

Gas Market Monitoring

General update - September 2020

Items

1. Updates from previous GWCF
 1. BB101
 2. STTM and GBB feedback
2. DWGM – threats to system security
3. STTM – recent capacity constraints in Brisbane

Action Item - GBB101

- APGA have been holding workshops on their #Better Together initiative
 - Looking at ways to improve gas pipeline information reporting to the market, and other feedback on what may not be working with the current framework.
 - APGA's ultimate vision for the initiative is to increase gas pipeline sector transparency to improve customer and market outcomes
 - There is a focus on working with customers to develop solutions where possible
 - Next round of #Better Together workshops scheduled 29/30 September
- High level feedback
 - The quantity and complexity of information can be confusing; many shippers find it difficult to identify what information is available and where it is located.
 - Some of this complexity relates to the broad distribution of information across several websites which is then further broken down across a range of separate documents.
 - Knowing where to find information
 - Many participants would strongly favour a central repository of pipeline information
- APGA has launched a Pipeline Information Web Portal to help consolidate this information into one location. See <https://www.apga.org.au/pipeline-information-users>
- AEMO have met with APGA on several occasions to collaborate on creating additional education information to help with understanding how to interpret information on the Gas Bulletin Board
- GBB101 and the Web Portal are the topics of discussion for 29/30 Sept #Better Together Workshops

Previous GWCF - STTM

STTM

- Feedback was sought on proposed minor updates to STTM procedures relating to
 - Event reports
 - MOS estimates
 - Updates to the report specification
- Minimal feedback was received and AEMO is progressing these changes and plans on running a procedure consultation in the near future

Previous GWCF – GBB

- Feedback was sought on clarifications
 - Nameplate rating
 - Connection point data
 - Linepack Adequacy Flag
 - Production facility point-to-point pipelines
 - Locations
 - Short term capacity outlooks
 - Input into the Biennial Review
- Minimal feedback was received and AEMO will incorporate proposed changes in the near future when we incorporate the changes from the measures to improve transparency in gas markets reforms.

Threats to system security in the DWGM

Impacts of cold weather and COVID-19 on the demand profile

DWGM Interventions – Key facts

- Threat to System Security notice issued 7 times so far this year – highest yearly number in the history of DWGM.
- In all incidents the gas was available and bid into the market, but was above market price i.e. a localised constraint requiring gas to be constrained-on
- Five of these related to gas from Dandenong LNG being required to maintain minimum pressure at the Dandenong City Gate – four of which resulted in scheduled out-of-merit-order LNG (in merit order but above market price)
- Ancillary Payments across the four of the incidents totalling \$420,000
- Higher frequency of these events are a direct result of changes in demand profile due to COVID-19
- Intervention Reports are available here
<https://aemo.com.au/energy-systems/gas/declared-wholesale-gas-market-dwgm/dwgm-events-and-reports>

DWGM Interventions – Summary of Events

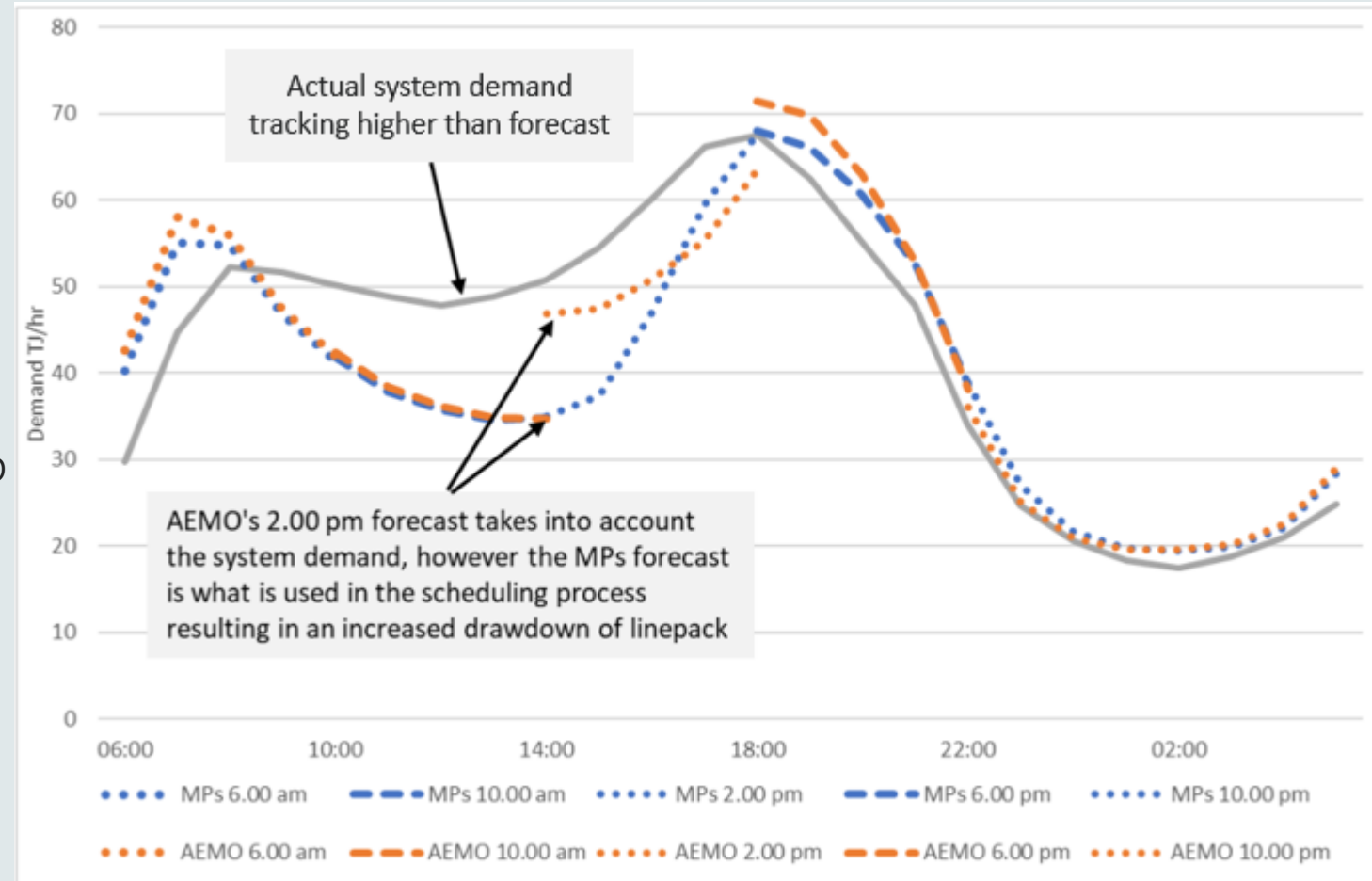
Gas Day	Event Summary	Market Impact
12-13 May 2020	<ul style="list-style-type: none"> Out-of-merit-order Iona injections initially scheduled to support Southwest Pipeline's demand due to Brooklyn Compressor Station Outage No out-of-merit-order gas flown with compressors returned to service. 	None
1 June 2020	<ul style="list-style-type: none"> 34 TJ of out-of-merit-order LNG injections scheduled to support the pressure at DCG for the 6 PM schedule Exports out of Southwest Pipeline restricted to zero to support the pipeline's demand 	~150K
3 June 2020	<ul style="list-style-type: none"> Out-of-merit-order Iona injections initially scheduled to support Southwest Pipeline's demand due to Brooklyn Compressor Station Outage No out-of-merit-order gas flown with compressors returned to service. 	None
3 July 2020	<ul style="list-style-type: none"> Out-of-merit-order LNG injections initially scheduled to support the pressure at DCG No out-of-merit-order gas flown. 	None
4 August 2020	35 TJ of out-of-merit-order LNG injections scheduled to support the pressure at DCG for the 2 PM schedule	~80K
7 August 2020	57 TJ of out-of-merit-order LNG injections scheduled to support the pressure at DCG for the 2 PM schedule	~148K
22 August 2020	20 TJ of out-of-merit-order LNG injections scheduled to support the pressure at DCG for the 6 PM schedule	~42K

