

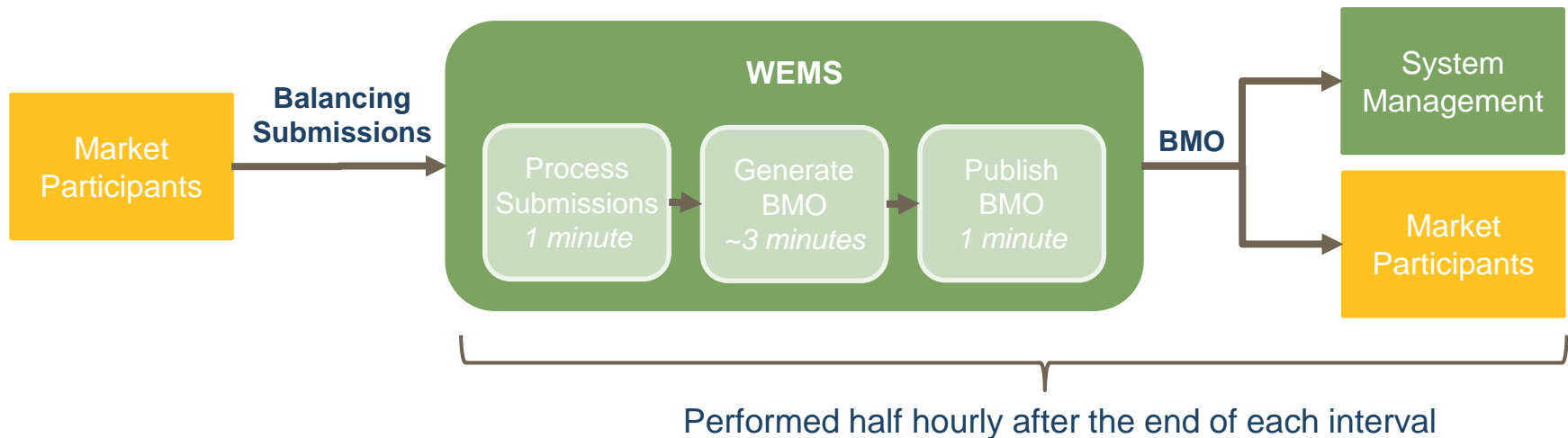
RC_2017_02: IMPLEMENTATION OF 30-MINUTE BALANCING GATE CLOSURE

Market Advisory Committee Meeting 1 May 2017

PRESENTED BY MARTIN MATICKA AND
DEAN SHARAFI

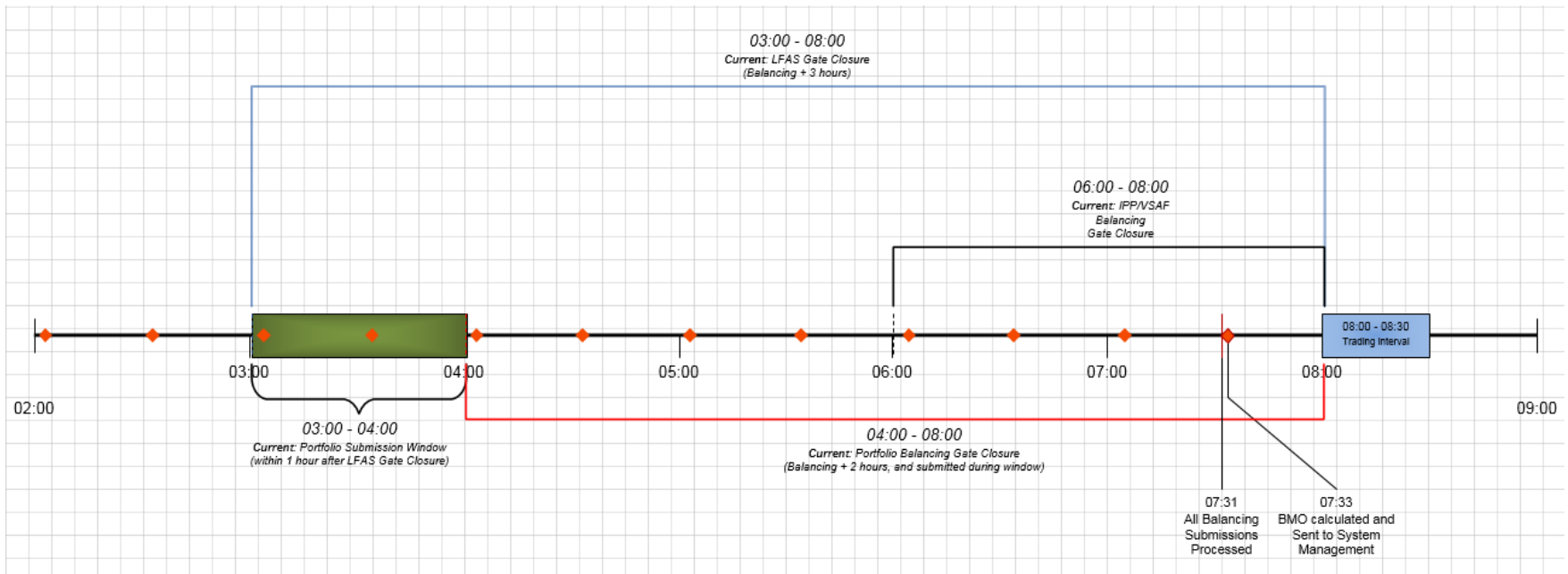


MARKET SYSTEMS – CURRENT PROCESS



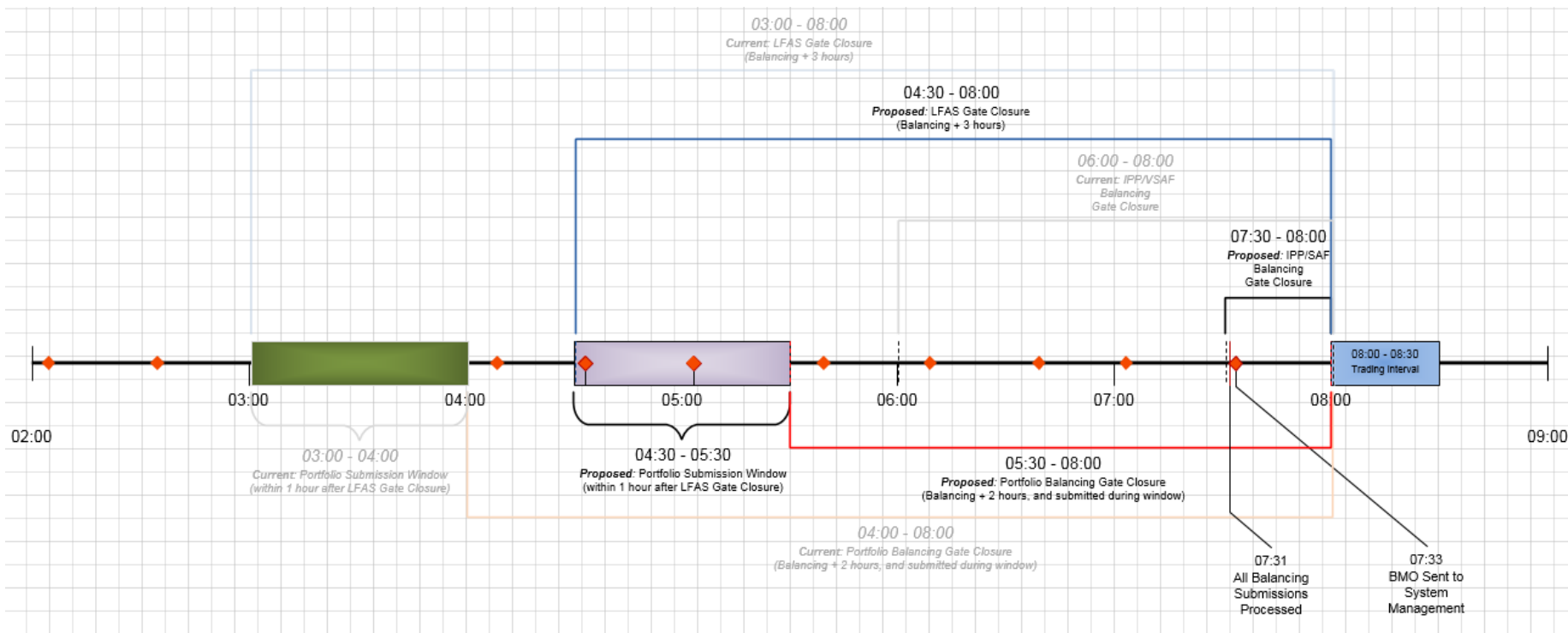
- Under normal operating conditions:
 - Balancing Submissions processed ~1 minute after the end of each interval.
 - BMOs are generated and sent to System Management within 3-4 minutes after the end of each interval.
- Process will remain unchanged with 30 minute Gate Closure.
- A Gate Closure less than 30 minutes will require more significant changes to AEMO's systems.

