

5MS Settlements Focus Group #2

Wednesday, 20 March 2019

AEMO Melbourne office

Level 22, 530 Collins Street, Melbourne

Attendees

NAME	COMPANY / DEPARTMENT	NAME	COMPANY / DEPARTMENT
Chris Muffett	AEMO	Christine McMaster	Engie
Scott Maskiel	AEMO	Drew Pass	Engie
Katalin Foran	AEMO	Varun Dewan	Engie
Christine Kang	AEMO	Divya Kapoor	Flowpower
Bhanu Rajan	AEMO	Martin Ralph	Hydro Tasmania
Austin Tan	AEMO	Fergus Stuart	Origin
Mark Kennedy	AGL	Grace Wu	Origin
Maree Madden	AGL	Martin Vyhnaelek	Origin
Therese Sato	Alinta	Arunesh Choubey	Red Energy
Eoghan Conran	Alinta	Rita Wu	Snowy Hydro
Stephen Wilson	Aurora Energy	Volodymyr Shatorkin	Snowy Hydro
Deepak Gupta	EA	Ricky Brooks	Stanwell
Greg Fawcett	Engie	Piera Lorenz	Telstra

Agenda

NO	TIME	AGENDA ITEM	RESPONSIBLE
Preliminary Matters			
1	10:00 – 10:10am	Welcome, Introduction and Apologies	Chris Muffett (AEMO)
2	10:10 – 10:20am	Actions from previous meeting	Austin Tan (AEMO)
Matters for Noting and Discussion – 5MS Settlements			
3	10:20 – 10:30am	Settlement Procedures Update	Austin Tan (AEMO)
4	10:30 – 11:00am	5MS Metering and Dispatch – Settlement considerations	Chris Muffett (AEMO)
5	11:00 – 11:30pm	Reallocations	Katalin Foran (AEMO), Pedro Riveros Gutierrez (AEMO)
6	11:30 – 11:45am	5MS Settlements Transition Approach	Bhanu Rajan (AEMO)
7	11:45 – 12:15am	AEMO Settlement Interfaces	Bhanu Rajan (AEMO), Scott Maskiel (AEMO)
	12:15 – 12:45pm	Lunch	
8	12:45 – 12:55pm	5MS Readiness Approach	Chris Muffett (AEMO)
9	12:55 – 1:10pm	Reconciliation Support	Chris Muffett (AEMO)
Matters for Noting and Discussion – Global Settlements			
10	1:10 – 1:30pm	Global Settlement overview	Austin Tan (AEMO)
11	1:30 – 1:50pm	UFE Calculation and Application	Chris Muffett (AEMO)
12	1:50 – 2:10pm	UFE Verification Reporting	Christine Kang (AEMO)
13	2:10 – 2:30pm	UFE Trends Reporting	Austin Tan (AEMO)
Other Matters			
14	2:30 – 2:40pm	General Questions and next steps	Chris Muffett (AEMO)

Actions from previous meeting

Austin Tan

Responses to SFG actions (1)

#	Topic	Action	Response
1	Revisions Procedures	Participants to provide feedback on consultation timelines for the NEM Settlement Revisions Policy consultation	Participant responses were supportive of AEMO's approach. AEMO proceeded with the NEM Settlement Revisions Policy consultation as planned.
2	Transitional billing arrangements	Participants to provide feedback on billing and reporting transitional arrangements during the billing week when the 5MS transition occurs on 1 July 2021	Participant feedback received. AEMO will present the proposed 5MS transition approach at the SFG on 20 March 2019
3	Reallocations Procedures	AEMO to consider the optimal timeline for allowing for input of 5 minute reallocations	AEMO is working towards having the production interface for 5 minute reallocations available at least 6 months before 5MS go live. AEMO will continue to communicate with participants on this timeline through the PWG, SWG or SFG.

Responses to SFG actions (2)

#	Topic	Action	Response
4	Reallocations interface	Participants to provide further suggestions to improve current reallocations user interface and functionality, including preferences for file uploading	Participant feedback received. AEMO will present changes to the reallocations system at the SFG on 20 March 2019.
5	5MS IT Settlements approach	Participants to provide feedback on AEMO's approach of retaining the same table names and structures	Participant feedback received. AEMO will present changes to the 5MS settlement interface at the SFG on 20 March 2019.
6	DI archive data	Participants to provide feedback regarding what types of data should be retained in the DI archive for more than 6 months	Participant feedback received. AEMO will present changes to the 5MS settlement interface at the SFG on 20 March 2019.

Responses to SFG actions (3)

#	Topic	Action	Response
7	5MS IT Settlements approach	Participants to provide any additional suggestions on how to ease the 5MS IT settlements transition	Participant feedback received. AEMO will present the proposed 5MS transition approach at the SFG on 20 March 2019.
8	Settlement reports	Participants to provide feedback on any opportunities to improve settlement reporting (SS, SR, etc.)	Participant feedback received. AEMO will present changes to the 5MS settlement interface at the SFG on 20 March 2019.
9	APIs	Participants to provide feedback on what other functions would benefit from API services	Participant feedback received. AEMO will present changes to the 5MS settlement interface at the SFG on 20 March 2019.

Responses to SFG actions (4)

#	Topic	Action	Response
10	Reallocations interface	Participants to provide feedback on the introduction of a notifications feature on the reallocations web interface	Participant feedback received. AEMO will present changes to the reallocations system at the SFG on 20 March 2019.
11	Settlement Focus Group	Participants to provide feedback on the introduction of additional reporting capability on net energy reallocations	Participant feedback received. AEMO will present changes to the reallocations system at the SFG on 20 March 2019.
12	EMMS industry training	AEMO to consider organising a training session on EMMS data activities	Participants expressed minimal interest in a formal EMMS data training session. AEMO will continue to ad-hoc support on EMMS as necessary to participants and will re-consider the need for formal training sessions in the future.

