Amendments

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

ELECTRICITY RULE CHANGE PROPOSAL

FIVE MINUTE SETTLEMENT AND GLOBAL SETTLEMENT IMPLEMENTATION AMENDMENTS

March 2019

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NEW SOUTH WALES QUEENSLAND SOUTH AUSTRALIA VICTORIA AUSTRALIAN CAPITAL TERRITORY TASMANIA WESTERN AUSTRALIA

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1. SUMMARY

The Australian Energy Market Operator (AEMO) is seeking changes to the National Electricity Rules (NER) to improve clarity, reduce unnecessary administrative burden, avoid unintended consequences of implementing five-minute settlement (5MS) and global settlement (GS) in the National Electricity Market (NEM).

The *National Electricity Amendment (Five-minute settlement) Rule 2017 No.15* (5MS Rule) was made by the Australian Energy Market Commission (AEMC) in November 2017 and has a commencement date of 1 July 2021 for the substantive amendments. The 5MS Rule aligns operational dispatch and financial settlement at five minutes, thereby reducing the time interval for financial settlement in the NEM from 30 minutes to five minutes. Implementation of 5MS requires AEMO and NEM participants to make considerable changes to metering, IT systems and contracts prior to the commencement date.

The *National Electricity Amendment (Global settlement and market reconciliation) Rule 2018 No.14* (GS Rule) was made by the AEMC in December 2018 and has a commencement date of 6 February 2022 for the substantive amendments. GS will replace the existing 'settlement by difference' framework for settlement of the demand side of the NEM and includes additional reporting requirements for AEMO. Implementation of 5MS and GS are broadly aligned to minimise costs for AEMO and Market Participants.

AEMO's 5MS and GS implementation program began in early 2018. Through this program AEMO has identified six areas of the NER that it considers require amendments to assist in implementing 5MS and GS effectively and efficiently:

1. **Determining marginal loss factors (MLFs) at 30-minute or shorter intervals.** A rule change is required to:
    - avoid an unintended change to current requirements which see marginal loss factors (MLFs) determined for each 30-minute period as part of the intra-regional loss factor (IRLF) calculation process, and
    - provide the flexibility to calculate MLFs based on data shorter time periods in the future if there is a case to do so.

    Without this change, MLFs would need to be determined on a trading interval (five-minute) basis from 1 July 2021. This would incur major costs for negligible benefit as each IRLF is a static figure determined annually as the weighted average of the relevant year's MLFs for the connection point.
2. **Accommodating fast-start plant in pre-dispatch.** A rule change is required to enable dispatch inflexibility profiles to be used in determining the five-minute resolution pre-dispatch forecast. Without this change, the NER would prevent the use of inflexibility profiles for fast-start generators in the five-minute pre-dispatch forecast. This will produce infeasible forecasts that fast-start generators could not comply with.
3. **Amending the spot market operations timetable.** A rule change is recommended to relax AEMO's consultation requirements for amending the spot market operations timetable where the changes are minor or administrative. Without this change, AEMO is required to run a full 'rules consultation' process to update the spot market operations timetable even for minor and administrative changes. This places an administrative burden on AEMO and market participants for low risk changes to the timetable.
4. **Correction to list of AEMO procedures for 5MS.** A rule change is required to remove the reliability standard and settings guidelines from the list of procedures that AEMO must review, and if necessary update, for 5MS. These guidelines are the responsibility of the Reliability Panel.

5. **Timing for AEMO to publish unaccounted for energy (UFE) data.** A rule change is required to clarify the information that AEMO is required to publish in relation to UFE from 1 July 2021.
6. **Assigning non-market unmetered loads to a transmission node identifier (TNI) or virtual transmission node (VTN).** A rule change is required to clarify that each non-market unmetered load be assigned to the TNI or VTN that is most appropriate.

AEMO considers the proposed changes will not have a significant effect on the NEM and are therefore non-controversial. AEMO requests that the AEMC considers this proposal as a request for a non-controversial Rule in accordance with section 96 of the National Electricity Law. AEMO notes that it has engaged with market participants on these matters through its 5MS and GS project engagement channels.

2. BACKGROUND AND STATEMENT OF ISSUES

This section sets out the background to 5MS, GS, AEMO's implementation responsibilities and each of the six NER areas that are the subject of the rule change request. It also describes the issues with each of the NER areas that need addressing.

2.1 Five Minute Settlement Rule

The 5MS Rule reduces the trading interval for financial settlement in the NEM from 30 minutes to five minutes, aligning with NEM dispatch.

From 1 July 2021, the following processes will occur on a five-minute basis:

- Bidding and offering into the National Electricity Market.
- Settlement.
- Intervention pricing.
- Calculation of trading amounts.
- Calculation of the cumulative price threshold.

Implementing 5MS requires AEMO and various NEM market participants to:

- Review and where necessary update existing contract terms and conditions.
- Upgrade metering to provide five-minute granularity data (where required).
- Upgrade IT systems to store and process five-minute granularity data.