CURRENT TIMELINE – 8:00 AM INTERVAL



- BMOs are calculated and published half hourly (orange diamonds).
- **Before 06:00:** Market Participants are able to make Balancing Submissions (clause 7A.2.1)
- **Between 06:00 and 07:30:** Balancing Submissions may be made due to a constraint (clause 7A.2.10). These are reflected in 07:33 BMO and used for dispatch.
- **Between 07:30 and 08:00:** Balancing Submissions may be made due to a constraint (clause 7A.2.10) and are reflected Pricing BMO.

RC_2017_03 TIMELINE – 8:00 AM INTERVAL



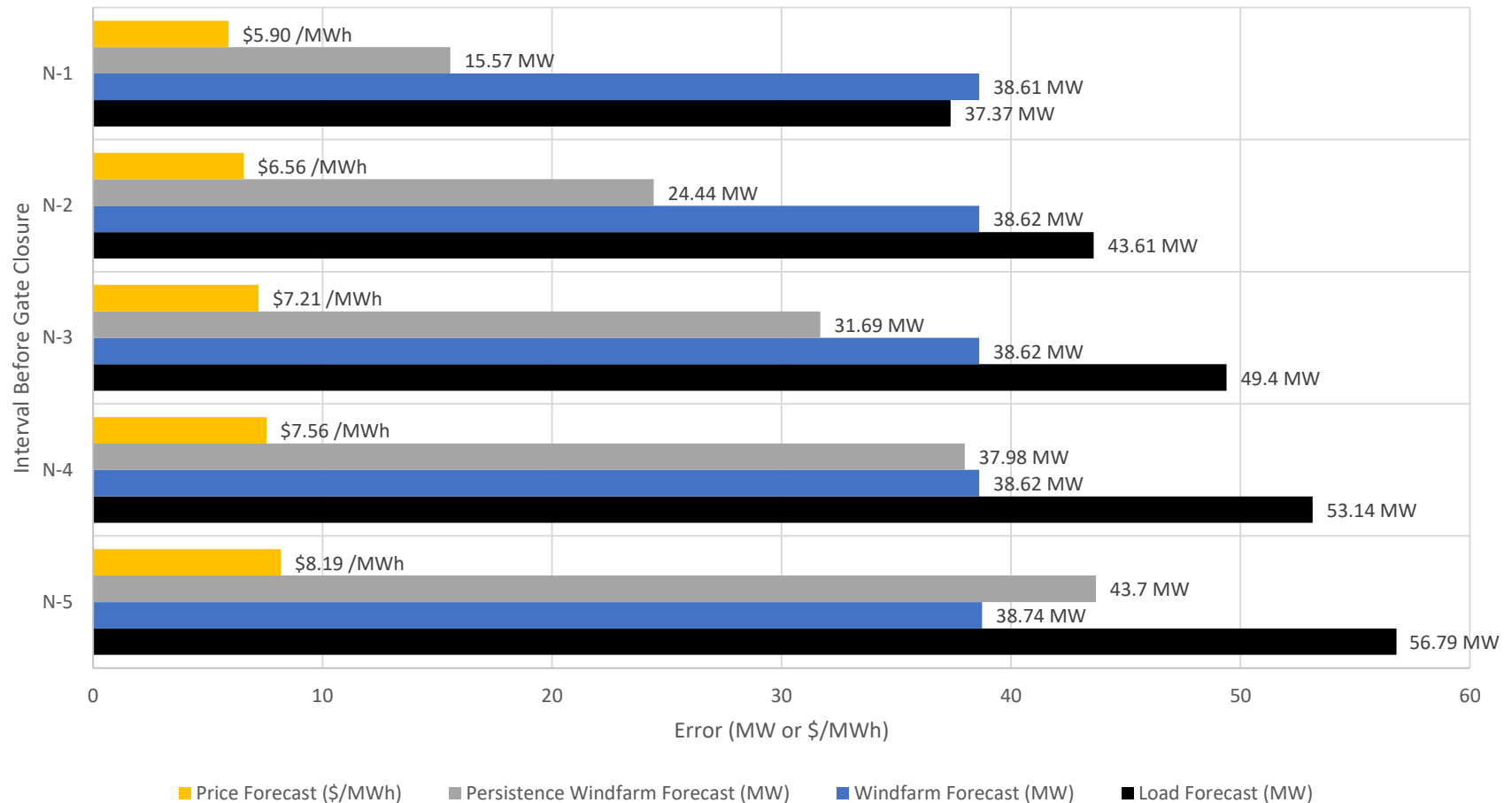
- BMOs continue to be calculated and published half hourly (orange diamonds).
- **Before 07:30:** Market Participants are able to make Balancing Submissions (clause 7A.2.1). These are reflected in 07:33 BMO and used for dispatch.
- **Between 07:30 and 08:00:** Balancing Submissions may be made due to a constraint (clause 7A.2.10) and are reflected Pricing BMO.
- Portfolio gate closure and LFAS gate closure shifts accordingly.

