



# 5MS Systems Working Group

SWG #11 - Monday, 17<sup>th</sup> June 2019

**AEMO Offices:**

Level 10, 10 Eagle Street, Brisbane

Level 22, 530 Collins Street, Melbourne

Level 2, 20 Bond Street, Sydney

WebEx: <http://aemo.webex.com>

ACCESS CODE: 574 891 539 PASSWORD: 7AR79353 (9426577 from phones)

**PLEASE NOTE THIS MEETING WILL BE RECORDED FOR THE  
PURPOSE OF PREPARING MINUTES**

# Agenda (Melbourne Time)

NO	TIME	AGENDA ITEM	RESPONSIBLE
<b>Preliminary Matters</b>			
1	10:00am – 10:05am	Welcome, introduction and apologies	Hamish McNeish (AEMO)
2	10:05am – 10:15am	Minutes and Actions from last meeting	Hamish McNeish (AEMO)
<b>Matters for Noting</b>			
3	10:15am – 10:30am	Program and Milestone Update	Hamish McNeish/Monica Morona (AEMO)
4	10:30am – 10:40am	Retail Stream update	Jim Agelopoulos (AEMO)
5	10:40am – 10:50am	Dispatch Stream update	Ian Devaney (AEMO)
6	10:50am – 11:00am	Settlements Stream update	Hamish McNeish (AEMO)
<b>Matters for Discussion</b>			
7	11:00am – 11:20am	Global Settlement	Blaine Miner (AEMO)
8	11:20am – 11:35am	Metering Focus Group Outcomes	Blaine Miner (AEMO)
9	11:35am – 11:50am	MSATS Standing Data Scenario	Simon Tu (AEMO)
10	11:50am – 12:00pm	Readiness Working Group update	Greg Minney (AEMO)
<b>Other Business</b>			
10	12:00pm – 12:30pm	Technical Document Update	Hamish McNeish, Simon Tu (AEMO)
11	12:30pm – 12:40pm	Forward meeting plan	Hamish McNeish (AEMO)
12	12:40pm – 12:50pm	General questions	Hamish McNeish (AEMO)

# Matters for Noting

Hamish McNeish

# Open Actions

Item	Topic	Action required	Action Update	Responsible	By
1.6	Participant bandwidth implications	<p>AEMO to provide assessment on bandwidth/networking impacts.</p> <p>Internally there have been some changes to AEMO's proposed network architecture with additional cloud deployments. We are working on sizing the expected network traffic first, once this is completed we will be able to review the bandwidth allocations.</p> <p>Design work continuing – next update moved to end June 2019</p>	Pending	AEMO	June 2019  (previously May-19)
7.6	Request for change password API	<p>AEMO to investigate adding an API to allow resetting of a URM user account password (as used by API's)</p> <p>AEMO is progressing an API for this, outside of the 5MS project. The timeline is still to be confirmed. The proposal is to provide an API allowing a URM account to reset its own password.</p> <p>This work is in now in design</p>	Pending	AEMO	May 2019
9.7.3	Metering – Meter Data Delivery	Participant feedback regarding the proposed approach to revised MSATS error codes	Pending	SWG Members	May 2019

# Open Actions

Item	Topic	Action required	Action Update	Responsible	By
9.7.5	Metering – Meter Data Delivery	Participant feedback required in regard to RM reports identified to be retired; are any of these reports utilised or business critical.	Pending	SWG Members	May 2019
9.7.6	Metering – Meter Data Delivery	AEMO to provide clarification for reporting in the cutover period, where the reports go across the 30min and 5min intervals, will reports display data for both 48 and 288 intervals.	Pending	AEMO	May 2019
10.9.4	General Questions	AEMO will consider approach and advise participants when error codes are proposed to be published.	Pending	AEMO	Jul 2019
10.9.5	General Questions	Present findings of Metering Focus Group discussion at next SWG.	Pending	AEMO	Jun 2019

# Actions to Close

Item	Topic	Action required	Action Update	Responsible	By
9.7.3	Matters for Noting – Item 7.9	Participant feedback regarding the proposed approach to revised MSATS error codes	Closed Participant feedback requested by 31 May.	AEMO	May 2019
9.9.1	General Questions	SWG members to provide feedback regarding SWG current and future engagement activities via <a href="mailto:5ms@aemo.com.au">5ms@aemo.com.au</a>	Closed Feedback received via SWG post-working group survey.	SWG Members	May 2019
10.2.1	Matters for Noting	Share notes from Reconciliation Support Workshop being held 22 May.  <a href="http://aemo.com.au/-/media/Files/Electricity/NEM/5MS/Program-Information/2019/Reconciliation-Support-Workshop.pptx">http://aemo.com.au/-/media/Files/Electricity/NEM/5MS/Program-Information/2019/Reconciliation-Support-Workshop.pptx</a>	Closed Meeting notes available on the AEMO 5MS website	AEMO	Jun 2019
10.4.1	Systems Work Stream Updates - Dispatch & Operations	Based on feedback, prepare table to identify technical specification documentation clearly, the package they relate to and the content.	Closed Addressed through SWG website update.	AEMO	Jun 2019

# Actions to Close

Item	Topic	Action required	Action Update	Responsible	By
10.9.1	General Questions	<p>Historical 5-min meter data – AEMO to investigate and clarify with procedures team.</p> <p><a href="http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Procedures-Workstream/Metering-package-2---MSATS-and-SLPs">http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Procedures-Workstream/Metering-package-2---MSATS-and-SLPs</a></p>	<p>Closed</p> <p>Metering Package 2 Metrology Part B contains a proposed estimation methodology that addresses this scenario. Package 2 first stage submissions are open until 24 June 2019</p>	AEMO	Jun 2019
10.9.2	General Questions	<p>Confirm with procedures group where details on Global Settlement are published for consultation.</p>	<p>Closed</p> <p>Global Settlements procedures changes are included in Metering Package 2. See above.</p>	AEMO	Jun 2019
10.9.3	General Questions	<p>Add Global Settlement as a general item to agenda to discuss the specifics of system changes and the impact to Global Settlement.</p>	<p>Closed</p> <p>Covered in this SWG</p>	AEMO	Jun 2019

# Matters for Discussion

Hamish McNeish

# Key Resources – Update

- Mal Borschman and Bhanu Rajan have finished up with the 5MS & GS team
- Sammy Wainrit is taking over the role as 5MS & GS IT Manager
- Website updates to new consultation and technical document layout have been completed

# Stakeholder Update – Participant Survey Feedback

- SWG survey results provided a good snapshot of participant views and areas AEMO can improve the approach to make the SWG more relevant/valuable.
- Areas to improve:
  - Meeting pack as a standalone document / resource
  - Provide details in advance for the discussion / information expected from participants
  - Links between milestones, procedures and technical specifications
  - Targeted approach to detailed technical discussions – ie. More focus groups
  - Focus on impacts to industry, not just AEMO

# Workstream Milestone changes – Impact Assessment Approach

- AEMO Impact Assessment – identify scope of impact to AEMO program
  - Specific scope impact (HLIA, Technical Documents)
  - Impact to L2 milestones
  - Risks
- AEMO is seeking feedback from SWG Members on impacts to participant program:
  - Schedule
  - Risks
- AEMO is seeking an indication of the potential impact level from SWG members - Low, Medium, High
- Where AEMO and/or participants identify a potential impact or risk this will be discussed at the PCF

# System Workstream – Metering

Jim Agelopoulos

# System Workstream - Metering

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
<b>METERING</b>										
PACKAGE 1 - Metering Data & Metrology										
<b>MDFF</b> • MDFF Specification NEM12 NEM13 v20	Aug-18	Oct-18	Oct-18	Nov-18	Jan-19	Apr-19 (TBC)	-	1-Dec-2019	Sep-20	Nov-20
PACKAGE 2 - MSATS & SLPs										
<b>Transition</b> • MSATS Release Schedule & Technical Specification	Aug-18	Sep-18	Aug-18	Nov-18	31-May-19	Jul-19 (At Risk)	-	-	-	-
<b>Meter Data - MDFF and MDMF</b> • MDM File Format and Load Process (Technical Specification) • MSATS Release Schedule & Technical Specification	Aug-18	Oct-18	Sep-18	Nov-18	31-May-19	Jul-19 (At Risk)	-	-	-	Nov-20
PACKAGE 3 - Miscellaneous										
<b>B2M via API</b> • MSATS Release Schedule & Technical Specification	Oct-18	-	Apr-19	09-May-19	31-May-19	30-Sep-19	Aug-19 TBC	30-Dec-19 TBC	Feb-20 TBC	Mar-20 TBC
<b>MSATS Browser (LVI) changes</b> • MSATS Release Schedule & Technical Specification	Item shifted into Systems Metering Package 3		May-19	Added missing date		Aug-19	TBC	Jul-20	Added TBC to expected date	
<b>MSATS Report changes</b> • MSATS Procedures MDM Procedure • MDM File Format and Load Process (Technical Specification) • MSATS Release Schedule & Technical Specification General Process & Document Clean-up	Oct-18	-	Apr-19	Apr-19	28-Jun-19 TBC	Aug-19 (At Risk)	TBC	Jul-20 TBC	Sep-20	Nov-20