Settlement Procedures Update

Austin Tan

Consultations

Settlement Estimates Policy

- Second stage submissions closed on 5 March 2019
- Final report and procedures will be published 4 April 2019

Settlements Miscellaneous Package –Settlement Revisions Policy & Misc. Settlement Guides

- Draft Report & Notice of second stage consultation will be published 22 March 2019
- Second stage submissions due 5 April 2019

Settlement Reallocations Package – EDOR & SOOR

- Final notice and procedures published 28 February 2019
- 3 submissions received after one round of consultation, all supportive of AEMO's recommendations. No further changes to the draft procedures were made

Consultations

SRA package – Auction Participation Agreement (APA)

- Consultation will commence on 22 March 2019, first stage submissions due 27 May 2019
- Final Report and procedures scheduled for publication on 5 August 2019
- Effective date of the version of the APA will be dependant on the implementation of the SRA secondary trading project

TNSP Negative Settlements Residue Procedure

- Not a Rules consultation document
- Proposed changes are administrative. Consultation will be single round and targeted at TNSPs.
- Consultation will commence on 1 April 2019, submissions due 3 June 2019 and final procedures will be published 14 June 2019

Consultations

Prudentials Package - Credit Limit Procedures (CLP)

- Previously, a single round consultation was proposed since 5MS related changes was expected to be administrative
- AEMO is now investigating further changes to the CLP in line with participant feedback to simplify the prudentials process
- Consultation will be two rounds, likely to commence in April/May
- AEMO will advise the Procedures Work Group (PWG) when further details are available

5MS Metering and Dispatch – Settlement considerations

Chris Muffett

Metering: Five-minute Settlements Rule

Metering Requirement	Considerations
<ul style="list-style-type: none">Types 1, 2 and 3 meters to record and store five-minute data from the commencement date of the rule.Type 4 meters at a transmission network connection point or distribution network connection point where the relevant financially responsible Market Participant is a Market Generator or Small Generation Aggregator to record and store five-minute data from the commencement date of the rule.All other types 4, 4A, 5 and 6 meters that are already installed do not need to provide five-minute data at the commencement date. The data from these meters will be profiled to five-minute trading intervals by AEMO using load profiles.All new and replacement metering installations, other than type 4A, installed from 1 December 2018 must provide five-minute data from 1 December 2022 at the latest.All type 4A new and replacement metering installations installed from 1 December 2019 must provide five-minute data from 1 December 2022 at the latest	<ul style="list-style-type: none">Impacts associated with the transition to 5min trading intervals<ul style="list-style-type: none">Increase in meter data volumesHandling of 48, 96 and 288 trading intervals per dayChanges to MDFF NEM12 content and formatPotential changes to MSATS Browser meter data viewability and extraction<ul style="list-style-type: none">Pre e.g. 30min and post profiling i.e. 5min?Changes to profiling methodologies<ul style="list-style-type: none">15 and 30min interval meter data profiling and its impact on NSLP profiling<ul style="list-style-type: none">New profile name in CNDS table

Metering: Global Settlements Rule

Metering Requirement	Considerations
<ul style="list-style-type: none"> All connection point meter data to be delivered to AEMO from 1 July 2021 <ul style="list-style-type: none"> Tier 1 meter data being received by AEMO for Settlement purposes Tier 2 meter data will no longer be delivered to LRs by MDPs from the commencement of GS (6 Feb 2022). TNI/Boundary meter data will no longer be delivered to LRs/FRMPs by MDPs from the commencement of GS (6 Feb 2022). Concept of Local Retailer is being removed, except in specific circumstances e.g. embedded networks Non-market Unmetered loads to be processed through MSATS <ul style="list-style-type: none"> The load profile and size to be agreed upon by the customer, DNSP, retailer Only to be used for UFE purposes, still considered non-contestable loads AEMO is currently working with the AEMC to understand the intent behind the 5MS rule that could influence the contestability of Non-Market Unmetered loads. 	<ul style="list-style-type: none"> All connection points are now relevant for Settlement purposes <ul style="list-style-type: none"> Including Tier 1 and non-market unmetered loads Bulk activation of associated NMLs and datastreams Bottom up methodology <ul style="list-style-type: none"> LR removed, Tier 2 and TNI/boundary meter data no longer being delivered to Retailers Changes to meter data aggregation processes for Settlements purposes Best treatment of non-market unmetered loads e.g. categorisation (MSATS standing data flags) Cross boundary/border supply points between distribution networks or Local Retailer regions Publishing of various load values <ul style="list-style-type: none"> AGE, ADME and UFE Public vs confidential information Potential changes to various RM reports, including: Level 1, Level 2 and Profiling reports How AEMO will work with Market Participants in investigating UFE related load queries

Metering: Changes to the Delivery of Meter Data to AEMO from MDPs

Meter Data Requirement	Considerations
<ul style="list-style-type: none">• Meter Data Format<ul style="list-style-type: none">• MDFF NEM12 files to be the required file format for all interval meter data being delivered to AEMO• MDFF NEM13 files to be supported by AEMO<ul style="list-style-type: none">• AEMO to continue to support and accept MDMF files for Basic meter reads• Origin queried if there was a planned end date for MDMF files. AEMO clarified that currently there is no plan to end support for MDMF files. Decommissioning of MDMF files is not mandatory to implement 5MS and will fall outside of the 5MS program scope.• Action: AEMO to consider merits of moving away from MDMF files• Meter Data Resolution<ul style="list-style-type: none">• NEM12 Interval meter data at the register level<ul style="list-style-type: none">• As per the meter's configuration i.e. 5, 15 or 30-minute meter data intervals• Meter Data Frequency<ul style="list-style-type: none">• Meter data to be delivered to AEMO on a daily basis<ul style="list-style-type: none">• AEMO is not seeking to amend any obligations regarding the current B2B Provide Meter Data or Verify Meter Data processes	<ul style="list-style-type: none">• AEMO using the RM11 report to communicate meter data exceptions with MDPs• Transition from Net level datastreams to register level in the CATS NMI Datastream (CNDS) table

Metering: Changes to the Delivery of Meter Data to AEMO from MDPs

Meter Data Requirement	Considerations
<ul style="list-style-type: none">• Meter Data Granularity<ul style="list-style-type: none">• Import and Export Active energy (kWh) and Import and Export Reactive energy (kVarh) will be required to be sent to AEMO• All new records created in the CNDS table are to be created at the register level e.g. E and B.<ul style="list-style-type: none">• Existing Net datastreams records can remain active post 1 July 2021, until an update to the Datastreams record is required• Datastreams associated to import and export reactive energy e.g. Q and K do not need to be created in the CNDS table• Origin requested for AEMO to consider publishing 30 minute data after commencement of 5MS on 1 July 2021. It was flagged that due to the differing commencement dates of 5MS and GS, it will be costly for participants to undergo two system changes over a short period of time. Not publishing 30 minute data may result in Origin not able to reconcile settlements data between 1 Jul 2021 and 5 Feb 2022.• AEMO advised that its system is currently not designed to publish 30 minute data after 1 July 2021. Any amendments to this will have impacts on program timeline.• Action: Participants to provide information to AEMO on what data streams will be necessary for reconciliation purposes between 1 July 2021 and 6 February 2022.• Action: AEMO to further explore request to provide 30 minute data post 5MS through Reconciliation workshop	<ul style="list-style-type: none">• AEMO using the RM11 report to communicate meter data exceptions with MDPs• Transition from Net level datastreams to register level in the CATS NMI Datastream (CNDS) table