- The following changes to WEMS are expected:
 - Configuration changes to represent new Balancing Gate Closure.
 - Consequential configuration changes to represent updated Portfolio Submission Window and LFAS Gate Closure.
 - Changes to automated test suite.
- The following changes to processes may be required:
 - Updates to Market Procedures and other documentation.
 - Updates to Internal Procedures and compliance monitoring tools.

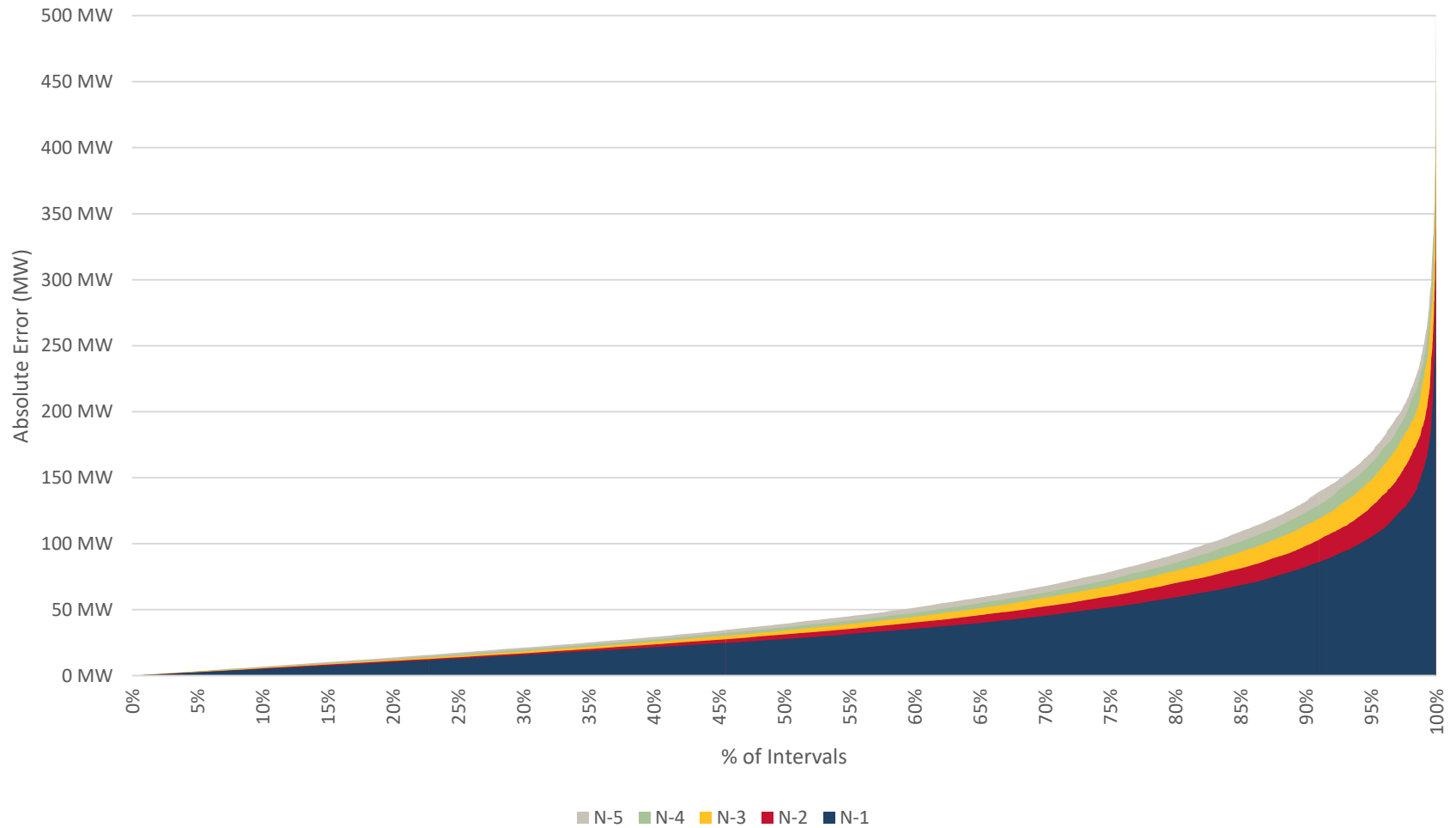
MARKET IMPACTS FORECAST ACCURACY



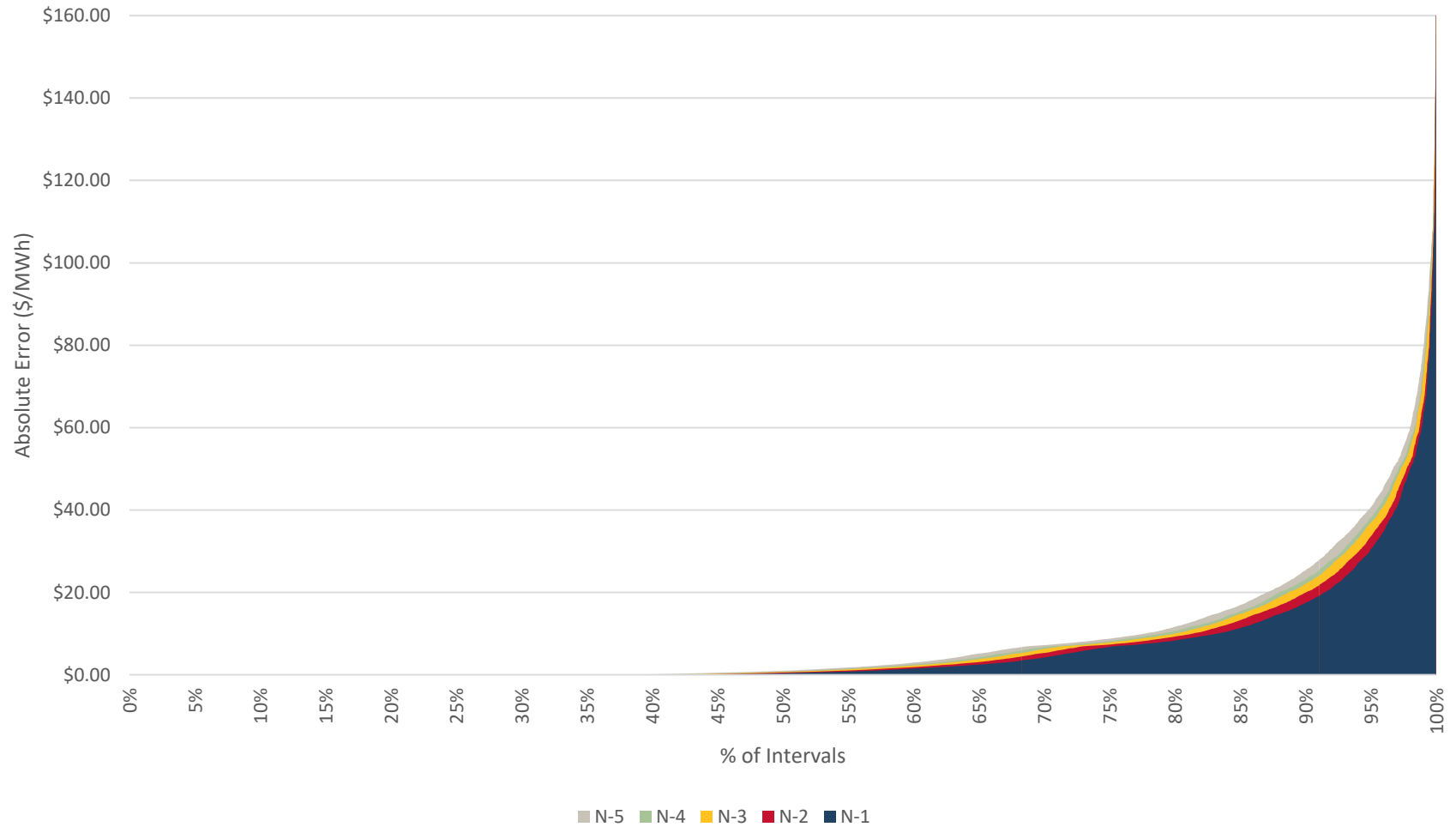
Mean Absolute Deviation for Forecasts in the Balancing Market for 2016
(N-5 = current situation, N-2 = 30 min gate closure)



MARKET IMPACTS - LOAD FORECAST ERROR DURATION CURVE 2016