General change Added calendar days where known

Likely impact from Metering Procedures Package 2

Item shifted into Systems Metering Package 3

Added missing date

Added TBC to expected date

# Level Two Milestones – Metering (External)

#ID	Level	Workstream	Milestone	Description	Date	Status	Notes
L2-M1	2	Retail	<i>AEMO internal Metering solution – Solution Design complete (internal)</i>	Solution Design phase for new AEMO Meter Data Management (MDM) and Profiling Allocation Engine (PAE) complete.	31-May-2019 17-Jun-2019	[Firm]	Internal delay, due to decision to continue analysis of elements of technical design in relation to performance, usability and cost. No impact to subsequent milestones.
L2-M2	2	Retail	Final Technical Specifications for Package 1 published by AEMO	Technical Specification for changes to MDFF NEM12 NEM13 as a result of 5MS and GS available to participants.	30-Apr-2019	Complete	Metering Package 2 has re-released this. The only change is AEMO added as a recipient of MDFF meter data.
L2-M3	2	Retail	Final Technical Specifications for Packages 2 published by AEMO	Technical Specification for changes to Transition, Meter Data Load – MDFF, <del>B2M via API</del> as a result of 5MS and GS available to participants.	31-Jul-2019 30-Sep-2019	[Firm]	Alignment with Metering Package 2
L2-M4	2	Retail	Final Technical Specifications for Package 3 published by AEMO	Technical Specification for introduction of B2M via API as well as changes to the MSATS Browser (LVI) and MSATS Report changes as a result of 5MS and GS available to participants.	31-Aug-2019	[Firm]	Scope adjustment – B2M via API now part of Package 3 (not Package 2)
L2-M5	2	Retail	Software Drop for Packages 1 & 2 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for Meter Data Load – MDFF and <del>B2M via API</del> available for participant testing.	01-Dec-2019	[Firm]	On Track
L2-M6	2	Retail	Agreement on requirements for Accreditation & Market Trial	Program agreement of the Accreditation requirements and process, and on market testing requirements and process.	31-Mar-2020	Provisional	Aligned with the MSP Accreditation Plan document
L2-M7	2	Retail	<i>AEMO internal Metering solution – Build complete (internal)</i>	Build phase for new AEMO Meter Data Management (MDM) and Profiling Allocation Engine (PAE) complete	30-Jun-2020	[Firm]	On Track
L2-M8	2	Retail	Software Drop for Package 3 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for B2M via API, MSATS Browser (LVI) and MSATS Report enhancements and available for participant testing.	31-Jul-2020	[Firm]	On Track
L2-M9	2	Retail	<i>AEMO internal Metering solution – Go Live complete (internal)</i>	Go Live date for new AEMO Meter Data Management (MDM) and Profiling Allocation Engine (PAE) complete	31-Oct-2020	Provisional	On Track
L2-M10	2	Retail	New MDFF format accepted by AEMO	AEMO deploys MDFF capable software to PROD, and all market participants can begin submitting files in the new MDFF format.	01-Nov-2020	Provisional	Dependent upon readiness strategy
L2-M11	2	Retail	Market Trial preparation completed by participants	All market participants who are required to submit five-minute meter reads are ready for market trials	30-Nov-2020	Provisional	Content and timing of Market Trials TBD
L2-M12	2	Retail	Market Trial preparation completed by AEMO	AEMO has deployed all relevant software to the 5MS pre-Production environment and is ready to deliver the agreed Market Trial scenarios	30-Nov-2020	Provisional	Content and timing of Market Trials TBD
L2-M13	2	Retail	Market Trials conclude	All relevant Market Participants have completed Market Trials to	31-May-2021	Provisional	Content and timing of Market Trials TBD

# Milestone Management – Metering - Level 2 – Review and Assess Impact

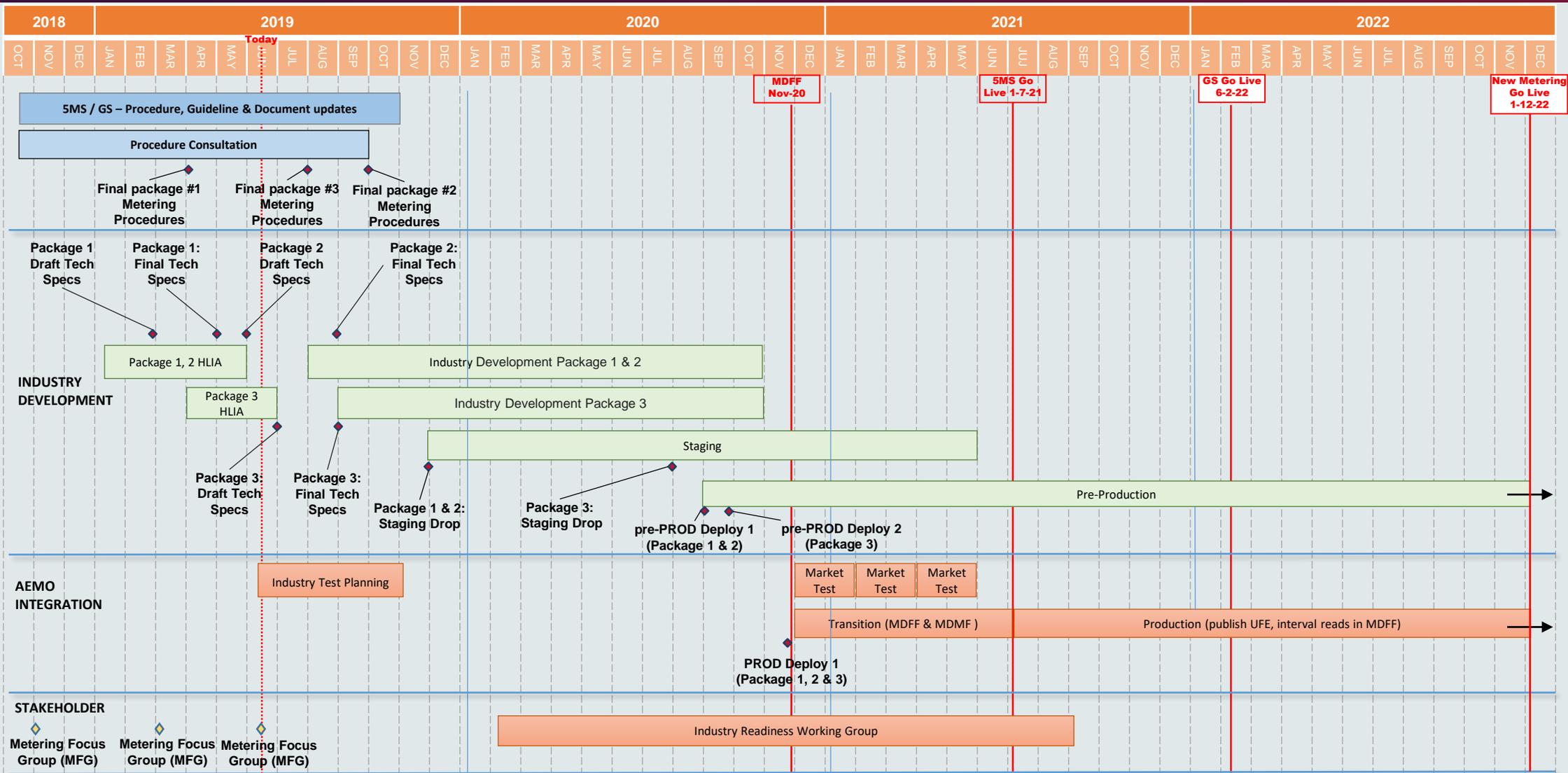
- AEMO seeking feedback on potential Milestone changes, as part of impact assessment

#ID	Milestone	Description	Date	Status	Notes	Who's Impacted by change	Scope and Schedule	Risk
L2-M1	<i>AEMO internal Metering solution – Solution Design complete (internal)</i>	Solution Design phase for new AEMO Meter Data Management (MDM) and Profiling Allocation Engine (PAE) complete.	<del>31-May-2019</del> 17-Jun-2019	[Firm]	Internal delay, due to decision to continue analysis of elements of technical design in relation to performance, usability and cost.	AEMO	10 business day delay No scope change  Schedule impact: internal milestone delay, no impact to external milestones	Very Low
L2-M2	Final Technical Specifications for Package 1 published by AEMO	Technical Specification for changes to MDFF NEM12 NEM13 as a result of 5MS and GS available to participants.	30-Apr-2019	Complete	Metering Package 2 has re-released this.  The only change is AEMO added as a recipient of MDFF meter data	MDPs AEMO	No scope or schedule impact - this was a oversight in Metering Package 1, and communicated in other documentation  AEMO recommends no schedule change – seeking participant feedback due to Metering Package 2 linkage.	None

# Milestone Management – Metering - Level 2 – Review and Assess Impact

#ID	Milestone	Description	Date	Status	Notes	Who's Impacted by change	Scope and Schedule	Risk
L2 - M3	Final Technical Specifications for Package 2 published by AEMO	Technical Specification for changes to Transition, Meter Data Load – MDFF, B2M via API as a result of 5MS and GS available to participants.	<del>31-Jul-</del> 2019 30-Sep-2019	[Firm]	Alignment with Metering Package 2	Directly: MDPs AEMO  Indirectly: Retailers Generators	Scope change: B2M via API now part of Package 3 (not Package 2)  Schedule change: Delay in MDM Load and Processing Technical specification  AEMO recommendation: Assess further after initial Metering Package 2 feedback	High risk, depends on responses to Metering Package 2 first stage (24 <sup>th</sup> June)  Option to separate “MDM File Load and Processing” document and Transition
L2 - M4	Final Technical Specifications for Package 3 published by AEMO	Technical Specification for introduction of B2M via API as well as changes to the MSATS Browser (LVI) and MSATS Report changes as a result of 5MS and GS available to participants.	<del>31-Aug-</del> 2019 30-Sep-2019	[Firm]	Scope adjustment – B2M via API now part of Package 3 (not Package 2)	MDPs Retailers Generators Distributors AEMO	Scope change: B2M via API now part of Package 3 (not Package 2)  Schedule change: No schedule change  AEMO recommendation: Assess further after initial Metering Package 2 feedback	Medium risk, depends on responses to Metering Package 2 first stage.  RM reports and browser screens may be impacted by changes in Metering Package 2 particularly for Global Settlement.