The transitional provisions of the 5MS Rule also require AEMO consult on and amend its relevant procedures, methodologies and guidelines to accommodate 5MS by 1 December 2019. AEMO has identified around 70 procedures that require updating for 5MS, of which around 20 (including the spot market operations timetable) are subject to the formal Rules consultation procedures under the NER, as described in the box below.[1]

Rules consultation procedures

Broadly, the Rules consultation procedures involve AEMO conducting a two-stage process for consulting on changes to certain documents made under the NER. As a minimum, the process requires AEMO to publish three sets of notices and consultation or determination documents, and to receive, consider and respond to submissions from stakeholders as inputs into its draft and final determinations. The process takes a minimum of about four months from the time AEMO initiates it, but will often run for longer.

For certain procedures, the NER provide that AEMO need not follow the Rules consultation procedures for minor or administrative changes. This avoids the time and resources that AEMO and participants would otherwise need to put into consulting and responding on corrections, updates or other minor changes that may have to be made quickly and are not controversial. Where there is a reduced consultation, stakeholders can still engage with AEMO on the changes and AEMO can revert to a full rules consultation if substantive issues are raised.

[1] NER, rule 8.9.

2.2 Global Settlement Rule

The GS Rule changes the settlement of the demand side of the wholesale electricity market to a global settlement framework. This is a move away from the 'settlements by difference' approach which has been in place since the start of the NEM.

The GS Rule sets out how unaccounted for energy (UFE) is calculated and allocated, the treatment of unmetered loads, and metering responsibilities at network connection points. To facilitate the allocation of UFE, meter data providers (MDPs) will need to give AEMO metering data from 1 July 2021 for local retailer (LR) loads, and AEMO will also need to be notified of the agreed consumption of non-market unmetered loads.[2]

The GS Rule also places reporting obligations on AEMO:

- A requirement to provide retailers with UFE information specific to the market connections points for which they are financially responsible by 1 July 2021.[3]
- A requirement to report on UFE trends from 1 March 2022 and at least annually thereafter.[4]

Implementation of GS is broadly aligned with 5MS to minimise costs for AEMO and Market Participants.

2.3 Background to the rule change request

The 5MS Rule was made in November 2017 and AEMO's extensive 5MS implementation program began in early 2018. GS implementation activities were incorporated into the program following the GS Rule in December 2018. The program covers the system and procedure changes needed to implement 5MS and GS and has required AEMO and registered participants to consider market systems and processes that may have been unintentionally affected by the 5MS and GS Rules. Through this program AEMO has identified six areas of the NER that it considers need changing to assist in implementing 5MS and GS effectively and efficiently:

1. Determining marginal loss factors (MLFs) at 30-minute or shorter intervals.
2. Accommodating fast-start plant in pre-dispatch.
3. Amending the spot market operations timetable.
4. Correction to list of AEMO procedures for 5MS.
5. Timing for AEMO to publish UFE data.
6. Assigning non-market unmetered loads to a TNI or VTN

Each of these areas are described in more detail in the following sections.

[2] AEMO's metrology procedures will need updating to include the requirements for both the calculation and provision of non-market unmetered load quantities.
[3] New clause 3.15.5(d) (GS Rule).
[4] New clause 3.13.5B (GS Rule).

2.4 Determining MLFs at 30-minute or shorter intervals

Background

IRLFs represent the marginal electrical transmission losses between a regional reference node (RRN) and a connection point.[5] They are used:

- In the NEM dispatch process to reference bid prices from connection points to the RRN.
- In the NEM settlement process to calculate settlement prices for connection points.
- By renewable energy generators to calculate large-scale generation certificates under the Large-scale Renewable Energy Target.[6]
- As locational signals for investment decision making.

For the purposes of this rule change request it is important to highlight the difference between MLFs and IRLFs. This distinction is made because, irrespective of the NER definitions, the common industry term for IRLF is MLF.

- Currently, **MLF**s are calculated by simulating every half hour in the next financial year using inputs such as connection point energy forecasts, generator availability and generation and transmission constraints.
- The **IRLF** for a connection point is a static value for a whole year and is the volume-weighted average of the calculated MLFs for a transmission network connection point.[7]

Issue: Cost and benefit

From the commencement of 5MS, the definition of a trading interval will change from 30 minutes to 5 minutes, meaning that MLFs would need to be determined for every 5 minute interval. There is negligible benefit in calculating MLFs on five-minute basis as the current NER methodology requires AEMO to calculate each IRLF as an annual weighted average of the MLFs, meaning the outcome under the current methodology will be similar irrespective of the granularity of the data. Updating the offline calculation tools to enable MLFs to be determined on a five-minute basis would be costly and resource-intensive.

Issue: Future changes

There are ongoing industry discussions around the suitability of the current IRLF calculation methodology.