MARKET IMPACTS - PRICE FORECAST ERROR DURATION CURVE 2016



CURRENT STATE – 2 HR GATE CLOSURE



Current interval

'Closed' intervals

10:00		10:30						11:00				11:30				12:00				12:30							
EOI		Chg		EOI		Chg		EOI		Chg		EOI		Chg		EOI		Chg		EOI							
2470		-70		2400		-11		2390		-4		2386		-12		2374		5		2379							
Publish Offset Data		Offset Input		0		0		0		0		0		0		0		0		0							
R.T.D.E. Offset		0		0		0		0		0		0		0		0		0		0							
DI	Gen	Time	DI	RR	Ack	Chg	Gen	Time	DI	RR	Ack	Chg	Gen	Time	DI	RR	Ack	Chg	Gen	Time	DI	RR	Ack	Chg	Gen		
199	216						216	11:00	179	2	A	-20	196							196							
199	218						218	11:00	179	2	A	-20	198							198							
136	139						139	11:10	86	9	S	-50	89	11:30	83	9	S	-3	86	12:00	100	9	S	17	103		
136	138						138	11:10	83	9	A	-53	85	11:30	62	9	S	-20	65	12:00	83	9	S	20	85		
24	24						24	11:10	83	9	A	-53	24	11:30	20	3	S	-4	20	12:00	15	3	S	-5	15		
240	244	10:30	272	6	A	32	276	11:00	310	6	A	38	314							314							
21	22						22	11:00	143	11	A	144	144							22	12:30	87	9	S	-13	90	
																				144	12:30	10	3	S	-5	85	
55	58						58						58							58					58		
58	58					1	60					2	61							61					61		
114	117					19	136					12	148							148					148		
68	69					7	76					3	79							79					79		
43	44					0	44					0	44							44					44		
3	3					0	4					-1	3							3					3		
0	1					-1	0					0	0							0					0		
6	7					1	8					1	8							8					8		
VE	973					-127	846					-68	778							24	802				-44	757	
																										7	764