Dispatch: High level 5MS overview

Current setting

- Dispatch already operates on a five-minute cycle
- Bids and offers must cover every “trading interval” in the day

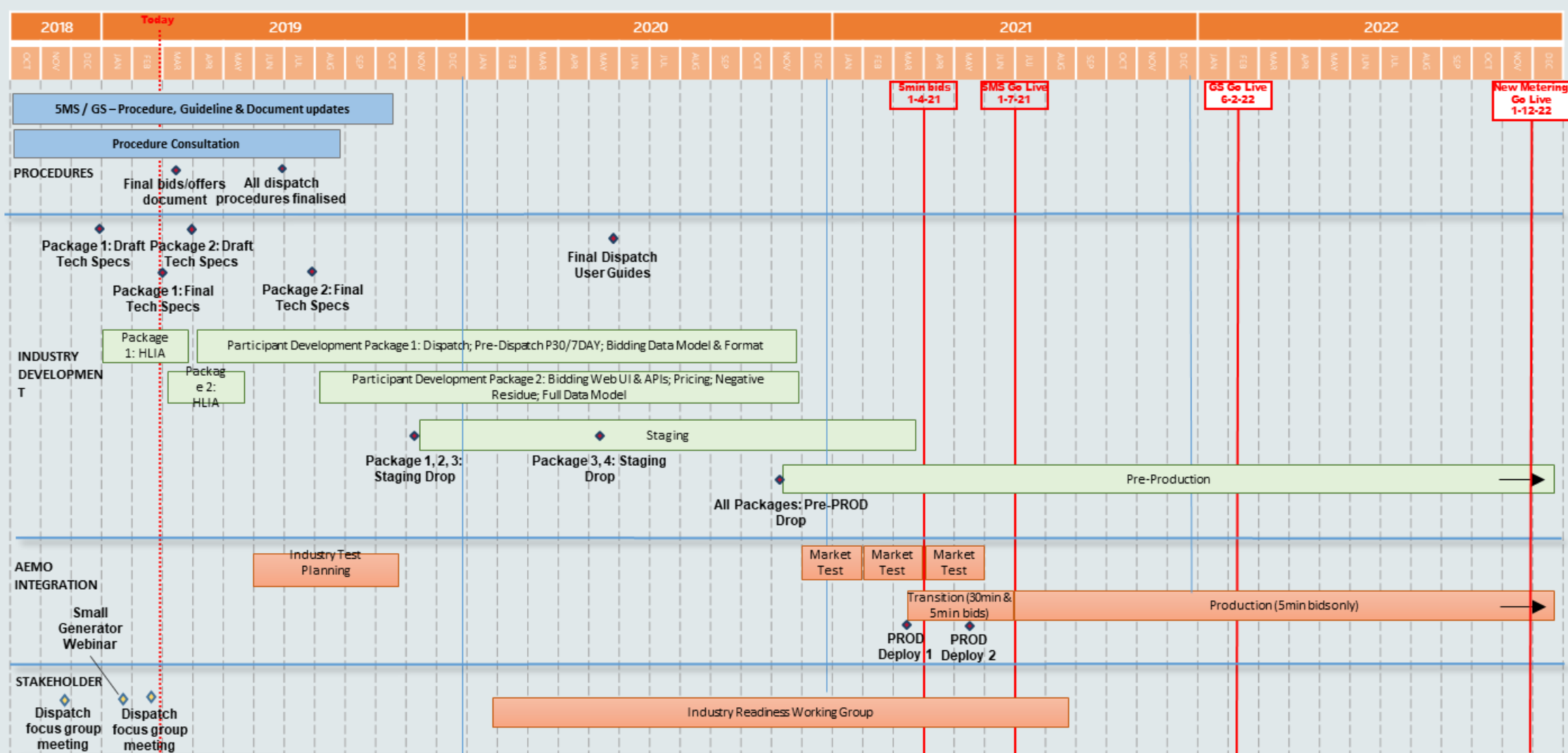
5MS Rule from 1 July 2021 and settlement implications

- 5MS changes 5-minute dispatch intervals to 5-minute trading intervals
- Bids and offers will now have 288 intervals (up from 48)
- Similarly, spot prices will now be calculated every 5 minutes
- There are also other changes to market information that will influence bidding strategies e.g. introduction of 5-minute pre-dispatch, use of “lowest availability” 5-minute trading interval within a 30-minute period in ST PASA etc

Transition to 5-minute bidding

- AEMO will accept 5-minute bids or 30-minute bids from 1 April 2021 to 30 June 2021 (30-minute settlement)
- From 1 July 2021, AEMO will only accept 5-minute bids (5-minute settlement)
- A participant suggested that AEMO should consider co-ordinating the transition of 5 minute bidding across the industry. AEMO advised that this work can be considered as part of the 5MS Readiness Workstream.
- **Action:** AEMO to consider co-ordinating the transition to 5-minute bidding across the industry

Dispatch: 5MS Participant Timeline



Reallocations

Katalin Foran

5MS related changes

- Switchover from 30 minute reallocations to 5 minute reallocation on 1 July 2021 (procedures updated to reflect this).
- All formulas/calculations remain the same, except now performed at 5 minute level.
- With reference to business continuity, this will be discussed at the 5MS Readiness Workgroup.
- **30-minute reallocations can only be entered if the “End date” is earlier than 1 Jul 2021.**
- **Conversely, 5-minute reallocations will only be accepted if the “Start Date” is later or on 1 Jul 2021.**

