

DECLARED NEM PROJECT – 5MS PROGRAM

FINAL REPORT AND DETERMINATION

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EXECUTIVE SUMMARY

The publication of this Final Report and Determination (Final Report) concludes the Rules consultation process conducted by AEMO to consider a determination as to whether the 5MS Program meets the criteria to be a declared NEM project.

The 5MS Program is the project developed and run by AEMO to implement the Five-Minute Settlement and Global Settlement rule changes.

On 22 July 2019, AEMO published the Notice of First Stage Consultation and the Consultation Paper to consider a determination of the 5MS Program as a declared NEM project. AEMO received three submissions.

Two of the submissions supported a determination of the 5MS Program as a declared NEM project.

The third submission raised matters which AEMO considers is out of scope for this consultation, however will be considered as part of the potential subsequent consultation regarding the fee structure for the recovery of costs of the project, or addressed in AEMO's annual budget and fees publication process. The third submission did ask whether the granting of "Declared NEM Project" allows AEMO to recover costs from market participants from 1 July 2020 or earlier as retailers may be constrained from passing on costs that are not captured with existing Victoria Default Offer or Default Market Offers. If AEMO decides the 5MS Program is a declared NEM project, the start date of a 5MS fee will be considered as part of the subsequent consultation however currently, to align with the start of the Five-Minute Settlement rule change, AEMO does not expect that the start date of a 5MS fee will be before 1 July 2021.

Having considered the submissions, AEMO's draft decision was to determine the 5MS Program meets the criteria to be a declared NEM project.

On 24 September 2019, AEMO published the Notice of Second Stage Consultation and Draft Determination. AEMO received one stage two submission from Red Energy and Lumo Energy.

AEMO's assessment of and responses to the submission are set out in Appendix B.

Considering the submissions and the requirements of the NER, AEMO's final determination is to determine that the 5MS Program meets the criteria to be a declared NEM project.



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1. STAKEHOLDER CONSULTATION PROCESS

As required by the NER, AEMO is consulting on whether to determine the 5MS Program a declared NEM project in accordance with the Rules consultation process in rule 8.9.

The 5MS Program is the project developed and run by AEMO to implement the Five-Minute Settlement and Global Settlement rule changes.

Note that there is a glossary of terms used in this Final Report at Appendix A. References in this paper to 'clause x' is a reference to a clause in the NER.

AEMO's timeline for this consultation is outlined below..

Deliverable	Indicative date
Consultation Paper published	22 July 2019
5MS Program Consultation Forum Presentation	8 August 2019
Submissions due on Consultation Paper	27 August 2019
Draft Report published	24 September 2019 ¹
Submissions due on Draft Report	9 October 2019
Final Report published	20 November 2019

Stakeholders should note that this consultation related only to determining whether the 5MS Program meets the criteria under the NER to be determined to be a declared NEM project. The actual fee structure for recovery of the costs of the project including the start date, the period of recovery and the Registered Participants that will be charged the fees will be determined in a separate consultation.

An indicative timetable on the separate consultation to determine the actual fee structure for recovery of the costs of the project including the Registered Participants that will be charged the fees and the effective date of those fees will be considered shortly.

However, AEMO does not intend commencing the separate consultation in 2019. The timing for the separate consultation will be confirmed by AEMO in early 2020.

2. BACKGROUND

2.1. NER requirements

AEMO recovers the costs of performing its functions from Registered Participants.

Pursuant to clause 2.11.1(a) of the National Electricity Rules (NER), AEMO recovers costs from Registered Participants in accordance with the structure of Participant fees determined by AEMO.

The current Participant fee structure determined by AEMO for electricity markets applies from 1 July 2016 to 30 June 2021.

However, subject to consultation, the NER allows for AEMO to determine a separate fee to recover the costs of specific projects during the term of a Participant fee structure determination (**declared NEM project**).

Pursuant to clause 2.11.1(ba) of the National Electricity Rules (NER), AEMO may determine any of the following projects to be a declared NEM project:

- a) a major reform or development (including an anticipated reform or development) of the market;
- or

¹ AEMO has concludes that it is not desirable or necessary to hold any meetings under clause 8.9(f) of the Rules



- b) a major change (including an anticipated change) to a function, responsibility, obligation or power of AEMO under the Rules; or
- c) a major change (including an anticipated change) to any of the computer software or systems that AEMO uses in the performance of any of its functions, responsibilities, obligations or powers under the Rules.

