

5MS Systems High-Level Impact Assessment

Program	5-minute Settlement
Project	Systems Workstream
Version	0.8
Status	In progress
Last Saved	17 May 2019

1. Document control

Release History

Version	Date	Notes
0.1	13-Nov-18	Initial draft.
0.2	30-Nov-18	Added further background on the 5-minute and Global Settlement rule changes.
0.3	06-Dec-18	Updated based on: 27 th Nov - Dispatch Focus Group <ul style="list-style-type: none"> - Added Rebid Explanation changes 6 th Dec - Global Settlement final determination <ul style="list-style-type: none"> - Confirmed UFE publication as 1st July 2021 - Changed GS settlement date to 6th Feb 2022 (start of a billing week)
0.4	10-Dec-18	Alignment to Procedures HLIA for Retail
0.5	14-Dec-18	Added Dispatch content on: <ul style="list-style-type: none"> - Administered pricing - Suspension pricing - Negative Residue management
0.6	26-Feb-19	General <ul style="list-style-type: none"> - Updated consultation/discussion status - Renamed Sandbox to 5MS Staging Retail - Interval meter data MDMF support retirement now 1 st July 2021 Dispatch – Fixed load treatment changed
0.7	8-April-19	Updates to Settlements: <ul style="list-style-type: none"> - Added high-level settlement information Updates to Retail: <ul style="list-style-type: none"> - Transition - Meter Data Interfaces - B2B and B2M Interfaces - Inclusion of new RM reports Updates to Dispatch and Operational Systems: <ul style="list-style-type: none"> - Removed TBCs where a position has been determined - Updated 5-minute pre-dispatch (P5) to be clear FSIP and Daily Energy Constraints will be included regardless of the decision on extending P5
0.8	14-May-19	Updates to Retail: <ul style="list-style-type: none"> - Updated Global Settlements - Updated Impact to TUoS NMIs - Updated B2M Communications - B2M via API - Max File size and transaction limit added

Version	Date	Notes
		<ul style="list-style-type: none">- Updated MDM Release 1 Go-Live date from November 2020 to December 2020 <p>Updates to Dispatch and Operations</p> <ul style="list-style-type: none">- Corrected release date in section 4.2 - Transition

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2. Introduction

2.1 Document Purpose

This document provides a high-level assessment of the changes required to AEMO market facing systems to support the 5-minute and global settlement rule changes.

New versions of this document are expected to be released as decisions are made from AEMO's Industry Engagement.

2.2 Background

2.2.1 5-Minute Settlement Rule change

Current NEM

- The NEM dispatch process determines an energy price every 5 minutes, however the energy market is only settled based on 30-minute energy volumes
- To accommodate the different timeframes, the "spot" price in the NEM is the average of 6 dispatch prices.

Changes

- The AEMC has determined that from 1 July 2021, the NEM will be directly settled using 5-minute prices (i.e. the current 5-minute dispatch price will become the trading or "spot" price)
- To support this, metering will progressively change to 5-minute:
 - All type 1-3, type 7, and some type 4 connection points must be 5-minute prior to go-live
 - New meters installed after 1 December 2018 must be 5-minute capable
- Bids/offers are also changing scheduled participants must submit bids/offers with 5-minute granularity

Expected Benefits

- Removes the anomaly between five-minute dispatch and 30-minute settlement, which has been identified as a contributing factor to disorderly bidding.
- Provides a clearer price signal for investment in fast response technology, including batteries and demand response.

More information on the 5MS rule change can be found [here](#).

2.2.2 Global Settlement Rule Change

Current NEM

- The current settlement approach (referred to as settlement by difference) requires AEMO to measure the electricity supplied in a distribution area and bill that quantity to the local retailer (LR) less the loss-adjusted metered electricity consumed by customers of other retailers.
- This means the LR bears the risks and costs for unaccounted for energy (UFE).

Changes

- Settlement will be based on provided metering data plus a share of the UFE for a distribution area, which is proportionally allocated across all retailers who have customers in that area.
- Final rule change to be made 6 Dec 2018 with industry go live of:
 - UFE publication - 1 July 2021
 - Global Settlement – 6 February 2022

Expected Benefits

- Improved transparency, leading to fewer settlement disputes between retailers and lower levels of UFE over time
- Competition on equal terms
- Improved risk allocation driving enhanced incentives

More information on the GS rule change can be found [here](#).

3. Retail Systems

3.1 Services Impacted

3.1.1 Metering

Five-minute Settlement

- AEMO systems will need to accept 5 and 15-minute interval meter data from MDPs and continue to be able to accept 30-minute interval and basic meter data.

Global Settlement

- All Tier 1 basic meter data is provided to AEMO by 1 July 2021 to enable calculation of unaccounted for energy.

3.1.2 Energy Profiling and Allocation

Five-minute Settlement

- Profiling algorithms introduced to derive five-minute energy data from the 30-min, 15-min and basic meter reads.
- Controlled Load Profile (CLP) and Net System Load Profile (NSLP) change from 30-minute to five-minute.

Global Settlement

- Calculation of unaccounted for energy in at least a profile area.
- Allocation of unaccounted for energy will be changed from the local retailer (LR) being responsible, to being proportioned to financially responsible parties (FRMPs) in a profile area.
- NMI's for Non-Contestable Unmetered Loads will need to be created in MSATS using the new NMI Classification of "NCONUML"
- 5 minute data will need to be provided by the Local DNSP

3.2 Transition

Key Dates

Item	Date	Description
New and replacement meters must be 5-minute capable (except Type 4A)	1 Dec 2018	From this date any installed meters must be capable of producing 5-minute meter reads, but do not need to be providing 5-minute data Doesn't apply to Type 4A meters
Type 4A new and replacement meters must be 5-minute capable	1 Dec 2019	From this date any installed Type 4A meters must be capable of producing 5-minute meter reads, but do not need to be providing 5-minute data
AEMO supports MDFF	1 Dec 2020	AEMO begins to accept MDFF files Where MDFF is now being set AEMO begins accepting CNDS Register Reads

Item	Date	Description
		<p>AEMO systems can accept basic, 5/15/30-minute metering submitted via MDFF</p> <p>AEMO aggregates and 5/15-minute meter data to 30-minute for settlement</p> <p>It should be noted that the date of 1 Dec 2020 is subject to change based on the outcome of consultation around 5MS Readiness</p>
5MS Rule Commencement	1 July 2021	<p>For 1 July 2021 :</p> <p>MDPs must provide Type 1, 2, 3, 4, 7 meter data at 5-minute resolution</p> <p>AEMO will profile received 15 and 30 minute reads to 5 minute resolution for Settlement</p> <p>AEMO will continue to accept MDMF consumption reads All Tier 1 basic reads provided to AEMO - required to determine UFE</p> <p>AEMO publishes UFE factors</p>
MDMF interval meter data support retired	1 July 2021	<p>AEMO no longer accepts interval meter data in MDMF format</p> <p>Interval meter data must be provided in MDFF format</p>
CNDS Net Datastreams no longer supported	1 July 2021	AEMO will stop accepting Change Requests for CNDS Net Datastreams
Global Settlement starts	6 Feb 2022	<p>AEMO will settle settlement days from 6 Feb 2022 using global settlement</p> <p>Settlement days prior to 6 Feb 2022 will continue to be settled using settlement by difference</p>
AEMO Annual Report on UFE	1 Mar 2022	AEMO provides the first report on UFE trends and analysis
New and replaced meters providing 5-minute meter data	1 Dec 2022	All new and replaced meters installed from 1 December 2018, or 1 December 2019 for Type 4A meters, are providing 5-minute meter data
MDMF basic meter support retired	TBC	AEMO no longer accepts basic meter data in MDMF format

