



Five-Minute Settlement Program: Program Consultative Forum 8

AEMO 5MS Program Team

FRIDAY 8 MARCH 2019

AEMO OFFICES:

LEVEL 22, 530 COLLINS STREET, MELBOURNE

LEVEL 2, 20 BOND STREET, SYDNEY

DIAL IN: 02 9037 0069 ACCESS CODE: 570 256 017

Agenda

NO	TIME	AGENDA ITEM	RESPONSIBLE
Preliminary Matters			
1	10:00am – 10:10am	Welcome, introduction and apologies	Chris Muffett (AEMO)
2	10:10am – 10:20am	Minutes and actions from previous meeting	Chris Muffett (AEMO)
Matters for Noting			
3	10:20am – 10:40am	Program update	Graeme Windley (AEMO)
4	10:40am – 11:00am	Industry risks & issues	Graeme Windley (AEMO)
5	11:00am – 11:10am	Procedures workstream update	Emily Brodie (AEMO)
6	11:10am – 11:20am	Systems workstream update	Mal Borshman (AEMO)
7	11:20am – 11:30am	Stakeholder Update	Chris Muffett (AEMO)
Matters for Discussion			
8	11:30am – 11:50am	Industry timelines	Graeme Windley (AEMO)
9	11:50am – 12:10pm	Recap from Executive Forum	Peter Carruthers (AEMO)
10	12:10pm – 12:30pm	Industry readiness approach	Peter Carruthers (AEMO)
Other Business			
11	12:30pm – 12:40pm	General questions	Chris Muffett (AEMO)
12	12:40pm – 12:40pm	Forward meeting plan	Chris Muffett (AEMO)

Minutes and actions from previous meeting

Chris Muffett

Program update

Graeme Windley

Program Update

- Procedures Workstream
 - Overall Green, A couple of documents delayed but no overall impact
 - Bids & Offers document changes moved to SWG, as largely technical document
- Metering Workstream
 - AEMO Internal – Contract with Solution Integrator (Tata Consulting Services, TCS) has been signed
 - Design work begun, with TCS onsite in AEMO's Melbourne location
 - Metering Focus Group Monday 4 March: Package 1 submission, participant feedback aligned; MDFF data approach agreed
 - Stage-Gated approach of AEMO internal Metering solution progress communicated to the PCF on Thursday 4 April
- Settlements Workstream
 - Approach for 5MS Staging environment to be discussed at Settlements Focus Group, Wednesday 20 March
- Dispatch Workstream
 - EMMS Tech Spec released for participant feedback on Friday 1 March
- Readiness Workstream
 - Outline presentation today on the Principles; program continuing to develop
 - Tui Grant, 5MS Test Manager, to begin defining the approach to market trials over the upcoming months
 - Initial presentation at SWG on Monday 18 March

Industry risks & issues

Graeme Windley

Summary

- Latest risk/issue register distributed along with meeting pack
 - Includes updates discussed at PCF #7
 - 2 new issues added – relating to post July 2021 support
 - Preliminary risk ratings (as per action) for consideration by members.
- Live Risk/issue register is published on 5MS PCF page:
<http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Program-Management/Program-Consultative-Forum>

Procedures workstream update

Emily Brodie

Procedures workstream status

5 MINUTE SETTLEMENT PROCEDURES TRACKING	Pre-consultation		Consultation			
	HLIA	PWG Engagement	TIMING			CONTENT
			Consultation paper	Draft documents	Final documents	Package content
METERING						
1. Metering - Metering Data & Metrology	Jul-18	Jul-18	Sep-18	Jan-19	Mar-19	
2. Metering - MSATS and SLPs	Jul-18	Dec-18 & Mar-19	Apr-19	Jun-19	Aug-19	
3. Metering - Miscellaneous*	Jul-18	Mar-19	n/a	Mar-19*	Jul-19	
B2B Procedures - B2B file size	n/a	Feb-19	n/a	n/a	n/a	
SETTLEMENTS						
SRA	Jun-18	Jul-18	n/a	Jul-18	Aug-18	
SRA round #2	Jun-18	Feb-19	Mar-19	Jun-19	Aug-19	
TNSP	Feb-19	Feb-19	Apr-19	n/a	Jun-19	
Estimation	Aug-18	Aug-18	Nov-18	Feb-19	Apr-19	
Reallocations	Dec-18	Dec-18	n/a	Dec-18	Feb-19	
Miscellaneous	Oct-18	Oct-18	Dec-18	Mar-19	May-19	
Prudentials	Aug-18	Sep-18	n/a	Apr-19	May-19	
DISPATCH						
1. Dispatch - Bids/Offers*	Jul-18	Jul 18 ongoing	n/a	Feb-19	Mar-19	
2. Dispatch - Spot market	Sep-18	Oct 18 ongoing	Jan-19	Apr-19	Jul-19	
3. Dispatch - Pricing	Aug-18	Aug 18 ongoing	Aug-18	Dec-18	Jul-19	
4. Dispatch - Miscellaneous*	Jan-19	Feb-19	n/a	n/a	Jun-19	
POWER SYSTEM OPS						
1. Operations - Miscellaneous*	TBA	Apr 19 ongoing	n/a	n/a	Jul-19	

TIMING
Started and on track
Started late
Overdue

CONTENT
No issues
Issues
Severe issues

Responsibility for updating bids/offers document moved to SWG as it is mainly a technical guide. Delayed because seeking additional stakeholder feedback on precedent technical specifications. 9

Procedures workstream meetings

- Next PWG scheduled for Tuesday 12th March:
 - Metering – Package 2 (MSATS and SLPs) and Package 3 (Miscellaneous)
 - Update on IEC recommendation regarding B2B procedures update for 5MS
 - Settlements – approach to updating the Auction Participation Agreement
 - Dispatch – debrief on dispatch focus group
 - Metering –debrief on metering focus group
- Focus groups:
 - Dispatch focus group – Friday, 15th February, Sydney
 - Metering focus group – Monday 4th March, Brisbane
 - Settlements focus group – Wednesday 20th March, Melbourne
- Other:
 - Renewable and small generator webinar – Wednesday 27th February

Consultations

5MS Metering package 1

- Submissions on Draft Report were due 15 February 2019
 - AEMO received 15 submissions (including two late submissions) from Retailers, LNSPs, Meter Providers, Meter Data Providers and intending participants.
- Final report to be published 22 March 2019
- <http://aemo.com.au/Stakeholder-Consultation/Consultations/Five-Minute-Settlement---Metering-Procedure-Changes-Package-1>

5MS Settlements package - Reallocations

- Final report published 28 February 2019
- <http://aemo.com.au/Stakeholder-Consultation/Consultations/Five-Minute-Settlement---Reallocation-procedures?Convenor=AEMO%20NEM>

5MS Settlements package - NEM Settlement Estimates Policy

- Draft Report & Notice of second stage consultation published on the 19 February 2019
- Submissions on Draft Report due 6 March 2019
- <http://aemo.com.au/Stakeholder-Consultation/Consultations/Five-Minute-Settlement---NEM-Settlement-Estimates-Policy?Convenor=AEMO%20NEM>

Update: 5MS implementation rule change request

- Throughout the second half of 2018, AEMO sought feedback from 5MS stakeholders on any areas of the 5MS Rule that needed amending to facilitate implementing the rule.
- Five areas were identified:
 1. Determining marginal loss factors (MLFs) at 30-minute or shorter intervals
 2. Accommodating fast-start plant in pre-dispatch
 3. Process for amending the spot market operations timetable
 4. Correction to list of AEMO procedures for 5MS
 5. Timing for AEMO to publish unaccounted for energy (UFE) data
- Rule change request will be submitted to the AEMC by mid-March.
- AEMO considers the proposed changes to be non-controversial. It is therefore seeking to have the request assessed under the 'expedited' rule change process.