When AEMO determines a project to be a declared NEM project under clause 2.11.1(ba), it must also determine the start date for recovery and the period or periods over which recovery will occur for the declared NEM project.

AEMO must also determine the structure of an additional Participant fee to be used in the recovery of costs associated with a declared NEM project until the next general determination of all Participant fees is made under clause 2.11.1(a) of the NER.

AEMO has prepared this Final Report to conclude the consultation to determine whether the 5MS Program meets the criteria to be a declared NEM project.

2.2. Context for this consultation

2.2.1. Five-Minute Settlement rule change

On 28 November 2017, the AEMC made a final determination and rule to alter the settlement period for the wholesale electricity spot market from 30 minutes to five minutes, to align with the dispatch period. The commencement of the change is from 1 July 2021.²

The AEMC determined that Five-Minute Settlement would provide a better price signal for investment in fast response technologies, such as batteries, new gas peaking generation, and demand response. The alignment of the operational dispatch and financial settlement periods are expected to lead to more efficient bidding, operational decisions, and investment.

2.2.2. Global Settlement rule change

On 6 December 2018 the AEMC made a final rule that requires a move to a Global Settlement framework for the demand side of the wholesale electricity market.³

The three key reasons why the AEMC has made a final rule to move to a Global Settlement framework are:

- Improved transparency, leading to fewer settlement disputes and lower levels of Unaccounted for Energy (UFE) over time.
- Competition on equal terms.
- Improved risk allocation driving enhanced incentives.

2.2.3. 5MS Program

AEMO has established the 5MS Program in order to coordinate the implementation of changes as a result of the Five-Minute Settlement rule change and the proposed Global Settlement rule change.

The Five-Minute Settlement rule allowed for an implementation period of 3 years and 7 months, such that the rule would commence on 1 July 2021. Implementation of Five-Minute Settlement requires AEMO and NEM participants to make changes prior to the commencement date.

² Information regarding the rule change, including the final determination and rule, is published on the AEMC website at: <https://www.aemc.gov.au/rule-changes/five-minute-settlement>.

³ Information regarding the rule change, including the final determination and rule, is published on the AEMC website at: <https://www.aemc.gov.au/rule-changes/global-settlement-and-market-reconciliation>



These changes include:

- amending the interfaces for the submission of bids and offers to support 5-minute granularity
- amending the systems and interfaces to support 5-minute and 15-minute meter data
- amending the systems and interfaces to perform settlement on a 5-minute basis
- reviewing and where necessary updating procedures.

The AEMC noted in its final determination for the Global Settlement rule change that it was the appropriate time to move to a Global Settlements approach because its implementation could be synchronised with implementation of the five minute settlement rule, which would reduce implementation costs.

As a result AEMO has modified the 5MS Program to integrate the implementation of Global Settlement into the 5MS implementation program. Many systems and processes are impacted by both these changes, so it is more efficient for them to be implemented together.

3. DISCUSSION

3.1. Declared NEM project

Pursuant to clause 2.11.1(ba) of the National Electricity Rules (NER), AEMO may determine any of the following projects to be a declared NEM project:

- a) a major reform or development (including an anticipated reform or development) of the market; or
- b) a major change (including an anticipated change) to a function, responsibility, obligation or power of AEMO under the Rules; or
- c) a major change (including an anticipated change) to any of the computer software or systems that AEMO uses in the performance of any of its functions, responsibilities, obligations or powers under the Rules.

AEMO may determine a project to be a declared NEM project if the project meets any of these criteria.

The NER does not define ‘major reform or development’ or a ‘major change’ for the purpose of clause 2.11.1(ba) of the NER.

This consultation considered whether the 5MS Program would meet any of these criteria to be a declared NEM project, including consideration of the cost of the 5MS Program, the extent of the 5MS Program changes to the Rules, procedures, processes and systems and the impact on AEMO and participants.