A closer look

- Demand profile has changed as a result of COVID-19 restrictions
- Accuracy and timing of weather forecast plays a part
- Minimal updates in aggregate participant forecasts at each scheduling interval

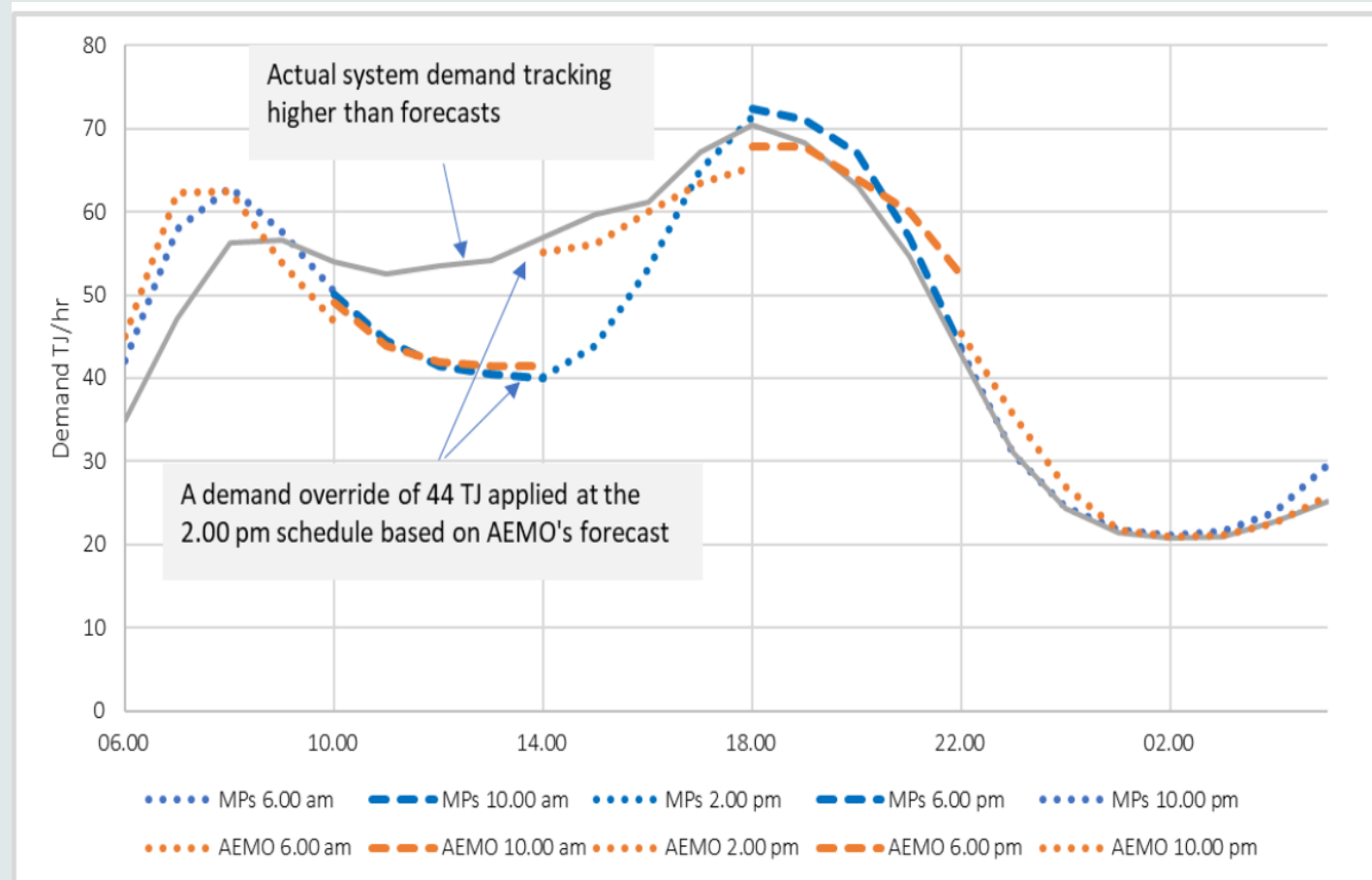
1 June 2020

- Forecast maximum temperature of 11°C
- 6.00 am forecast
 - Participants – 936 TJ
 - AEMO – 959 TJ
- By 2.00 pm a cold front with heavy rain passed through Melbourne causing a temperature drop of ~1.6°C