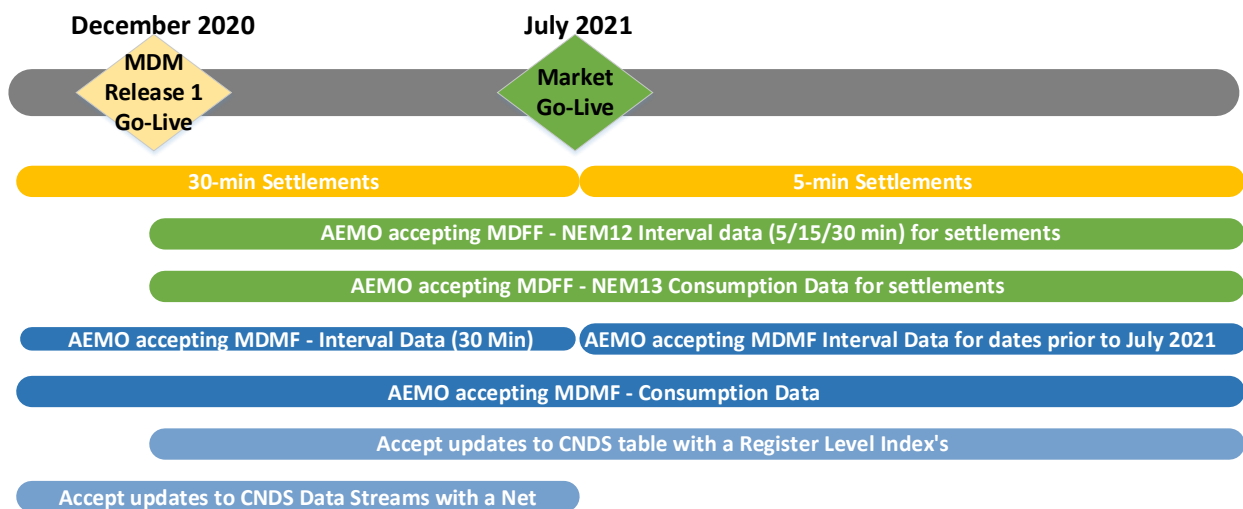


Figure 1. Transition summary

Summary

- Shift to MDFF to unify interval meter data to a single format across the industry
- B2B APIs and FTP interfaces can be used to deliver meter data (in MDFF) to AEMO
- MDMF for basic meter data continues to be supported for an extended period
- AEMO accepts basic, 5/15/30-minute reads in MDFF from 1 December 2020^{1*} to enable a 6-month transition window to 5-minute meter data for industry
- From 1 December 2020* AEMO aggregates any 5/15-minute meter data to 30-minutes
- Energy allocation and profiling shifts to 5-minutes from 1 July 2021
- UFE factors are published from 1 July 2021
- The application of UFE from 6 Feb 2022 will be done in AEMO's wholesale settlement systems

3.3 Meter Data Format

Status	Industry Impact
Consultation Complete	High for MDPs Medium for Retailers, LNSPs and Distributors

3.3.1 Current

Summary

- 30-minute interval and basic meter read data is provided in MDMF to AEMO by MDPs
- AEMO provides message acceptance (MESSAGE ACKNOWLEDGEMENTs) and 2nd level data validation (Meter Data Response) following the B2M process
- MDPs provide 15 and 30-minute meter read data in MDFF to Retailers, LNSPs and Distributors, following the B2B procedures
- Retailers etc... provide PMD and VMD transactions as part of the validation of meter data received in MDFF, following the B2B procedures

3.3.2 5-minute Settlement

Summary

- 5 and 15-minute meter data must be provided as MDFF (NEM12)
- 30-minute meter data can be provided as MDFF (NEM12) or MDMF, until MDMF is retired
- Basic meter data can be provided as MDFF (NEM13) or MDMF
- 30-minute interval meter data MDMF support will be retired after a 1st of July 2021

¹ 1 Dec 2020 is subject to change based on the outcome of consultation for SMS Readiness

- Basic meter data MDMF support may be retired after a transition period

MDFF

- The file format will support 5-minute meter data, with cosmetic changes to the specification:
 - i. NEM12 format will be used for interval meter data
 - ii. Record 200 (IntervalLength field) is used to specify the interval length
 - iii. NEM13 format will be used for basic meter data
- Must be used by MDPs to provide AEMO with 5, 15-minute interval meter data from the 1st of July 2021.
- Must be used by MDPs to provide AEMO with 30-minute interval meter data when MDMF is retired for interval metering data from the 1st of July 2021.
- May be used by MDPs to provide basic meter data to AEMO as an alternative to MDMF.
- The provided meter data is at the register level, i.e. the E, B, K, Q streams, aggregated data streams are not supported i.e. Record 200.NMISuffix cannot be 'N*'

MDMF

- The MDMF format will not change.
- The MDMF validations will not change.
- May be used by MDPs to provide 30-minute interval data to AEMO until MDMF is retired from the 1st of July 2021
- May continue be used by MDPs to provide basic meter data to AEMO.

Participant Impact

1. Prior to 1st Dec 2020 MDPs must provide meter data in MDMF format to AEMO. MDPs must perform any required aggregations to 30-minutes for interval meter data.
2. From 1st Dec 2020 MDPs can start providing meter data to AEMO in MDFF format. MDPs also no longer need to aggregate meter data to 30-minutes, AEMO will perform the required aggregation.
3. MDPs will need to provide AEMO with 5-minute metering in MDFF format by:
 - 1st Jul 2021 – for Type 1, 2, 3 and 7 meters
 - 1st Jul 2021 – for Type 4 (transmission and connection point) meters
 - 1st Dec 2022 – for all new and replacement meter installations (except Type 4A) installed from 1 Dec 2018
 - 1st Dec 2022 – for Type 4A meters installed from 1 December 2019
4. By 1st July 2021 MDP's will need to provide all interval meter data in MDFF, MDMF will no longer be supported for interval meter data.

3.3.3 Global Settlement

Summary

- The additional Tier 1 basic reads required as part of global settlement must be provided in either MDMF or MDFF by 1st July 2021

- Wholesale NMIs, and child NMIs of embedded networks will continue to be settled by difference
- Cross border feeds will need to be identified and metered so they can be accounted for in UFE calculations
- Profile shapes for non-contestable unmetered loads need to be developed by LNSPs

Participant Impact

1. Change to AEMO reconciliation reports, with the publication and allocation of UFE
2. Requirement to install meter at all cross-border supply points
3. New NMI Classification values will be available when establishing and updating NMI standing data

3.4 Standing Data Changes

Status	Industry Impact
Pre-consultation	<p>Medium for MDPs and LNSPs</p> <p>Low for other Market Participants</p>

3.4.1 Current

Summary

- Data streams used for settlement (basic and interval) are registered in the CNDS table, and it is the MDPs responsibility to maintain this standing data
- The CRI table holds the details of all registers associated with a meter. It is the MP's responsibility to maintain this standing data
- There is no registration of a register, or data streams interval length, this is provided in record 200 of the MDFF
- Victorian wholesale NMIs currently identified as part of VIC TUoS billing have B and C registers with a datastreamtype of 1, E and F with datastreamtype of 2, K and L with datastreamtype of 3, Q and R with a datastreamtype of 4

3.4.2 5-minute Settlement

Summary

- AEMO will determine the sign of the reads in MDFF using the first character of NMI Suffix
- AEMO will accept all the Unit of Measures (UOMs) as per the MDFF. AEMO will transform to KWh and store to 4 decimal places
- If K and Q data streams are registered in CNDS, AEMO will accept these however they will not be used for settlements
- Only suffixes registered in CNDS will be used in settlements

Participant Impact

1. MDPs should change NMI standing data to transition from the N data stream, to the E and B data streams, to positively identify registers used for settlement
2. MDPs should ensure the accuracy of the MDFF content, especially the meta-data such as Record 200, as this will now be a key input for settlement
3. Victorian wholesale NMIs currently identified as part of VIC TUoS billing will need to have their register level data stream identifier updated to "P" on the 1st of Dec 2020
4. Victorian wholesale NMIs currently identified as part of VIC TUoS billing will need to have the E and B registers updated to "I" on the 1st of July 2021

3.4.3 Global Settlement

Summary

- Local Retailer (LR) code will be updated to "GLOPOOL" in MSATS at Global Settlement go live on all distributor connected NMI's except for Embedded Network Child NMI's, participants will need to update their systems to maintain consistency
- FRMP code will be updated to "GLOPOOL" in MSATS at Global Settlement go live on distributor feed in NMI's including distribution to distribution NMI's, participants will need to update their systems to maintain consistency
- Registration of Non-market unmetered load with a NMI Classification Code of NCONUML
- Changes to Existing NMI Classification Codes to assist settlement calculation and reconciliation

Participant Impact

1. All participants should update the LR to 'GLOPOOL' for distributor connected NMI's (Not embedded networks or wholesale)
2. All participants should update the FRMP to 'GLOPOOL' for transmission to distribution or distributor to distributor NMI's (TNI's or Cross Boundary NMI's)
3. All participants should register all Non-contestable unmetered loads in MSATS and provide 5-minute interval data
4. Local Retailers (LRs) will no longer receive Wholesale NMI data

3.5 Meter Data Interfaces

Status	Industry Impact
In Discussion	High for MDPs

3.5.1 Current

Summary

- The MTRD supports two distinct purposes:
 - > B2B MTRD Meter Data Notifications – For Retail Billing
 - > B2M MTRD Meter Data Notifications – For Transmission Use of System (TUoS) billing
- B2M Interval and Basic Meter read data is delivered using the MDMT transaction group
 - > MDPs deliver MDMT transaction via B2M using the FTP, or the MSATS web browser
 - > The MDMF Message Exchange pattern is:
 1. MDP sends MDMF message with 'NEMMCO' as TO
 2. AEMO performs 1st level validation of message, aseXML schema, MDMF (field format and valuations)
 3. AEMO sends Message and Transaction Acknowledgment as a single .ack
 4. AEMO performs 2nd level validation of standing data and replacement reads
 5. AEMO sends a Meter Data Response message to the MDP
 6. MDP to sends Message Acknowledgment for the Meter Data Response
 7. MDP to sends Transaction Acknowledgment for the Meter Data Response
 8. AEMO to sends Message Acknowledgment for the transaction acknowledgment
 - 9-10. For reads that have been rejected due to an "Error" event the MDP resends the corrected reads