As noted above, this consultation did not consider the actual fee structure for recovery of the costs of the project or the Registered Participants that will be charged the fees and the effective date of those fees and therefore, AEMO has not considered matters that are relevant to determining those issues in this paper such as the extent to which the budgeted revenue requirements for AEMO for the 5MS Program involve particular categories of Registered Participant.

3.1.1. A major reform or development (including an anticipated reform or development) of the market.

Since the start of the NEM in 1998, the dispatch process by which generators are scheduled has operated on a 5-minute basis, but the settlement process has operated on a 30-minute basis. The difference in time period was primarily due to historical arrangements prior to market start, including limitations on metering and data communications



The 30 minute settlement arrangements have been in place for nearly two decades. All existing IT systems, metering infrastructure, and financial contracts have been designed with reference to 30 minute settlement. Consequently, there will be significant practical challenges and risks associated with implementing Five-Minute Settlement, non-trivial one-off costs, as well as ongoing costs. While varying in its level of impact, Five-Minute Settlement affects the majority of participants in some way.

The wholesale market is currently settled through the settlement-by-difference methodology, which has been in place since the start of the NEM in 1998. This arrangement allowed the market to commence and operate without the need for an expensive and impractical upgrade (at the time) to metering of all customers. However, it entrenches different treatment of retailers: those that were incumbent at the start of the market (referred to as Local Retailers) and those retailers that have subsequently entered the market. Since market start there have been significant changes in metering, with the roll-out of smart meters and advances in communication technology. There are also a significant number of customers that have changed retailers, and the concept of the Local Retailer is no longer necessary in many jurisdictions.

Global Settlement is an alternative methodology to settlement-by-difference, in which there is no need for a Local Retailer. Effectively, this means all retailers are settled in the same way.

The main impact of Global Settlement will be on Market Customers (electricity retailers), Meter Data Providers, Distribution Businesses and AEMO.

AEMO has identified around 70 procedures that need to be updated due to the Five-Minute Settlement and Global Settlement rule changes. Approximately 20 of these will require a formal Rules procedure consultation, however, AEMO intends to consult with participants on all procedure changes.

As well as updating procedures, AEMO is also responsible for implementing the Five-Minute Settlement and Global Settlement rule changes by updating any relevant processes and systems to support market readiness for Five-Minute Settlement and Global Settlement.

Five-Minute Settlement and Global Settlement will require changes to metering, settlement, prudentials, and bidding processes, as well as electricity retail and wholesale market systems.

- Metering
 - Central systems' acceptance of 5-minute metering data from the market.
 - Adjusting some groups of interval meters to deliver data at 5-minute intervals.
 - Controlled Load Profile (CLP) and Net System Load Profile (NSLP) change from 30-minute to 5-minute.
- Settlement Calculation
 - Profiling algorithms introduced to derive 5-minute energy data.
 - Transactions will need to be calculated for each 5-minute period.
 - Settlement estimation will calculate energy transactions for every 5-minute period.
 - Inter-regional and intra-regional residue will be calculated on a 5-minute basis.
 - A number of non-energy transactions, such as market ancillary services (i.e. FCAS) and compensation recovery, will be completed using 5-minute energy volumes.
- Dispatch and Market Information
 - Daily bidding intervals to increase from 48 to 288. AEMO will create new data structures to receive, use and store 5-minute bids and offers.
 - 30-minute pre-dispatch and PASA processes that use bid information will be provided with 5-minute data.



- Market participant systems will need to be updated to submit and receive confirmations of 5-minute bid and offer data.
- AEMO will publish 5-minute data

AEMO has published and will continue to publish information about the changes to processes and systems and implementation of these changes.⁴

As the Five-Minute Settlement and Global Settlement rule changes have now been made, AEMO does not have discretion on whether or not to implement Five Minute Settlement and Global Settlement, nor do market participants have the ability to opt out of Five Minute Settlement or Global Settlement.

Five-Minute Settlement and Global Settlement also have a significant impact on Participants, and in particular Market Customers (including retailers), Market Generators, and metering service providers. During consultation on the Five-Minute Settlement rule change, submissions indicated the total cost to Participants over 15 years from implementing Five-Minute Settlement was \$250 million, including system change costs of \$150 million⁵.