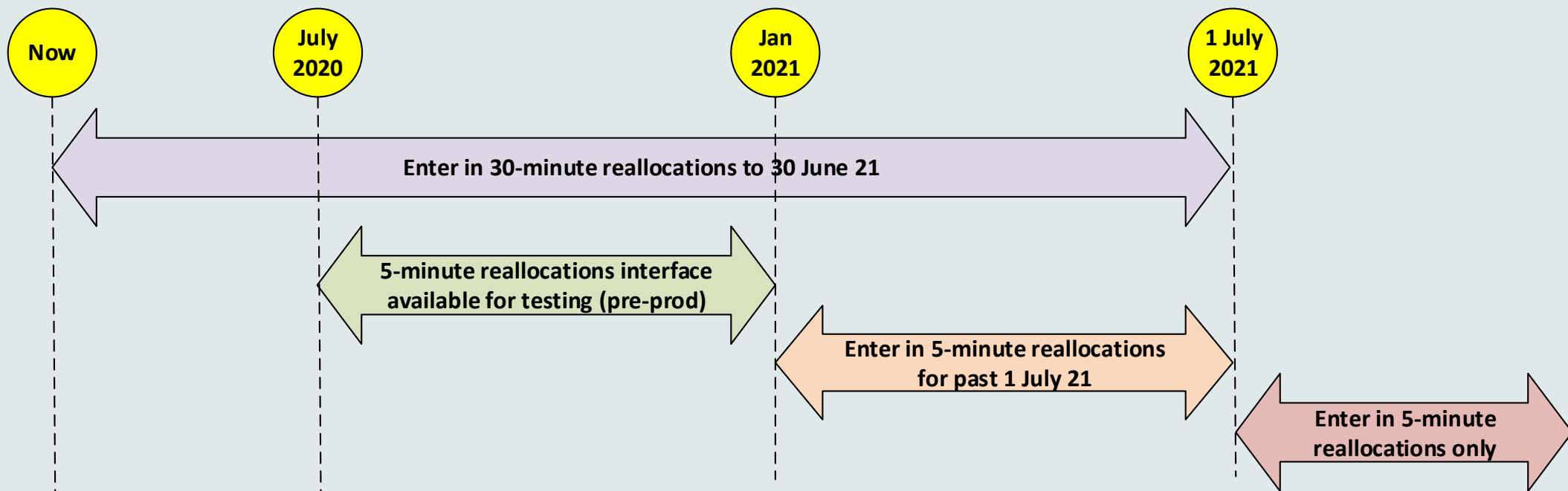
Transition to 5 minute reallocations

- Production reallocations interface for 5-minute reallocations available 6 months prior to July 2021.
- Pre-production 5-minute reallocations interface to be available for market participant testing and developing of API interfaces (aim for mid 2020).
- Ex-post 30-minutes reallocation will naturally fade out as per the ex-post due date in accordance with the [Reallocation Time Table](#)

2.2. Ex Post Reallocations

- (a) *A reallocation request for an ex post reallocation may be registered after a target trading interval has occurred, but not later than the date and time specified in paragraph (b).*
- (b) *To be included in a final statement, the reallocation request must be registered (i.e. submitted and authorised by the credit and debit parties) before 5.00 pm on the 16th business day after the earliest trading interval specified in the reallocation request.*
- (c) *To be included in a preliminary statement, the reallocation request must be registered before 5.00 pm on the second business day after the billing period end date.*

5 Minute reallocations – indicative timetable of transition arrangements



What if you have 30 minute contracts beyond 1 July 2021?

- 30-minute contracts for \$, MWh or Swap reallocations beyond 1 July 2021
 - Participants can enter in reallocations by dividing the energy volume into 6 equal parts, and use the same strike price for each 5-minute period.
 - Approach will correctly settle 30-minute contracts based on \$, MWh or Swap agreement types from 1 July 2021.
- 30-minute Cap and Floor reallocation types beyond 1 July 2021
 - Cannot be correctly reflected in 5-minute periods if contract is based on a 30-minute strike price.
 - There are no reallocations of this type currently in use - we don't think support for these reallocation types will be needed beyond the start of 5MS.
- It was raised that some participants at the AFMA forums expressed interest in 30 minute contracts post-5MS. AEMO will be attending the next AFMA forum on 4 April and will be providing information to the industry on AEMO's transition approach and the methodology to enter into 30-minute contracts through the new interface.

Additional system functionality

Changes, discussed with/requested by market participants, that are not strictly related to the 5MS project are being assessed.

- **API to be available for participants to develop own reallocation interfaces**
 - This is included in the revised procedures and is expected to be implemented with 5MS.
 - An earlier version of the API is expected to be available for reallocations at a 30-minutes basis.
 - API will expose all the methods used in the web UI, methods to create, list, authorise among others.
- **Regional calendars**
 - Under consideration - a drop down list of authorised/loaded/available calendars for the participant to choose the preferred calendar, per reallocation ID.
 - Procedure change gives AEMO the option of adding in a regional calendars for reallocations.
 - It does not change the current functionality of the NEM calendars, which participants will continue to have access to.
 - AEMO is still exploring the best approach for implementing regional calendars, and the associated costs.
 - [In response to a participant query, AEMO advised that the process on how to manage the potential new calendars is still being considered. AEMO will consult with the industry on the implementation on this calendar.](#)
- **Fill functionality**
 - Fill functionality will be implemented with 5MS.
 - Functionality will allow participants to enter a value for one trading interval, and if there is no values for the subsequent intervals, the entered value is used.
 - Similar functionality to what is currently in the table for the bidding interface.

Additional system functionality (continued)

- **New business alerts**

- Under consideration – development of a new set of business alerts using the business alert functionality currently available.
- This would enable new Settlements Direct subscription to alerts, reminders and notifications.
- Currently, participant can subscribe to available alerts to be received by email or SMS.
- **AEMO noted that the current design will notify participants when:**
 - The user is nominated as a counter party to a reallocation and is required to authorise the reallocation
 - The counterparty authorises the reallocation
- **Action:** Participants to provide feedback on whether there are additional alerts that will be beneficial features in the reallocations system

- **Single list of all reallocations**

- Under consideration - participants to have a single list of all reallocations and the ability to filter and sort this list.
- Additional reporting function/summarization (i.e. net position) - more detail of market participant expectations is required to assess if functionality can be included.

Additional system functionality (continued)

- **Reverse / Cancel feature**
 - Currently participants have a way of reversing/cancelling reallocations.
 - Exploring a way to make the functionality easier to use and find.
- **Copy/paste functionality**
 - Under consideration – similar functionality available for the bidding interface, however its expected to be expensive to implement.
 - This requirement may be satisfied by the Fill functionality.