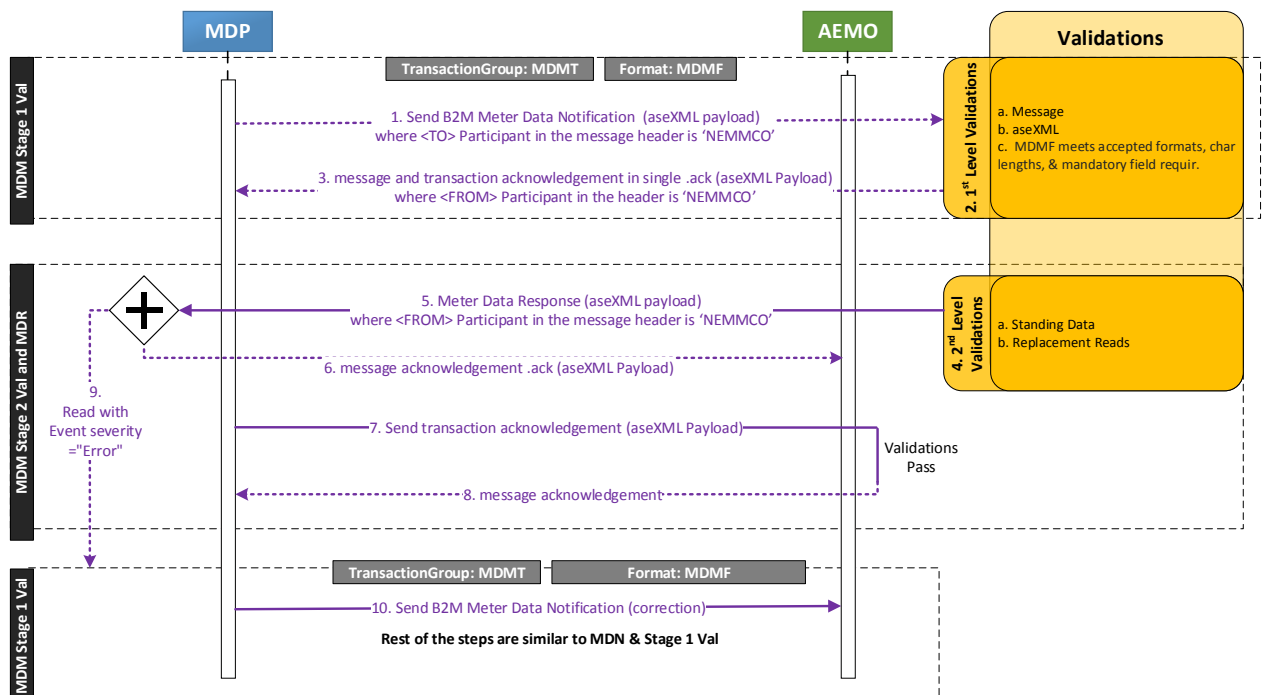


Figure 2. As Is MDMF Message Exchange pattern

3.5.2 5-minute Settlement

Summary

- The MTRD shall support three distinct purposes:
 - >B2B MTRD Meter Data Notifications – For Retail Billing
 - >B2M MTRD Meter Data Notifications – For Transmission Use of System (TUoS) billing
 - >B2M MTRD Meter Data Notifications – For Market Settlements
- B2M Interval and Basic Meter read data can be delivered using the MTRD transaction group
 - >MDPs deliver MTRD via B2M using the FTP, or the MSATS web browser
 - >MDPs can also use APIs to deliver MTRD
 - >AEMO will align where possible to the B2B processes
 - >MDPs will deliver the same MDFF they send to LNSPs and Retailers to NEMMCO as if AEMO is a B2B recipient using the MTRD transaction group
 - >AEMO will not be a B2B participant, and as such will not be governed by the B2B procedures
 - >AEMO will not send any VMD or PMD transactions
 - >AEMO to provide MDFF validations in the Transaction Acknowledgement based using MSATS error codes
 - >Message patterns for MTRD B2M Market Settlements shall mirror that described in the B2B Procedure Technical Delivery Specification to allow participants to maintain existing system
 - >The MDMF Message Exchange pattern is:
 1. MDP sends MTRD message with 'NEMMCO' as To
 2. AEMO performs 1st level validation of message & aseXML schema
 3. AEMO sends Hub Acknowledgment
 4. AEMO sends Message Acknowledgment with validation results
 5. AEMO performs 2nd level validation of MDFF & replacement reads
 6. AEMO sends Transaction Acknowledgment with validation results
 7. MDP to send Message Acknowledgment
 - 8 – 14. After the fact missing data reporting shall allow MDPs to identify missing reads or incomplete standing data
 - 15-16. For reads that have been rejected due to an "Error" event the MDP resends the corrected reads

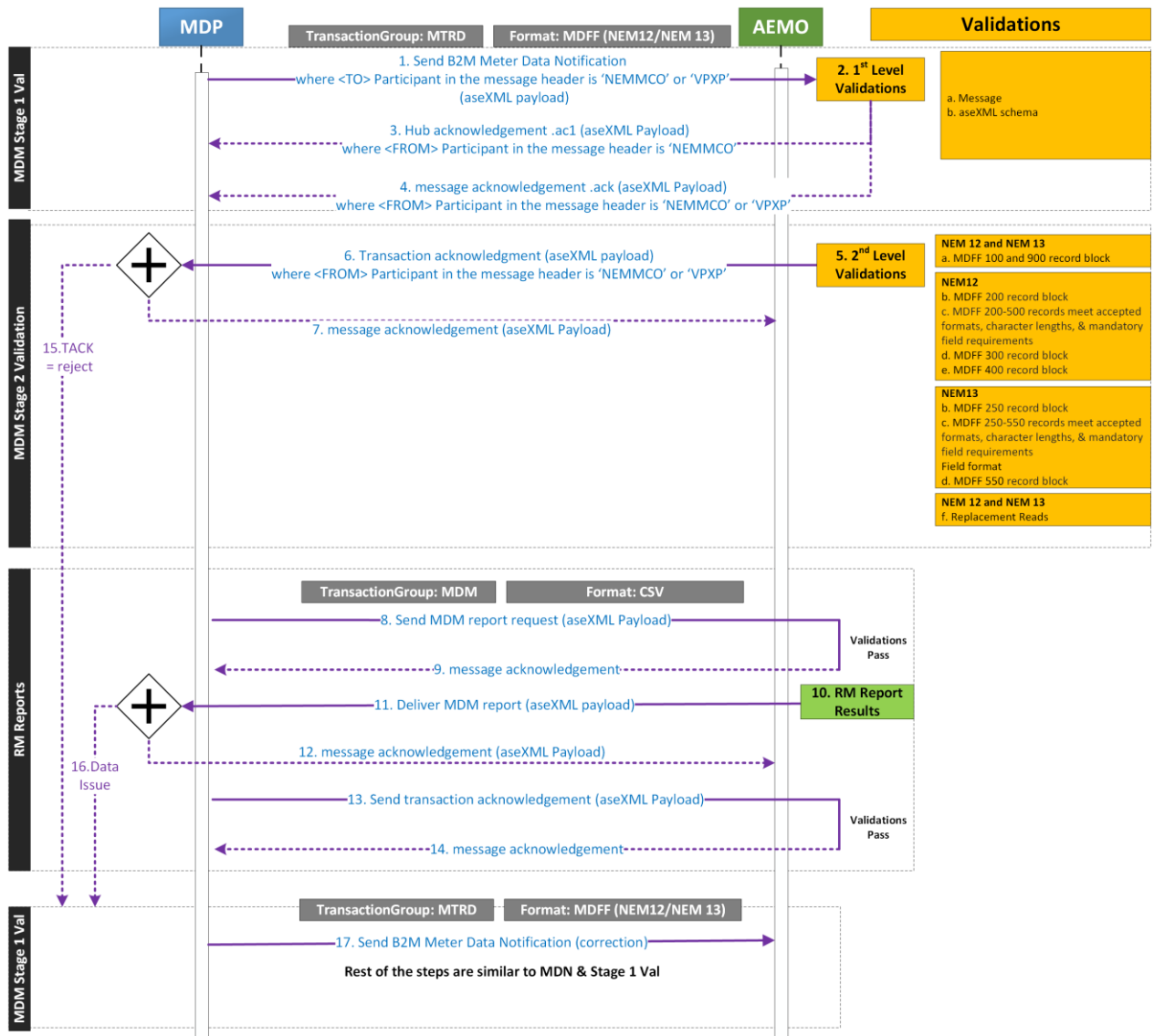


Figure 3. To Be MTRD Message Exchange pattern

- B2M Basic Meter read data can continue to be delivered using the MDMT transaction group
 - > MDPs deliver MDMT via B2M using the FTP, or the MSATS web browser
 - > MDPs can also use APIs to deliver MDMT
- MDPs will use the B2B aseXML schema when they use MDFF, and the B2M aseXML schema when they use MDMF