Final decision

AEMO considers that the 5MS Program is a major reform or development of the NEM for the following reasons:

- 30 minute settlement and global settlement have been fundamental parts of the design of the market since the introduction of the NEM.
- The 5MS Program requires significant changes to metering, settlement, prudentials, and bidding processes, as well as electricity retail and wholesale market systems.
- The 5MS Program also requires significant changes to the Rules, procedures and system changes impacting both AEMO and participants.
- The 5MS program will have a significant impact on Participants, and in particular Market Customers (including retailers), Market Generators, and metering service providers, including total cost to Participants over 15 years from implementing Five-Minute Settlement expected to be \$250 million, including system change costs of \$150 million.

3.1.2. A major change (including an anticipated change) to a function, responsibility, obligation or power of AEMO under the Rules.

AEMO is responsible for operating and administering the NEM wholesale exchange including balancing instantaneous supply and demand through a central dispatch algorithm that is run for every dispatch interval, ancillary service markets that correct for deviations within dispatch intervals, and settlement in the NEM to make sure market generators are paid for the energy they provide, and retailers pay for the energy their customers use.

The general function of AEMO to operate and administer the NEM wholesale exchange will not change as a result of the Five-Minute Settlement and Global Settlement rule changes and the dispatch intervals on

⁴ <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Program-Information-and-Fact-Sheets>

⁵ AEMC Rule Determination, Five-Minute Settlement, p. 125, <https://www.aemc.gov.au/sites/default/files/content/97d09813-a07c-49c3-9c55-288baf8936af/ERC0201-Five-Minute-Settlement-Final-Determination.PDF>



which AEMO balances supply and demand are already 5 minute intervals, therefore dispatch intervals will not change as a result of the Five-Minute Settlement rule change.

However, the intervals on which AEMO settles the wholesale exchange will change from 30 minute intervals to 5 minute intervals, and as a result, AEMO's functions, responsibilities, obligations and powers will change to the extent they relate to trading intervals changing from 30 minute to 5 minute intervals.

The 5MS Program involves changes to numerous AEMO procedures, processes and systems to reflect the changes to AEMO's functions, responsibilities, obligations and powers only to the extent they relate to trading intervals changing from 30 minute to 5 minute intervals.

Final decision

AEMO considers that the 5MS Program is not a major change to AEMO's function, responsibility, obligation and power under the NER or the following reasons:

- AEMO's function under the National Electricity Law is to operate and administer the wholesale exchange and, although the basis on which the wholesale exchange is settled will change as a result of the 5MS Program, the function of operating and administering the wholesale exchange as conferred on AEMO under the NEL will not change as a result of the 5MS Program.

3.1.3. A major change (including an anticipated change) to any of the computer software or systems that AEMO uses in the performance of any of its functions, responsibilities, obligations or powers under the Rules.

A large number of AEMO systems will be impacted by the 5MS Program to implement the functional changes as a result of the Five-Minute Settlement rule change and Global Settlement rule change.

As part of the 5MS Program, AEMO has published a 5MS Systems High-Level Impact Assessment of the changes required to AEMO market facing systems to support the five-minute and Global Settlement rule changes.⁶ This is a ~60 page document developed in conjunction with the 5MS Systems Working Group and sets out the changes required to AEMO's systems and the consequent impacts.

The core systems impacted are:

- Electricity Market Management System (EMMS).
- Market Settlement and Transfer Solution (MSATS).

The system and software applications are complex. The modifications required by the 5MS rule change to accommodate the trading interval change are extensive and the demands on IT technology and infrastructure associated with the increased metering volumes are significant. Further modifications are required to accommodate the Global Settlement and associated Unaccounted For Energy changes.

As noted above, AEMO has published and will continue to publish information about the changes to processes and systems and implementation of these changes.⁷

AEMO has established a significant program to undertake the 5MS Program changes. AEMO has estimated that it will incur a cost of approximately \$121 million over ten years as part of implementing and operating Five-Minute Settlement and Global Settlement. These costs comprise the following:

- upfront costs associated with building, testing and implementing the required system changes.
- upfront costs associated with coordinating the industry transition, including facilitation of industry testing and market trials.