Procedures co-ordination: Meetings calendar

The screenshot shows the AEMO website's 'Industry Forums and Working Groups' page. The page features a navigation bar with 'ELECTRICITY' and 'GAS' tabs, and a search icon. The main content area includes a 'FILTERS' sidebar on the left with options for 'Wholesale Meetings', 'Retail Meetings', 'IT meetings', 'Other meetings', and 'WA Meetings and Activities'. The main text explains AEMO's commitment to stakeholder engagement and lists several forums and working groups. A red circle highlights the 'Industry meetings calendar' section, which provides information on upcoming wholesale and retail meetings and includes a link to the 'Consultative Forum Meetings Calendar - 19 February 2015'.

STAKEHOLDER CONSULTATION ABOUT AEMO CAREERS AND EDUCATION MEDIA CENTRE CONTACT US MARKET WATCH

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

ELECTRICITY GAS

INDUSTRY FORUMS AND WORKING GROUPS

FILTERS

SEARCH:

ORDER BY:

APPLY

Subscribe

Wholesale Meetings Retail Meetings IT meetings Other meetings WA Meetings and Activities

AEMO is committed to ensuring that stakeholders have the opportunity to engage and participate in the ongoing planning, development, and operation of Australian energy markets. To facilitate this, AEMO has established working groups made up of a range of energy stakeholders to discuss issues and share information. These are AEMO's current industry forums and working groups.

[NEM Wholesale Consultative Forum](#)

[Gas Wholesale Consultative Forum](#)

[Settlement Resilience Committee](#)

[Settlement Managers Working Group](#)

Industry meetings calendar

A calendar of upcoming wholesale and retail meetings is provided below. However, changes or additions to meeting dates are communicated primarily through email distribution lists for the relevant industry forum or working group, so this calendar should be used as supplementary to email distribution lists only.

[Consultative Forum Meetings Calendar - 19 February 2015](#) (33 KB PDF)

Dates of retail and other meetings can be found on the relevant working group information page.

For more information, please contact:
StakeholderRelations@aemo.com.au

ELECTRICITY GAS STAKEHOLDER CONSULTATION ABOUT AEMO

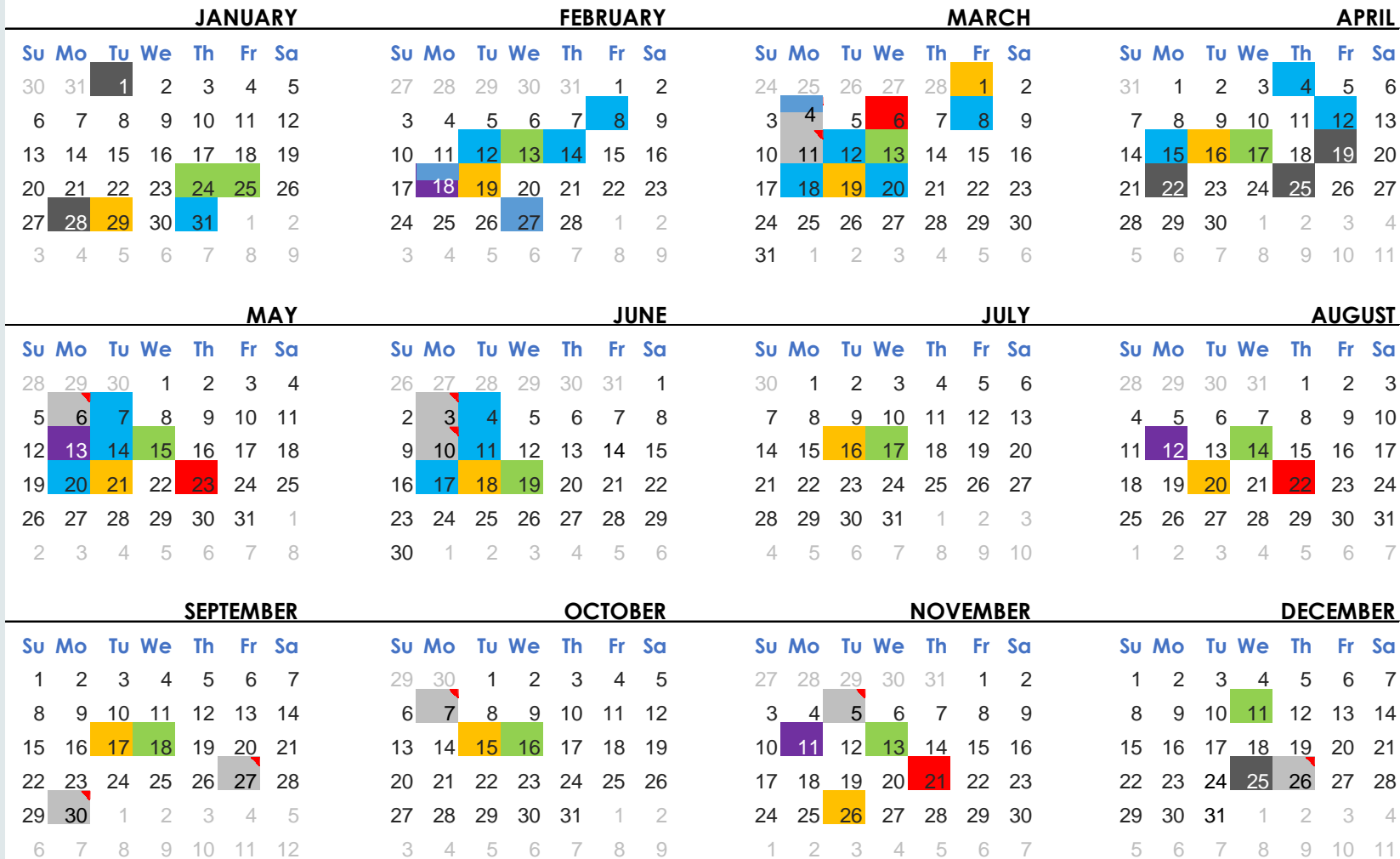
Careers and Education Media Centre Contact us

Procedures co-ordination: Meetings calendar

2019 Consultative Forums and 5MS Meetings

Last updated: 22 February 2019

This calendar is subject to change, and is only intended as supplementary to email distribution lists, which will remain the primary means of notifying industry of new meeting/changes of date.



Legend

GRCF	ERCF
B2BWG	ERMCF
IEC	
5MS	
National Public Holiday	
State Public Holiday*	

*Relevant state has been marked in a comment. NT, TAS, ACT holidays have not been marked.