Participant Impact

5. MDPs may choose to use the new web APIs to deliver basic meter data in MDFF or MDMF, and interval meter data in MDFF
6. MDPs will need to change their systems to be able to process the returned Transaction Acknowledgement from AEMO for meter data sent via MDFF and address any validation errors. The Transaction Acknowledgment is used instead of AEMO's existing meter data response (MDR)
7. MDPs can send MDFF to AEMO without having to first migrate interval net data streams ('Nx' suffixes) to a register level (i.e. 'Ex' and 'Bx' suffixes)

- MDPs migration of CNDS data can occur anytime after the MDP has switch to the MDFF file format
 - Prior to sending MDFF, MDPs must however ensure MDMDataStreamIdentifier, NMIConfiguration and NMISuffix is accurate
 - When a MDP shutdowns down the net 'Nx' data stream and populates the 'Ex' and 'Bx' they can also move from defining 'Nx' to 'Ex' and 'Bx' in the NEM12 MDMDatastreamidentifier field
8. Effort to raise CRs to change net to register level in CNDS (at any point after the move to MDFF) and supply new ADL
 9. It is possible that MDPs may need to support MDFF for some NMIs, and MDMF for others.
 10. The MSATS Web Browser will allow MDFF meter data file to be uploaded via the 'B2B Browser' > 'Upload File' screen for the purpose of Market Settlements
 11. Where an MDP resends a MTRD Meter Data Notification transaction to another Participant in response to a VMD or PMD transaction, when the metering data has change, the MDP msut also resends the correcting MTRD Meter Data Notification to the NEMMCO participant

3.5.3 Global Settlement

Summary

- All Tier 1 basic reads must be supplied to AEMO from 1st July 2021
- Registration of non-contestable unmetered load with a Meter Installation Type Code of NCONUML
- Non-contestable unmetered load reads must be supplied to AEMO in MDFF

Participant Impact

1. Register non-contestable unmetered load with a Meter Installation Type Code of NCONUML
2. Send non-contestable unmetered load reads to the NEMMCO Participant ID in MDFF
3. Send non-contestable unmetered load reads to required B2B Participant roles

3.6 B2B and B2M Interfaces

Status	Industry Impact
In Discussion	Medium

3.6.1 Current

Summary

- B2B and B2M messages are limited to a 1 MB raw message / file size (i.e. uncompressed)
- B2M transactions MDMT, CR and NMID are only supported by FTP or a limited set of Web Services (<https://msats.prod.nemnet.net.au/msats/ws/>)

3.6.2 5-minute Settlement

Summary

- Maximum File Size will be set to 10MB uncompressed for MTRD and MDMT transactions
- Maximum Transaction volume will be set to 1000 transactions for MTRD and MDMT transactions
- Other B2M and B2B transaction groups will remain as is at 1MB
- AEMO to remove limits from Procedural documentation so new limits can be adjusted without extensive consultation
- Likely need to revise the stop file limits with MDPs managing meter reads via the B2B process

Participant Impact

1. Participants will need to validate their own messaging systems can handle and process the larger messages
2. Participants will need to implement file size and transaction volume limits in their Market Systems
3. Participants should take part in industry testing (using AEMO's 5MS Staging and pre-production systems) to validate the processing with AEMO and other parties
4. Where a 10MB maximum file size is identified as an issue that cannot be resolved before 1 July 2021, a bilateral agreement on the acceptable file size between the effected parties should be sort

3.6.3 Global Settlement

Summary

- There is no expected B2B or B2M interface changes due to Global Settlements

Participant Impact

1. None identified

3.6.4 B2M Communications - B2M via API

Summary

- AEMO will continue to service the existing B2M Web Services (<https://msats.prod.nemnet.net.au/msats/ws/>). These Web Services shall remain accessible via MarketNET and will also be extended for access via the Internet (VPN)
- AEMO will deploy a new set of APIs to support the submission of Inbox / inbound CATS, NMID and MDMT B2M messages and acknowledgments to AEMO by Participants
- AEMO will deploy a new set of APIs to support the delivery of Outbox / outbound CATS, NMID and MDMT B2M messages and acknowledgments to Participants by AEMO via:
 - >an Internet (VPN) facing Push API
 - >an Internet (VPN) facing Pull API

- AEMO will deploy a new set of APIs to notify Participants of B2M Stopfile and badack events
- The new APIs shall be available to Participants through the Internet (VPN)
- The API Inbox submission and Outbox delivery protocols are independent allowing for flexible deployments by Participants. For example, a Participant shall be able to submit a CATS Change Request transaction via FTP but elect to receive the CATS Change Request Response via API
- The MSATS Browser 'Participant' > 'Participant Schema' screen shall be redesigned to include a feature that allows a Participant to choose how AEMO delivers Outbox messages to them. This feature shall be defaulted to 'FTP' but will allow Participants to select 'Pull API', and where they have registered their API endpoint with AEMO, 'Push API'
- A new MSATS Browser 'B2M Hub Queue' screen shall be developed to allow Participants to manage queued B2M Outbound messages
- API Message patterns shall be modelled on SMP Asynchronous Push-Push and Push-Pull patterns developed for Power of Choice

Participant Impact

- Participants will need to determine which protocol they will use to interact with AEMO
- Participants wishing to utilise Push APIs will need to register their API endpoint with AEMO through the AEMO SupportHub

3.7 Energy Profiling and Aggregation

Status	Industry Impact
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Pre-consultation	Medium
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3.7.1 Current

Summary

- Basic meter data is profiled to 30-minute resolution

3.7.2 5-minute Settlement

Summary

- For settlement days from 1 July 2021 AEMO will profile:
 - Basic meter data to 5-minute resolution (using the NSLP or CLP)
 - 15/30-minute meter data to 5-minute resolution
- AEMO will aggregate any 5/15-minute meter data received for settlement days prior to 1st July 2021 to 30-minute resolution

Participant Impact

1. No expected direct systems impact from this process
2. Retailers and Distribution companies may need to change reconciliation processes or checks – due to the change in profiling methodology

3. There will be changes to the profile shapes published in <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Metering/Load-Profiles>

3.7.3 Global Settlement

Summary

- Tier 1 Basic will also be profiled
- Estimations will apply to T1 Basic as well
- L3 applicable to T1 Basic as well
- Readings for non-contestable unmetered loads to be provided
- Cross boundary metering is the responsibility of LNSP's

Participant Impact

1. There is an increased incentive to ensure unmetered load is accurately captured and reported to AEMO
2. Unmetered supplies need to be set up in MSATS with Active data-streams
3. LNSP's to ensure the MC's have been appointed for Cross Boundary metering

3.8 Energy Allocation

Status	Industry Impact
Pre-consultation	Medium

3.8.1 Current

Summary

- Energy allocation is done at 30-minute resolution
- Unaccounted-for energy is settled by settlement by difference (left with LR)

3.8.2 5-Minute Settlement

Summary

- Energy allocation will be done at 5-minute resolution
- Allocation will be done using the 'Settlement by difference' approach up until 6th February 2022

Participant Impact

1. L1, L2 and L3 reconciliation reports, for settlement runs from 1 July 2021, will change from 30-minute to 5-minute resolution

3.8.3 Global Settlement

Summary

- Calculation of unaccounted for energy in a profile area. This will be published as UFE Profile in an RM report
- Allocation of unaccounted for energy will be changed from the local retailer (LR) being responsible, to being proportioned to financially responsible parties (FRMPs) in a profile area.
- Non-contestable unmetered loads will be reported and included in the Settlement process

Participant Impact

1. UFE profiles will be published, in a new RM report to participants from the 1st of July 2021
2. UFE allocation will appear on Participant Settlement statements from the 6th of February 2022, and not provided as part of the RM reports
3. Retailers, LNSP and Distribution companies may need to change reconciliation processes or checks due to the change in allocation methodology
4. Retailers will no longer receive meter reads from MDPs for NMIs where the retailer is the LR but not the FRMP, with the exception of embedded networks where the LR (proposed to be named ENLR) will continue to receive meter reads for these connection points.

3.9 MSATS Browser Changes

3.9.1 Current

Participants currently have access to various screens via the MSATS Browser, depending on their role the functions available will differ.