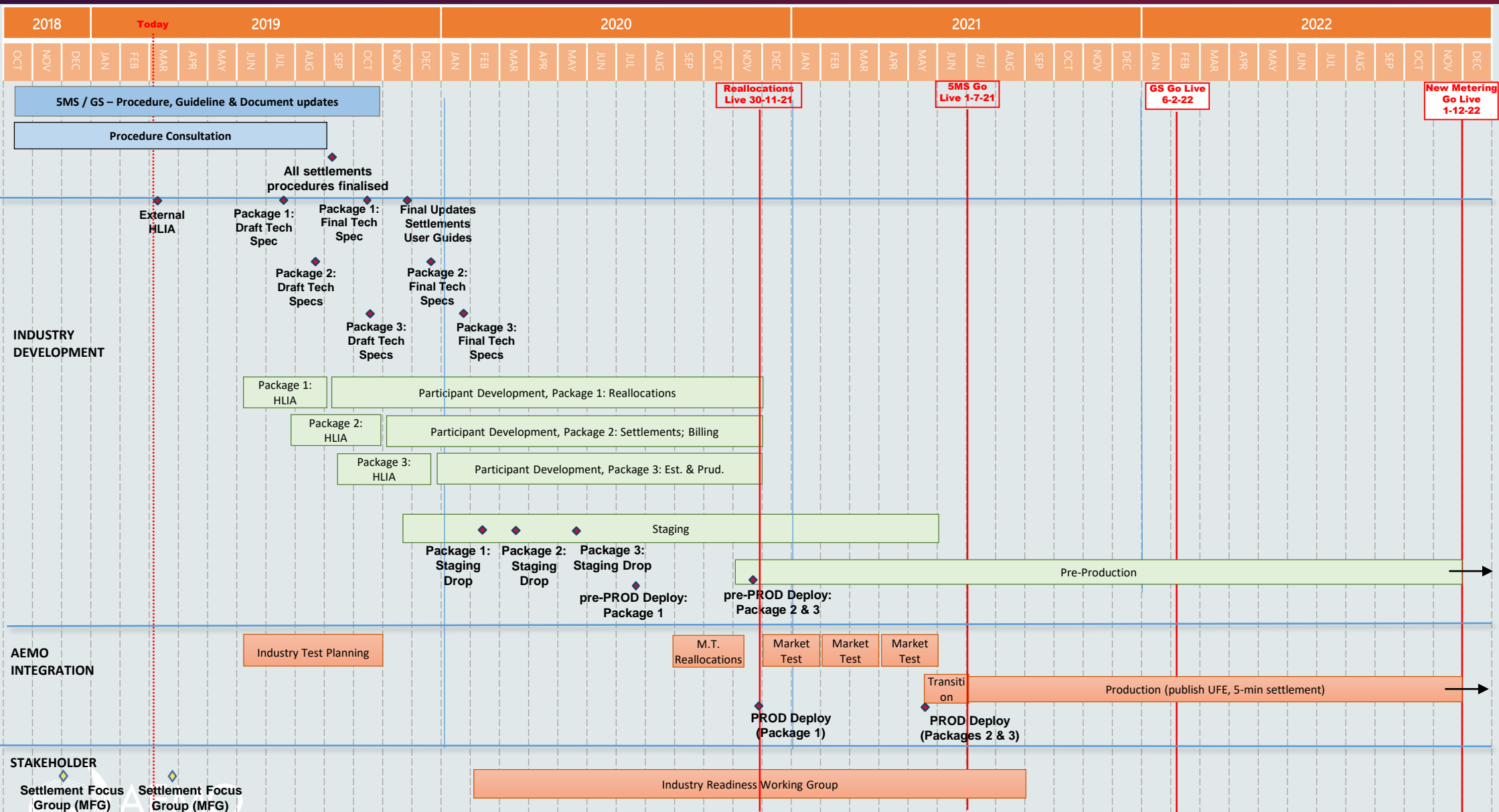
5MS Settlements Transition Approach

Bhanu Rajan

Overview

- 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.
- AEMO noted that the enhanced settlements system will be regression tested internally, and will consider external certification prior to go-live.
- **Action:** AEMO will discuss the scope of certification through the 5MS Readiness Workstream

Timelines



Timelines

5 MINUTE SETTLEMENT SYSTEMS TRACKING	TIMING									
	Internal HLIA	Focus/Group	SWG Engagement	External HLIA	Draft Tech Spec	Final Tech Spec	User Guides	SMS Staging	Preprod	Production
SETTLEMENTS										
Estimation	Oct-18	Nov-18	Dec-18	Mar-19	Oct-19	Jan-20	-	May-20	Nov-20	May-21
Settlements	Oct-18	Nov-18	Dec-18	Mar-19	Aug-19	Dec-19	-	Mar-20	Nov-20	May-21
Reallocation	Dec-18	Nov-18	Dec-18	Mar-19	Jul-19	Oct-19	Nov-19	Feb-20	Jul-20	Nov-20
Billing	Oct-18	Nov-18	Dec-18	Mar-19	Aug-19	Dec-19	-	Mar-20	Nov-20	May-21
Prudentials	Sep-18	Nov-18	Dec-18	Mar-19	Oct-19	Jan-20	Nov-19	May-20	Nov-20	May-21
Full Data Model	Refer DISPATCH									

Estimation: data model changes

Settlements: data model changes

Reallocation: data model changes, User Interface changes, API's

Billing: Invoice changes, SR Report changes, data model changes

Prudentials: data model changes, Prudential Dashboard changes, PCO Report changes

Billing

- 1 July 2021 is mid billing week.
- 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).
- 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
 - AEMO noted it was not cost effective to provide two separate SR reports during the transition week. AEMO to provide mapping document between invoices and data interchange.
 - Considerations for business continuity will be considered by the 5MS Readiness Workstream
 - In response to feedback from Momentum Energy, AEMO notes that considerations around the transition period for retailers for customers billing purposes will be the responsibility of the retailer.
 - **Action:** AEMO to provide information through the Systems Working Group (SWG) on mapping between Data Interchange and SR Reports

5MS Settlements Interfaces

Scott Maskiel, Bhanu Rajan

Data Interchange

- Design Principle: ease transition and mitigate impact to industry.
- 5-min Settlement DI reports will use the same table names and structures as existing 30-min feeds, with definition of "PeriodID" changing from a 30-min period (1 to 48) to a 5-min period (1 to 288).
 - AEMO clarified that the 5MS final rule requires this transition from midnight 1 July 2021
- DI data for settlement runs prior to July 2021 (e.g. Revisions) will retain a 30-min PeriodID.
- 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.
- All settlement results tables in Data Interchange have these two columns 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.
- Interval Length needs to be looked at when comparing historic data and with both formats.
- AEMO noted that changes to the Data Model will be released a few months prior to 1 July 2021 so participants have some flexibility on when to transition their systems

DI Archive

- The AEMO DI archive contains a copy of all reports distributed through either Data Interchange or Publishing Direct. This includes:
 - All Electricity and Gas Data Model files
 - Other files produced through the Data Interchange system but not directly supported in the Data Model, e.g. Causer Pays FI data
 - All PDF and Text reports produced by the NEM Settlements system
 - All CSV/XML files produced by EMMS that are published on nemweb.com.au
- Currently, we store up at least 6 months worth of historic data for all reports.
- Participants have provided feedback that some reports should have their retention period increased to 2-3 years. AEMO is looking at modifying the archiving system to support per-report retention periods. Reports under consideration for longer retention periods are:
 - PDF Tax Invoices / RCTI's
 - PDF Adjustment Notes / RC Adjustment Notes
 - SR Reports
 - ...feedback on any other reports we should consider is welcomed
- **Action:** Participants to advise which reports should be retained for longer in the AEMO DI archive, and how long it should be retained for.