Procedures co-ordination: Metering

INITIATIVE:	FIVE MINUTE SETTLEMENT			NMI STANDING DATA	DER REGISTER	METERING INSTALLATION TIMEFRAMES	B2B	MSATS WISH-LIST
	Pack 1	Pack 2	Pack 3					
AFFECTED PROCEDURES (listed alphabetically – please add in any missing documents)								
Accreditation Checklists - Metering Providers, Metering Data Providers & Embedded Network Managers			X					
CATS Procedures Principles and Obligations		X		X		X		X
Exemption Procedure - Metering Provider Data Storage Requirements		X						
Guide to MSATS and B2B Terms			X	X			X	
Guide to the Role of the Metering Coordinator (MC)			X					
Guidelines to the National Measurement Act			X					
MDM File Format and Load Process		X						
Meter Data File Format Specification NEM12 & NEM13	X							
Meter Data Provision Procedure	X							
Metering Data Management (MDM) Procedures		X						
Metrology Procedure Part A	X	X						X
Metrology Procedure Part B	X	X						X
MSATS -CATS Hints and Tips and NMI Discovery			X	X				
MSATS Procedures		X						
National Metering Identifier		X						
Procedures for the Management of WIGS NMIS		X		X				
Retail Electricity Market Glossary and Framework	X	X		X				
Service Level Procedure: Metering Data Provider Services		X						X
Service Level Procedure: Metering Provider Services		X						
Special Sites and Technology Related Conditions within the National Electricity Market			X					
Standing Data for MSATS			X	X				X
Understanding Load Profiles Published from MSATS			X					
Unmetered Load Guideline - Determination of Device Load and Annual Energy Consumption for Unmetered Device Types			X					
B2B Procedure Customer and Site Details Notification Process							X	
B2B Procedure Service Order Process						X	X	
B2B Procedure Meter Data Process							X	
B2B Procedure One Way Notification Process							X	
B2B Guide							X	
B2B Procedure Technical Delivery Specification							X	
DER Information Guidelines					X			
Technical Guide to Bulk Data Tool in MSATS				X				
NMI Standing Data Schedule				X				

Procedure co-ordination: Cross-program co-ordination

- 2019 Gas and Electricity Retail Consultations calendar, including 5MS program, to be published shortly (next slide)
- Intended only as a rough guide of when AEMO will hold consultations. Dates are indicative only and are subject to change without notice.
- Authoritative consultation dates continue to be published either through the relevant distribution lists for the consultative/program forums or in the Consultations section of AEMO's website:
<https://www.aemo.com.au/Stakeholder-Consultation>
- Our business SMEs are second line of defence for identifying procedures subject to multiple changes e.g. some dispatch procedures were consulted on for both 5MS and other rule changes at once.

Procedures co-ordination: Consultations calendar

2019 Gas and Electricity Retail Consultations

Last updated: 4 March 2019

This spreadsheet is indicative only. Please refer to AEMO's website for authoritative consultation dates.

	Mar					Apr					May					Jun				Jul					Aug					
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 1	Week 2	Week 3	Week 4	Week 5	Week 1	Week 2	Week 3	Week 4	Week 5	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 5	Week 1	Week 2	Week 3	Week 4	Week 5	
Gas Retail Consultations																														
IN002/16 - GDH RMP changes (QLD,NSW/ACT and SA)	1/3-1/3	4/3-8/3	11/3-15/3	18/3-22/3	25/3-29/3	1/4-5/4	8/4-12/4	15/4-18/4	23/4-26/4	29/4-30/4	1/5-3/5	6/5-10/5	13/5-17/5	20/5-24/5	27/5-31/5	3/6-7/6	11/6-14/6	17/6-21/6	24/6-28/6	1/7-5/7	8/7-12/7	15/7-19/7	22/7-26/7	29/7-31/7	1/8-2/8	5/8-9/8	12/8-16/8	19/8-23/8	26/8-30/8	
IN006/17 - Harmonise RMP SA (SA only)																														
IN012/17 - Deregistered MIRN status (SA only)																														
IN014/17 - Remove the text "using the sum..." (SA only)																														
IN004/18 - Forecast to actual sunshine hours and change of weather station (SA only)																														
IN009/18 - GDH transitional arrangements (QLD, NSW/ACT and SA)																														
IN001/19 - High/low meter tolerance test (NSW/ACT only)																														
IN002/19 - GDH Retail Guidelines (QLD, NSW/ACT and SA)																														
IN005/18 - Estimated consumption for meter removal (QLD, NSW/ACT, VIC and SA)																														
IN010/18 - Exempt seller regime (All except WA)																														
IN001/19W - Transition Deed Clause 8 provisions (WA only)																														
IN004/18W - Complete MIRN Listing (WA only)																														
IN004/19W - WAGRMA (WA only)																														
IN006/18W - Requirements around EIC (WA only)																														
IN002/19W - Reduce regulatory administration for EIC (WA only)																														
IN001/18W - Clause 325, notice of alleged procedure breach (WA only)																														
IN003/19W - Holistic tidy up of RMP WA (WA only)																														
IN007/18W - PPC -> GRFC in RMP WA (WA only)																														
IN002/15W - New Service Order Job Enquiry Code (JEC) (WA only)																														
IN005/19W - Retrospective EIC (WA only)																														
SMS Consultations																														
Metering 1 - Metering Data & Metrology																														
Metering 2 - MSATS and SLPs																														
Metering 3 - Miscellaneous																														
Settlements 1 - Settlements Residue Auctions																														
Settlements 2 - Estimations																														
Settlements 3 - Miscellaneous																														
Settlements 4 - TNSP Negative Settlement Residue																														
Settlements 5 - Prudentials																														
Settlements 6 - Reallocations																														
Dispatch 1 - Bids/Offers																														
Dispatch 2 - Pricing																														
Dispatch 3 - Spot Market																														
B2B Electricity Retail Consultations																														
Metering Installation Timeframes																														
Post-POC																														
Life Support Status/NOMW definitions																														
MSATS, Metering Services, and Metrology Electricity Retail Consultations																														
NMI Standing Data																														
Metering Installation Timeframes																														
MSATS Requests																														
Legend																														
Gas																														
Electricity																														
SMS																														
Initial consult																														
GMI																														
consult																														
Consultation paper																														
PPC																														
Draft det																														
Draft det																														
IR																														
Final det																														
Final det																														
AEMO																														
Decision																														
IEC Recom																														
AEMO/ERA																														
AEMO																														
Review																														
Review																														
AEMO Review																														

Systems workstream update

Malcolm Borschman

Systems Workstream Status - Metering

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
METERING										
Transition	Aug-18	Sep-18	Aug-18	Nov-18	Apr-19 TBC	Jun-19 TBC	-	Dec-19	-	-
MDFF •MDFF Specification NEM12 NEM13 v20	Aug-18	Oct-18	Oct-18	Nov-18	Jan-19	Apr-19	-	Dec-19	Sep-20	Nov-20
Meter Data - MDFF and MDMF •MDM File Format and Load Process •MSATS Technical Specification	Aug-18	Oct-18	Sep-18	Nov-18	Apr-19	Jun-19	-	Dec-19	Sep-20	Nov-20
B2M to eHub Technical Guide (new)	Oct-18	-	Mar-19	Feb-19	Apr-19	Jul-19	-	Dec-19	Sep-20	Nov-20
MSATS Browser (LVI) Changes •Guide to MSATS Web Portal •MSATS Technical Specification	Aug-18	TBC	TBC	TBC	Jun-19 TBC	Aug-19 TBC	TBC	-	Sep-20	Nov-20
MSATS Report Changes •MSATS Procedures MDM Procedure •MDM File Format and Load Process •MSATS Technical Specification	Oct-18	Nov-18	TBC	TBC	Jun-19 TBC	Aug-19 TBC	-	-	Sep-20	Nov-20