# 5MS Participant Timeline – Metering



# System Workstream – Dispatch and Operations

Ian Davaney

# System Workstream - Dispatch

5 MINUTE SETTLEMENT SYSTEMS TRACKING	TIMING									
	Internal HLIA	Focus/Group	SWG Engagement	External HLIA	Draft Tech Spec	Final Tech Spec	User Guides	5MS Staging	Preprod	Production
<b>DISPATCH AND OPERATIONS</b>										
<b>PACKAGE 1 - Bidding FTP and API</b>										
Transition	Aug-18	Oct-18	Aug-18	Nov-18	Dec-18	02-Apr-19	Oct-19	29-Nov-19	Nov-20	Mar-21
Bidding Data Model	Aug-18	-	Sep-18	Mar-19	Dec-18	02-Apr-19	Oct-19	29-Nov-19	Nov-20	Mar-21
Bidding Format	Aug-18	-	Sep-18	Nov-18	Dec-18	02-Apr-19	Oct-19	29-Nov-19	Nov-20	Mar-21
<b>PACKAGE 2 - Bidding Web UI</b>										
Bidding Web UI and APIs	Aug-18	Nov-18	Dec-18	Jan-19	Mar-19	31-Jul-19	Oct-19	29-Nov-19	Nov-20	Mar-21
<b>PACKAGE 3 - Dispatch, Pre-dispatch and PASA</b>										
Dispatch	Aug-18	-	Oct-18	Nov-18	Oct-18	02-Apr-19	-	29-Nov-19	Nov-20	Mar-21
Predispatch P30/7DAY	Aug-18	-	Oct-18	Nov-18	Oct-18	02-Apr-19	-	29-Nov-19	Nov-20	Mar-21
Predispatch P5	Nov-18	Oct-18	Nov-18	TBC	TBC	TBC	-	TBC	Nov-20	May-21
ST and PD PASA	Aug-18	-	Oct-18	Nov-18	Oct-18	02-Apr-19	Oct-19	29-Nov-19	Nov-20	Mar-21
<b>PACKAGE 4 - Pricing and Miscellaneous</b>										
Trading Price / Price Revision	Aug-18	-	Feb-19	Nov-18	Mar-19	31-Jul-19	-	15-May-20	Nov-20	May-21
Administered Pricing and CPT	Aug-18	-	Feb-19	Dec-18	Mar-19	31-Jul-19	-	<b>Changed from TBC</b>  <b>Includes Data Model scripts</b>	Nov-20	May-21
Suspension Pricing	Sep-18	-	Feb-19	Dec-18	Mar-19	31-Jul-19	-		Nov-20	May-21
Negative Residue Management	Sep-18	-	Feb-19	Dec-18	Jun-19	31-Jul-19	-		Nov-20	May-21
RERT	Oct-18	TBC	TBC		TBC	TBC	TBC		Nov-20	May-21
<b>PACKAGE 5 - Full Data Model</b>										
Full Data Model	Sep-18	Ongoing	Ongoing	Apr-19	Ongoing	31-Jan-20	Oct-20	29-Nov-19	Nov-20	May-21

# Level Two Milestones - Dispatch

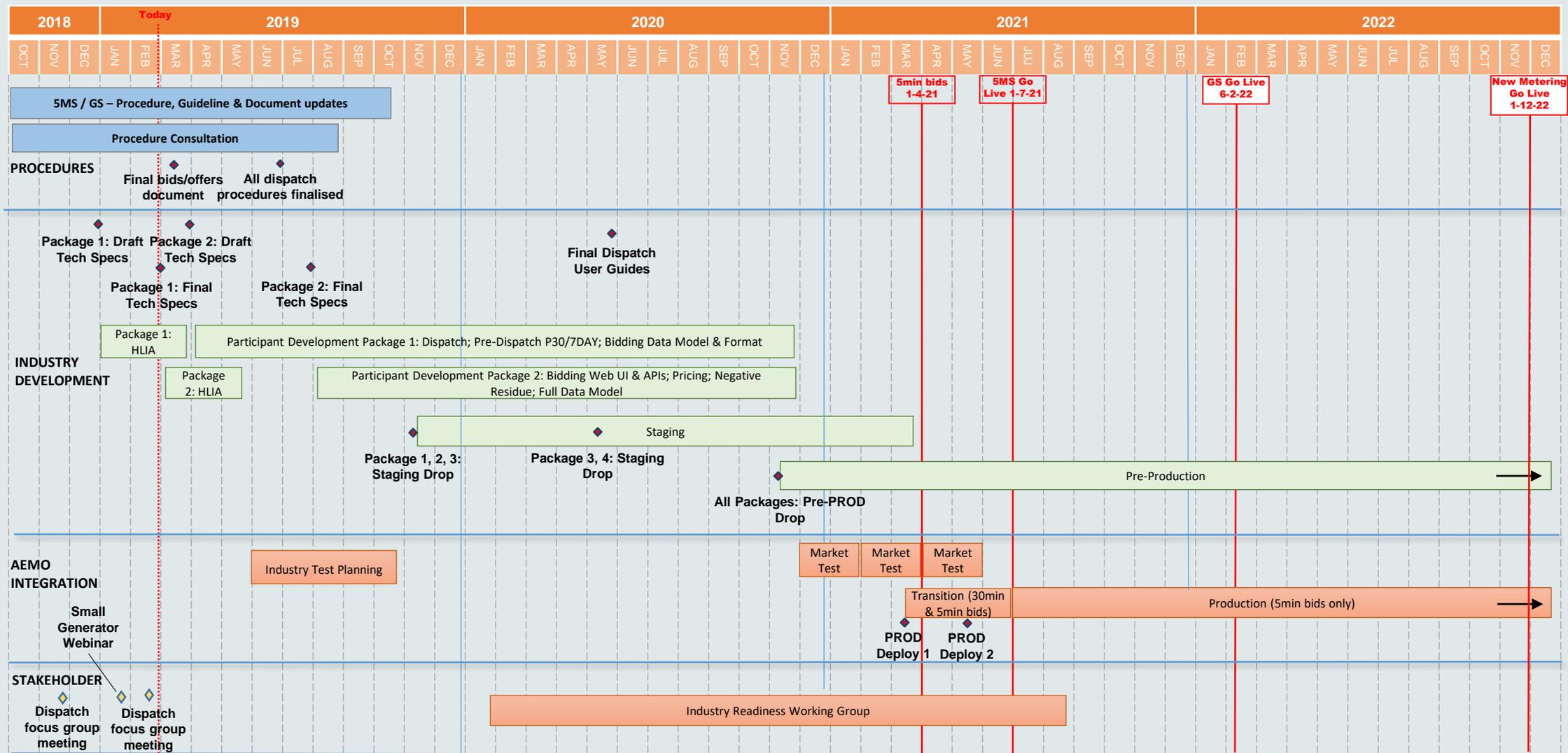
#ID	Level	Workstream	Milestone	Description	Date	Status	Notes
L2-D1	2	Dispatch	Final Technical Specifications for Package 1 published by AEMO	Technical Specification for changes to Dispatch, Pre-dispatch P30/7DAY, ST PASA, Bidding Data Model and Bidding Format as a result of 5MS and GS available to participants.	2-Apr-2019	[Firm]	Final now published. Delay of 2 days due with confirmation of API naming standard taking longer than expected.
L2-D2	2	Dispatch	Final Technical Specifications for Package 4 published by AEMO	Technical Specification for changes to the Bidding Web UI and APIs as a result of 5MS and GS available to participants.	31-Jul-2019	[Firm]	Package 4, not 2.
L2-D3	2	Dispatch	Software Drop for Packages 1,2 & 3 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for Dispatch, Predispatch P30/7DAY, ST PASA, Bidding Data Model and Bidding Format, Bidding Web UI and APIs and Predispatch P5.	29-Nov-2019	[Firm]	On Track
L2-D5	2	Dispatch	Software Drop for Package 4 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for RERT, Trading Price / Price Revision, Administrated Pricing and CPT, Suspension Pricing, Negative Residue Management, data model for Dispatch	15-May-2020	[Firm]	
L2-D4	2	Dispatch	<i>Development completed (internal)</i>	All AEMO internal development work has completed for the Dispatch stream	31-May-2020	[Firm]	On Track
L2-D6	2	Dispatch	<i>UAT completed (internal)</i>	All AEMO internal UAT has completed for the Dispatch stream	30-Nov-2020	[Firm]	
L2-D7	2	Dispatch	Market Trial preparation completed	All market participants who are required to submit 5MS bids and offers are ready for market trials	30-Nov 2020	Provisional	Content and timing of Market Trials TBD
L2-D8	2	Dispatch	Market Trial preparation completed	AEMO has software deployed to pre-production environment and is ready to deliver the agreed Market Trail scenarios	30-Nov 2020	Provisional	Content and timing of Market Trials TBD
L2-D9	2	Dispatch	5-min Bidding Phased Go Live Begins	Participants can begin submitting 5-min bids to the market	01-Apr-2021	Provisional	
L2-D10	2	Dispatch	Market Trial conclude	Market Trial scenarios related to dispatch have been completed	31-May-2021	Provisional	Content and timing of Market Trials TBD
L2-D11	2	Dispatch	30-min Bidding no longer accepted by AEMO	All Wholesale market Participants now submitting five-minute bids and offers to AEMO	01-Jul-2021	Mandatory	
L2-D12	2	Dispatch	Final Technical Specifications for Package 4 published by AEMO	Technical Specification for changes to Pricing (and Miscellaneous) as a result of 5MS and GS available to participants.	31-Jul-2019	[Firm]	
L2-D13	2	Dispatch	Final Technical Specifications for Package 5 published by AEMO	Technical Specification for changes to the full data model as a result of 5MS and GS available to participants.	31-Jan-2020	[Firm]	

# Milestone Management – Dispatch - Level 2

- Two new Dispatch Level Two Milestones

#ID	Level	Workstream	Milestone	Description	Target Date	Status	Notes
L2-D12	2	Dispatch	Final Technical Specifications for Package 4 published by AEMO	Technical Specification for changes to Pricing (and Miscellaneous) as a result of 5MS and GS available to participants.	31-Jul-2019	[Firm]	New
L2-D13	2	Dispatch	Final Technical Specifications for Package 5 published by AEMO	Technical Specification for changes to the full data model as a result of 5MS and GS available to participants.	31-Jan-2020	[Firm]	New