⁶ <https://www.aemo.com.au/-/media/Files/Electricity/NEM/5MS/Systems-Workstream/5MS-Systems-External-HLIA.pdf>

⁷ <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Program-Information-and-Fact-Sheets>



- upfront costs associated with identifying and consulting on the required changes to the procedures.
- incremental costs associated with the ongoing operation of the impacted systems.
- costs of servicing the financing required to fund the implementation.

Final decision

AEMO considers that the 5MS Program is a major change to the computer software or systems that AEMO uses in the performance of AEMO's functions, responsibilities, obligations and powers under the NER for the following reasons:

- A large number of AEMO systems will be impacted by the 5MS Program to implement the functional changes as a result of the Five-Minute Settlement rule change and Global Settlement rule change, including EMMS and MSATs and the changes are complex and extensive and a substantial part of the estimated costs to implement and operate the 5MS Program are related to changes to computer software and systems.

4. SUBMISSIONS

AEMO received one submission for the second stage of this consultation.

The submission supported the determination that the 5MS Program meets the criteria to be a declared NEM Project. The submission further raised matters which AEMO considers is out of scope for this consultation, however will be considered as part of the potential subsequent consultation regarding the fee structure for the recovery of costs of the project.

AEMO's assessment of and responses to the submission are set out in Appendix B.

5. FINAL DETERMINATION

Having considered the matters raised in submissions and the requirements of the NER, AEMO's final decision is to determine that the 5MS Program meets the criteria in the NER to be a declared NEM project pursuant to clause 2.11.1(ba)(1) and clause 2.11.1(ba)(3) of the NER.

Stakeholders should note that this consultation relates only to determining whether the 5MS Program meets the criteria in the NER to be a declared NEM project. The actual fee structure for recovery of the costs of the project including the start date, the period of recovery and the Registered Participants that will be charged the fees will be determined in a separate consultation.

AEMO does not intend commencing the separate consultation in 2019. The timing for the separate consultation will be confirmed by AEMO in early 2020.



APPENDIX A - GLOSSARY

Term or acronym	Meaning
5MS Program	The project developed and run by AEMO to implement the Five-Minute Settlement and Global Settlement rule changes
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
NER	National Electricity Rules
EMMS	Electricity Market Management System; software, hardware, network and related processes to implement the wholesale energy market



APPENDIX B - APPENDIX B. SUMMARY OF SUBMISSIONS AND AEMO RESPONSES

No.	Consulted person	Issue	AEMO response
1.	Red Energy and Lumo	Red and Lumo mentioned that in the draft determination, AEMO states that recovery for the 5MS and global settlement program will not occur until the commencement of the first rule applies to the market on 1 July 2021. Red and Lumo support the recovery timeline and that the program is considered a NEM Declared Project.	Noted. AEMO clarifies that the draft determination did not decide on the start date of a 5MS fee, and the start date for the 5MS fee will be considered as part of the subsequent consultation. However currently, to align with the start of the Five-Minute Settlement rule change, AEMO does not expect that the start date of a 5MS fee will be before 1 July 2021.
2.	Red Energy and Lumo	Red and Lumo continue to question the value that this project is delivering to consumers. At the 5MS Executive Forum on 20 February 2019, AEMO advised participants that the total cost that was required to be recovered was \$121m, recovered from electricity customers at approximately \$1.10/year over 10 years. This is also noted in the AEMO draft determination. One of the key determinants of the establishment of this program as a NEM Declared Project is that the beneficiaries of this project will be subject to a proportion of the fees associated. AEMO should ensure that recovery of the 5MS program costs are recovered from the parties that have publicly argued they would benefit from the reform. We look forward to working with AEMO on the next phase of this consultation that deals with cost recovery for 5MS.	Noted. This matter is out of scope for this consultation, however will be considered as part of the potential subsequent consultation regarding the fee structure for the recovery of costs of the project.
3.	Red Energy and Lumo	Consistent with the views submitted to the initial consultation, Red and Lumo echo the requests for transparency in the costs borne by AEMO associated with the implementation of this program. This will ensure that participants are comfortable that the costs associated are only resulting from the 5MS and global settlement program, and that AEMO are acting in accordance with the National Electricity Objective and focused on the long term interests of consumers.	Noted. This matter is out of scope for this consultation, however will be considered as part of the potential subsequent consultation regarding the fee structure for the recovery of costs of the project.