Systems Workstream Status - 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
DISPATCH										
Transition	Aug-18	Oct-18	Aug-18	Nov-18	Dec-18	Mar-19	Oct-19	Nov-19	Nov-20	Mar-21
Bidding Web UI and APIs	Aug-18	Nov-18	Dec-18	Jan-19	Mar-19	Jul-19	Oct-19	Nov-19	Nov-20	Mar-21
Bidding Data Model	Aug-18	-	Sep-18	Mar-19	Dec-18	Mar-19	Oct-19	Nov-19	Nov-20	Mar-21
Bidding Format	Aug-18	-	Sep-18	Nov-18	Dec-18	Mar-19	Oct-19	Nov-19	Nov-20	Mar-21
Dispatch	Aug-18	-	Oct-18	Nov-18	Oct-18	Mar-19	-	Nov-19	Nov-20	Mar-21
Predispatch P30/7DAY	Aug-18	-	Oct-18	Nov-18	Oct-18	Mar-19	-	Nov-19	Nov-20	Mar-21
Predispatch P5	Nov-18	Oct-18	Nov-18	TBC	TBC	TBC	-	TBC	Nov-20	May-21
Trading Price / Price Revision	Aug-18	-	Feb-19	Nov-18	Mar-19	Jul-19	-	-	Nov-20	May-21
Administered Pricing and CPT	Aug-18	-	Feb-19	Dec-18	Mar-19	Jul-19	-	-	Nov-20	May-21
Suspension Pricing	Sep-18	-	Feb-19	Dec-18	Mar-19	Jul-19	-	-	Nov-20	May-21
Negative Residue Management	Sep-18	-	Feb-19	Dec-18	Mar-19	Jul-19	-	-	Nov-20	May-21
Full Data Model	Sep-18	Feb-19	Mar-19	Mar-19	Mar-19	Jul-19	Oct-20	-	Nov-20	May-21

Systems Workstream Status - Settlements

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	Aug-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									
POWER SYSTEM OPS (TBC)										
PASA (ST/PD)	Aug-18	-	Oct-18		TBC	TBC	Oct-19	Nov-19	Nov-20	Mar-21
RERT	Oct-18	TBC	TBC		TBC	TBC	TBC	-	Nov-20	May-21
Negative Residue Management	Refer DISPATCH									

APIs – Limitations of FTP

Data transmission or interfaces between participants and AEMO is currently using FTP which has its limitations such as:

- FTP is asynchronous only so is slower (responses must be polled for); Retail uses legacy Hokey-Pokey process to manage the file transfer
- FTP is designed as a transport mechanism not an interface i.e. provides no business context of the data that is exchanged
- FTP has low security (username and password are in plaintext), but this could be improved with Secure FTP
- Interfaces are only available on AEMO's MarketNet
- AEMO is aiming to move these interfaces onto AEMO's eHub (API) platform.

APIs – Communication Benefits

Functionality exposed in the AEMO's Market Portals will be implemented via APIs; providing the following benefits:

- Provides choice to the Participants to use the web browser or call the browser APIs from their applications
- Allows Participants to build automated interfaces to the Portal functionalities
- Common definitions for web interface and participant API interfaces
- Browser APIs are available on AEMO's MarketNet & Internet

AEMO will leverage AEMO's eHub (API) platform to implement the browser interfaces

APIs – Industry Benefits & Cost

Participants will be able to transact with AEMO on a common platform across multiple markets using unified message exchange patterns and protocols:

- Improved speed of business, or additional service offers with synchronous API calls
- Reduced industry costs to use, AEMO APIs will be utilising open standards and technologies
- Improved security compared to FTP interfaces
- Consistent future development; allows AEMO to introduce new functionality in a staged approach e.g. Supportability of the new and current functionality using the concept of API versioning
- Move away from point-point integration (tight coupling); enabling orchestration of reusable services

AEMO's internal integration layer uses API calls to interact with internal systems. The additional cost of opening these up to participants is approach \$5,000 each (note this does not include the cost of developing the platform and standards).

APIs – Current and Future Lists

- Following Business Services (APIs) are available to Participants via eHub (APIs)
 - Retail B2B message exchange (Implemented in Dec 2017; Power of Choice Program)
 - Generator Recall
 - 5-Min Self Forecasting
 - Gas Bulletin Board
 - Pipeline Capacity Trading
- Following Business Services (APIs) will be implemented by the 5MS Project
 - Non-Retail B2B message exchange
 - Retail B2M message exchange
 - New / changes to the MSATS Browser Functionalities
 - Submission of Bids/Offer
 - Settlement Reallocation
 - New / changes to the EMMS Markets Portal Functionalities
 - Internal Application to Application interfaces