# 5MS Participant Timeline - Dispatch



# System Workstream – Settlements

Hamish McNeish

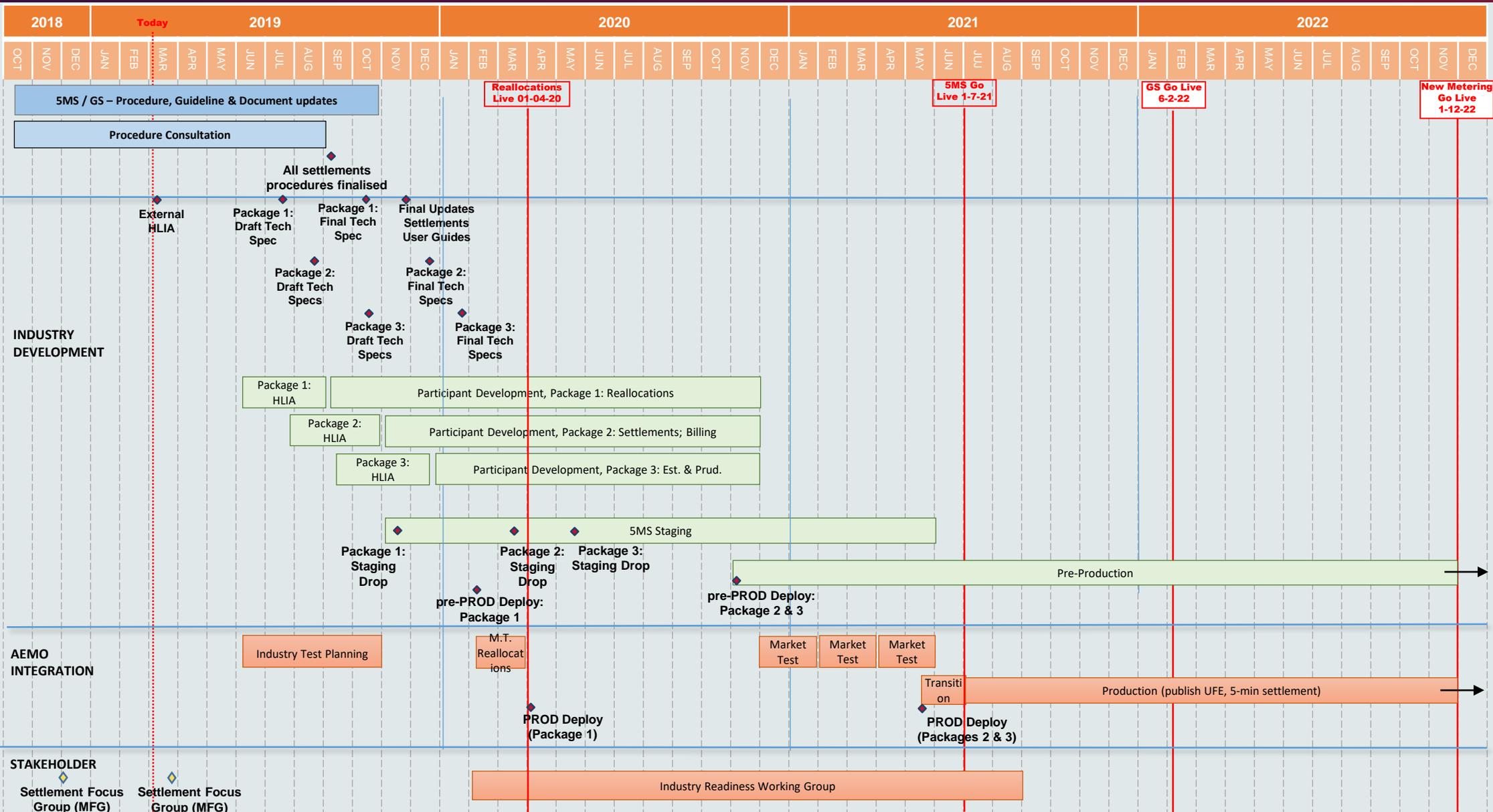
# System Workstream – Settlement and Operations

5 MINUTE SETTLEMENT SYSTEMS TRACKING	TIMING									
	Internal HLIA	Focus/Group	SWG Engagement	External HLIA	Draft Tech Spec	Final Tech Spec	User Guides	5MS Staging	Preprod	Production
<b>SETTLEMENTS</b>										
<b>PACKAGE 1 - Reallocations</b>										
Reallocation	Dec-18	Nov-18	Dec-18	Mar-19	Jul-19	Oct-19	Nov-19	Nov-19	Mar-20	Apr-20
<b>PACKAGE 2 - Settlements and Billing</b>										
Settlements	Oct-18	Nov-18	Dec-18	Mar-19	Aug-19	Dec-19	-	Mar-20	Nov-20	May-21
Billing	Oct-18	Nov-18	Dec-18	Mar-19	Aug-19	Dec-19	-	Mar-20	Nov-20	May-21
<b>PACKAGE 3 - Prudentials and Estimation</b>										
Prudentials	Sep-18	Nov-18	Dec-18	Mar-19	Oct-19	Jan-20	Nov-19	May-20	Nov-20	May-21
Estimation	Oct-18	Nov-18	Dec-18	Mar-19	Oct-19	Jan-20	-	May-20	Nov-20	May-21
Full Data Model	Refer DISPATCH									

# Level Two Milestones - Settlements

#ID	Level	Workstream	Milestone	Description	Date	Status	Notes
L2-D1	2	Settlements	Final Technical Specifications for Package 1 published by AEMO	Technical Specification for changes to Reallocation as a result of 5MS and GS available to participants.	15-Oct-2019	[Firm]	On Track
L2-D2	2	Settlements	Software Drop for Package 1	Software deployed into the 5MS Staging environment for Reallocations.	01-Nov-2019	[Firm]	On Track
L2-D3	2	Settlements	Final Technical Specifications for Package 2 published by AEMO	Technical Specification for changes to Settlements and Billing as a result of 5MS and GS available to participants.	15-Dec-2019	[Firm]	On Track
L2-D4	2	Settlements	Final Technical Specifications for Package 3 published by AEMO	Technical Specification for changes to Prudentials as a result of 5MS and GS available to participants.	31-Jan-2020	[Firm]	On Track
L2-D5	2	Settlements	<i>Development completed (internal)</i>	All AEMO internal development work has completed for Settlements stream	31-May-2020	[Firm]	On Track
L2-D6	2	Settlements	Software Drop for Package 2 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for Settlements and Billing.	16-Mar-2020	[Firm]	On Track
L2-D7	2	Settlements	Software Drop for Package 3 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for Estimations and Prudentials.	15-May-2020	[Firm]	On Track
L2-D8	2	Settlements	Industry Testing for Reallocations	Required market participants have completed industry testing for the upgraded reallocations web portal.	13-Mar-2020	[Provisional]	Content of Market Trials TBD
L2-D9	2	Settlements	<i>UAT completed (internal)</i>	All AEMO internal UAT has completed for Settlements stream	30-Nov-2020	[Firm]	
L2-D10	2	Settlements	Market Trial preparation completed by participants	All market participants who will receive Wholesale settlement invoicing are ready for market trials.	30-Nov-2020	Provisional	Content and timing of Market Trials TBD
L2-D11	2	Settlements	Market Trial preparation completed by AEMO	AEMO has deployed all relevant software to the 5MS pre-Production environment and is ready to deliver the agreed Market Trial scenarios.	30-Nov-2020	Provisional	Content and timing of Market Trials TBD
L2-D12	2	Settlements	Reallocations Go Live	AEMO has deployed reallocation software to the PROD environment and 5-minute reallocation requests are enabled.	01-Apr-2020	Provisional	
L2-D13	2	Settlements	Market Trials conclude	All relevant Market Participants have passed the Market Trial for Settlements	31-May-2021	Provisional	Content and timing of Market Trials TBD

# 5MS Participant Timeline – Settlements



# Global Settlements

Blaine Miner

# 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')

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

**6 February  
2022**

GS begins

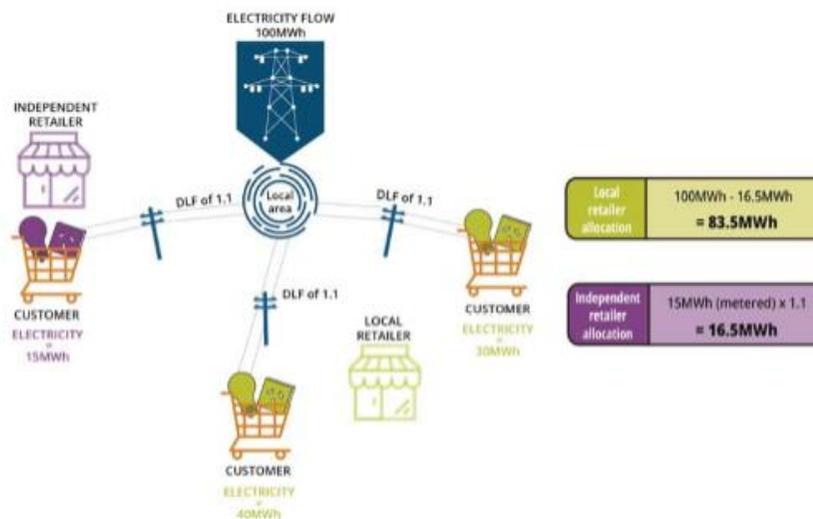
**1 March  
2022**

AEMO's first annual report on UFE trends

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

# Settlements by Difference vs Global Settlements

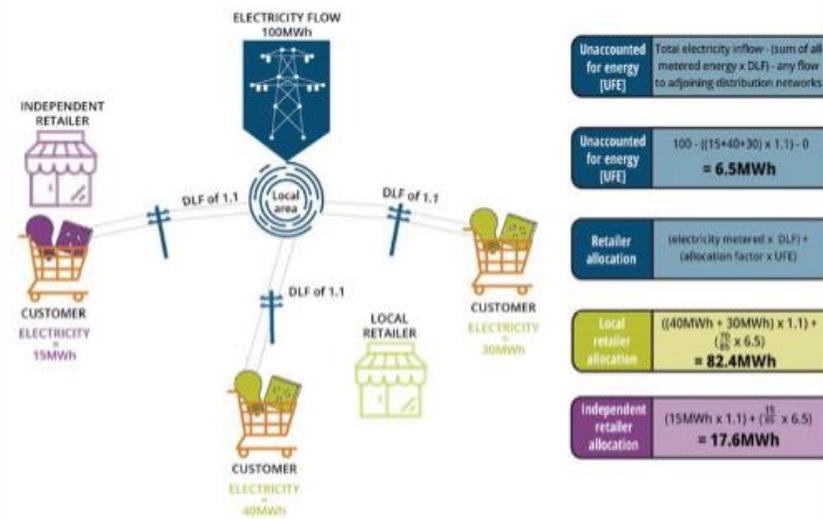
## Settlement by difference



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

# Global Settlements - UFE Publication Requirement

Topic	Consideration
UFE Publication	<p>AEMO is required under the GS Rule to report on UFE from 1 July 2021</p> <ul style="list-style-type: none"> <li>No financial impact from the allocation of UFE until 6 Feb 2022</li> <li>5min Settlement by Difference to occur from 1 July 2021 to 5 Feb 2022</li> </ul>
1st tier NMIs	NMI/Metering standing data to be activated and maintained in MSATS
	1st tier accumulation metering data (forward estimates) to be delivered to AEMO at least one full reading cycle prior to 1 July 2021, to allow for appropriate allocation
	Provision for interval Import and Export Reactive energy (kVarh)
	Capability and capacity to profile all accumulation meter reads within required timings
Non-Contestable unmetered loads	Load and Inventory tables to be updated in MSATS by DNSPs, as required
	<p>NMI/Metering standing data to be created and maintained in MSATS</p> <ul style="list-style-type: none"> <li>NMI creation process TBC e.g. 1 NMI to 1 device or 1 NMI to multiple devices</li> </ul>
	Calculated 5min metering data to be provided by MDPs to AEMO and participants via MDFF