3.9.2 Five-minute Settlement

A number of screens will be required to be rebuilt as they interface with the new MDM solution, including:

- Changes to the 'Settlement Data' screens
- A new 'B2M Hub Queue' screen shall be developed to allow Participants to manage queued B2M Outbound messages
- Change to 'System status' screen to allow Participants to view if the B2M APIs are available for message processing or stopped due to the presence of one or more B2M stop files raised against their Participant ID
- Changes to 'Queue Monitoring' screens to allow Participates to view if a stop file has been placed against their Participants ID and the current daily count of B2M message flow control messages (e.g. count of unacknowledged B2M messages or current count of CR Notifications)
- Changes to the 'Meter Data Enquiry' screen to allow Participants to view interval data at a 30, 15, and 5 minute resolution
- Changes to the 'MDM Reports' screens to reflect post 1 July 2021 available RM reports

- Changes to the 'Participants' > 'Participant Schema' screen to allow Participants to select, by B2M Transaction Group (CATS, NMID and MDMT) what their protocol preferences are for the delivery of Outbox messages. The available options shall be 'FTP', 'API Push', 'API Pull'
- Changes to the 'Transaction Group' drop down on the 'B2B Hub Queue', 'B2B Inbox/Outbox', 'B2B Achieve/Inbox Archive' screens to display Non-Retail Transaction Groups handled by to SMP
- Change to B2B Protocols and Transforms Screen to support Non-Retail Transaction Group protocol preferences
- Redesign and rebuild of the 'B2B FTP Dashboard', 'B2B Participant Status Report', and 'FTP System Status' pages to reflect the availability of API services

3.9.3 Global Settlement

No additional screens have been identified as a result of the Global Settlement changes.

3.10 RM Reports

Status	Industry Impact
Pre-consultation	High

3.10.1 Current

Summary

- RM reports provide several 30-minute meter data reports to be used for reconciliation

3.10.2 5-minute Settlement

Summary

- RM reports covering meter data will be updated to support for 5 and 15-minute meter data in addition to 30-minute meter data
- RM reports covering settlement data will be updated to support for 5-minute interval data in addition to 30-minute interval data
- Separate CSV payloads will be provided in the report response asXML for each interval length.
- AEMO has proposed several infrequently used RM reports are retired
- AEMO may introduce additional RM/PMS reports highlighting unusual or unexpected data combinations (especially around data differences between MDFF/CNDS/CRI)
- All new reports will be pushed to participants

RM Metering Reports

Report	Description
RM11	AEMO will automate this report to be pushed to MDP's prior to the Final Settlement run

Report	Description
RM37	New AEMO report to be pushed to MDP's for Missing Wholesale, Generator and Interconnector Data prior to Prelim Settlement run
RM38	New AEMO report to be pushed to MDP's for Missing Data-stream readings where NEM12 data is sent to AEMO
RM39	New AEMO report to be pushed to MDP's for Mismatch Data for Data-stream Readings are sent to AEMO that does not have the corresponding NMI Standing Data.

RM Reports to Retire

The following RM reports have been proposed for retirement.

Report	Description	Usage
RM7	MDP Data Delivery Report - Reports on Reads delivered by an MDP current as of a specific date and time (trans_startts) for a date range.	20 Execution total, last run 2011 (1), 2005 (3), 2004 (12)
RM8	Lists all profiles created and applied within a specified period.	80 Execution total, last run 2017 (2), 2016 (2), 2015 (1), 2014 (2), 2013 (3), 2012 (3)
RM10	Load Aggregation Error Report - Reports on processing errors (MSATS_Event_Log) in a settlement run.	3 Execution total, last run 2004
RM12	Wholesale Maximum Value Report - Reports on Wholesale (LR = POOL%) meter reads greater than a specified value.	4 Execution total, last run 2006
RM14	MDP Data Version Comparison Report allows the comparison of meter readings loaded on 2 separate date times for a single NMI.	71 Execution total, last run 2014
RM15	Multiple Versions Report is to provide information on the number of versions of metering data that have been supplied to the system by an MDP.	94 Execution total, last run 2017 (2), 2016 (1), then 2014(3)
RM18	Electricity Interval Data Report is to allow AEMO and Participants to retrieve all the metering data for a particular combination of TNI, FRMP, LR, and MDP.	541 Execution total, last run 2017 (10), 2016 (50)
RM19	Aggregated Actual vs Estimate Report - Counts of Actual Reads vs Estimated reads in a settlement run – Interval reads only – By TNI, FRMP, LR, MDP.	15 Execution total, last run 2006 (1), 2004 (2)

3.10.3 Global Settlement

Summary

- Publish UFE factors as an RM report (UFE allocation will be part of EMMS settlements)

RM Reports

Report	Description
RM43	AEMO will publish UFE factors by profile area from 1 July 2021

Participant Impact

- Participants can use the UFE factors for analysis and reconciliation purposes

4. Dispatch and Operational Systems

4.1 Services Impacted

- 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.
- A new bidding JSON format will be introduced replacing the current TXT format
- New web APIs will be introduced to support bid submission and associated functionality. The APIs will be accessible over the internet and MarketNET
- Periods in dispatch and 5-minute pre-dispatch will use the associated 5-minute interval bid inputs
- Periods in 30-minute pre-dispatch (next day and 7-day) will use the last 5-minute bid (the 6th) in a 30-minute interval as it's inputs
- Period in 30-minute PASA processes (ST and PD) will use the 5-minute bid with the lowest availability in a 30-minute interval

4.2 Transition

Key Dates

Item	Date	Description
5MS Staging – 5-minute bidding	Nov 2019	Early release for participants to test bidding interfaces against Functionality will gradually be rolled out to this environment
Pre-prod - EMMS Dispatch release	Nov 2020	Release to pre-production to support industry testing and market trials
Prod – 5-minute bidding	Mar 2021	Changes to support 5-minute bids 30-minute bids converted to 5-minute bids
Start 5-minute bidding	1 st Apr 2021	After AEMO's system release participants can submit 5-minute bids for 1 April 2021
AEMO final release	Jun 2021	Final releases of 5MS dispatch functionality
Rule Commencement	1 1 st July 2021	30-minute bids no longer accepted

Summary

- Accept 5-minute bids from 1 April 2021, 3 months before commencement.
- From 1 April 2021:
 - Existing 30-minute bids for trading days from 1/4/2021 will be converted to 5-minute bids by AEMO (during the release)
 - Any received 30-minute bids will be converted to 5-minute bids by AEMO's systems
 - Dispatch, pre-dispatch, PASA, etc. will run off 5-minute data
 - 5-minute data model reports will start to be published

- 5-minute bids will be provided in JSON format; 30-minute bids can only be submitted in the current TXT format.
- The EMMS Markets Portal will support both 30-minute and 5-minute bids during transition, for both user entry and file upload.
- From 1 July 2021 (commencement) 30-minute bids will be rejected as invalid.

4.3 Bidding Format

Status	Industry Impact
Pre-consultation	High for dispatchable plant operators using FTP
	Medium for dispatchable plant operators using the EMMS Web Portal

This section refers to the following bids and offer types:

1. Energy
2. FCAS
3. MNSP

NMAS offer formats are not expected to change, and remain in the TXT format

In this section bids are used to refer to a bid or an offer, as defined in the NER.

4.3.1 Current

Summary

- Bids are submitted in a TXT based format
- Bids are offered for 48 half-hour periods
- Bid responses are in CSV format:
 - i. CPT.csv – for invalid bids
 - ii. ACK.csv for valid bids

4.3.2 5-minute Settlement

Summary

- Bids will be submitted in a new JSON format
- Bids are offered for 288 5-minute periods
- Rebid explanation now requires additional fields to be provided
- Fixed load is no longer accepted as a 0
- MNSP bids now require both links to be included in a bid
- The current TXT format will be retired from 1 July 2021
- A CSV format will be support for importing and exporting into the Web Bidding system

Participant Impact

1. Participants will need to change their systems to produce a JSON format for energy, FCAS and MNBP bids replacing the existing TXT format by 1 July 2021
2. Participants may need to review, update and test any impacted business continuity planning (BCP) processes
3. Participants may choose to use tools such as Excel to leverage the CSV format. This may assist in easier management of bids with 288 periods, either in daily operations or BCP scenarios.