SR Reports & Tax Invoices

- Participant feedback has indicated there is a lack of clarity / information around tying back line items in the statement and/or the SR report, to specific tables and columns in the EMMS Data Model.
- AEMO will consider providing a mapping document describing the relationships between line items on the statement, sections of the SR report, and the EMMS data model.
- Participants to highlight sections (lines) on the SR report and statements which are difficult to tie back to the EMMS data model.
- **Action:** Participants to highlight priorities for AEMO to provide mapping information between SR Reports and the EMMS data model

Global Settlement

- Go-live date for Global Settlements is 6th February 2022.
- Prior to this date AEMO will publish UFE information through the NEM Settlements reconciliation data in the EMMS Data Model.
- On 1st July 2021, AEMO will publish in the EMMS Data Model:
 - Separate UFE, AGE, and ADME amounts in the SetCPData table on a per-TNI, per-interval basis. ADME will continue to be published as separate import energy (INEnergy) and export energy (XNEnergy) amounts. UFE and AGE will be published as single amounts.
 - Separate UFE, AGE, and ADME amounts in the BillingCPData table.
 - AGE will always be equal to ADME (Import – Export) until Global Settlements go-live.
- On 6th Feb 2022, AEMO will publish in the EMMS Data Model:
 - The same UFE, AGE, and ADME amounts in the SetCPData and BillingCPData tables.
 - AGE will now include the UFE component.
 - Energy settlement dollar amounts will include the financial settlement of UFE, by virtue of UFE being include in AGE. $TA = AGE \times TLF \times RRP$.

Lunch

5MS Readiness Approach

Chris Muffett

5MS/GS Readiness



Document preparation approach

- AEMO prepares initial draft
- Discuss/consult with industry
- AEMO prepares final draft

Potential Market Readiness Principles

- Joint commitment to Readiness for 'Go-Live'
- Collaborative approach to market readiness
- Each party is responsible for their own readiness
- Report readiness issues and risks as early as possible
- Communicate readiness issues and risks in writing
- True and honest readiness reporting
- Appropriate handling of confidential and commercially sensitive information by AEMO
- AEMO to explain readiness decisions to NEM participants
- AEMO noted that it is looking into providing more transparency behind AEMO's progress, and is working on providing program milestones to the Program Consultative Forum (PCF)

Market Readiness Strategy

- Objective
 - The objective of the Market Readiness Strategy is to facilitate uninterrupted market operations for AEMO and NEM participants and, as a consequence, continued service delivery to NEM end-use customers, prior to and effective from the “go-live” date of Five-Minute Settlement (5MS) and Global Settlement (GS).
- Purpose
 - The purpose of the Market Readiness Strategy document is to set out the approach for managing, coordinating, informing, monitoring and reporting on AEMO and NEM participants’ operational preparedness, particularly in relation to revised business systems and processes, for a seamless transition to new arrangements starting on the “go-live” dates of 5MS and GS.
- Scope
 - Overview of the 5MS and GS Rules
 - Scope and principles
 - Market Readiness phases
 - Overview of key Market Readiness documents
 - Key milestones of the program
 - Planned Stakeholder engagement activities
 - Reporting and monitoring processes
 - Participant information sessions

Reconciliation Support

Chris Muffett

Reconciliation Support

Background

- Ergon Retail approached AEMO late last regarding a potential 'Profiled Meter Data Delivery' proposal
- Momentum Energy also mentioned in their Metering P1 consultation response that their preference was for AEMO to provide two sets of meter data feeds, from 1 July 2021, one which had been profiled and the other data set as provided by the MDP
- With this in mind, AEMO has been considering:
 - The current level of reconciliation support it provides to the market today
 - What opportunities may exist to enhance this level of support in a 5MS/GS environment
 - How proposals, such as the ones raised by Ergon and Momentum, should be captured and assessed going forward, including:
 - Value proposition
 - Delivery channel
 - Industry and Program implications

Next Steps

- AEMO is seeking the SFG's support in AEMO running a workshop which focuses specifically on reconciliation related activities, including:
 - The reconciliation challenges Retailers may encounter in a 5MS/GS environment
 - Opportunities in addressing these potential issues
 - What support Retailers may require from AEMO and other market participants in a 5MS/GS world
 - The new GS UFE publishing and trend analysis requirements
- For this workshop to be successful, representatives will need to have an in-depth understanding of settlements and billing reconciliation activities
- **Action:** Participants to register interest in Reconciliation Support workshop and provide feedback on scope of workshop agenda

Global Settlement overview

Austin Tan

Global settlement implementation timeline

1 December 2019

AEMO procedures updated for both 5MS and GS

1 July 2021

5MS begins
AEMO starts publishing UFE data ('soft start')

6 February 2022

GS begins

1 March 2022

AEMO's first annual report on UFE trends

New *procedure* required
[NER 3.15.5(d) and 11.112.5]

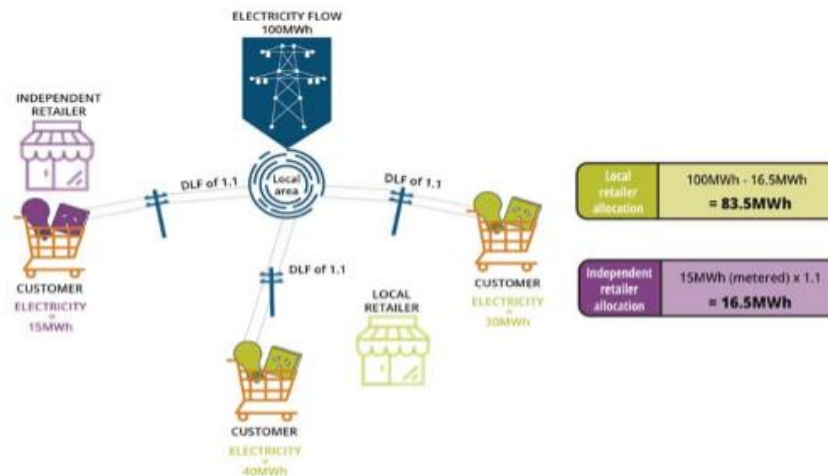
New *annual report*
[NER 3.15.5B] and new
reporting guidelines
[NER 3.15.5B(d) and 11.112.6]