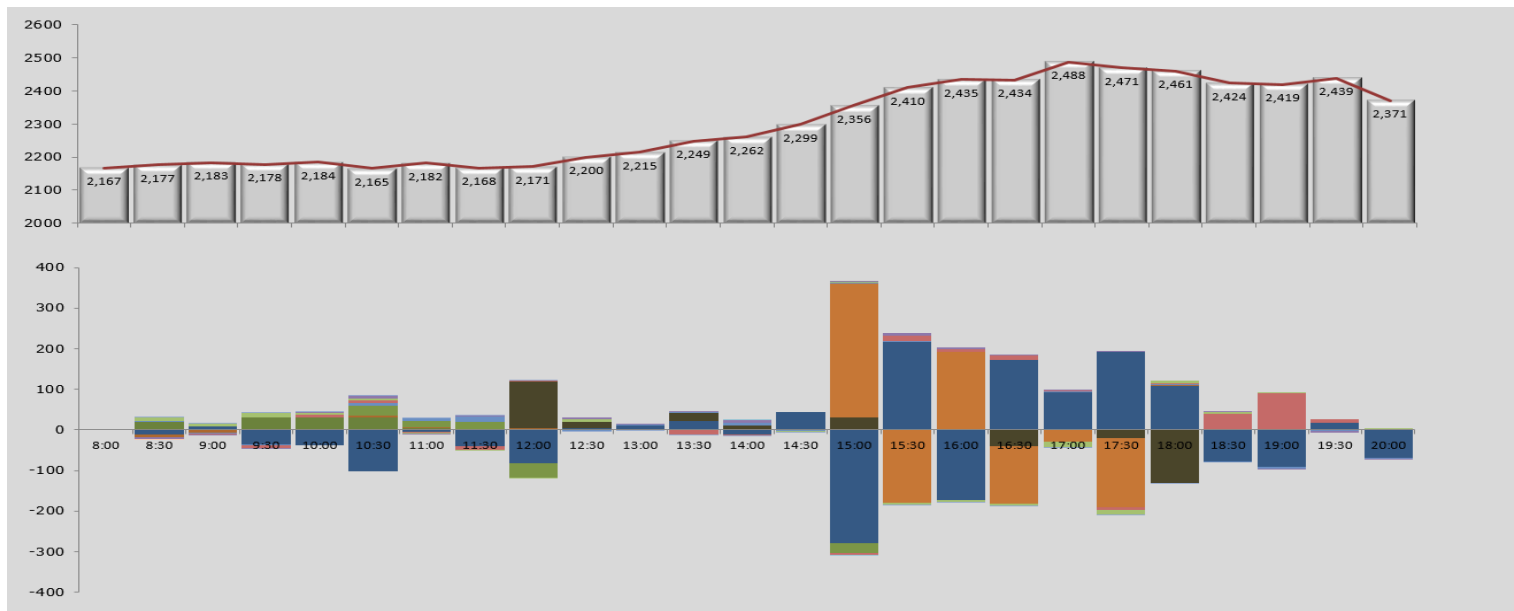
CURRENT STATE – 2 HR GATE CLOSURE



- 2 Hr look ahead allows positioning for large movements
 - Combined bids can bring on or off in excess of 300 MW in a single interval
- Controller must plan the system to allow movements to occur, whilst ensuring;
 - Spinning reserve maintained
 - Load following up and down maintained
 - Load rejection requirements maintained
- Synergy portfolio positioned to meet peaks and troughs
- AEMO needs to accommodate combined ramping of IPPs that can be more than 3-4 times the ramp rate of the Balancing Portfolio, plus additional movement of Intermittent Generators
- Controllers have to start positioning plant up to 110 min out to meet market dispatches