Stakeholder update

Chris Muffett

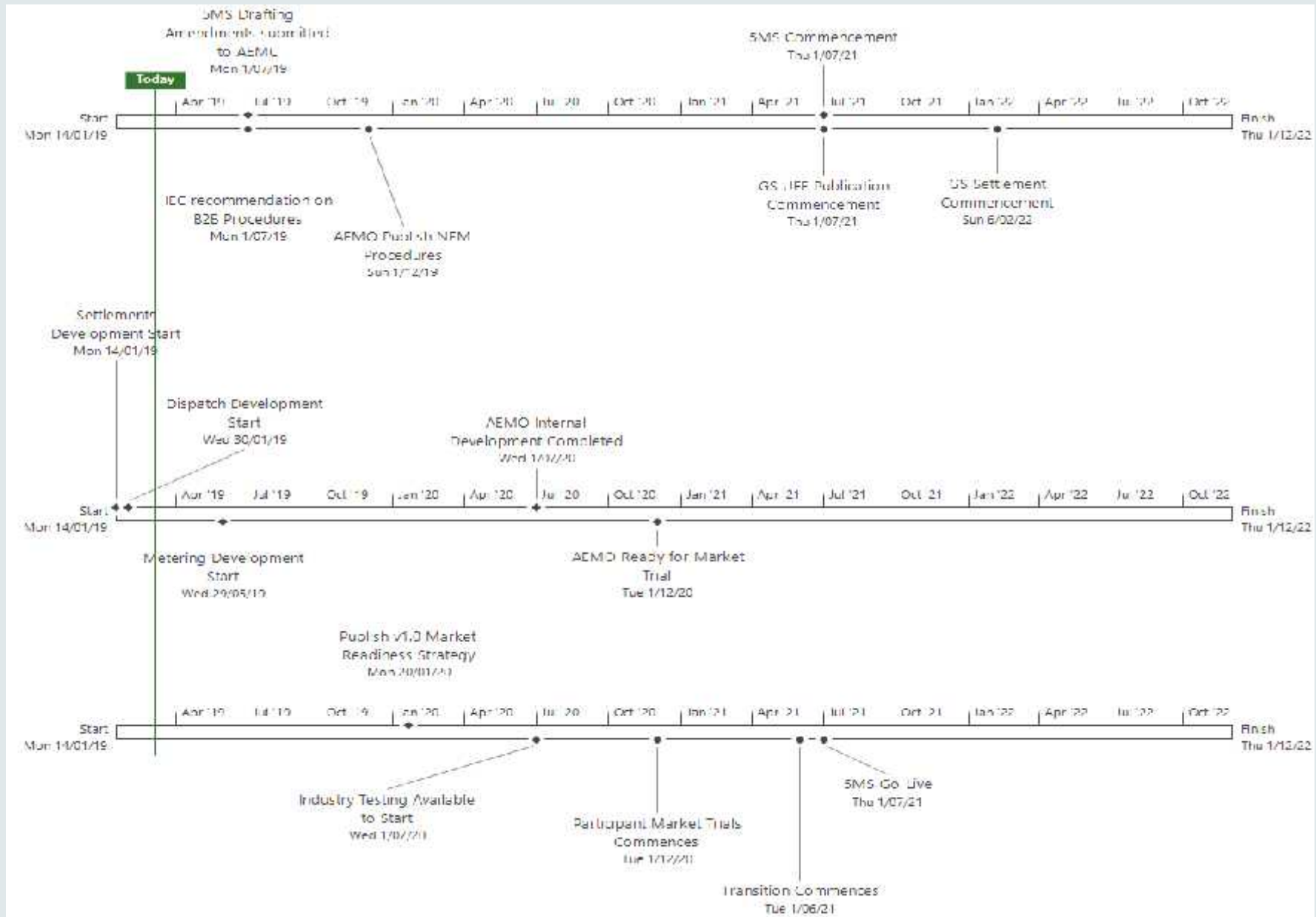
Industry timelines

Graeme Windley

5MS Milestone Management Framework

- AEMO is proposing a Milestone Management Framework to:
 - Provide visibility over the 5MS program schedule and progress
 - Provide committed dates for key artefacts critical to participants
 - Provide a framework for managing in a controlled way any changes to dates
- Key elements of the framework
 - Defined milestones with committed dates
 - Reporting process
 - Change management and impact assessment
- Milestones
 - Level 1 milestones: key milestones that apply to the overall Program
 - Level 2 milestones: milestones by workstream that show key dates relevant for participants
 - Milestones will have an identifier, explicit dates and a description
 - Defined in Microsoft Project, available for sharing with participants
- Reporting process
 - Red, Amber, Green shown for each milestone, updated for presenting at each PCF
 - Where not Green, reason and remedial actions will be defined
- Change process
 - Milestone dates may not be achieved or may need to be moved, for a variety of reasons
 - Project will undertake impact analysis on proposed changes to L1 or L2 milestones
 - Participant views sought with response times as follows: 5 business days for urgent/low impact changes, 10 business days for major changes

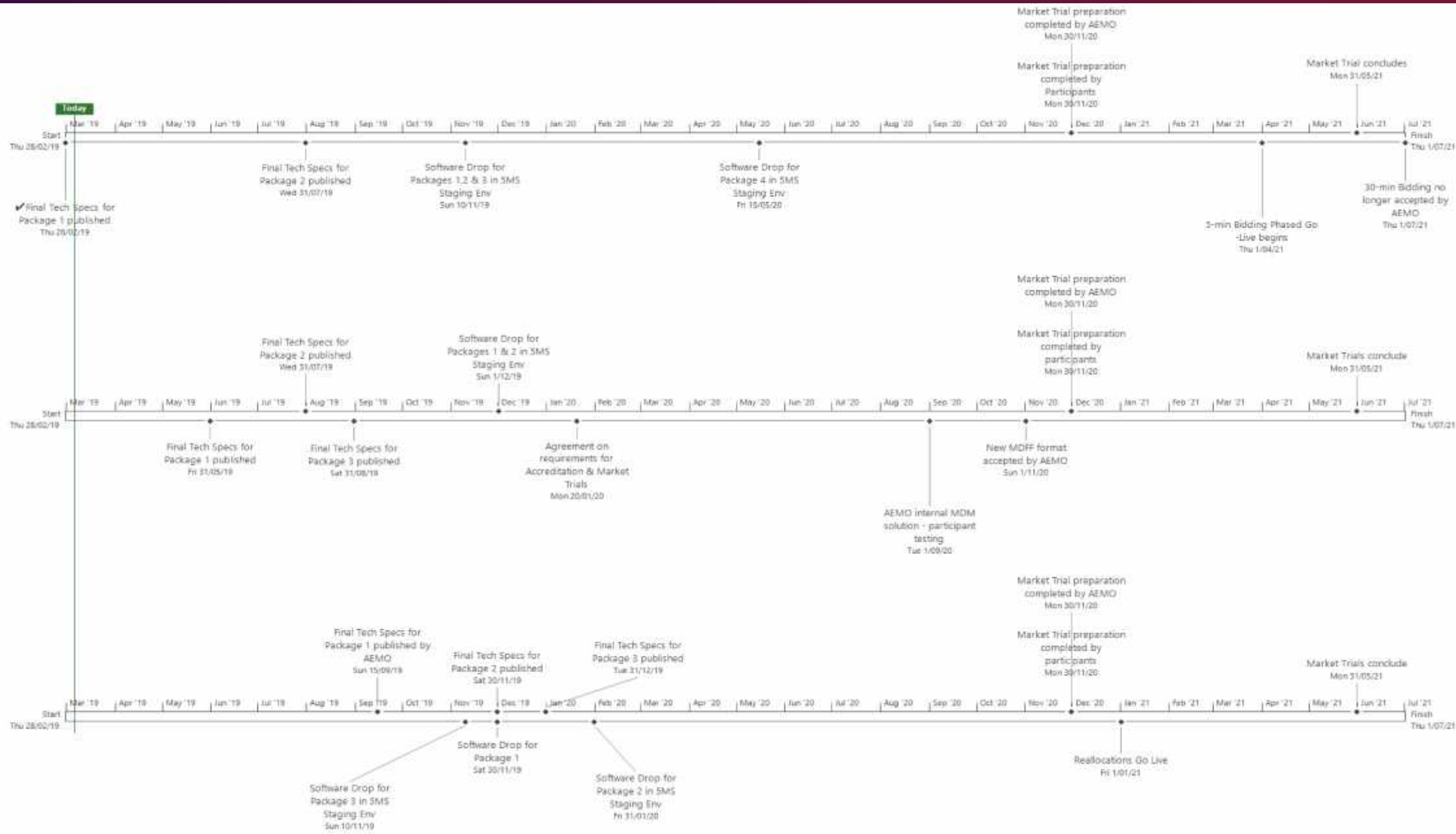
Level One Milestones



Level One Milestones - Description

Milestone		Description	Date	Status	Notes
5MS Drafting Amendments submitted to AEMC	Regulatory	Issues with current drafting collated and submitted back to the AEMC by AEMO.	20-Mar-2019	On Track	
IEC Approves B2B Procedures	Regulatory	The IEC must have consulted and recommended to AEMO any changes to the B2B procedures.	01-Jul-2019	Completed	The IEC advised AEMO in February 2019 that no changes to the B2B procedures are required as a direct result of the 5MS Rule.
AEMO publishes NEM Procedures	Regulatory	The approved 5MS and GS changes to NEM Procedures are completed and published on the AEMO website.	01-Dec-2019	Mandated	On Track
5MS & UFE Market Go Live	Regulatory	Industry settles electricity at five-minute intervals. UFE reported to market.	01-Jul-2021	Mandated	
GS Market Go Live	Regulatory	NEM Market Settlements operation commences using Global Settlements.	06-Feb-2022	Mandated	
Mandatory 5MS Meter Data Delivery	Regulatory	Five-minute reads are mandatory from all new and replacement meters.	01-Dec-2022	Mandated	
Market Readiness Strategy Published by AEMO	Readiness	A completed Market Readiness strategy is published on the AEMO website.	20-Jan-2020	Provisional	
Participant Market Trials commence	Readiness	Initial Market Trial commences.	01-Dec-2020	Provisional	Details of Market Trails will be developed throughout 2019.
Participant Market Trials conclude	Readiness	Final Market Trial completes.	30-Apr-2021	Provisional	
Metering Accreditation Complete	Readiness	MPs and MDPs who are delivering 5-min data for 1 July 2021 have been accredited as part of the market readiness process.	31-May-2021	Tentative	
All AEMO workstream development commenced	System Delivery	All internal workstreams will have commenced development to deliver the 5MS and GS solutions.	23-May-2019	On Track	
5MS Staging environment live	System Delivery	The 5MS Staging environment is available to Participants, who can interact with deployed 5MS and GS code.	01-Dec-2019	Provisional	Functionality to be deployed throughout 2020
AEMO Internal	Systems	All AEMO internal system development completed.	30-Jun-2020	Provisional	