Key design elements

ISSUE	FINAL RULE
Implementation timeframes	<ul style="list-style-type: none"> Global Settlement starts 6 Feb 2022 across the NEM Commence the global settlement soft start at the same time as 5MS commencement on 1 Jul 2021. Requirement is for AEMO to begin publishing UFE data AEMO procedural and guideline changes aligned to 5MS
Who and how to allocate UFE	<ul style="list-style-type: none"> UFE allocated to all market customers (i.e. retailers) in proportion to their share of the loss-adjusted consumption within the area
At what level should UFE be allocated?	<ul style="list-style-type: none"> UFE to be allocated at the local area (i.e. DNSP network) level
Treatment of VTNs	<ul style="list-style-type: none"> VTNs are retained for settlement purposes and there is no change to the VTN policy arrangements
Information requirements	<ul style="list-style-type: none"> AEMO to publish UFE reconciliation data to enable market customers to verify UFE AEMO to introduce a analysis and reporting framework on UFE sources and trends. To be developed through consultation with industry.
Unmetered loads	<ul style="list-style-type: none"> The energy associated with off-market (i.e. non-type 7) unmetered loads is to be explicitly included in AEMO's settlement processes. AEMO is to include in its metrology procedures guidance on how this should occur. As a result of the information requirements changes from the draft rule, NMIs will not be required to be allocated to TNIs within VTNs. More flexibility is also provided to AEMO

Settlements by difference vs Global settlements

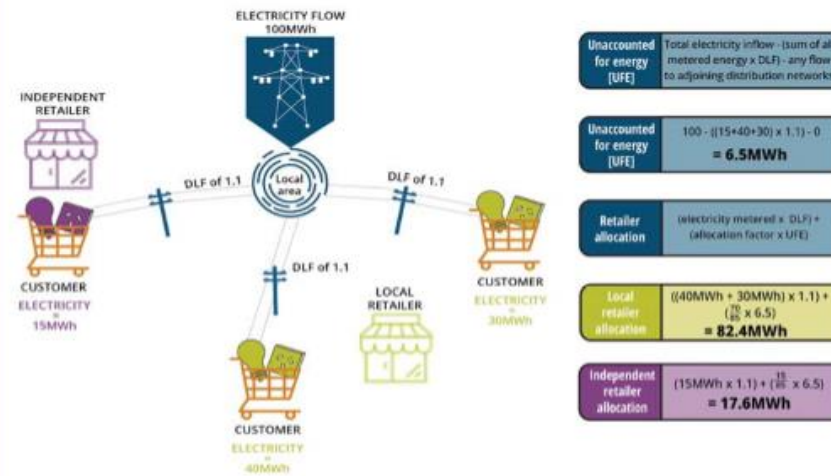
Settlement by difference



Source: Adapted from AEMO, High level design, p. 6

VS

Global settlements



Source: Adapted from AEMO, High level design, p. 10

Stylised calculation of settlement by difference

1. Establish total amount of electricity that flows into the distribution network
2. Sum the metered electricity for each independent retailer and adjust for distribution losses
3. Charge each respective independent retailer their distribution loss-adjusted metered consumption
4. The local retailer pays for the remainder of the electricity in the local area, including any UFE

UFE is made up of errors in the distributed loss factor (DLF), commercial losses (e.g. electricity theft, inaccurate meters, estimation errors for unmetered devices) and estimation errors from profiling meters

Stylised calculation of global settlements:

1. Establish total amount of electricity that flows into the distribution network
2. Sum the metered electricity for all retailers and adjust for distribution losses
3. Calculate UFE as the difference between DLF-adjusted metered energy and the total energy inflow into the distribution network
4. Apportion UFE to each retailer based on their proportion of total metered consumption
5. Charge each retailer their distribution loss-adjusted metered energy and their proportion of UFE

New UFE procedures/guides overview

	<i>UFE Reconciliation Guide</i>	<i>UFE Reporting Guide</i>
Description	<ul style="list-style-type: none"> A new procedure to be developed by AEMO outlining the approach to publishing information that allows market customers to verify allocated UFE volumes. 	<ul style="list-style-type: none"> A new guideline to be developed by AEMO on the approach to preparing the UFE trends report.
Rules requirement	<ul style="list-style-type: none"> NER 3.15.5 (d) - AEMO must publish information to enable each <i>Market Customer</i> in a <i>local area</i> to verify the unaccounted for energy amounts allocated to that <i>Market Customer's</i> market connection points in that <i>local area</i> under paragraph (b) for each <i>trading interval</i> in accordance with a procedure developed and published by AEMO. 	<ul style="list-style-type: none"> NER 3.15.5B (d) - AEMO must determine, maintain and publish UFE reporting guidelines that set out AEMO's approach to preparing and publishing the report required under paragraph (a), including how the purpose of the report will be achieved. AEMO is not required to comply with the UFE reporting guidelines for the first report
Rules Consultation?	<ul style="list-style-type: none"> No 	<ul style="list-style-type: none"> Yes – NER 3.15.5B (e)
Key dates	<ul style="list-style-type: none"> 1 July 2021 - UFE data must be published, UFE adjustment procedure due 	<ul style="list-style-type: none"> 1 March 2022 - First annual UFE trends report due (NER 11.112.3) 1 December 2022 - UFE reporting guidelines due (NER 11.112.6)

UFE Calculation and Application

Chris Muffett

Calculate and Allocate UFE Load

What's changed due to GS?	Considerations
<ul style="list-style-type: none">• Settlements will be a bottom up as opposed to a top down approach• Not changing<ul style="list-style-type: none">• Embedded networks will continue to be settled using settlements by difference within the network• Treatment of VTN's is unchanged (primary contributor to UFE being allocated at the Local Area level)<ul style="list-style-type: none">• VTNs are retained for the purposes of settlement.• $UFE = TME - DDME - ADME$<ul style="list-style-type: none">• UFE is the total unaccounted for energy amount (in MWh) to be determined• TME is the amount of electrical energy, expressed in MWh, flowing at each of the transmission network connection points in the local area in the trading interval• DDME is the amount of electrical energy, expressed in MWh, flowing at each of the distribution network connection points in the local area which are connected to an adjacent local area, in the trading interval• ADME is the aggregate of the amounts represented by $(ME \times DLF)$ for that trading interval for each connection point assigned to the transmission network connection point or virtual transmission node	<ul style="list-style-type: none">• Changes to meter data aggregation process for Settlements purposes• UFE charges now levied on applicable market customers based on their 'accounted-for' energy in a local area• Action: Participants to advise AEMO if there is value in publishing TME and DDME values for UFE reconciliation• Action: AEMO to consider publishing import and export ADME data