CURRENT STATE - CHALLENGES

- Multiple market participants increasing (or decreasing) output in a single interval can create large dispatches
- 57 MW load increase saw 675 MW of dispatches in a single interval (up and down) see below

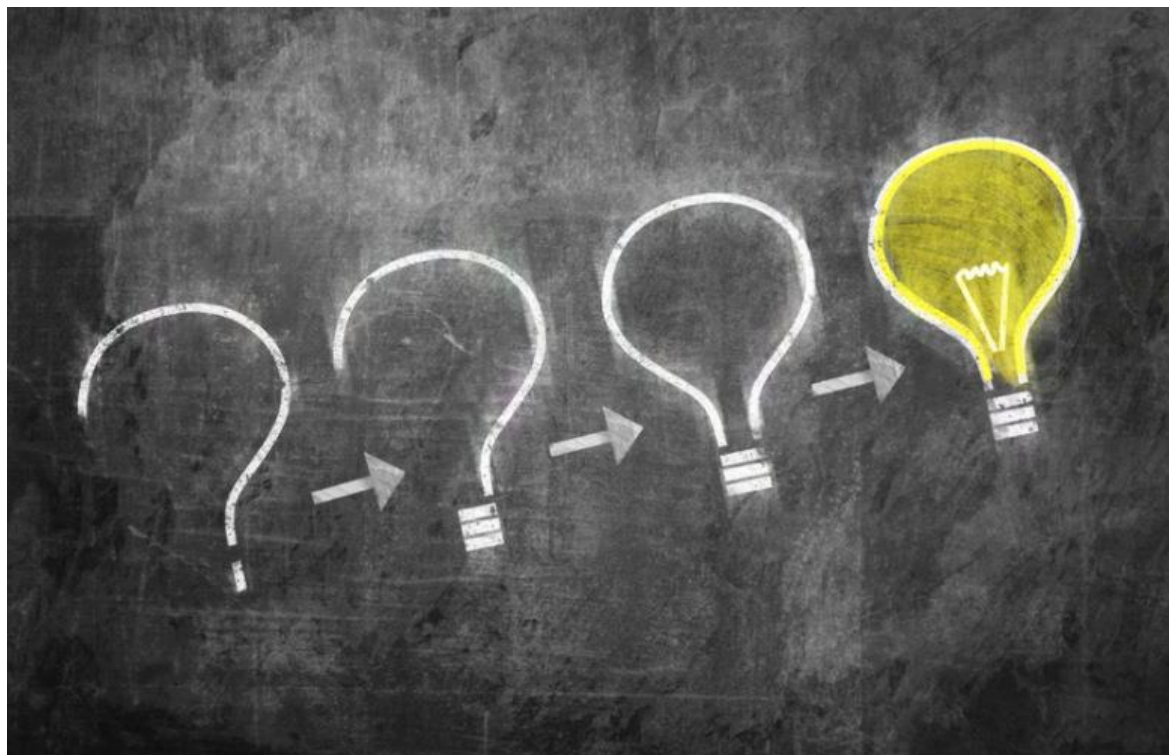


- Intermittent wind and solar
 - Solar change of 100 MW near instantaneous not uncommon
 - Wind change of 200 MW near instantaneous not uncommon

All whilst maintaining system security and required reserves

Large challenging dispatches happen frequently every one or two shifts

- Ramp Rate limit
 - Ramping of generators according to the load requirement will allow smooth movement of the system at the beginning of each interval and will limit the time required for short-term operational planning



Thank you!