The NEM is currently undergoing a significant transition, with more renewable generation entering the market and retirement of thermal generation. In this context, AEMO has seen large year-on-year changes in IRLFs. Consequently, it has initiated work with industry around whether the current IRLF methodology is fit for purpose, both now and in the future.[8] AEMO also notes that Adani Renewables has proposed a rule change to amend the IRLF calculation framework.[9]

If there is a case for the IRLF calculation methodology to be changed in future, there may also at that stage be a need to use MLF input data at a trading interval resolution, or on some other basis.

[5] NER, clause 3.6.2(e).
[6] The LRET is administered by the Clean Energy Regulator: www.cleanenergyregulator.gov.au
[7] Some transmission connection points have dual MLFs for example where there is storage.
[8] Australian Energy Market Operator, *MLF Engagement Session*, http://aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Loss_Factors_and_Regional_Boundaries/2018/MLF-Information-Session---Slides.pdf, September 2018.
[9] Australian Energy Market Commission, *Loss factor frameworks*, https://www.aemc.gov.au/rule-changes/loss-factor-frameworks.

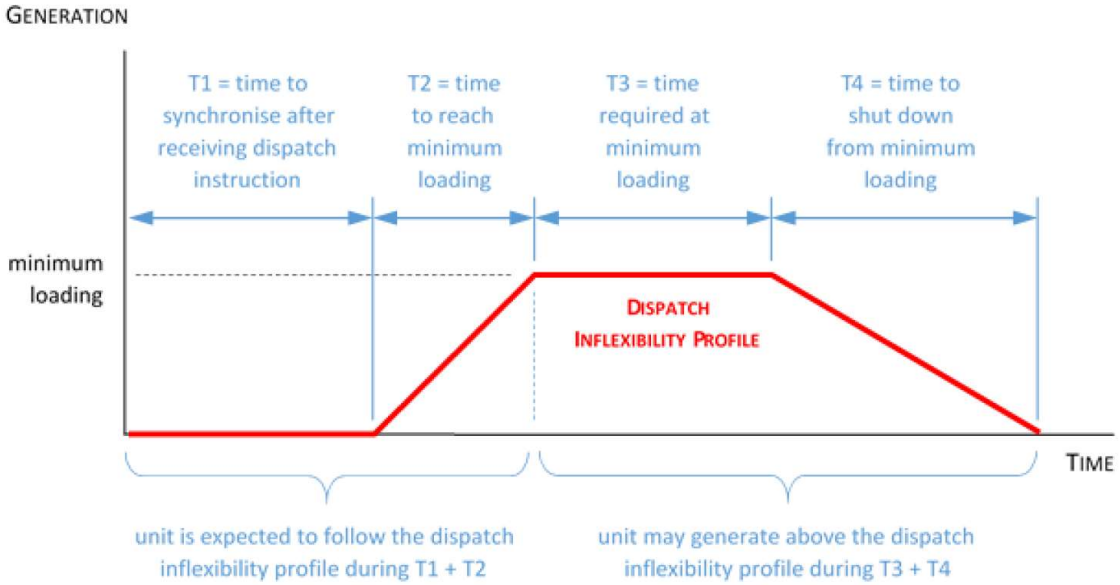
2.5 Accommodating fast-start plant in pre-dispatch

Background

Dispatch inflexibility profiles are more commonly known as fast start inflexibility profiles. Fast start inflexibility profiles are characterised by:

- The required time (T1) to increase loading from 0 MW after AEMO issues a dispatch instruction.
- The required time (T2) to reach minimum load.
- The required time (T3) at minimum load.
- The required time (T4) to decrease loading from minimum load to zero.

The figure below shows a schematic fast start inflexibility profile for a generator.



Fast start inflexibility profiles are used when a Generator wants a generating unit to be committed by the central dispatch process, rather than through self-commitment. The fast-start inflexibility profiles are used in the central dispatch process to ensure that dispatch instructions reflect the physical capabilities of the plant. Only plant that can synchronise and reach minimum load in less than or equal to 30 minutes can be committed in this way.

NER 3.8.20(d) prohibits the use of dispatch inflexibility profiles to determine pre-dispatch schedules. AEMO has been unable to determine why this prohibition was inserted in the Rules. A plausible explanation is that because fast-start plant can synchronise and reach minimum load within 30 minutes, and because pre-dispatch had a 30-minute resolution, fast-start inflexibility profiles were considered an unnecessary sophistication when calculating pre-dispatch schedules.

The 5MS Rule expands the definition of pre-dispatch in NER 3.8.20(b) to include five-minute pre-dispatch. AEMO introduced five-minute pre-dispatch to the NEM as a voluntary initiative. Five-minute pre-dispatch is not currently subject to other pre-dispatch rules because it is not currently mandated by the NER. Consequently, owners of fast-start plant do not at present need to be able to comply with the five-minute pre-dispatch schedule, or else rebid their plant to create a pre-dispatch schedule that they can comply with, as required under NER 3.8.20(g).