# Global Settlements - UFE Publication Requirement

Topic	Consideration
New Codes to be introduced	7 new NMI Classification Codes being proposed to support various connection point scenarios
	Affected existing NMIs will need to be updated, and participants notified, by 1 July 2021
	New Meter Installation Type code being proposed to support Non-contestable unmetered loads
AEMO to publish information to allow UFE verification	<p>How will AEMO publish UFE information?</p> <ul style="list-style-type: none"> <li>• Changes required to RM and Settlement reports               <ul style="list-style-type: none"> <li>• Settlement Reports                   <ul style="list-style-type: none"> <li>• A new column will appear in the settlement report (SR) displaying the apportioned UFE in the energy transaction section</li> <li>• UFE dollars will not be published in the SR, UFE energy values will be</li> <li>• UFE will be recalculated and reallocated for each settlement cycle</li> </ul> </li> <li>• RM Reports                   <ul style="list-style-type: none"> <li>• New RM 43 report - UFE factors by profile area report being created to provide UFE by TNI and profile area.                       <ul style="list-style-type: none"> <li>• Option to automatically trigger and deliver or manually request</li> </ul> </li> <li>• Report delivery and format</li> </ul> </li> </ul> </li> </ul>
	How will Market Customers consume and verify the UFE information provided?

# Global Settlements - Financial Settlement Requirement

Topic	Consideration
Financial Settlement	UFE load will be financially settled from 6 Feb 2022
Changes to metering data access	Tier 2 metering data will no longer be delivered to LRs by MDPs from the commencement of GS (6 Feb 2022)
	TNI/BULK metering data will no longer be delivered to LRs/FRMPs by MDPs from the commencement of GS (6 Feb 2022)
	Bulk changes to LR and FRMP standing data as of 6 February 2022
	How will these changes impact participant's load aggregation processes?
Customer products	How will participants recover UFE charges from customers?
	When will these pricing considerations need to be implemented by?
AEMO Trend reporting 1 Mar 2022	How will AEMO and Market Customers reduce UFE? E.g. Impact of profiling errors, forward estimates vs profiling imperfections
	<p>The initial report will have its constraints due to:</p> <ul style="list-style-type: none"> <li>• Most trading weeks from 1 July 2021 to March 2022 not having reached R2 status yet</li> <li>• Effects of seasonality not being able to be analysed since only 6mths of data will be available</li> <li>• The potential of fundamental standing and metering data not being fully in place by 1 July 2021</li> </ul>
	<ul style="list-style-type: none"> <li>• What will participants want to see in these reports and how should they be delivered</li> </ul>

# Metering Focus Group Outcomes

Blaine Miner

# Metering Focus Group #6

## Metering Procedures – 14 Jun

- Topics Discussed
  - Metering Consultation Update
  - MSATS Standing Data Scenarios
  - Treatment of Non-Contestable Unmetered Loads
  - Metering Data Quality and Quantity Requirements
  - Changes to RM Reports
  - Readiness Workstream
  - Preparing for 1 July 2021

# Metering Focus Group #6

## Metering Procedures – 14 Jun

Topic	Key Items
Metering Consultation Update	<ul style="list-style-type: none"> <li>• Metering Package 2 First stage submissions close 24 June 2019</li> <li>• Metering Package 3 to be published for comment by the end of June</li> </ul>
MSATS Standing Data Scenarios	<ul style="list-style-type: none"> <li>• Over 30 unique standing data scenarios identified to date, to support the accurate allocation of energy from 1 July 2021               <ul style="list-style-type: none"> <li>• AEMO UFE Publication obligation under the GS Rule</li> </ul> </li> <li>• Scenario categories considered: transmission connected, distribution connected, cross boundary/border, embedded networks and load/generators</li> <li>• 7 new NMI Classification Codes and one Metering Installation Code being proposed</li> <li>• Scenarios also considered changes to Participant Relationships i.e. LR and FRMP from 6 Feb 2022</li> </ul>
Non-Contestable Unmetered Loads	<ul style="list-style-type: none"> <li>• Discussed how these loads will be administered in MSATS, PE cells vs non-PE cells</li> <li>• The relationship between NMIs and devices e.g. 1 to many</li> <li>• How the size and profile of these loads will be agreed between the customer, DNSPs, Retailers and AEMO and subsequently maintained</li> </ul>
Metering Data Quality and Quantity Requirements	<ul style="list-style-type: none"> <li>• Current arrangements are not adequate to achieve the required level of accuracy in the NEM settlement process in a 5MS/GS environment               <ul style="list-style-type: none"> <li>• They don't delineate between remotely read meters and manually read meters</li> <li>• They don't reflect the expected level of improvement in both the quantity and quality of settlement ready data delivered between the settlement</li> </ul> </li> </ul>

# Metering Focus Group #6

## Metering Procedures – 14 Jun

Topic	Key Items
Changes to RM Reports	<ul style="list-style-type: none"> <li>• Changes to reports (add/modify/retire)</li> <li>• How to request reports in the future</li> <li>• How reports will be delivered</li> <li>• Expected report formats</li> </ul>
Readiness Workstream	<ul style="list-style-type: none"> <li>• Scope and priorities of the RWG</li> <li>• Indicative dates of key artefacts, strategies, plans, etc.</li> <li>• First meeting 27 June and then monthly afterwards</li> <li>• RWG rep requirements i.e. what must the reps be able to represent</li> <li>• Potential RWG sub-groups</li> </ul>
Preparing for 1 July 2021	<ul style="list-style-type: none"> <li>• Ongoing discussion including activities to support:</li> <li>• UFE Publication requirements, from 1 July 2021, e.g. bulk updates of NMI Class Codes, activation of 1<sup>st</sup> accumulation metered NMIs, provisioning of first tier forward estimates pre 1 July 2021 and the provisioning of NCULs in MSATS</li> <li>• Changes in the delivery of metering data to AEMO e.g. bulk updates to CNDS records to transition from Net datastreams to register level and the accurate reflection of metering configuration in the MDFF files</li> <li>• The reconfiguration/replacement of type 1, 2,3 and subset of 4 meters e.g. data storage assessments, Participant specific data aggregation requirements pre and post 1 July 2021</li> </ul>

# MSATS Standing Data Scenarios

Simon Tu

# MSATS Standing Data Scenarios - Actions Required

Item	Action required	Responsible	Required By
<b>New NMI Classification Code</b>	All new NMI Classification Codes will be available from 1/12/2020	LNSP & ENM	From 1/12/2020
<b>Battery NMI Classification Code</b>	Update existing Transmission connected Battery NMI to 'THYBRID' and make the second NMI 'Extinct'	LNSP	Prior to 1/7/2021
<b>Note:</b> A registrations impact has been identified for this new code type	Update existing Distribution and Embedded Network connected Battery NMI to 'DHYBRID' and made the second NMI 'Extinct'	LNSP & ENM	
<b>TNI NMI Classifications Code</b>	Update existing TNI NMI (WHOLESALE) to 'BULK'	AEMO (tbc)	Prior to 1/7/2021
<b>Generator NMI Classification Code</b>	Transmission connected 'GENERATR' no change	No Action	
	Update existing Distribution and Embedded Network connected Generator to 'DGENERATR'	LNSP & ENM	Prior to 1/7/2021

# MSATS Standing Data Scenarios - Actions Required

Item	Action required	Responsible	Required By
<b>Small Generator Aggregator Classification Code</b>	<p>Transmission will not have any Small Generator Aggregators</p> <p>Update Existing Distribution and Embedded Network connected Small Generator Aggregator to 'SGA'</p>	<p>No Action</p> <p>LNSP &amp; ENM</p>	<p>Prior to 1/7/2021</p>
<b>Non-contestable Unmetered Load Classification Codes</b>	<p>Register all Non-contestable Unmetered Loads within MSATS using the NMI Classification Code to 'NCONUML' and the Meter Installation Type Code to 'NCONUML'</p>	<p>LNSP</p>	<p>Prior to 1/7/2021</p>
<b>Cross Boundary Classification Codes</b>	<p>Update existing Distribution to Distribution Cross Boundary NMI from WHOLESAL to 'XBOUNDARY' (excludes low voltage cross boundary services)</p> <p>All High Voltage Cross Boundary NMI's will be Metered and register in MSATS with a NMI Classification Code of 'XBOUNDARY'</p> <p>Cross Boundary connections require a NMI to be create for each Distribution Area with different TNI codes for each area</p>	<p>LNSP</p> <p>LNSP, MC, MP</p> <p>LNSP, MC, MP</p>	<p>Prior to 1/7/2021</p>