- 34 TJ out-of-merit-order gas at 6.00 pm
- Total demand of 1,020 TJ



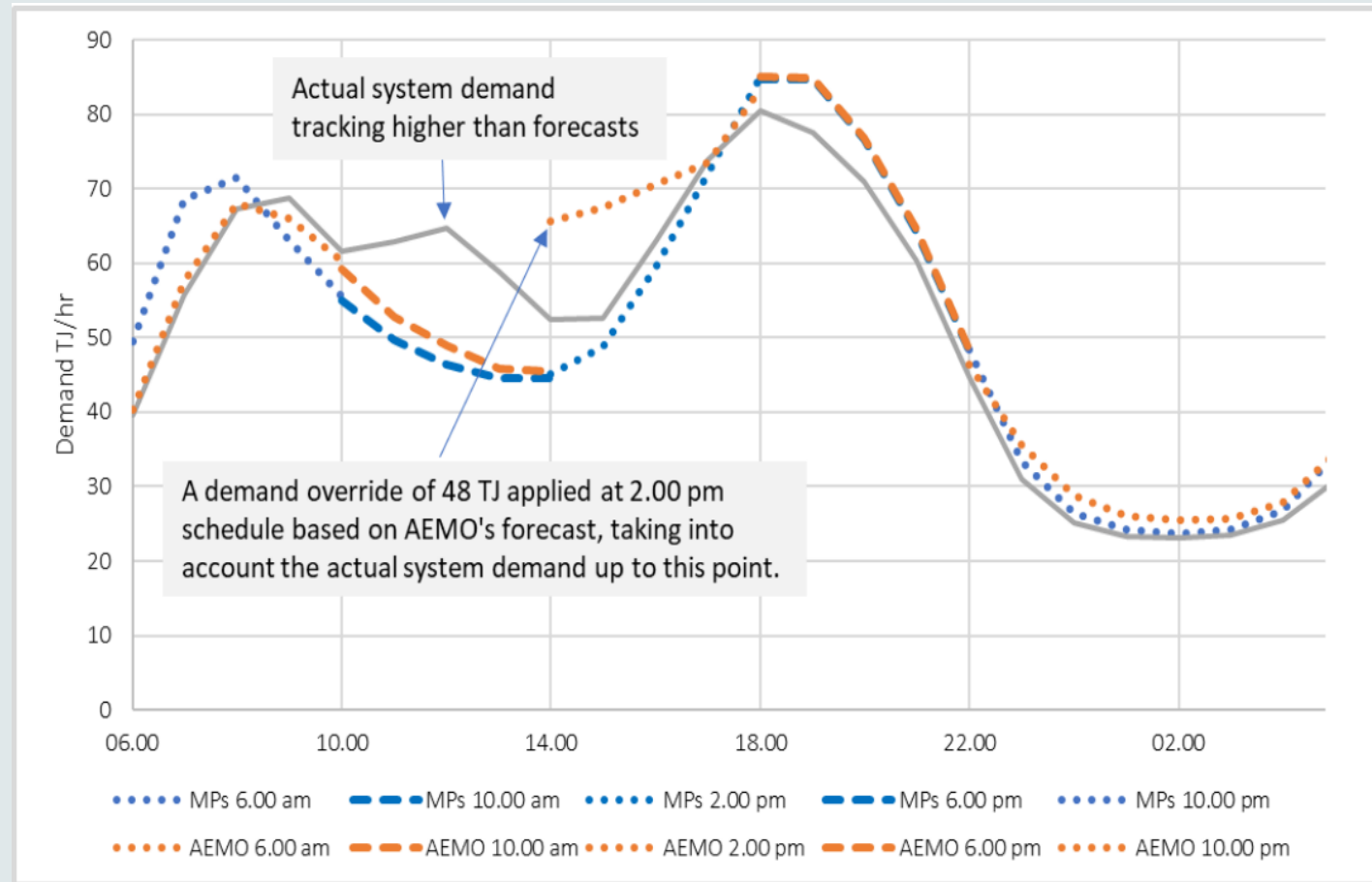
3 July 2020

- Forecast maximum temperature of 10.3°C
- 6.00 am forecast
 - Participants – 1,081 TJ
 - AEMO – 1,070 TJ
- Actual temperatures tracked lower after reaching 10°C around mid-day in line with forecast
- No out-of-merit-order gas scheduled
- Total demand of 1,120 TJ