4.4 Bidding Interfaces

Status	Industry Impact
Discussion complete	<p>High for participants using the FTP interface</p> <p>Medium for participants using the Web interface</p>

4.4.1 Current

Summary

- Bids can be submitted over MarketNET via:
 - i. Compressed file or TXT file via FTP
 - ii. Uploaded file in the EMMS Markets Portal
 - iii. The bidding screen in the EMMS Markets Portal

4.4.2 5-minute Settlement

Summary

- New RESTful web APIs (accessible over the Internet and MarketNET) will be introduced for bidding
- FTP will continue to be supported
- The EMMS Markets Portal Bidding screen will be enhanced
- The file upload in the EMMS Markets Portal will continue to be supported
- TXT bids via any interface will no longer be supported from the rules commencement
- JSON bids via any interface will be supported from early transition

FTP

- Will support both 30-minute and 5-minute bids from early transition
- FTP may be used as a backup mechanism to the web APIs
- FTP will only be accessible over MarketNET
- 5-minutes bids must be in compressed JSON
- Acknowledgements from AEMO for 5-minute bids will be in compressed JSON

Web Bidding

- Will support both 30-minute and 5-minute bids from early transition
- Proposal to support CSV import and export of bids
- Other likely usability enhancements

Web Upload

- Will support both 30-minute and 5-minute bids from early transition
- Will support the current 30-minute TXT bid format until rules commencement
- Will support JSON bid format upload from early transition
- Proposal to support CSV upload into the Web UI for viewing and submitting from early transition

APIs

- Will support only 5-minute bids from early transition
- Will be asynchronous
- Will use JSON as the API message format, with corresponding JSON schemas
- Will support submitting bids and bid retrieval
- Will provide additional APIs to support the Web Bidding system

Participant Impact

1. Participants FTP bidding interface with AEMO will need to be changed to support the new JSON format
2. Participants may choose to leverage the new bidding APIs in their bidding systems
3. Participants may need to change their existing BCP processes, e.g. the API interface can't be accessed, FTP, Web UI or Web Upload may be able to be used as a backup

4.5 Registration

Status	Industry Impact
Discussion compete	None identified

4.5.1 Current

Summary

- Default bids of 0 energy for each 30-minute trading interval are submitted for a new scheduled/semi-scheduled unit when registered by AEMO's registration system.

4.5.2 5-minute settlement

Summary

- Default bids of 0 energy are submitted for each 5-minute trading interval when a new scheduled/semi-scheduled unit when registered by AEMO's registration system.

Participant Impact

- No impact has been identified, in-line with existing processes participants will replace these initial bids in-line with their bidding obligations

4.6 Mandatory Restrictions

Status	Industry Impact
Pre-consultation	Low – The new bidding format should be used

4.6.1 Current

Summary

- AEMO will call for restriction offers equal to the estimated required demand reduction via a Market Notice with a cut-off time for offers (minimum 2 hours)
- Generators and MNSPs in the affected region choosing to respond should provide the mandatory restriction quantities for all 30-minute intervals and an associated price scaling factor for the bid.
- If required plant with accepted MR capacity will be the last to be dispatched, with dispatch price set at Market Price Cap (MPC)
- Scheduled loads, and semi-scheduled generation cannot submit MR offers to AEMO

4.6.2 5-minute Settlement

Summary

- Mandatory restriction availabilities will now be provided for all 5-minute intervals

Participant Impact

1. Participants should provide mandatory restrictions amounts for each 5-minute interval

More information on AEMO's Mandatory Restrictions is available [here](#)

4.7 Dispatch

Status	Industry Impact
Discussion complete	Low – the 5-minute dispatch process remains largely unchanged

4.7.1 Current

Summary

- Dispatch runs every 5 minutes
- The effective bids and offers provided for the 30-mn trading period are used in the dispatch process.

- Fixed Load values must be 1 or more, a value of 0 is now invalid.

4.7.2 5-minute Settlement

Summary

- The effective bids and offers provided for the 5-minute trading period are used in the dispatch process.
- Fixed Load treatment will change, a 0 will no longer be allowed
To provide no fixed load the field should not be provided in the bid
- The published dispatch XML solution file may change
- Dispatch will start using 5-minute bids once AEMO completes the system release to support the early transition period.
- Effective 30-minute bids will be converted to 5-minute bids as part of the systems release for early transition
- 30-minute bids submitted after the systems release will be converted to 5-minute resolution, by duplicating the bid for each 5-minute interval in the 30-minute trading interval.
- The dispatch solver (NEMDE) will not change as part of the 5MS changes
- 5-minute price determination will not change as part of the 5MS changes

Participant Impact

1. Participants may need to change their systems if they currently submit 0 fixed load – intending this to mean no fixed load
2. Participants should be aware of AEMO’s treatment of 30-minute bids and 5-minute bids in the transition period

4.8 5-minute pre-dispatch (P5min)

Status	Industry Impact
In Consultation	TBC – subject to decision on P5 extension

4.8.1 Current

Summary

- P5 is not mandated by the rules
- P5 pre-dispatch runs every 5 minutes cover 1 hour (12 x 5-minute intervals)
- The effective bids and offers for the respective 30-minute trading period are used in the pre-dispatch process.

4.8.2 5-minute Settlement

Summary

- P5 will now be mandated by the rules

- P5 pre-dispatch will run every 5 minutes covering at least 1 hour (12 x 5-minute intervals)
- The effective bids and offers for each 5-minute trading period covered are used in the P5 pre-dispatch process.
- Fast Start Inflexibility Profiles (FSIP) will be included in P5
- Daily energy constraints will be included in P5
- Participants have proposed AEMO investigate the feasibility of:
 - i. Extending the schedule to 3, 6 and 24 hours
 - ii. Calculating price sensitivities for a the P5 run
- Data model changes are expected to be required to support the proposed changes.

Participant Impact

1. Participants should comply with the rule obligations for 5-minute pre-dispatch
2. TBC – based on AEMOs decision on an extension to P5

4.9 30-minute pre-dispatch (PD)

Status	Industry Impact
Discussion complete	Low – the 30-minute pre-dispatch process remains largely unchanged

4.9.1 Current

Summary

- 30-minute pre-dispatch runs every half an hour covering between 32 and 79 30-minute intervals
- The effective bids and offers for the 30-minute trading periods covered by pre-dispatch are used

4.9.2 5-minute Settlement

Summary

- The effective bids and offers for the last 5-minute in the 30-minute intervals covered by pre-dispatch are used.
 - i.e. The bids for intervals 6, 12, 18, 24,288 would be used as the bids for the 30-minute pre-dispatch covering these intervals.
- Report outputs and the data model are not expected to change

Participant Impact

1. No direct impact
2. Any processes performing analysis on pre-dispatch outcomes against data that is changing in SMS (such as bids, or spot process)

4.10 7-day pre-dispatch (PD7day)

Status	Industry Impact
Discussion complete	Low – the 30-minute pre-dispatch process remains largely unchanged

4.10.1 Current

Summary

- 30-minute interval pre-dispatch runs 3 times a day covering the current day and 6 further trading days
- The effective bids and offers for the 30-minute intervals covered by the schedule are used

4.10.2 5-minute Settlement

Summary

- The effective bids and offers for the last 5-minute in the 30-minute intervals covered by pre-dispatch are used.
i.e. The bids for intervals 6, 12, 18, 24,288 would be used as the bids for the 30-minute pre-dispatch covering these intervals.
- Report outputs and the data model are not expected to change

Participant Impact

1. No direct impact
2. Any processes performing analysis on pre-dispatch outcomes against data that is changing in SMS (such as bids, or spot process)

4.11 Short Term PASA (ST PASA)

Status	Industry Impact
Discussion complete	Low – the 30-minute PASA process remains largely unchanged

4.11.1 Current

Summary

- Published every 2 hours providing a 6-day assessment of system adequacy from the end of the next trading day.
- The effective bids and offers for each 30-minute interval covered by the ST PASA timeframe are used.

4.11.2 5-minute Settlement

Summary

- The effective 5-minute bids and offers with the lowest availability in a 30-minute interval covered by the ST PASA timeframe are used.

Participant Impact

1. Be aware of the change of logic in ST PASA bid and offer inputs
2. There are no expected data model changes for ST PASA tables
3. Any participant analysis of bids/offers against ST PASA outcomes will need to change

4.12 Pre-dispatch PASA (PD PASA)

Status	Industry Impact
Discussion compete	Low – the 30-minute PASA process remains largely unchanged

4.12.1 Current

Summary

- Published every half hour providing an assessment of system adequacy in the same timeframe as 30-minute pre-dispatch
- The effective bids and offers for each 30-minute interval covered by the PD PASA timeframe are used.

4.12.2 5-minute Settlement

Summary

- The effective 5-minute bids and offers with the lowest availability in a 30-minute interval covered by the PD PASA timeframe are used.