Level Two Milestones



Level Two Milestones - Dispatch

Level	Workstream	Milestone	Description	Date	Status	Notes
2	Dispatch	Final Technical Specifications for Package 1 published by AEMO	Technical Specification for changes to Dispatch, Predispatch P30/7DAY, ST PASA, Bidding Data Model and Bidding Format as a result of 5MS and GS available to participants.	28-Feb-2019	Firm	Completed
2	Dispatch	Final Technical Specifications for Package 2 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	Provisional	On Track
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.	10-Nov-2019	Provisional	On Track
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 and the Full Data Model (including Settlements)	15-May-2020	Tentative	Date to be approved by SWG
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	Tentative	Content and timing of Market Trials TBD
2	Dispatch	Market Trial preparation completed	AEMO has software deployed to 5MS pre-Production environment and is ready to deliver the agreed Market Trail scenarios	30-Nov 2020	Tentative	Content and timing of Market Trials TBD
2	Dispatch	5-min Bidding Phased Go Live Begins	Participants can begin submitting 5-min bids to the market	01-Apr-2021	Firm	
2	Dispatch	Market Trial conclude	All relevant Market Participants have passed UAT to submit five-minute bid and offer data.	31-May-2021	Tentative	Content and timing of Market Trials TBD
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	

Level Two Milestones - Metering

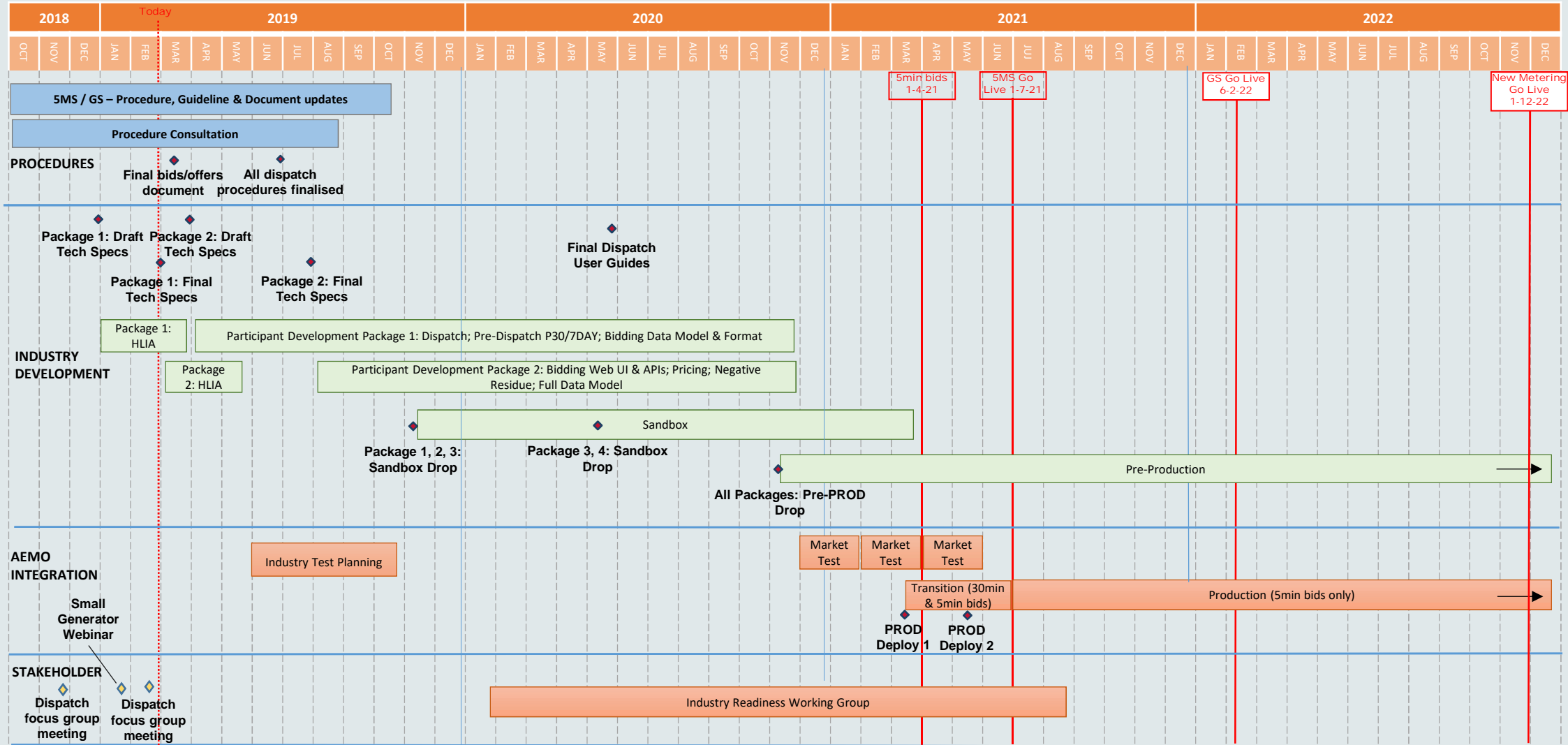
Level	Workstream	Milestone	Description	Date	Status	Notes
2	Metering	Final Technical Specifications for Package 1 published by AEMO	Technical Specification for changes to Transition, Meter Data – MDFF, B2M MDFF (API and FTP) as a result of 5MS and GS available to participants.	31-May-2019	Provisional	On Track
2	Metering	Final Technical Specifications for Packages 2 published by AEMO	Technical Specification for changes to and Standing Data and validations, and B2M via eHub, as a result of 5MS and GS available to participants.	31-Jul-2019	Provisional	On Track
2	Metering	Final Technical Specifications for Package 3 published by AEMO	Technical Specification for changes to the MSATS Browser (LVI) and MSATS Report Changes as a result of 5MS and GS available to participants.	31-Aug-2019	Provisional	On Track
2	Metering	Software Drop for Packages 1 & 2 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for Transition, Meter Data – MDFF, B2M MDFF (API and FTP), Standing Data and validations, B2M via eHub.	01-Dec-2019	Provisional	On Track
2	Metering	Agreement on requirements for Accreditation & Market Trails	Program agreement of the Accreditation requirements and process, and on market testing requirements and process.	20-Jan-2020	Provisional	Date to be approved by PWG
2	Metering	AEMO internal MDM solution – participant testing	Participant regression testing on for new MDM build begins	01-Sep-2020	Provisional	Detail TBC; full market not req'd
2	Metering	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	
2	Metering	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	Tentative	Content and timing of Market Trials TBD
2	Metering	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 Trail scenarios	30-Nov-2020	Tentative	Content and timing of Market Trials TBD
2	Metering	Market Trials conclude	All relevant Market Participants have passed UAT to submit five-minute read data.	31-May-2021	Tentative	Content and timing of Market Trials TBD