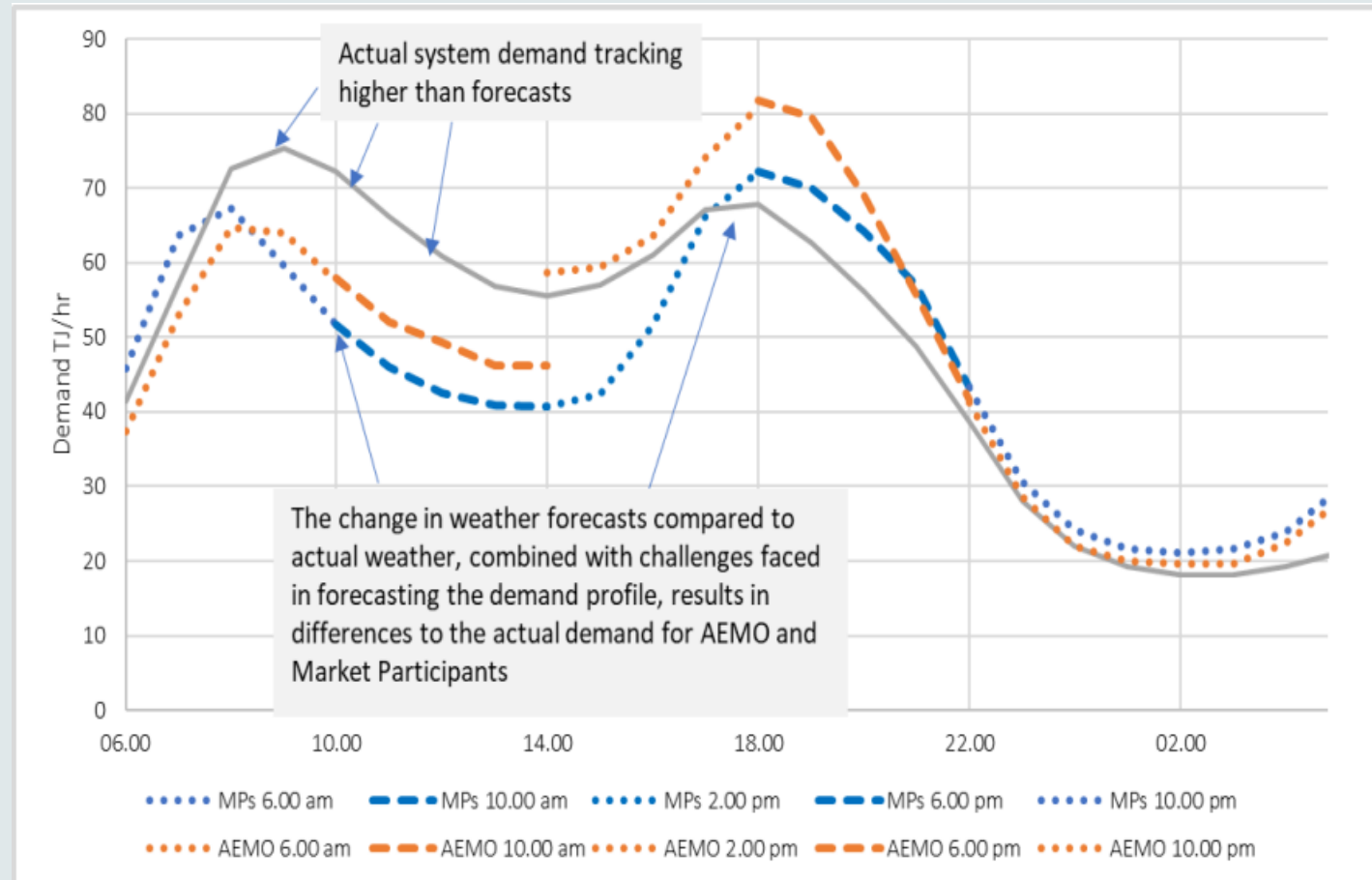
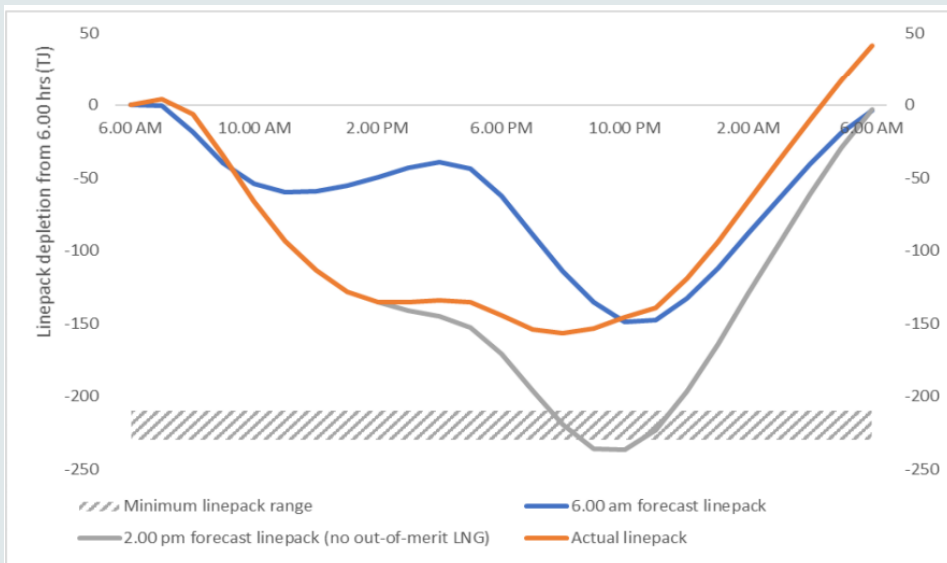
4 August 2020