Issue: Ability of fast start plant to comply with five-minute pre-dispatch

NER 3.8.20(d) and 3.8.20(g) will be mutually incompatible under five-minute settlement. NER 3.8.20(d) stops AEMO using dispatch inflexibility profiles to calculate the five-minute pre-dispatch schedule. NER 3.8.20(g) requires owners of fast-start plant to be able to comply with the five-minute pre-dispatch schedule, or else rebid their plant to create a five-minute pre-dispatch schedule that they can comply with. If dispatch inflexibility profiles are not used in five-minute pre-dispatch, it may be impossible for fast-start plant owners to comply with the five-minute pre-dispatch schedule, no matter how often and diligently they rebid.

Consider a fast-start plant that takes 10 minutes to start generating after receiving a dispatch instruction (T1=10). This restriction would be ignored in a five-minute pre-dispatch without the use of fast start profiles. The generator may then be scheduled to start supplying power the moment the offer price of the generator is less than the clearing price in five-minute pre-dispatch, even though it is physically incapable of doing this. In this case the only way the plant owner could rebid to achieve a five-minute pre-dispatch schedule they can comply with would be to set their availability to zero, effectively preventing their participation in the market.

Alternatively, if the plant was operating with a minimum load time of 20 minutes (T3=20) and the clearing price in five-minute pre-dispatch fell below the generator's offer price during this period, the generator would be scheduled to reduce its output below minimum load, despite the generator signalling through its fast start profile that this is infeasible. In this case there is no way the plant owner could rebid to achieve a five-minute pre-dispatch schedule that they could comply with.

2.6 Amending the spot market operations timetable

Background

The spot market operations timetable specifies the schedule for operating the spot market and publishing market information. The contents of the timetable are largely determined by the NER, and the timetable as published refers to the NER clauses that mandate the timetable entries. Any changes to the timetable require compliance with the Rules consultation procedures.

Issue: Regulatory and administrative burden for low risk changes to the spot market operations timetable

Changes to the spot market operations timetable require compliance with the Rules consultation procedures. This is true even for minor and administrative changes, such as adding, removing or amending NER references after rule changes. In such cases, the resources involved in running and responding to a Rules-based consultation are arguably not justified by the inconvenience of tolerating such errors in the timetable, suggesting that the national electricity objective is better served by perpetuating the erroneous references in the timetable. AEMO considers this is an undesirable outcome.

Amending the timetable to accommodate future market changes can present additional challenges, as it may require multiple consultations.

2.7 Review of reliability standard and settings guidelines

Background

The 5MS Rule inserted a new transitional clause 11.103.2, listing the procedures and other documents to be reviewed by AEMO, the Information Exchange Committee and the AER, and amended as required to accommodate 5MS, generally by 1 December 2019. The list of AEMO documents includes the reliability standard and settings guidelines which, under clause 3.9.3A of the NER, are to be made by the Reliability Panel.

Issue

As the Reliability Panel determines the reliability standard and settings guidelines under clause 3.9.3A of the NER, their inclusion in the list of documents to be reviewed and amended by AEMO under clause 11.103.2(a) appears to be an error. AEMO has no authority to review these guidelines.

The reliability standard and settings guidelines refer to dispatch intervals and to a specific number of trading intervals in relation to the cumulative price threshold, so it seems likely that these guidelines will require some amendment to account for 5MS. AEMO therefore proposes that they be removed from the list of AEMO documents but retained in the transitional provisions for review by the Reliability Panel.

It is possible that AEMO's reliability standard implementation guidelines (RSIG) were intended to be included in the 5MS transitional clause. However, AEMO has confirmed that the 5MS Rule does not necessitate any changes to the RSIG, therefore it does not need to be covered in the transitional clause.

2.8 Timing for AEMO to publish UFE data

Background

The GS Rule introduces a requirement for AEMO to provide UFE information to each Market Customer so that they can verify the UFE being apportioned to them at each of their market connection points.[10] AEMO understands the AEMC's policy intent is for AEMO to calculate and report UFE quantities from 1 July 2021, representing a 'soft start' prior to the implementation of GS from 6 February 2022.[11]

Issue

The transitional provisions in the GS Rule require AEMO to publish the information necessary to verify UFE allocations *by* 1 July 2021.[12] However, Metering Data Providers (MDPs) are expected to only start sending AEMO the required data inputs for UFE calculation and publication *from* 1 July 2021 (under AEMO's amended metering procedures), and no allocations of UFE will be made until 6 February 2022. Further, by referring only to AEMO's obligation to publish UFE verification information, the transitional clause does not seem to fully capture the policy intent of the GS Rule, namely that AEMO calculates and publishes the UFE quantities themselves during the soft start period.