Level Two Milestones - Settlements

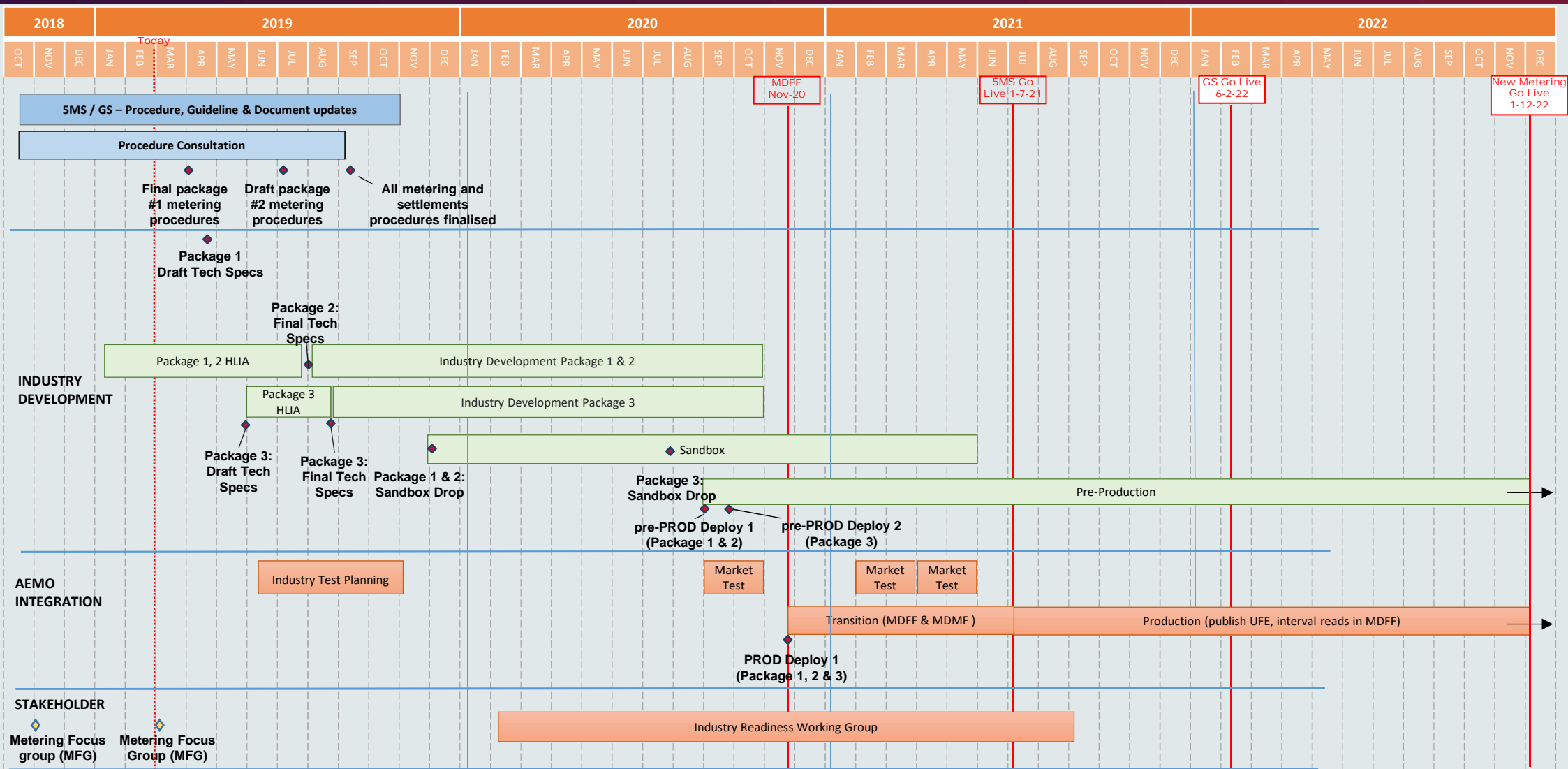
Level	Workstream	Milestone	Description	Date	Status	Notes
2	Settlements	Final Technical Specifications for Package 1 published by AEMO	Technical Specification for changes to Reallocation as a result of 5MS and GS available to participants.	15-Sep-2019	Provisional	On Track
2	Settlements	Software Drop for Package 1	Software deployed into the 5MS Staging environment for Reallocations.	30-Nov-2019	Provisional	On Track
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.	30-Nov-2019	Provisional	On Track
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-Dec-2019	Provisional	On Track
2	Settlements	Software Drop for Package 2 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for Settlements and Billing.	31-Jan-2020	Provisional	On Track
2	Settlements	Software Drop for Package 3 in 5MS Staging Environment	Software deployed into the 5MS Staging environment for Estimations and Prudentials.	30-Apr-2020	Provisional	On Track
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	Tentative	Content and timing of Market Trials TBD
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 Trail scenarios.	30-Nov-2020	Tentative	Content and timing of Market Trials TBD
2	Settlements	Reallocations Go Live	AEMO has deployed all relevant software to the 5MS pre-Production environment and is ready to deliver the agreed Market Trail scenarios.	01-Jan-2021	Tentative	To be discussed @Settlements Focus Group, 20-Mar-2019
2	Settlements	Market Trials conclude	All relevant Market Participants have passed UAT to submit five-minute read data.	31-May-2021	Tentative	Content and timing of Market Trials TBD

AEMO 5MS Timeline Appendix

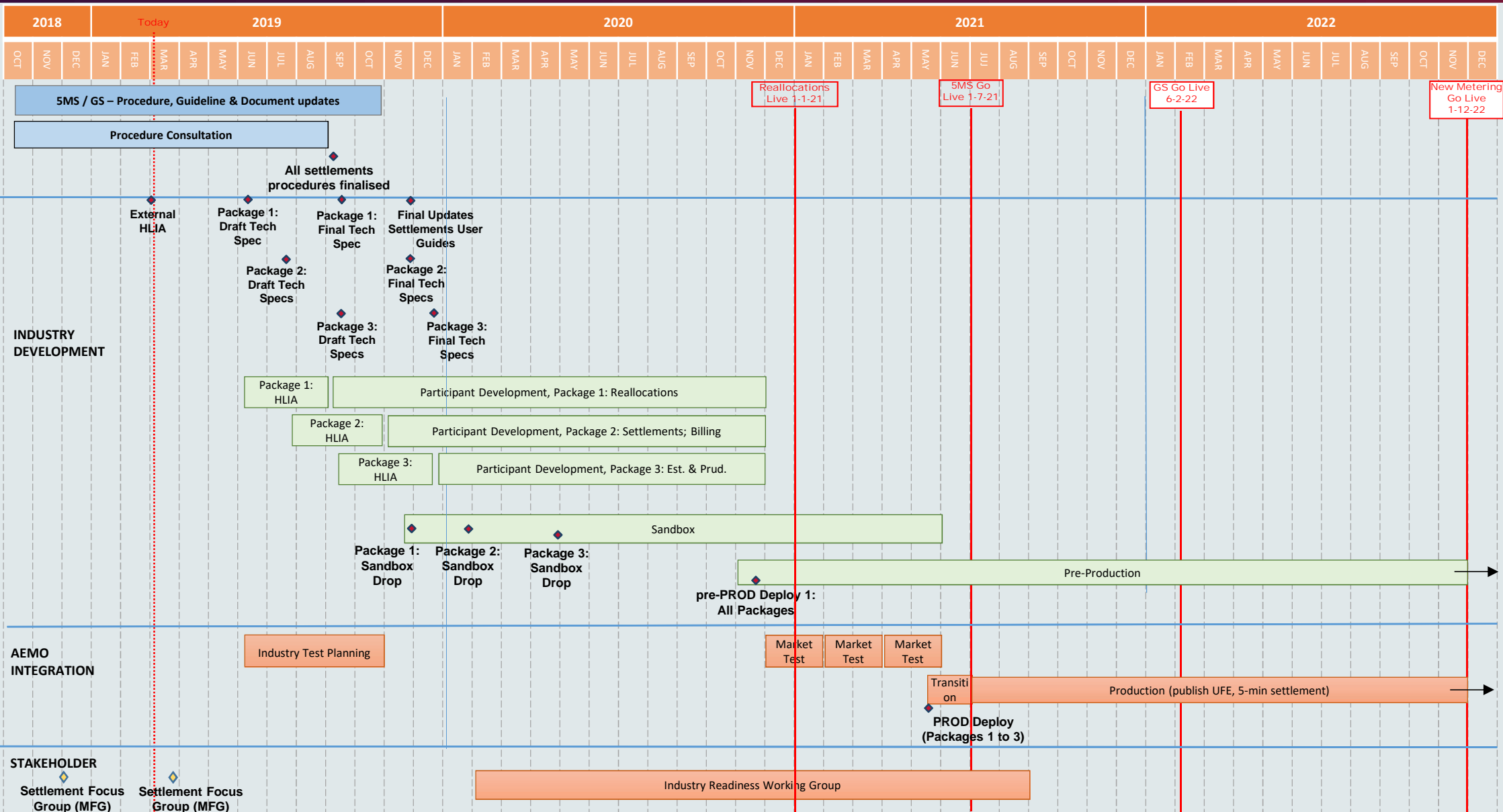
5MS Participant Timeline - Dispatch



5MS Participant Timeline – Metering



5MS Participant Timeline – Settlements



Recap from Executive Forum

Peter Carruthers

5MS Re-cap

AEMC - 5MS Consultation (2016-17)