Calculate and Allocate UFE Load

What's changed due to GS?	Considerations
<ul style="list-style-type: none"> • UFE calculated for each local area to be allocated across all market customers in that local area based on their 'accounted-for' energy • $AGE = (ME \times DLF) + UFEA$ <ul style="list-style-type: none"> • AGE is the Adjusted Gross Energy amount to be determined • ME is the amount of electrical energy flowing at the market connection point in the trading interval • DLF is the distribution loss factor applicable at that connection point • $UFEA = UFE \times (DME / ADMELA)$ <ul style="list-style-type: none"> • UFEA is the share of unaccounted for energy allocated for the relevant connection point and trading interval • UFE is the unaccounted for energy amounts for the local area • DME is the amount represented by $(ME \times DLF)$ for the relevant connection point and trading interval • ADMELA is the aggregate of the amounts represented by DME for that trading interval for each market connection point in that local area, for which a Market Participant is financially responsible 	<ul style="list-style-type: none"> • Changes to meter data aggregation process for Settlements purposes • UFE charges now levied on applicable market customers based on their 'accounted-for' energy in a local area • Calculation will be done in AEMO settlement systems at a TNI level instead of a NMI level. However this calculation will align with NMI level allocation as defined in the Rules. • Action: AEMO to engage with the AEMC on the alignment in granularity of UFEA calculation in AEMO systems and the GS final rule

UFE Verification Reporting

Christine Kang

What the new GS rule says

3.15.5 (d) Unaccounted for energy adjustment - local areas

AEMO must publish information to enable **each Market Customer** in a local area to verify the **unaccounted for energy amounts allocated** to that Market Customer's **market connection points** in that **local area** under paragraph (b) for **each trading interval** in accordance with a procedure developed and published by AEMO.

High level design – report 1

Name	Settlement supporting data (existing, add UFE verification report)
Confidentiality	<ul style="list-style-type: none">• Private• per market participant who are market customers• Through Settlements Direct
Trigger	<ul style="list-style-type: none">• event trigger• Each published settlement runs
Specification	<ul style="list-style-type: none">• Settlement run number• Market participant (PID)• Day• Trading interval (5 minutes)• TNI• Local area ID• DME (MWh) is the old AGE, ME x DLF• UFEA (MWh)• AGE (MWh)

High level design – report 2

Name	Local area UFE report
Confidentiality	<ul style="list-style-type: none">• Public vs Market Participants• Through NEMWEB
Trigger	<ul style="list-style-type: none">• Event trigger• Each published settlement runs
Specification	<ul style="list-style-type: none">• Settlement run number• Local area ID• Day• Trading interval (5 minutes)• ADME (MWh) is the old AGE, ME x DLF• TME (MWh) is sum of all TNI flows• DDME (MWh) is the sum of all cross boundary flows• UFE (MWh)• AGE (MWh) is the new AGE• Action: AEMO to consider publishing UFE by Market Trial

UFE Trends Reporting

Austin Tan

UFE Trend Reporting - Rule Requirements

Clause 3.15.5B - Reporting by AEMO on UFE Trends

- a) At least once each year, *AEMO* must in accordance with the *UFE reporting guidelines*, prepare and publish on its website a report setting out:
- (1) *AEMO's* summary and analysis of the total unaccounted for *energy* amounts in each *local area* over the reporting period.
 - (2) *AEMO's* analysis of the unaccounted for *energy* amounts in each *local area* in the reporting period against benchmarks determined by *AEMO* acting reasonably.
 - (3) *AEMO's* analysis of the sources of unaccounted for *energy* in each *local area*.
 - (4) *AEMO's* recommendations to improve visibility of unaccounted for *energy* in each *local area*.
 - (5) *AEMO's* recommended actions to reduce the amounts of unaccounted for *energy* in each *local area*, including without limitation any actions that *AEMO* recommends ought to be taken by *Market Participants*, *Network Service Providers*, the *AER* or *AEMO*.
- b) The purpose of the report required under paragraph (a) is for *AEMO* to provide information and analysis of unaccounted for *energy* in each local area to facilitate efficient decreases in unaccounted for *energy over time*.
- c) Network Service Providers, Market Participants and large customers must provide to *AEMO* such information and assistance as *AEMO* reasonably requires to prepare the report required under paragraph (a).

UFE Reporting Guide development

<i>UFE Reporting Guide</i>	
Description	<ul style="list-style-type: none">• A new guideline to be developed by AEMO on the approach to preparing the UFE trends report.
Rules requirement	<ul style="list-style-type: none">• NER 3.15.5B (d) - AEMO must determine, maintain and publish UFE reporting guidelines that set out AEMO's approach to preparing and publishing the report required under paragraph (a), including how the purpose of the report will be achieved.• AEMO is not required to comply with the UFE reporting guidelines for the first report
Rules Consultation?	<ul style="list-style-type: none">• Yes – NER 3.15.5B (e)
Key dates	<ul style="list-style-type: none">• 1 March 2022 - First annual UFE trends report due (NER 11.112.3)• 1 December 2022 - UFE reporting guidelines due (NER 11.112.6)
Stakeholder consultation	<ul style="list-style-type: none">• Initial engagement with industry through the Settlements Focus Group

Next steps / questions

- AEMO is in the initial stages of exploring this requirement and will update the industry as relevant through the 5MS forums
- First annual report is due 1 March 2022, with the UFE Reporting Guidelines due 1 December 2022
- Open question – Providing reasons, what would you like to see in this report?
- **Action:** Participants to advise AEMO on what content would be most useful in the UFE Trends Report, stating reasons why

General questions & Next steps

Chris Muffett

General questions & next steps

- General questions
- Questions for other groups (e.g. Metering, Dispatch Focus Groups, Systems Working Group)
- Next Steps
 - **Action:** AEMO to present to the Systems Working Group (SWG) the 5MS IT program's approach to accommodate the increase in metering data
 - **Action:** AEMO and the SWG to consider the number of decimal places of UFE and UFEA