# MSATS Standing Data Scenarios - Actions Required

Item	Action required	Responsible	Required By
<b>Tier 1 Meter Data</b>	Ensure all Tier 1 NMI's have an active NMI data stream in MSATS	MC, MDP	Prior to 1/7/2021
	Provide Tier 1 Metering data, including forward estimates, to 'NEMMCO' one full reading cycle prior to 1/07/2021	MDP	
<b>Type 4a, 5, 6, 7 and NCONUML metering</b>	Provide Metering data, including forward estimates, to 'NEMMCO' one full reading cycle prior to 1/07/2021	MDP	Prior to 1/7/2021
<b>Local Retailer (LR) Update</b>	LR role on NMIs directly connected to the Distribution network will be updated to 'GLOPOOL' (under investigation by AEMO)	AEMO (tbc)	From 6/02/2022
		No Action	
	Market Notification <u>WILL NOT</u> be sent to Participants to prevent market stop files		
	Participants will need to update the LR Role in their own systems	Participants	
<b>Financially Responsible Market Participant (FRMP) Update</b>	FRMP role on all TNI and Cross Boundary NMIs will be updated to 'GLOPOOL' (under investigation by AEMO)	AEMO (tbc)	From 6/02/2022
	Market Notification <u>WILL</u> be sent to Participants due to the limited number of updates	No Action	

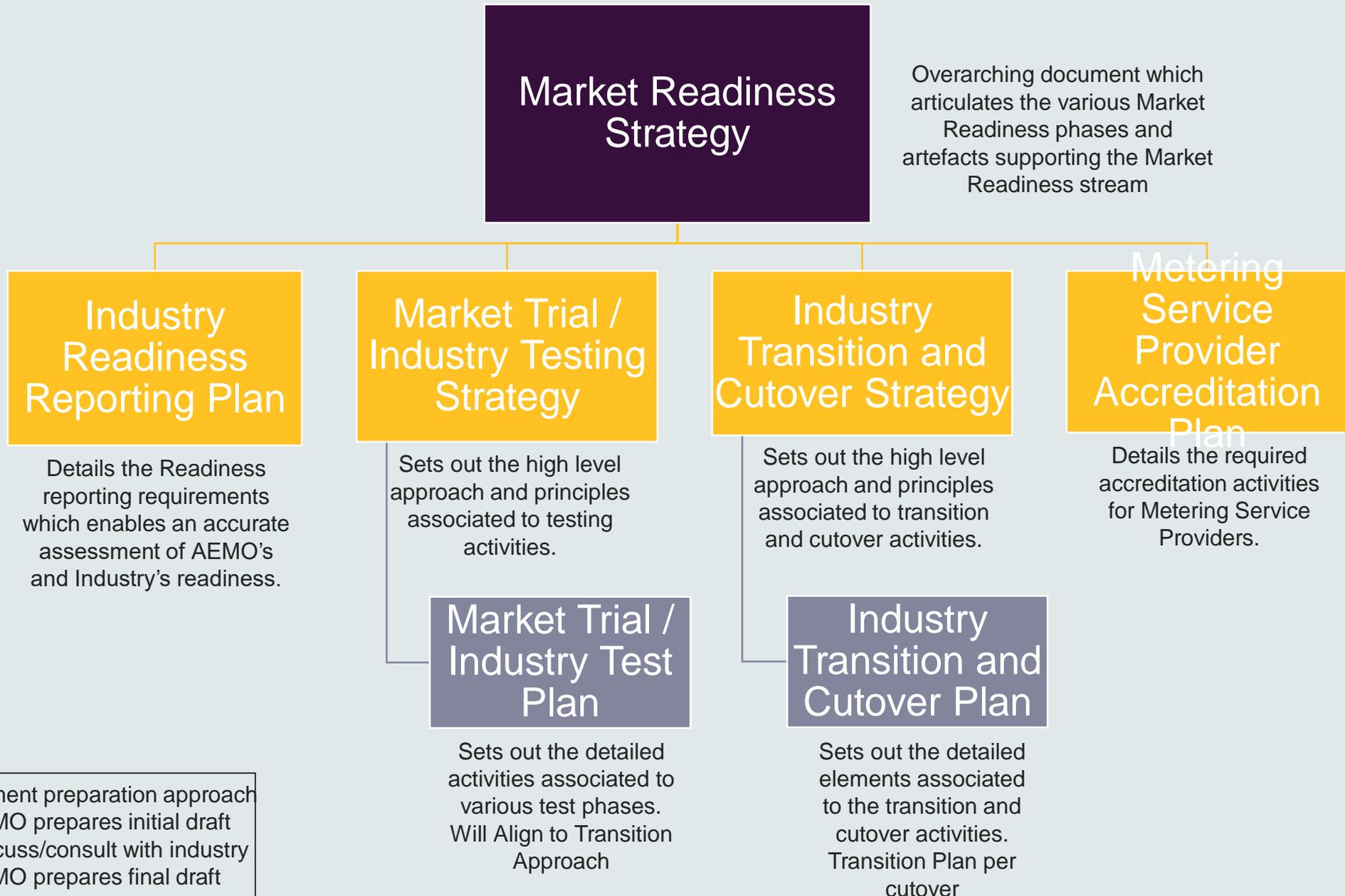
# Ongoing Consultation – MSATS Standing Data

- Further detail provided in the appendix to the slide pack
- Significant level of detail. Seeking participant feedback regarding approach to further engagement.
  - eg. focus group session

# Readiness Working Group Update

Greg Minney

# 5MS/GS Readiness



# Work Group Engagement – Initial Priorities

Meeting	Date	Meeting Topics	Deliverables for Consultation	Draft Date	Deliverables Finalised (post Consultation)	Draft Date
<b>Initial Meeting</b>	June	Work Group Expectations Objectives of Market Readiness Scope of Readiness Work Stream and AEMO Approach Ground Rules for Work Group Interaction Deliverables / Timing and priority				
<b>Meeting 2</b>	July	Market Readiness Strategy Input Deliverables / Timing Feedback Transition Principles and Approach Input Testing Phases and Approach Interim Readiness Reporting Approach	Market Readiness Strategy	30/08/2019		
<b>Meeting 3</b>	August	Feedback on Transition Principles / Timing Market Trial Strategy Input Interim Readiness Reporting approach/ criteria/ timing	Industry Test Strategy Transition and Go-Live Strategy	2/9/2019 27/09/2019		
<b>Meeting 4</b>	September	Principles for Industry Readiness Reporting Initial Issues and Risks Workshop			Industry Test Strategy	30/10/2019

# Technical Document Update

Hamish McNeish  
Simon Tu

# Technical Document Timeline – June to July 2019

Date	Document	Comment
20 May 19	Metering Package 2 released. Includes technical documents: - MDM Processing and Load - MDFF NEM12 and NEM13	<b>Managed by 5MS Procedures Working Group (PWG)</b> <ul style="list-style-type: none"> <li>• Submissions due 24<sup>th</sup> Jun 19</li> <li>• Final version due 30<sup>th</sup> Sep 19</li> </ul>
31 May 19	1 <sup>st</sup> draft of MDFF and MDM processing - 5MS MSATS Technical Specification	<ul style="list-style-type: none"> <li>• Feedback due 14<sup>th</sup> Jun 19</li> <li>• Final version due 30<sup>th</sup> Sep 19</li> </ul>
By 28 Jun 19	1 <sup>st</sup> draft of MSATS Browser and RM reports - 5MS MSATS Technical Specification	<ul style="list-style-type: none"> <li>• Feedback due 2 weeks after release</li> <li>• Final version due 30<sup>th</sup> Sep 19</li> </ul>
By 28 Jun 19	2 <sup>nd</sup> draft of Web Bidding APIs, Pricing and Mandatory Restrictions - 5MS EMMS Technical Specification	<ul style="list-style-type: none"> <li>• Feedback due 2 weeks after release</li> <li>• Final version due 31<sup>st</sup> Jul 19</li> </ul>
By 31 Jul 19	1 <sup>st</sup> draft of Reallocations - 5MS EMMS Technical Specification	<ul style="list-style-type: none"> <li>• Feedback due 2 weeks after release</li> <li>• Final version due 31<sup>st</sup> Oct 19</li> </ul>
By 31 Jul 19	Final of Web Bidding APIs, Pricing and Mandatory Restrictions - 5MS EMMS	<ul style="list-style-type: none"> <li>• Feedback due 2 weeks after release</li> </ul>

# Feedback for Technical Documents

## **5MS Systems High Level Impact Assessment (HLIA)**

- v0.8 – Browser and RM reports added

## **5MS MSATS Technical Specification**

- v0.12 – MDFF and MDM processing

# Forward Meeting Plan

Hamish McNeish

# Upcoming SWG Meeting Content

- Seeking feedback for proposed content/topic areas

Date	Meeting	Proposed Content
Mon, 15 July 19	SWG#12	<ul style="list-style-type: none"><li>• <b>Discussion</b><ul style="list-style-type: none"><li>• Settlements: Reallocations [overview]</li><li>• Metering: Procedures Package 2 [submission feedback]</li><li>• Metering: Focus Group #6 full debrief</li></ul></li><li>• <b>Technical Specifications</b><ul style="list-style-type: none"><li>• Dispatch: Web Bidding APIs, Pricing and Mandatory Restrictions [feedback review]</li><li>• Metering: MSATS Browser and RM reports [feedback review]</li></ul></li></ul>
Mon, 19 Aug 19	SWG#13	<ul style="list-style-type: none"><li>• <b>Discussion</b><ul style="list-style-type: none"><li>• <b>To be confirmed</b></li></ul></li><li>• <b>Technical Specifications</b><ul style="list-style-type: none"><li>• Settlements: Reallocations specification [feedback review]</li></ul></li></ul>
Mon, 17 Sept 19	SWG#14	<ul style="list-style-type: none"><li>• <b>Discussion</b><ul style="list-style-type: none"><li>• <b>To be confirmed</b></li><li>• Bidding Web UI Walkthrough (tentative)</li></ul></li><li>• <b>Technical Specifications</b><ul style="list-style-type: none"><li>• Settlements: Settlements and Billing specification [feedback review]</li></ul></li></ul>

# Upcoming Meetings

- Systems Working Group
  - SWG #12 - Mon, 15 July 2019
- Focus groups:
  - Participants to advise of key areas for focus group sessions (if required)
    - eg: MSATS Standing Data Scenarios
- Other AEMO IT Meetings
  - None scheduled
- 5MS Meetings and Forum Dates:
  - Updated to December 2019
  - <http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement>

# Upcoming meetings

Meetings and forum dates:

<http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement>

JUNE							JULY						
Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
26	27	28	29	30	31	1	30	1	2	3	4	5	6
2	3	4	5	6	7	8	7	8	9	10	11	12	13
9	10	11	12	13	14	15	14	15	16	17	18	19	20
16	17	18	19	20	21	22	21	22	23	24	25	26	27
23	24	25	26	27	28	29	28	29	30	31	1	2	3
30	1	2	3	4	5	6	4	5	6	7	8	9	10

Forums/Working Groups
Executive (EF)
Program Consult. (PCF)
Procedures (PWG)
Systems (SWG)
Readiness (RWG)

Focus Groups
Dispatch
Metering
Settlements
Reconciliation
Other
Information Sessions

National Public Holiday
State Public Holiday

# General Questions

Hamish McNeish

# Further information

- AEMO 5MS Program contacts:
  - Sammy Wainrit – Wholesale Lead
    - Sammy Wainrit – Settlements
    - Ian Devaney – Dispatch & Bidding
    - Grant Collins – Infrastructure
  - Hamish McNeish – Technical Advisor
  - Jim Agelopoulos – Retail Lead
  - Monica Morona – Stakeholder Engagement
- Contact details:
  - 5MS email: [5ms@aemo.com.au](mailto:5ms@aemo.com.au)
  - 5MS webpage: <http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement>

# Appendix 1 – Global Settlement

MSATS Standing Data Scenarios

# MSATS Standing Data Scenarios

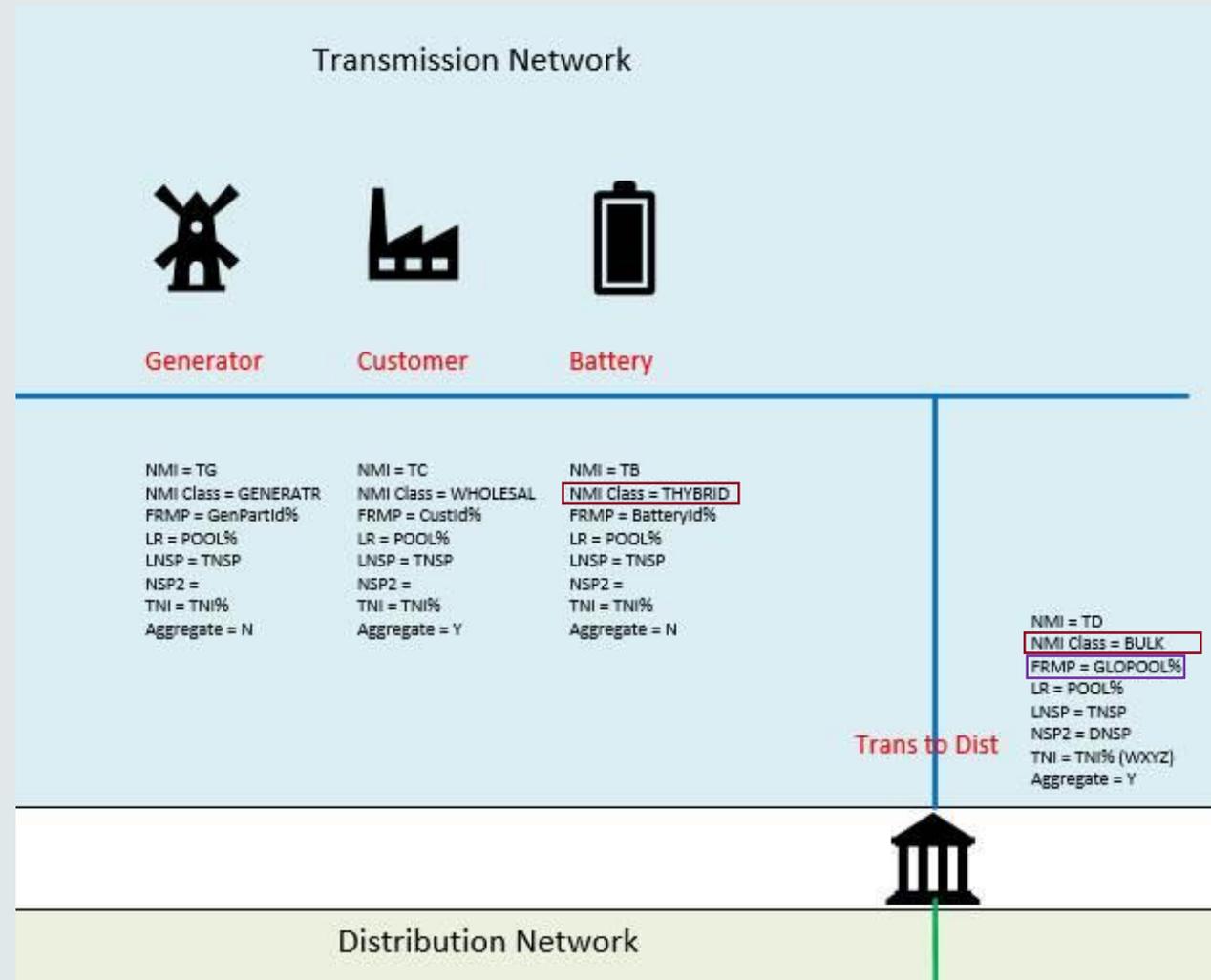
- AEMO has been considering and documenting MSATS Standing data scenarios required to support Global Settlements
  - This analysis has been conducted to ensure that AEMO's Metering and Settlement systems can accurately allocate energy associated to various types of loads
- In considering the various scenarios, AEMO has taken into consideration if the NMI is:
  - Transmission or distribution connected
  - A cross boundary/border supply
  - An embedded parent or child
  - A generator or a load
- Based on AEMO's considerations to date, a number of new NMI Classification Codes will be required to be implemented
- AEMO has also considered the implications to the market participant fields i.e. LR and FRMP as a consequence of the GS Rule
- As AEMO is required to publish UFE from 1 July 2021, any required data updates e.g. NMI Classification Codes will need to occur prior to that date

# MSATS Standing Data Scenarios

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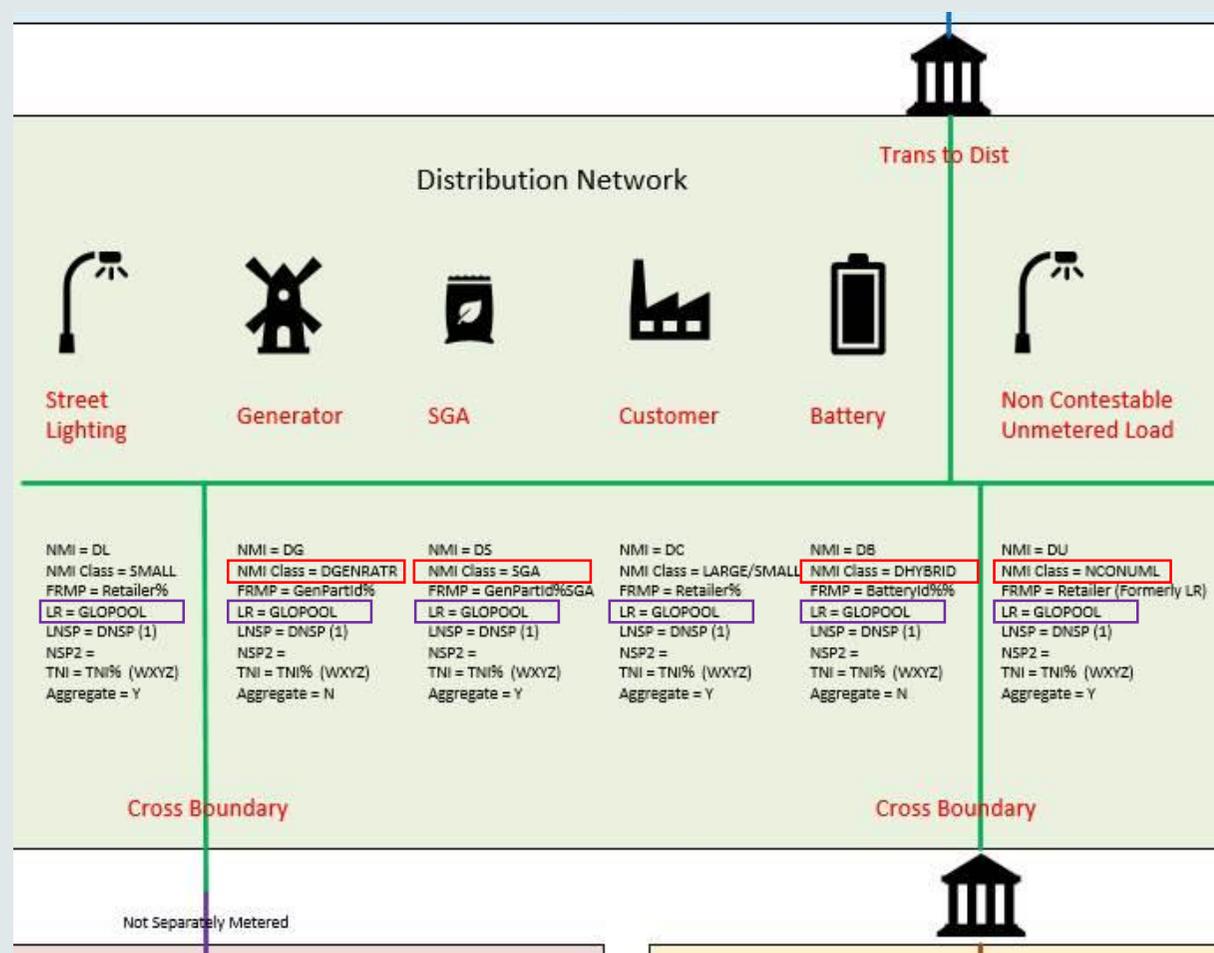
# Transmission Connected Scenarios

- Changes for Transmission Connected NMIs
  - New NMI Classification Code for Battery Connections (THYBRID)
    - Requiring only 1 NMI for the installation, the other NMI will be made Extinct.
  - Transmission to Distribution Connections will be changed to BULK to differentiate them from WHOLESAL customer connections
- Participant Changes – Global Settlements
  - Transmission to Distribution Connections will have the FRMP changed to GLOPOOL