- SunMetals submitted Rule Change in Dec 2015
- Series of consultations by AEMC with stakeholders through 2016/17
- AEMO noted implementation complexity and desirability of transition approach

AEMC - 5MS Final Determination (Dec 2017)

- Policy work complete, stakeholder views considered, definition of change is clear
- Focus moves to execution
- AEMO established 5MS Project, allocated resourcing and initial funding
- Stakeholder forums defined and established
- Implementation options assessment commenced

AEMO Execution (2018-today)

- Stakeholder forums up and running
- Procedures development and consultation well underway
- AEMO implementation options assessment and due diligence completed
- Noted Global Settlement final decision
- AEMO ready to seek Board approval for funding for major IT development project for 5MS & GS

Proposed Approach and Options Assessed

- AEMO has assessed 3 options during its Implementation Options Assessment
 - Commercial off-the-shelf (COTS) options
 - Enhance existing legacy applications
 - New Build
- Market testing showed COTS approach not practical
 - AEMO conducted RFI process for Metering & Settlements
 - Showed Commercial off-the-shelf solutions for wholesale market operators have poor fit and high fixed licensing and implementation costs
- AEMO analysed enhancing existing legacy applications
 - Option to invest further in existing Metering system not prudent, given the increasing legacy risk, the critical nature of the systems and expected level of market change going forward
 - Settlements application and Dispatch application more robust and enhancement (with technology uplift where required for Settlements) is preferred option.
- AEMO preferred option for Metering is New Build
 - Utilise experienced Systems Integrator vendor to manage risk
 - RFP process completed, competitive process with vendor identified and appointed
 - Other benefits include improved data services to participants and flexibility to respond to change through modern technologies/interfaces

AEMO Costs

- Implementation Cost estimates
 - Total Cost of Ownership \$121m over 10 years
 - Takes account of capex, opex and financing costs
- Selected option is the lowest Total Cost of Ownership
 - Legacy systems upgrade and off the shelf solutions incur very high opex and licencing over time that pushes costs above the preferred option.
- Costs are a function of 5MS/GS changes and legacy systems replacement/uplift
 - Legacy systems replacement cost broadly estimated at \$50-60m
 - Efficiency benefits of performing these changes concurrently
 - Estimated by the Project Team as ~20-30%
- Rigorous process for Implementation Options Assessment undertaken
 - Options tested in the market
 - Estimates developed by subject matter experts and review process undertaken
 - Project Plan prepared, including timeline, solution, resourcing, etc
 - Other market operators contacted (noting direct like-for-like comparisons difficult)
 - Risks reviewed and assessed
- Normal cost management initiatives undertaken
 - Fixed price arrangements with vendor
 - Off-shoring for IT development work where appropriate
 - PMO cost monitoring and management

AEMO Cost Recovery

- Cost Recovery via Current NEM Fee Structure
 - Cost per NMI of ~\$1.10 per annum over 10 years, commencing 2021
 - Across 10m NMIs, this results in annual AEMO cost recovery of ~\$11m per annum
 - The majority of costs allocated to retailers through the 'FRC Electricity' charge (~\$1 pa per NMI)
 - Small impact on generators and wholesale customers through 'NEM' charge (~\$0.10 per NMI)
 - Bottom-up cost allocation performed to assign program costs to these categories
- Other Cost Recovery options being assessed
 - For example, declared NEM Project
 - Potential benefit of spreading the cost base more broadly
 - Would require consultation, option to be considered
- 5MS rule change benefits (from AEMC Determination)
 - Improved bidding incentives and price signals for investment and market operation
 - Annual NEM transactions (\$16.6b in 2016/17) and expected medium term investment (up to \$90b) in NEM
- Participant Costs
 - Impact to participants is a critical driver of total industry costs
 - Importance of minimising impacts to participants is recognised
 - 5MS stakeholder forums provide the opportunity to identify and explore cost minimisation strategies

Exec Forum Debrief – Themes and Actions

Topic	Exec Forum Points	Actions
Costs	<ul style="list-style-type: none"> What is discretionary spend within the program? i.e. for future proofing, or non-mandatory requirements. What spend has been brought forward by 5MS? 	<ul style="list-style-type: none"> Discretionary items reporting to be maintained through existing PCF reporting mechanism. Examine possibility of strengthening this Prepare costs facts sheet. Release during March.
Scope	<ul style="list-style-type: none"> Future proofing and scope extensions may be valid where there is value 	<ul style="list-style-type: none"> Continue to engage through stakeholder forums on value-add opportunities
AEMC	<ul style="list-style-type: none"> Is the AEMC aware of the change in costs and does it impact on the overall benefit case? Is the AEMC (and ESB) aware of the effort/impact and aware that a 'rule change freeze' may be required? 	<ul style="list-style-type: none"> AEMO to maintain contact with AEMC Participants to engage with AEMC as required.
Timeline	<ul style="list-style-type: none"> Does the increase in effort to deliver a new MDM solution mean the timeline is at risk? AEMO needs to manage and co-ordinate with other programs. Flagged concerns about the timeline, and the visibility of progress against the timeline. 	<ul style="list-style-type: none"> Milestone identification and reporting framework tabled at PCF 8 March Procedures working group discussing broader Retail Procedures forward consultation plan AEMO working internally with related programs to understand linkages and impacts, will advise
Procedures	<ul style="list-style-type: none"> Why is there non-mandatory requirements in the Procedures? Has all feedback been considered and replied to? 	<ul style="list-style-type: none"> Address through ongoing Procedure consultation, and side discussions where requested
Cost Recovery	<ul style="list-style-type: none"> What is the process/timing for a Cost Recovery consultation? 	<ul style="list-style-type: none"> AEMO investigating approach to NEM Declared Project consultation

Industry readiness approach

Peter Carruthers

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

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

General questions

Chris Muffett

Further information

- AEMO 5MS Program contacts:
 - Graeme Windley, 5MS Program Manager
 - Chris Muffett, 5MS Business Lead
 - Emily Brodie, 5MS Procedure Lead
 - Malcolm Borschman, 5MS Systems Lead
- Contact details:
 - 5MS email: 5ms@aemo.com.au
 - 5MS webpage:
<http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement>

Forward meeting plan

Chris Muffett

Upcoming meetings

- Program Consultative Forums:
 - PCF #9: Thursday 4 April
- Next Executive Forum:
 - TBA: targeting May
- Next Procedure Working Group:
 - Tuesday 12 March
- Next Systems Working Group:
 - Monday 18 March
- Meetings and forum dates:
<http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement>