- Forecast maximum temperature of 9°C
- 6.00 am forecast
 - Participants – 1,221 TJ
 - AEMO – 1,206 TJ
- The temperature dropped to around 5°C (2 degrees lower than forecast) as a cold front passed through between 12.00 hrs and 14.00 hrs and then increased to 10°C (2 degrees above forecast) between 14.00 hrs and 16.00 hrs.
- 35 TJ out-of-merit-order gas at 2.00 pm
- Total demand of 1,238 TJ



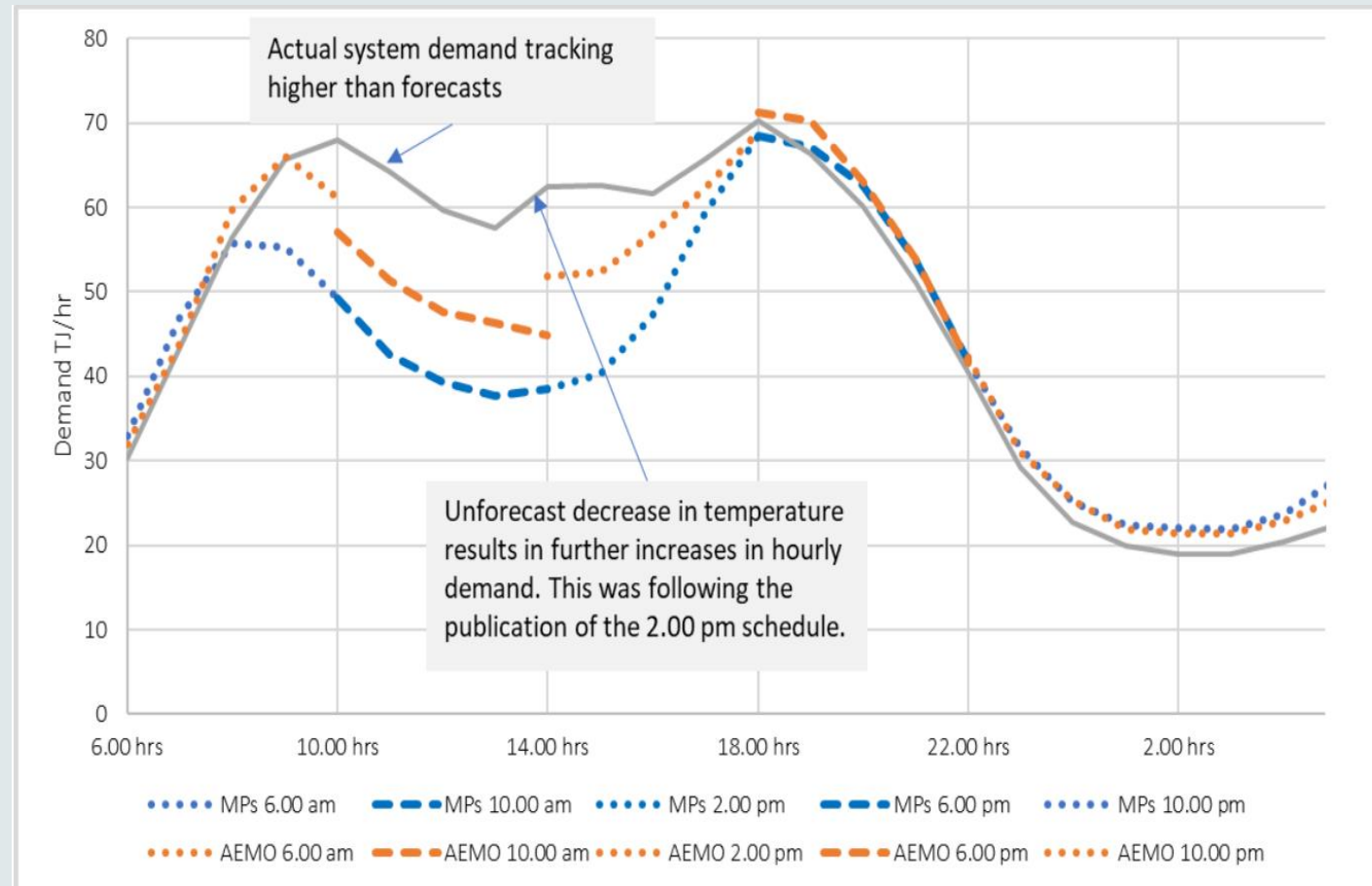
7 August 2020

- Forecast maximum temperature of 12°C
- 6.00 am forecast
 - Participants – 1,097 TJ
 - AEMO – 1,120 TJ
- Actual temperatures tracked lower than the forecast between 07.00 hrs and 12.00 hrs and higher between 12.00 hrs and 18.00 hrs
- 57 TJ out-of-merit-order gas at 2.00 pm
- Total demand of 1,164 TJ



22 August 2020

- Forecast maximum temperature of 10.8°C
- 6.00 am forecast
 - Participants – 991 TJ
 - AEMO – 1,083 TJ
- Actual temperatures tracked lower than the forecasts for the first 12 hours of the day particularly when a cold front reached Melbourne that saw temperatures decline sharply leading in to the 6.00 pm schedule
- 20 TJ out-of-merit-order gas at 6.00 pm
- Total demand of 1,139 TJ