2.9 Assigning non-market unmetered loads to a TNI or VTN

Background

Unmetered loads not subject to Type 7 metering arrangements (typically public amenities and telecommunication facilities) are currently supplied by the LR off market, with the consumption of those loads being agreed between the LR, the local network service provider (LNSP) and the customer. As such, these loads would form part of UFE if not specifically addressed.

The AEMC's position on non-market unmetered loads in the GS final determination is that these loads be identified and removed from the UFE calculation to avoid double counting by:[13]

- Processing unmetered loads through MSATS.[14]
- The customer, LNSP and LR agreeing on the load profile and size in accordance with AEMO's updated metrology procedures and unmetered load guidelines.

[10] New clause 3.15.5(d) (GS Rule).
[11] Australian Energy Market Commission, Global Settlement and Market Reconciliation, Rule determination, 6 December 2018, Chapter 7.
[12] New clause 11.112.5 and 3.15.5(d) (GS Rule).
[13] Australian Energy Market Commission, Global Settlement and Market Reconciliation, Rule determination, 6 December 2018, Chapter 4.
[14] Market Settlement and Transfer Solutions - AEMO's retail and metering IT systems.

- AEMO updating its metrology procedures and unmetered load guidelines, allowing for:
  - Creation of national meter identifiers (NMIs) for non-market unmetered loads.[15]
  - Assignment of non-market unmetered load connection points to TNIs or VTNs.[16]

AEMO understands that the AEMC's policy intent is for each non-market unmetered load be assigned to a specified TNI or VTN.

Issue

The wording of the rule requiring the assignment of non-market unmetered load connection points to TNIs or VTNs could be read as requiring all unmetered loads in a given network area to be assigned to the same (single) TNI or VTN. To avoid ambiguity, it would be preferable to clarify this rule.

[15] New clause 7.16.3(c)(6A)(i) (GS Rule).
[16] New clause 7.16.3(c)(6A)(ii) (GS Rule).

3. PROPOSED RULE

This section describes the proposed rule and how it will address the issues raised in section 2. It also notes consequent procedure change and transitional requirements.

3.1 Description of the proposed rule and how it will address the issues

3.1.1 Determining MLFs at 30-minute or shorter intervals

The proposed rule enables MLFs to continue to be calculated on a 30-minute period basis or be calculated on another, shorter period as defined in the relevant AEMO methodology. MLFs are an input into the IRLF calculation process.

This solution avoids the significant costs of changing IT tools. It also enables AEMO to reduce the time period basis for calculating MLFs in the future (if there is a demonstrated need) through a formal procedure change consultation.

3.1.2 Accommodating fast-start plant in pre-dispatch

The proposed rule removes the prohibition on using fast start inflexibility profiles in the preparation of pre-dispatch. This would maintain the requirement on participants to be able to operate their plant in accordance with the pre-dispatch schedule, or else rebid their plant to create a pre-dispatch schedule that they can comply with. It would also allow AEMO the flexibility to apply fast-start inflexibility profiles in five-minute pre-dispatch to produce feasible five-minute pre-dispatch schedules, while continuing to ignore fast-start inflexibility profiles in 30-minute pre-dispatch.

3.1.3 Amending the spot market operations timetable

The proposed rule allows AEMO to make minor and administrative changes to the spot market operations timetable without undertaking a full Rules consultation process.

The NER allow for minor and administrative changes to be made to many other procedures and subordinate instruments by the relevant decision-making body without following the full consultation process. AEMO considers that an analogous allowance for the timetable is consistent with existing practice and non-contentious because the timetable's contents are largely specified in the NER.

3.1.4 Correction to list of AEMO procedures for 5MS

The proposed rule shifts the requirement for AEMO to review and, where necessary, amend and publish the reliability standard and settings guidelines to the Reliability Panel. The correction of this error will ensure that the reliability standard and settings guidelines are reviewed and appropriately updated as required prior to the implementation of 5MS, by the body that is responsible for making those guidelines.

3.1.5 Timing for AEMO to publish UFE data

The proposed rule amends clause 11.112.5 of the GS Rule to require AEMO to calculate and publish the aggregate UFE for each local area as if new clause 3.15.5(a) were in effect from 1 July 2021, and publish that amount together with the information necessary to enable Market Customers to calculate the UFE allocation they would have received. This change means the timing of AEMO's UFE publication obligations will be consistent with the timing of the MDPs' meter data delivery obligations, and will support the policy intent of the soft start for GS.

3.1.6 Assigning non-market unmetered loads to a TNI or VTN

The proposed rule clarifies that each non-market unmetered load is to be assigned to a specified TNI or VTN, removing any potential unintended interpretation that all unmetered load should be assigned to the same (single) TNI or VTN.

3.2 AEMO procedure changes

Of the five areas considered in this rule change request, only two areas would require further procedure changes under the proposed rule, as described in the table below.