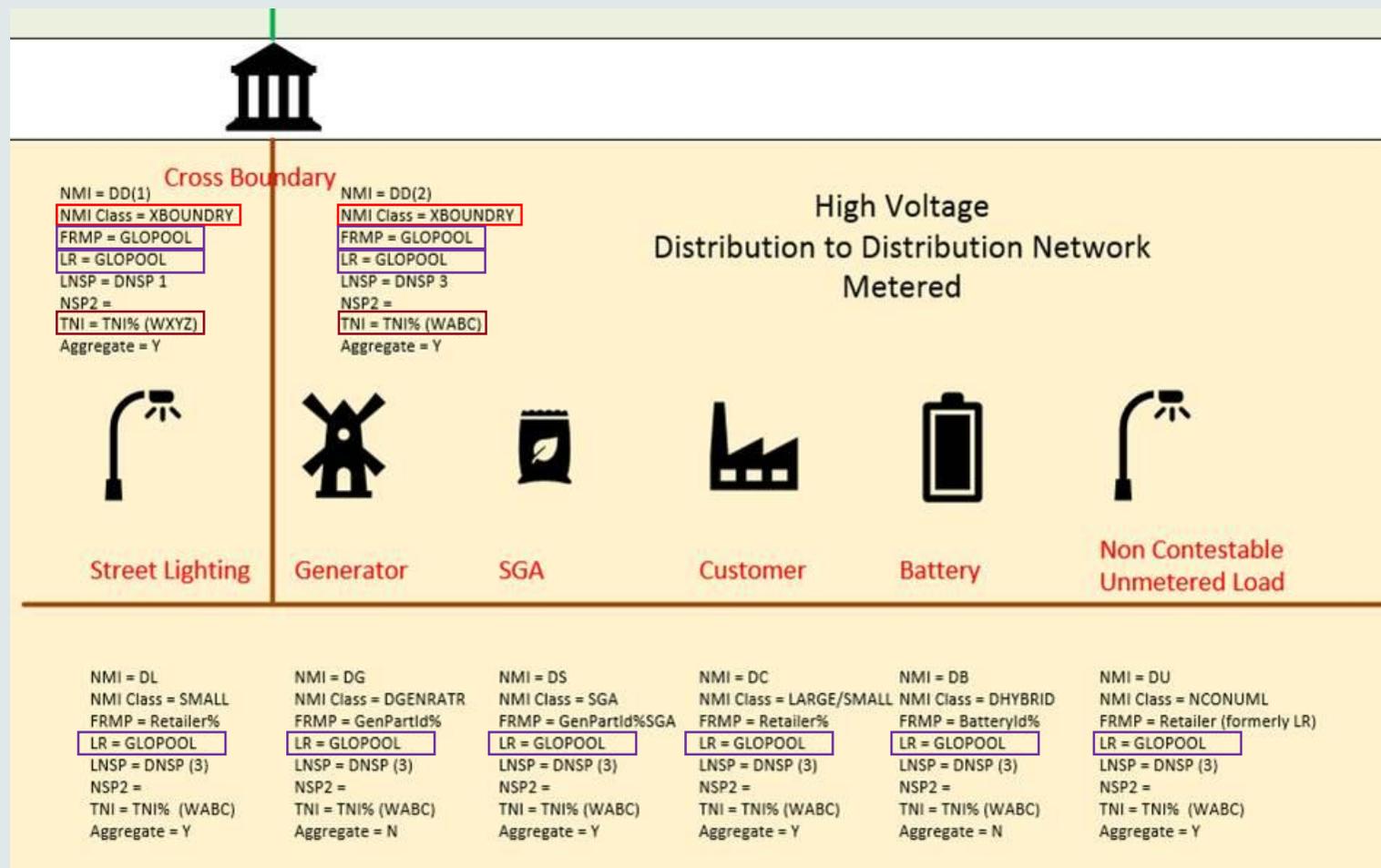
# Distribution Connected Scenarios

- Changes for Distribution Connected NMIs
  - New NMI Classification Code for Battery Connections (DHYBRID)
    - Requiring only 1 NMI for the installation, the other NMI will be made Extinct.
  - New NMI Classification Code for Generator Connections (DGENRATR)
  - New NMI Classification Code for Small Generator Aggregators (SGA)
  - New NMI Classification Code for Non-Contestable Unmetered Loads (NCONUML)
- Participant Changes – Global Settlements
  - Local Retailers will be changed to GLOPOOL for all distribution connected NMIs Except embedded network children



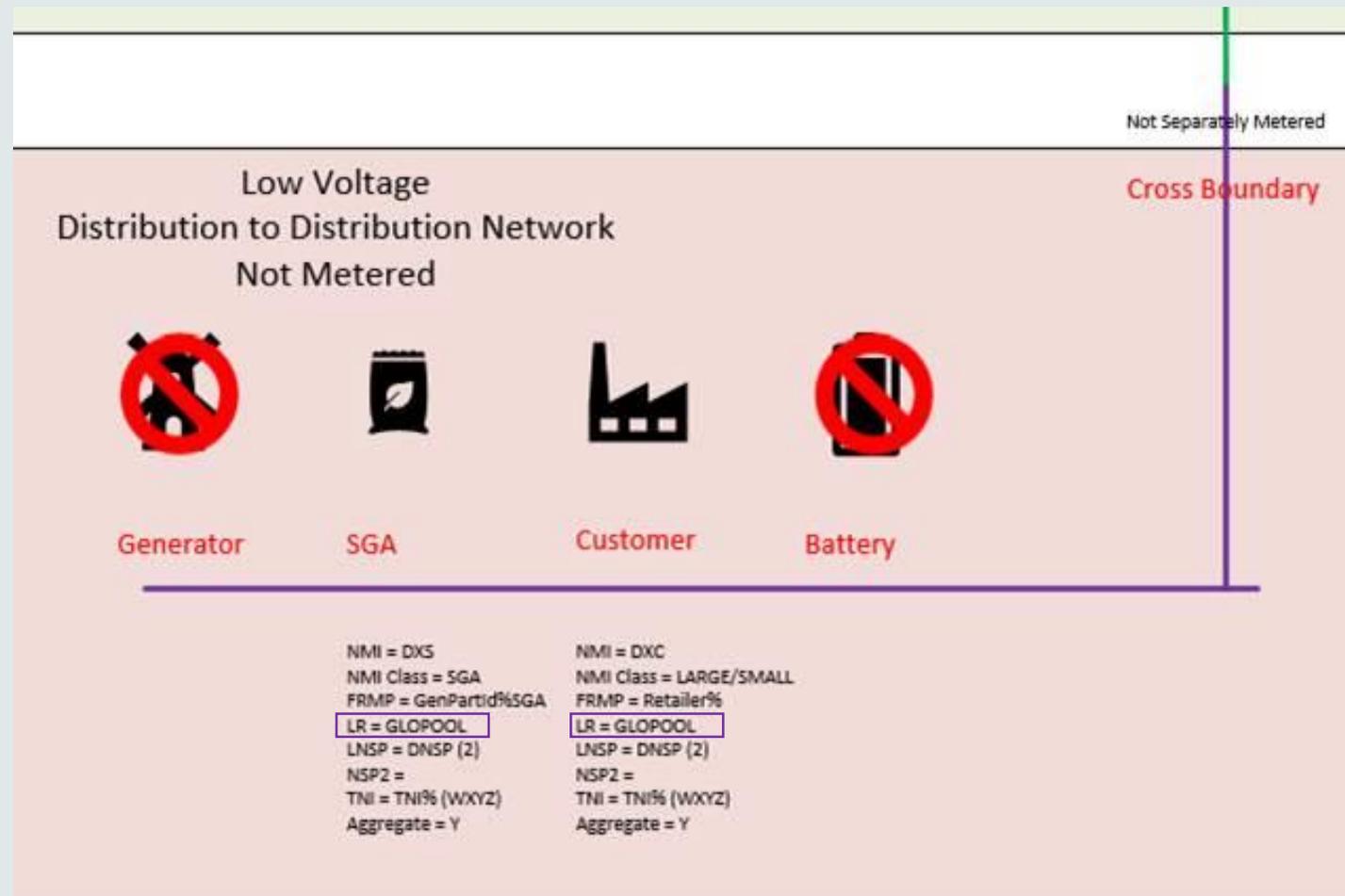
# High Voltage Distribution to Distribution Connections Scenarios

- Changes for Distribution Connected NMIs
  - Distribution to Distribution High Voltage connections will need to be metered
  - A separate NMI will be set up for each Distribution network
  - New NMI Classification Code for Cross Boundary situations (XBOUNDRY)
  - A different TNI code will be assigned to end use NMI in the receipt Distribution network (Network not connected directly to TNI)
- Participant Changes – Global Settlements
  - The LR and FRMP will be changed to GLOPOOL for all Cross Boundary NMIs
  - Local Retailers will be changed to GLOPOOL for all distribution connected NMIs except embedded network children



# Low Voltage Distribution to Distribution Connections Scenarios

- Changes for Distribution Connected NMIs
  - Distribution to Distribution Low Voltage connections may be unmetered
  - TNI codes for each of the end use NMIs MUST have the TNI code of connection to the Transmission Network
  - Generator and Battery connections are not allowable without boundary metering
- Participant Changes – Global Settlements
  - Local Retailers will be changed to GLOPOOL for all distribution connected NMIs Except embedded network children



# Embedded Network Connections Scenarios

- Changes for Embedded Network Connected NMIs
  - Embedded Network Child NMI Classification Codes will reflect those detailed in the Transmission and Distribution slides
- Participant Changes – Global Settlements
  - Local Retailers for All Embedded Network Child NMIs will remain unchanged
  - Local Retailers for Transmission Connected Embedded Network Parent NMIs will remain unchanged
  - Local Retailers for Distribution Connected Embedded Network Parent NMIs will be changed to GLOPOOL



# MSATS Standing Data Scenarios

- In summary, the proposed new NMI Classification Codes are:
  - THYBRID – Transmission Connected Batteries
  - DHYBRID – Distribution Connected Batteries
  - BULK – Bulk supply points from Transmission to Distribution connection points
  - DGENRATR – Distribution connected Generator
  - SGA – Small Generator Aggregator
  - NCONUML – Non-Contestable Unmetered Load
  - XBOUNDRY – Cross boundary connection points for High Voltage connection to another Distribution Network