Summary

- Cold temperatures and timing of cold fronts combined with COVID-19 impacted demand profile are creating challenges
- AEMO notes in all of these incidents that only minimal updates to participants forecasts are being made
- Participants are strongly encouraged to review their demand forecasts
- Total hourly demand data is available to see changes in shape of the profile
 - This data is available in the MIBB report 'Operational Metering Data' (INT236) on AEMO > Energy Systems > Gas > Declared Wholesale Gas Market > Daily data reports

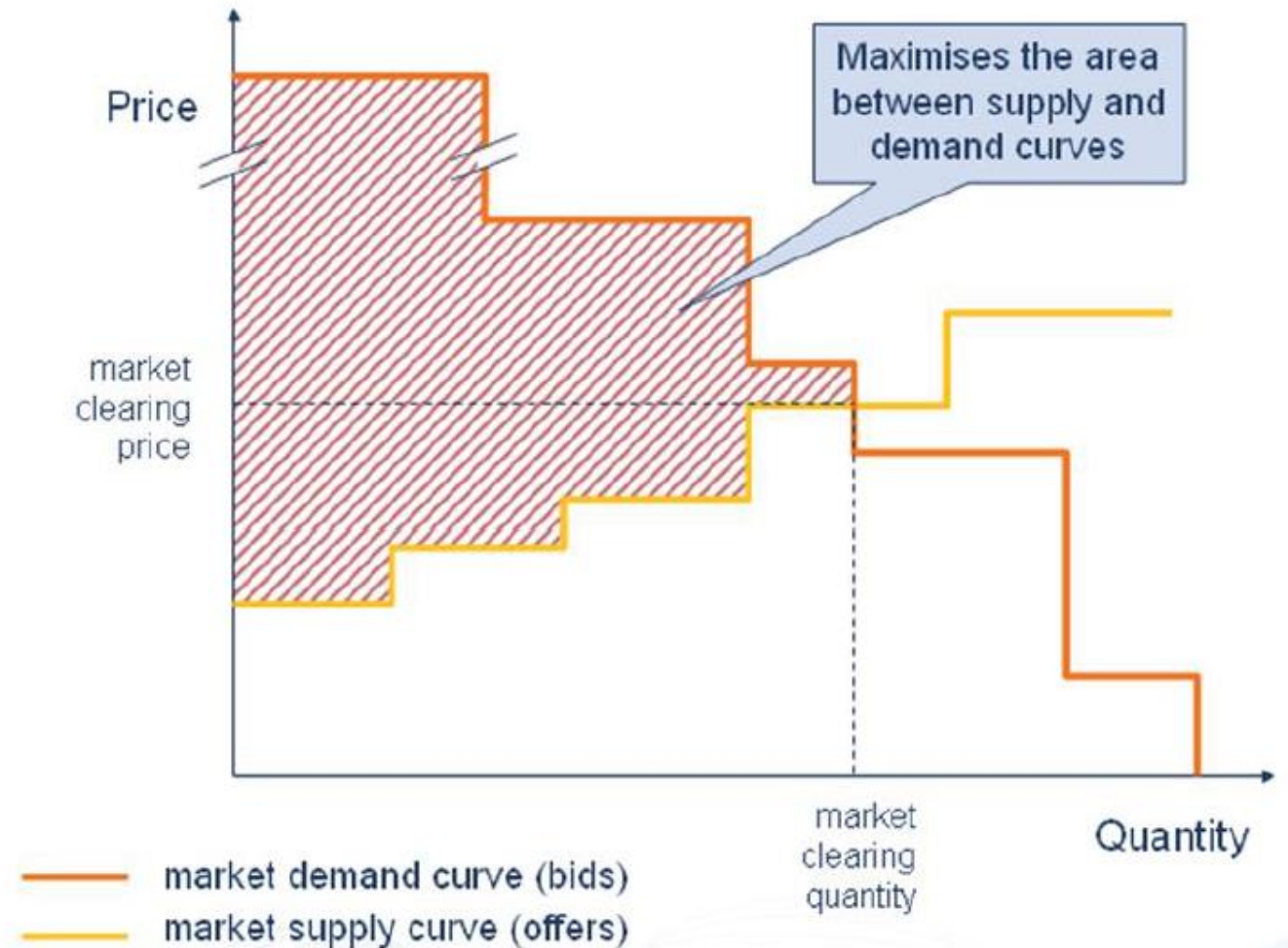
Brisbane STTM

Recent Capacity Constraint on the RBP

SPA maximises the benefit to the market

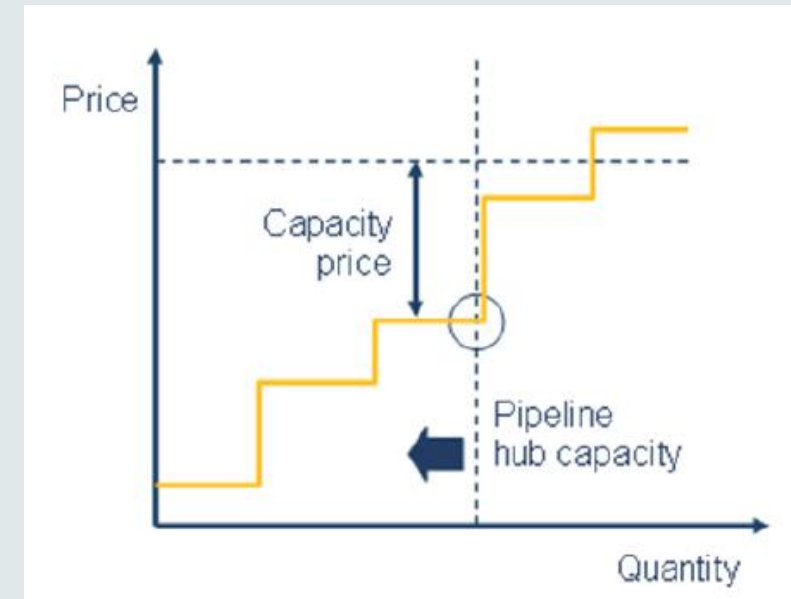
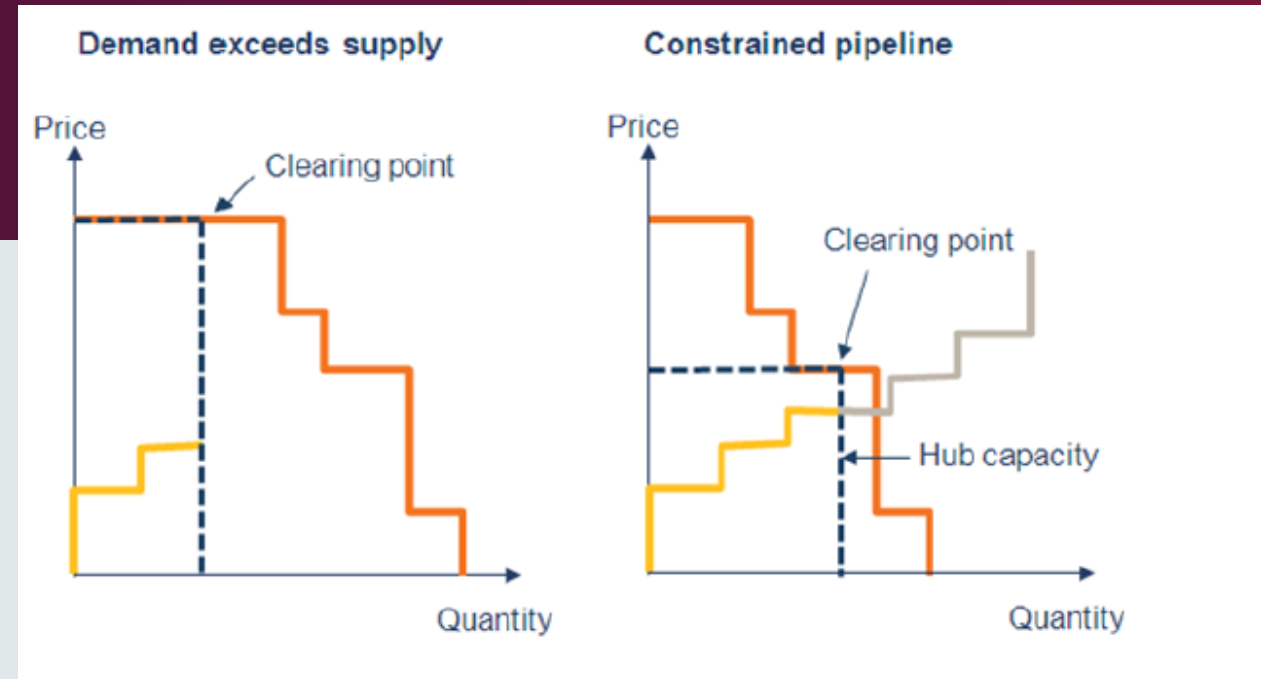
- Scheduling and Pricing Algorithm (SPA) applies NGR 405.
- The SPA seeks to maximise the amount by which the value of bids (and price taker withdrawals) scheduled exceeds the cost of offers.
- The Scheduling and Pricing Engine (SPE) is the software implementation of the SPA.

Figure 16 SPA maximises the benefit to the market



Some examples

- Demand exceeds supply
 - Not enough supply to meet demand
 - Will trigger a Contingency Gas (CG) Event
 - Price will be at Maximum Price Cap (MPC) \$400/GJ
- Constrained pipeline
 - The bid will set the price
 - Capacity Price set to the difference between price and highest offer.



Offer/Bid Stacks: RBP capped @ 114TJ

Price = \$10.00

Highest offer = \$3.90

Capacity Price = \$6.10