PROPOSED RULE	PROCEDURE CHANGE REQUIRED?
Determining MLFs at 30-minute or shorter intervals	AEMO's 'forward-looking transmission loss factors methodology' will need review if the proposed rule is made. In particular, AEMO will need to assess each occurrence of the term *trading interval* and whether it needs changing to 30-minute period or other time period.
Accommodating fast-start plant in pre-dispatch	Documentation on the pre-dispatch process will need to be updated to include five-minute pre-dispatch. The use of fast start inflexibility profiles in five-minute pre-dispatch will be added in that update.
Amending the spot market operations timetable	The timetable is already listed for review in the 5MS Rule. The proposed rule would change the way AEMO can consult on changes.
Correction to list of AEMO procedures for 5MS	No AEMO procedure change required, but the Reliability Panel may need to review the reliability standard and settings guidelines.
Timing for AEMO to publish UFE data	The GS Rule already requires a new procedure to be developed.
Assigning non-market unmetered loads to a TNI or VTN	The GS Rule already requires the MSATS and metrology procedures to be updated for GS.[17]

3.3 Transitional matters

AEMO suggests that the amendments in the proposed rule for the determination of MLFs and accommodating fast-start plant should be made with effect from the commencement date of the 5MS Rule (1 July 2021). The remaining proposed amendments would come into effect when the amending rule is made, as they relate to preparatory steps for 5MS or GS.

[17] New clause 11.112.2(a) (GS Rule).

3.4 Expedited rule change

AEMO considers the proposed changes will not have a significant effect on the NEM and are therefore non-controversial. AEMO therefore requests that the AEMC considers this proposal as a request for a non-controversial Rule in accordance with section 96 of the National Electricity Law.

Further, some of the outcomes of this rule change process could have IT system change implications. A timely final rule determination would assist in AEMO's 5MS implementation.

AEMO actively sought input from industry stakeholders on this rule change request through its 5MS engagement channels.[18] In particular, this rule change request has been socialised through the 5MS Program Consultative Forum, Procedures Working Group and Dispatch Focus Group throughout the second half of 2018 and in early 2019. AEMO received limited feedback during this time.

[18] For details on the 5MS engagement channels see the 5MS *industry engagement overview* at: http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement

4. EXPECTED BENEFITS AND COSTS OF THE PROPOSED RULE, AND HOW IT CONTRIBUTES TO THE NATIONAL ELECTRICITY OBJECTIVE (NEO)

The AEMC may only make a rule if it will or is likely to help achieve the national energy objectives. This rule change request pertains to the NEM and therefore the relevant energy objective is the NEO:

> *"to promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity with respect to:*
>
> *price, quality, safety and reliability and security of supply of electricity*
>
> *the reliability, safety and security of the national electricity system."*

Table 4.1 sets out the costs and benefits of each area of the proposed rule and how it contributes to the NEO.

Table 4.1: Costs and benefits of the proposed rule and how it contributes to the NEO

PROPOSED RULE	BENEFIT	COST	CONTRIBUTION TO THE NEO
Determining MLFs at 30-minute or shorter intervals	The proposed rule would: • Not change the MLF calculation outcomes for the current MLF methodology. • Avoid the need to rebuild the offline calculation tool to enable it to calculate MLFs on a 5-minute basis. Therefore, the cost of system upgrades will not be incurred, which would otherwise be passed on to market participants and potentially consumers. • AEMO's present MLF calculation tools are largely at end-of-life. Operating them at a 5 minute resolution would require major re-engineering and re-platforming to meet the scale of data. It would cost an estimated $1 million +/- 30% to	There would be no additional costs to AEMO to implement the proposed rule because it maintains the status quo.	The proposed rule prevents an unintended policy change with negligible benefit requiring AEMO to make costly changes to its MLF calculation tools, with these costs needing to be passed on to NEM participants and ultimately electricity consumers. It therefore contributes to the efficient operation of electricity services with respect to the price of electricity.

	replace the MLF system with a new solution, plus additional resources to implement. • Provide the flexibility to change the time period basis of the MLF calculation in future if a case for change is identified.		
Accommodating fast-start plant in pre-dispatch	As compared to the current rule that prevents using fast-start inflexibility profiles, the proposed rule: • Improves the quality of market information by enabling feasible five-minute pre-dispatch forecasts to be produced. • Enables fast-start generators to comply with the five-minute pre-dispatch schedule.	There is no incremental implementation cost from the proposed rule because AEMO already produces a voluntarily five-minute pre-dispatch that includes fast-start inflexibility profiles.	The proposed rule enables AEMO to produce market information that is representative of the physical capabilities of fast start generators to be dispatched in to the NEM. In this way it contributes to the efficient operation of electricity services with respect to the price of electricity.
Amending the spot market operations timetable	The proposed rule would: • Permanently reduce the regulatory and administrative burden for AEMO and market participants for minor or administrative changes to the timetable. • Maintain the requirement to run a full rules consultation for material changes to the timetable.	No cost to AEMO or market participants.	The proposed rule reduces regulatory and administrative burden on AEMO and participants, thereby contributing to the efficient operation of electricity services with respect to the price of electricity.
Correction to list of AEMO procedures for 5MS	The proposed rule will ensure that the reliability standard and settings guidelines are reviewed and appropriately updated as required prior to the implementation of 5MS, by the Reliability Panel that is responsible for making those guidelines.	The regulatory and administrative cost of reviewing and updating the reliability standard and settings guidelines would shift from AEMO to the Reliability Panel.	Not applicable – the proposed rule corrects an error.