Participant Impact

1. Be aware of the change of logic in PD PASA bid and offer inputs
2. There are no expected data model changes for PD PASA tables
3. Any participant analysis of bids/offers against PD PASA outcomes will need to change

4.13 7 Day Outlook

Status	Industry Impact
Discussion compete	N/A

4.13.1 Current

- Half-hourly produced forecast of capacity and demand at the daily peak for NEM regions based on PD PASA and ST PASA runs

4.13.2 5-minute Settlement

Summary

- Impacted indirectly by the PD and ST PASA change of availability inputs from bids

Participant Impact

1. Be aware of the change of logic in PD and ST PASA bid and offer inputs
2. There are no expected data model changes for the 7 Day Outlook tables
3. Any participant analysis of bids/offers against 7 Day Outlook outcomes will need to change

4.14 Medium Term PASA (MT PASA)

Status	Industry Impact
No discussion required	N/A - MTPASA is not changing

4.14.1 Current

Summary

- AEMO provides a weekly MTPASA run providing an assessment of system reliability over a 2-year horizon

More information on this process can be found [here](#)

4.14.2 5-minute Settlement

Summary

- No change identified

4.15 Demand Forecasting

Status	Industry Impact
No discussion expected	N/A – Demand forecasting is not changing

4.15.1 Current

Summary

- Generates 30-minute demand forecasts used in the 30-minute pre-dispatch processes

4.15.2 5-minute Settlement

Summary

- No changes identified

4.16 Administered Pricing

Status	Industry Impact
Discussion complete	Low

4.16.1 Current

Summary

- An administered pricing period is declared in a region when:
 - A trading interval when the sum of 30-minute energy prices for the previous 336 trading intervals reaches the cumulative price threshold (CPT)
 - A dispatch interval when the sum of the ancillary service prices for the previous 2016 dispatch intervals exceed 6 times the CPT
- For an administered pricing period AEMO will apply the Administered Price Cap (APC) of \$300/MWh and Administered Floor Price (AFP) of -\$300/MWh to the published dispatch prices. This is applied to energy and all ancillary services under (i), and only for all ancillary services under (ii)
- An administered pricing period continues to at least the end of the current trading day, if (at that time) the trigger conditions no longer apply

More information on this process can be found [here](#)

4.16.2 5-minute Settlement

Summary

- CPT has been increased by a factor of 6 to reflect a 5-minute trading interval rather than the 30-minute interval
- The determination of an administered price period changes with the shift of a trading interval to 5-minutes, with an administered pricing period is declared in a region for:
 - A trading interval when the sum of 5-minute energy prices for the previous 2016 trading intervals reaches the cumulative price threshold (CPT)
 - A trading interval when the sum of the ancillary service prices for the previous 2016 dispatch intervals exceed the CPT

Participant Impact

1. No identified direct impact
2. Data model table REGIONAPCINTERVALS data shifts from 30-minutes to 5-minute for price cap/floor data
3. AEMO provided Administered market notices format and content will likely change

4. Caps on energy prices may now start from a 5-minute interval instead of a 30-minute interval

4.17 Suspension Pricing

Status	Industry Impact
Discussion complete	None

4.17.1 Current

Summary

- AEMO prepares and publishes estimated price schedules for use during market suspension
- The price schedules provide 30-minute prices for each region and market (energy and eight FCAS markets) for weekday, weekends and public holidays
- The prices are based on historical averages over a 28-day period to the end of the NEM billing week (end of Saturday)
- The schedule is updated when price revisions occur

More information on this process can be found [here](#)

4.17.2 5-minute Settlement

Summary

- The price schedules will remain calculated for the 30-minute intervals over the 28 days
- The 30-minute price will be the price used for each of the respective 5-minute periods

Participant Impact

1. No direct impact has been identified

4.18 Negative Residue Management

Status	Industry Impact
Discussion not started	TBC

4.18.1 Current

Summary

- The inter-regional negative residue accumulation is determined as a period of consecutive trading intervals where the trading interval residues are negative
- AEMO monitors the accumulation of inter-regional settlement residues and takes action to cease the accumulation when it reaches or exceeds the negative residue accumulation threshold of -\$100,000

- AEMO uses inputs from dispatch as well as 30-minute pre-dispatch to estimate the negative residue accumulation
- In this situation AEMO will normally constrain the flow on the relevant directional interconnector to cease any further accumulation, this is accomplished by inputs AEMO’s systems provide to a set of permanently invoked NRM constraints
- AEMO will manage negative residues from the next dispatch interval to the end of the next trading interval. If the accumulated residue remains above the threshold AEMO will extend the management period for another trading interval
- AEMO may suspend management within the period based on certain conditions
- AEMO will issue associated market notices in relation to the management of negative residues

More information on this process can be found [here](#)

4.18.2 5-minute Settlement

Summary

- Changes to be confirmed

Participant Impact

1. Changes to be confirmed

4.19 Market Notices

Summary

- Changes to be confirmed

4.19.1 Current

Summary

- Changes to be confirmed

4.19.2 5-minute Settlement

Summary

- Changes to be confirmed

4.20 Dispatch Data Interchange / Data Model

Status	Industry Impact
Discussion in progress	High for generators, scheduled loads and MNSPs

4.20.1 Current

Summary

- Bidding, dispatch, pre-dispatch, pricing data publication

Refer to the current data model documents found [here](#)

For settlement and metering data model changes refer to section Error! Reference source not found.

4.20.2 5-minute Settlement

Summary

- Change to package BIDS:
 - i. New fields for BIDOFFERFILETRK
 - ii. New 5-minute bid tables BIDOFFERPERIOD, MNSP_BIDOFFERPERIOD
 - iii. Deprecate tables BIDDAYOFFER_D, BIDPEROFFER_D, MNSP_FILETRK and MNSP_OFFERTRK
- Change to package DISPATCH:
 - i. Likely changes to NEGATIVE_RESIDUE table
- Change to package FORCE_MAJEURE:
 - i. REGIONAPCINTERVALS table data shifts from 30-minutes to 5-minute price cap/floor data
- Change to package MREVENT:
 - i. MR_PEROFFER_STACK table data shifts from 30-minute to 5-minute offer stack
TBC - AEMO is reviewing the Mandatory Restrictions to determine if this needs to change

5. Settlement Systems

5.1 Services Impacted

Settlement Calculations

- Transactions will need to be calculated for each five-minute period.
- Settlement estimation will calculate energy transactions for every five-minute period.
- Inter-regional and intra-regional residue will be calculated on a five-minute basis.
- Several non-energy transactions, such as market ancillary services (i.e. FCAS) and compensation recovery, will be completed using five-minute energy volumes.

5.2 Transition

Key Dates

Item	Date	Description
5MS Staging – Reallocations	Nov 2019	5MS Staging environment will be available from Nov 2019, with Reallocations being the first release
5MS Staging – EMMS Settlements Release	May 2020	Multiple releases into the staging environment
Pre-prod - 5-minute Reallocations	Mar 2020	Early processing of 5-minute reallocations available 6 months before 1 July 2021
Pre-prod - EMMS Settlements release	Nov 2020	System release for Settlements, Billing, Invoicing and Prudentials prior to 1 July 2021
Prod - 5-minute Reallocations	May 2020	Early processing of 5-minute reallocations available at least 6 months before 1 July 2021
Prod - EMMS Settlements release	May-2021	System release for Settlements, Billing, Invoicing and Prudentials prior to 1 July 2021
30-minute reallocations deprecated	1 Jul 2021	30-minute reallocations won't be supported by AEMO from 1 July 2021
First 5-minute energy settlement run and first UFE publication	2 Jul 2021	Initial 5-minute run for 1 July 2021
Split billing week	27 Jun 2021 – 3 Jul 2021	Billing week will be a mix of 5-minute and 30-minute settlement
Global Settlement starts	6 Feb 2022	Billing weeks from 6 Feb 2022 will be settled using global settlement
Global Settlement run	7 Feb 2022	First settlement run for 6 Feb 2022 using global settlement instead of settlement by difference

Summary

- From 1 July 2021 at 0:00 am, AEMO's Settlements system executes processes based on 5-min energy data volumes.
- First Settlement Run with 5-min energy data volumes is scheduled to run on 2 July 2021 (wholesale settlement systems processes always run for previous day).
- AEMO's Settlements system will go-live prior to 1 July 2021 .
- AEMO will support both 30-min and 5-min energy data volumes to allow for a smoother transition on 1 July 2021 .
- Reallocations will go-live prior to 1 Jan 2021.
- AEMO will publish UFE data from 1 July 2021 (for reporting purposes), financial settlement is effective from 6 Feb 2022.

5.3 Settlement Estimation

Status	Industry Impact
Procedural Consultation in progress	Low

5.3.1 Current

- Used in settlement when normal processing is not available, this has never been invoked
 - i. Failure less than 2 weeks - Data from preliminary statements are used for final statements
 - ii. Failure 2 weeks or more - historical metering used for market customers, SCADA values used for market generators
- Used in the prudential process to estimate outstanding transactions
 - iii. Typically, 2 days are estimated using a scaled like-day energy method
 - iv. The rest are determined using interim meter data and preliminary and final settlement data
- Estimation is performed daily

5.3.2 5-Minute Settlement

Summary

- Scaled like-day energy estimation methodology remains the same, but the calculations are at 5-minute resolution
- AEMO will review the methodology for accuracy once 5MS is in place

Participant Impact

1. No direct impact

5.3.3 Global Settlement

Summary

- Where metering data is available AEMO will include the UFE component
- For scaled like-day estimates (2 days out of 30) the UFE component will be 0

Participant Impact

1. No direct impact

5.4 Settlement

5.4.1 Current

- Settlements runs are settled at a 30-minute resolution.