OFFER STACK						BID STACK					
gas_date	FACILITY_	CommonName	price	Quantity	cumqty_TJ	gas_date	FACILITY_IDENTIFIER	CommonName	price	Quantity	cumqty_TJ
31/08/2020	RBP	Incitec Pivot	0	38	38	31/08/2020	NETBRI1	Price Taker	400.00001	110.823	110.823
31/08/2020	RBP	Brickworks	0	1	39	31/08/2020	NETBRI1	Weston	400	1.972	112.795
31/08/2020	RBP	O-I International	0	3	42	31/08/2020	RBP	Weston	25	0.009	112.804
31/08/2020	RBP	CSR	0	2.2	44.2	31/08/2020	NETBRI1	Caltex	10	2.15	114.954
31/08/2020	RBP	AGL	0	0.67	44.87	31/08/2020	RBP	ERM	4.2522	3	117.954
31/08/2020	RBP	CleanCo	0	30.75	75.62	31/08/2020	RBP	Origin	3.81	2.056	120.01
31/08/2020	RBP	AGL	0	10	85.62	31/08/2020	RBP	Eastern Energy	3.8	3	123.01
31/08/2020	RBP	Origin	0	22.615	108.235	31/08/2020	RBP	ERM	3.4288	2	125.01
31/08/2020	RBP	Origin	0.1	0	108.235	31/08/2020	RBP	CleanCo	3.39	0.001	125.011
31/08/2020	RBP	Caltex	2.5	2.9	111.135	31/08/2020	RBP	ERM	3.2788	5	130.011
31/08/2020	RBP	Alinta	3.8	1	112.135	31/08/2020	RBP	ERM	3.1888	2	132.011
31/08/2020	RBP	Origin	3.8734	1.028	113.163	31/08/2020	RBP	ERM	2.5688	4	136.011
31/08/2020	RBP	Alinta	3.9	1	114.163	31/08/2020	RBP	CleanCo	2.55	0.999	137.01
31/08/2020	RBP	Alinta	3.95	1	115.163	31/08/2020	RBP	Eastern Energy	2.5	3	140.01
31/08/2020	RBP	Alinta	4	1	116.163	31/08/2020	RBP	ERM	2.01	4	144.01
31/08/2020	RBP	CleanCo	4.1	0.6	116.763	31/08/2020	RBP	Alinta	1.99	5	149.01
31/08/2020	RBP	CleanCo	4.35	2.4	119.163	31/08/2020	RBP	Alinta	1.51	5	154.01
31/08/2020	RBP	ERM	4.55	4	123.163	31/08/2020	RBP	CleanCo	1.5	3	157.01