Timing for AEMO to publish UFE data	The proposed rule enables AEMO to publish UFE information at a time that will be consistent with the timing of the MDPs' meter data delivery obligations, and will support the policy intent of the soft start for GS.	No cost incremental cost would be incurred by AEMO from the proposed rule as it adjusts the timing of information publication only.	The proposed rule enables AEMO to produce required market information from the time that the input data is available to it. In this way it contributes to the efficient operation of electricity services with respect to the price of electricity.
Assigning non-market unmetered loads to a TNI or VTN	The proposed rule clarifies that non-market unmetered loads should be assigned to an appropriate TNI or VTN in MSATS.	There is no incremental implementation cost from the proposed rule, as it has no impact on the process and effort of assigning non-market unmetered loads in MSATS.	The proposed rule avoids ambiguity. By removing the potential for different interpretations that would affect UFE calculations, it contributes to the efficient operation of electricity services with respect to the price of electricity.

5. PROPOSED RULE DRAFTING

This draft is based on version 119 of the National Electricity Rules, as amended by the 5MS and GS Rules where relevant.

5.1 Determining MLFs at 30-minute or shorter intervals

3.6.2 Intra-regional losses

[...]

(e) In preparing the methodology referred to in clause 3.6.2(d), *AEMO* must implement the following principles:

(1) *Intra-regional loss factors* are to apply for a *financial year*.

(2) An *intra-regional loss factor* must, as closely as is reasonably practicable, describe the average of the *marginal electrical energy losses* for electricity transmitted between a *transmission network connection point* and the *regional reference node* in the same *region* for each *trading interval* of the *financial year* in which the *intra-regional loss factor* applies.

(2A) *Intra-regional loss factors* must aim to minimise the impact on the *central dispatch* process of *generation* and *scheduled load* compared to that which would result from a fully optimised dispatch process taking into account the effect of losses.

(3) Forecast *load* and *generation* data for the *financial year* for which the *intra-regional loss factor* is to apply must be used. The forecast *load* and *generation* data used must be that *load* and *generation* data prepared by *AEMO* pursuant to clause 3.6.2A.

(4) The *load* and *generation* data referred to in clause 3.6.2(e)(3) must be used to determine *marginal loss factors* for each *transmission network connection point* for each *30-minute period* (or shorter period specified in the methodology) ~~*trading interval*~~ in the *financial year* to which the *load* and *generation* data relates.

(5) An *intra-regional loss factor* for a *transmission network connection point* is determined using a volume weighted average of the *marginal loss factors* for the *transmission network connection point*.

(6) In determining an *intra-regional loss factor* for a *transmission network connection point*, flows in *network elements* that solely or principally provide *market network services* will be treated as invariant, as the methodology is not seeking to calculate the marginal losses within such *network elements*.

5.2 Accommodating fast start plant in *pre-dispatch*

3.8.20 *Pre-dispatch* schedule

[...]

(b) The *pre-dispatch* process is to have a resolution of:

(1) one *thirty-minute period*; and

(2) one *trading interval*, for the period of 60 minutes from the time that the relevant *pre-dispatch schedule* is *published* by *AEMO*, provided that *AEMO* may at any stage provide the resolution required by this clause 3.8.20(b)(2) for a period longer than 60 minutes,

and no analysis will be made of operations within the *trading interval*, other than to ensure that *contingency capacity reserves* are adequate as set out in Chapter 4.

(c) Subject to paragraph (b), *AEMO* must determine the *pre-dispatch schedule* on the basis of:

(1) *dispatch bids*, *dispatch offers* and *market ancillary service offers* submitted for the relevant *trading interval* or *trading intervals*;

(2) *AEMO's* forecast *power system load* for each *region* for the relevant *trading interval* or *trading intervals*; and

(3) the *unconstrained intermittent generation forecasts*,

and by using a process consistent with the principles for *central dispatch* as set out in clause 3.8.1.

(d) [Deleted] ~~In determining the *pre-dispatch schedule AEMO* shall not take account of any *dispatch inflexibility profile* submitted in accordance with clause 3.8.19.~~

[...]