5.4.2 5-Minute Settlement

Summary

- From 1 July 2021 AEMO's Settlements system will start performing processes based on 5-min energy data volumes.
- First Settlement Run with 5-min energy data volumes is scheduled to run on 2 July 2021 (wholesale settlement systems processes always run for previous day).
- Settlement Runs for Settlement Days from 1 July 2021 will be settled at 5-min resolution
- Settlements Runs for Settlement Days prior to 1 July 2021 will be settled at 30-min resolution
- Any other 'Settlement' functions that will be changing due to 5-min Settlement

Participant Impact

1. Settlement reconciliation data provided through Data Interchange will be published at the same resolution as the associated settlement run, i.e. 30-min resolution for settlement days prior to 1 July 2021 , 5-min resolution for settlement days from 1 July 2021 .

5.4.3 Global Settlement

Summary

- From 1 July 2021 AEMO's Settlements system will start publishing UFE.
- From Feb 6 2022 AEMO's Settlements system will financially settle UFE amounts
- Tier 1 meters will be directly settled, instead of being handled through settlement-by-difference

Participant Impact

1. Once UFE financial settlement starts, AGE amounts that are used in energy settlement trading amounts, as well as non-energy settlement recovery processes, will incorporate a UFE component.
2. UFE to be allocated to each combination of TNI and FRMP on the basis of metered energy
3. Non-contestable unmetered loads to be included in energy settlements, and downstream recovery processes that are based on AGE, but excluded from market fee calculations based on NMI counts
4. From Feb 6 2022 the Local Retailer participant for each NMI will be updated to a system-wide 'GLOBALPOOL' LR for all Tier 1 customers, Tier 2 customers, and distribution-connected generators that are not within an embedded network.

5.5 Billing

5.5.1 Current

- Billing executes any settlement functions that span across multiple days, aggregates the 30-minute settlement amounts to line items for the statement, and applies GST.

5.5.2 5-Minute Settlement

Summary

- Aggregation of 5-minute settlement amounts as well as 30-minute settlement amounts.
- Format change to statement – table based layouts will apply to both line items and GST amounts

Participant Impact

1. 1 July 2020¹ is mid billing week.
2. AEMO's system will handle both 30-min and 5-min energy volumes processed across different settlement runs within the billing week of 27 June 2021 to 3 July 2021 (transitional week).
3. Transitional Week:
 - Produce SR Report as per current process
 - Produce PDF Tax Invoice as per current process
 - Data tables in Data Interchange can be utilised to identify 5min vs 30min

5.5.3 Global Settlement

Summary

- From 1 July 2021 AEMO's Settlements system will start publishing UFE on a billing week as well as a settlement interval basis.

Participant Impact

1. UFE amounts will appear in the SR report
2. No change to statements or invoices
3. Aggregate UFE amounts available in reconciliation data on a billing week basis

5.6 Reallocations

Status	Industry Impact
Procedural Consultation Completed	Low

5.6.1 Current

- Participants can enter reallocations (30-min) through AEMO Markets Portal

5.6.2 5-Minute Settlement

Summary

- 5-min reallocations can be entered at least six months prior to 1 July 2021

- Continue to support 30-min reallocations beyond 1 July 2021 (i.e. due to ex-post reallocations and revisions)
- Participants will be able to select different calendars for which Business or Non-Business profiles
- If any 30-min reallocations existed past 1 July 2021, providing an option of cancelling these reallocations. Alternatively, restrict input at the web interface to allow for 5-min contracts only past 1 July 2021
- Notifications for actions taken against a reallocation

Participant Impact

1. Able to enter 5-min reallocations six months prior to 1 July 2021, but only for days from July 2021 onwards
2. Able to enter 30-minute reallocations from July 2021 onwards, but only for days prior to July 2021
3. An API will be made available to participants for the submission, retrieval, authorisation, and cancellation of reallocations
4. Notifications will be sent via email through Publishing Direct to a participant whenever a counterparty takes action (submission or authorisation) of a reallocation
5. A new web screen to support reallocation profiles with 48 or 288 intervals.

5.6.3 Global Settlement

Summary

- No impact to Reallocations from GS

Participant Impact

1. None

5.7 Prudentials

Status	Industry Impact
Procedural Consultation in Progress	No direct impact

5.7.1 Current

- AEMO monitors the total outstandings or financial liability of all Market Participants to AEMO, which are compared to the respective Trading Limit

5.7.2 5-Minute Settlement

Summary

- Reallocation changes will be incorporated into Prudentials

Participant Impact

1. No impact

5.7.3 Global Settlement

Summary

- No impact to Prudentials from GS.

Participant Impact

1. None

5.8 Settlements Direct

5.8.1 Current

- Settlements Direct allows for Market Participants to subscribe to notifications, alerts, and data feeds for Settlement and Prudential processes in the NEM.

5.8.2 5-Minute Settlement

Summary

- New notifications for reallocations (see reallocations section)

Participant Impact

1. No impact to participants outside of reallocations

5.8.3 Global Settlement

Summary

- No impact to Settlements Direct from GS

Participant Impact

1. No impact to participants

5.9 Settlements Data Interchange / Data Model

5.9.1 Current

- Data Interchange is a set of cooperating applications to replicate, manage, and monitor data between AEMO's Wholesale Energy Market Systems and participants' local database
- AEMO-side reporting applications that generate structured .CSV files into the participant file server, where participant-side software consumes the files and replicates the data into one or more local DBMS's.

5.9.2 5-minute Settlement

Summary

- 5-min settlement data interchange reports will use the same table names and structures as existing 30-min feeds, with the definition of PeriodID changing from a 30-min period (1 to 48) to a 5-min period (1 to 288).
- Data interchange data for settlement runs prior to July 2021 (e.g. Revisions) will retain a 30-min PeriodID. The granularity for any given settlement run could be determined through an "Interval Length" column in one of the settlements DI tables.
- Additional indicator will be added for 'interval length' to specify what the length of interval is with each settlement run.
- Current proposal is to add this indicator to the "DayTrack" table, with a column name of "Trading_Interval_Length". DayTrack is the parent table for all NEM settlement runs, with a primary key of SettlementDate/SettlementRunNo.

Participant Impact

1. New version of the Electricity data model for 5MS. This will be an optional upgrade as the data model will be backwards compatible with the existing 'legacy' version.
1. All settlement results tables in Data Interchange will have the two columns detailed above (Summary Section) as the first elements of the primary key, therefore any settlement results table can be directly joined back to DayTrack to determine the interval length.
2. 'Interval Length' can be utilised when comparing historic data and with both formats (5-min and 30-min).

5.9.3 Global Settlement

Summary

- UFE included in reconciliation data at:
 - TNI/FRMP level (Confidential)
 - Local Area level (Public)
 - In both Settlements and Billing timeframes

Participant Impact

1. Local area UFE to include total UFE as well as TFE, DDME, and ADME
1. Total AGE for each profile area to be published in a public report, broken down into Import and Export values. Individual datastream import and export will be netted off to a single net import or net export value across the NMI for each settlement interval, before aggregation to the local area level.

6. Abbreviations and special terms

Term	Explanation
30-min period	New term to replace ‘trading interval’, where the period needs to remain as 30 minutes
5MS	Five-Minute Settlement Program
AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
B2B	Business-to-business
B2M	Business-to-market
Dispatch Interval	Obsolete term. See Trading Interval.
DUID	Dispatch unit ID
EMMS	Electricity Market Management System; software, hardware, network and related processes to implement the wholesale energy market
FCAS	frequency control ancillary services
Fixed Load	Optional MW, not greater than the max. availability. When supplied as ‘0’, this was interpreted as ‘not inflexible’, but this will now be interpreted as ‘fixed at 0’ (i.e no output).
FTP	File transfer protocol
GS	Global Settlement
JSON	Java Standard Object Notation. An agreed format for text files and data exchange. This will now be used by AEMO to receive bids and offers and provide responses
MSATS	Market Settlement and Transfer Solution for retail electricity
NEM	National Electricity Market
NER	National Electricity Rules
NMI	National Metering Identifier for electricity meters
MW	Megawatt
Spot Price	Refers to a 5-min price
Trading Interval	Was a 30-mn period, now replaces the dispatch interval as a 5-mn period

7. Appendix

No content