Offer/Bid Stacks: RBP capped @ 119TJ

\$0 offers = 122.95

RBP Cap = 119.00

% schedule = 96.8%

Price = \$10.00

Highest offer = \$0.00

Capacity Price = \$10.00

OFFER STACK						BID STACK					
gas_date	FACILITY_IDENTIFIER	CommonName	price	Quantity	cumqty_TJ	gas_date	FACILITY_IDENTIFIER	CommonName	price	Quantity	cumqty_TJ
3/09/2020	RBP	AGL	0	3.211	3.211	3/09/2020	NETBRI1	Price Taker	400.00001	104.097	104.097
3/09/2020	RBP	AGL	0	7	10.211	3/09/2020	NETBRI1	Weston	400	2.073	106.170
3/09/2020	RBP	Alinta	0	4.5	14.711	3/09/2020	RBP	Weston	25	0.006	106.176
3/09/2020	RBP	Brickworks	0	1	15.711	3/09/2020	NETBRI1	CleanCo	15	4	110.176
3/09/2020	RBP	Caltex	0	3.8	19.511	3/09/2020	NETBRI1	Caltex	10	2.2	112.376
3/09/2020	RBP	CleanCo	0	36	55.511	3/09/2020	NETBRI1	CleanCo	10	7.764	120.140
3/09/2020	RBP	CSR	0	2.2	57.711	3/09/2020	RBP	Origin	4.7895	2.085	122.225
3/09/2020	RBP	Incitec Pivot	0	38	95.711	3/09/2020	RBP	ERM	4.6488	4	126.225
3/09/2020	RBP	O-I International	0	3	98.711	3/09/2020	RBP	ERM	4.5088	4	130.225
3/09/2020	RBP	Origin	0	22.939	121.65	3/09/2020	RBP	Eastern Energy	4.1	3	133.225
3/09/2020	RBP	SGMT	0	1.3	122.95	3/09/2020	RBP	ERM	3.6188	4	137.225
3/09/2020	RBP	CleanCo	3.5	0	122.95	3/09/2020	RBP	CleanCo	3.39	0.001	137.226
3/09/2020	RBP	Arrow	4.5487	2	124.95	3/09/2020	RBP	ERM	3.3188	4	141.226
3/09/2020	RBP	Origin	4.7901	1.043	125.993	3/09/2020	RBP	Alinta	3.0011	5	146.226
3/09/2020	RBP	CleanCo	5.1	1	126.993	3/09/2020	RBP	Alinta	2.7211	5	151.226
3/09/2020	RBP	CleanCo	5.19	1.5	128.493	3/09/2020	RBP	ERM	2.61	2	153.226
3/09/2020	RBP	Arrow	5.2587	3	131.493	3/09/2020	RBP	CleanCo	2.55	0.001	153.227
3/09/2020	RBP	CleanCo	5.3901	3	134.493	3/09/2020	RBP	Eastern Energy	2.5	3	156.227
3/09/2020	RBP	Eastern Energy	5.5	1	135.493	3/09/2020	RBP	ERM	2.01	2	158.227
3/09/2020	RBP	ERM	5.7588	2	137.493	3/09/2020	RBP	CleanCo	1.5	0.998	159.225

Prices

- Ex post imbalance price also capped at RBP capacity.
- MOS D+2 has a big impact for negative deviation price.

gas_date	hub identifier	positive deviation price	negative deviation price	ex ante market price	ex post imbalance price	mos increase cost	mos decrease cost	ex ante capacity price	capacity qty
Mon 31-Aug-20	BRI	3.2788	10.5934	10.00	3.2788	10.5934		6.10	114,000
Tue 01-Sep-20	BRI	4.6787	10.00	4.6787	10.00		9.4802	0.00	114,000
Wed 02-Sep-20	BRI	10.00	10.00	10.00	10.00	5.085		5.189	119,000
Thu 03-Sep-20	BRI	3.6802	10.00	10.00	4.7895		3.6802	10.00	119,000
Fri 04-Sep-20	BRI	4.50	5.0676	4.50	4.50	5.0676		0.00	119,000
Sat 05-Sep-20	BRI	4.0087	5.0278	4.20	4.0087	5.0278		0.00	119,000
Sun 06-Sep-20	BRI	4.4787	10.585	4.4787	4.4787	10.585		0.00	119,000
Mon 07-Sep-20	BRI	3.719	4.4428	4.4428	4.4401		3.719	0.00	119,000
Tue 08-Sep-20	BRI	10.00	10.00	10.00	10.00	4.835		10.00	119,000