(g) Each *Scheduled Generator*, *Scheduled Network Service Provider* and *Market Customer* which has classified a *scheduled load* and *Market Participant* (which has classified an *ancillary service generating unit* or *ancillary service load*) must ensure that it is able to *dispatch* the relevant plant as required under the *pre-dispatch schedule* and is responsible for changing inputs to the *central dispatch* process, if necessary to achieve this, via the rebidding provisions under clause 3.8.22.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

5.3 Amending the *spot market* operations timetable

3.4.3 *Spot market* operations timetable

(a) *AEMO* must operate the *spot market* according to the *timetable* which must be approved by the *AEMC* and *published* by *AEMO* following compliance with the *Rules consultation procedures*.

(b) If *AEMO* wishes to change the *timetable* at any time, it may do so following compliance with the *Rules consultation procedures*.

(ba) *AEMO* may make minor and administrative amendments to the *timetable* without complying with the *Rules consultation procedures*.

(c) If *AEMO* amends the *timetable* in accordance with paragraph (b) or (ba), *AEMO* must:

(1) *publish* the amended *timetable*; and

(2) operate the *spot market* according to the *timetable* as amended.

5.4 Correction to list of AEMO procedures for 5MS

11.103.2 Amendments to procedures and guidelines

(a) By 1 December 2019, AEMO must review and where necessary amend and publish the following documents to apply from the commencement date to take into account the Amending Rule:

(1) the credit limit procedures in accordance with clause 3.3.8;

(2) the *spot market* operations timetable in accordance with clause 3.4.3;

(3) the automated procedures relating to *dispatch intervals* subject to review in accordance with clause 3.9.2B;

(4) the methodology for determining *dispatch prices* and *ancillary services prices* in the event of intervention by AEMO in accordance with clause 3.9.3;

(5) [deleted]~~the *reliability standards and settings guidelines*~~;

[...]

(e) By 1 December 2019, the *Reliability Panel* must review and where necessary amend and publish the *reliability standard and settings guidelines* to apply from the commencement date to take into account the Amending Rule.

5.5 Timing for publication of UFE data

11.112.1 Definitions

For the purposes of this rule 11.112:

Amending Rule means the National Electricity Amendment (Global settlement and Market reconciliation) Rule 2018.

effective date means 6 February 2022 which is the Commencement Date of Schedules 1 to 4 of the Amending Rule.

new clause 2.2.5(a) means clause 2.2.5(a) of the *Rules* and all related definitions in the *Rules* as in force on and from the effective date.

new clause 3.15.5(a) means clause 3.15.5(a) of the *Rules* and all related definitions in the *Rules* as in force on and from the effective date.

~~**new clause 3.15.5(d)** means clause 3.15.5(d) of the *Rules* and all related definitions in the *Rules* as in force on and from the effective date.~~

new clause 3.15.5B(a) means clause 3.15.5B(a) of the *Rules* and all related definitions in the *Rules* as in force on and from the effective date.

new clause 3.15.5B(d) means clause 3.15.5B(d) of the *Rules* and all related definitions in the *Rules* as in force on and from the effective date.

old clause 2.2.5(a) means clause 2.2.5(a) of the *Rules* and all related definitions in the *Rules* as in force immediately before the effective date.

11.112.5 Publication of UFE data by AEMO

(a) ~~By 1 July 2021, *AEMO* must *publish* the information on unaccounted for *energy* amounts required by new clause 3.15.5(d).~~ For each *trading interval* in the period commencing on 1 July 2021 and ending immediately before the effective date, *AEMO* must:

(1) determine the amount of unaccounted for *energy* for each *local area* as if new clause 3.15.5(a) were in effect; and

(2) *publish* the amounts determined under paragraph (1) together with information that enables *Market Customers* to determine the share of each amount that would have been allocated to them if the relevant *trading interval* had occurred after the effective date.

5.6 Assigning non-market unmetered loads to a TNI or VTN

7.16.3 Requirements of the metrology procedure

[...]

(6A) procedures for the inclusion of *non-market unmetered load* in *settlements* including:

(i) the creation of a *NMI* for the *non-market unmetered load*;

(ii) the assignment of each *connection points* relating to *non-market unmetered load* to a ~~single~~ *transmission network connection point* or *virtual transmission node*;

(iii) the methodology for calculating a *load* and *load profile* for *non-market unmetered load*; and

(iv) the provision of the estimated volumes of *non-market unmetered load* to *AEMO* for inclusion in *settlements*;

6. GLOSSARY

5MS	Five-minute settlement
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
GS	Global settlement
IRLF	Intra-regional loss factor
LNSP	Local network service provider
LR	Local retailer
MDP	Metering Data Provider
MLF	Marginal loss factor
MSATS	Metering settlement and transfer solutions
NEM	National electricity market
NER	National Electricity Rules
NEO	National electricity objective
NMI	National metering identifier
TNI	Transmission node identifier
UFE	Unaccounted for energy
VTN	Virtual transmission node