Electricity Contract Co-Design: Shaping Product Analysis for WS5



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Analysis Overview



For discussion

Context - Current Design Overview

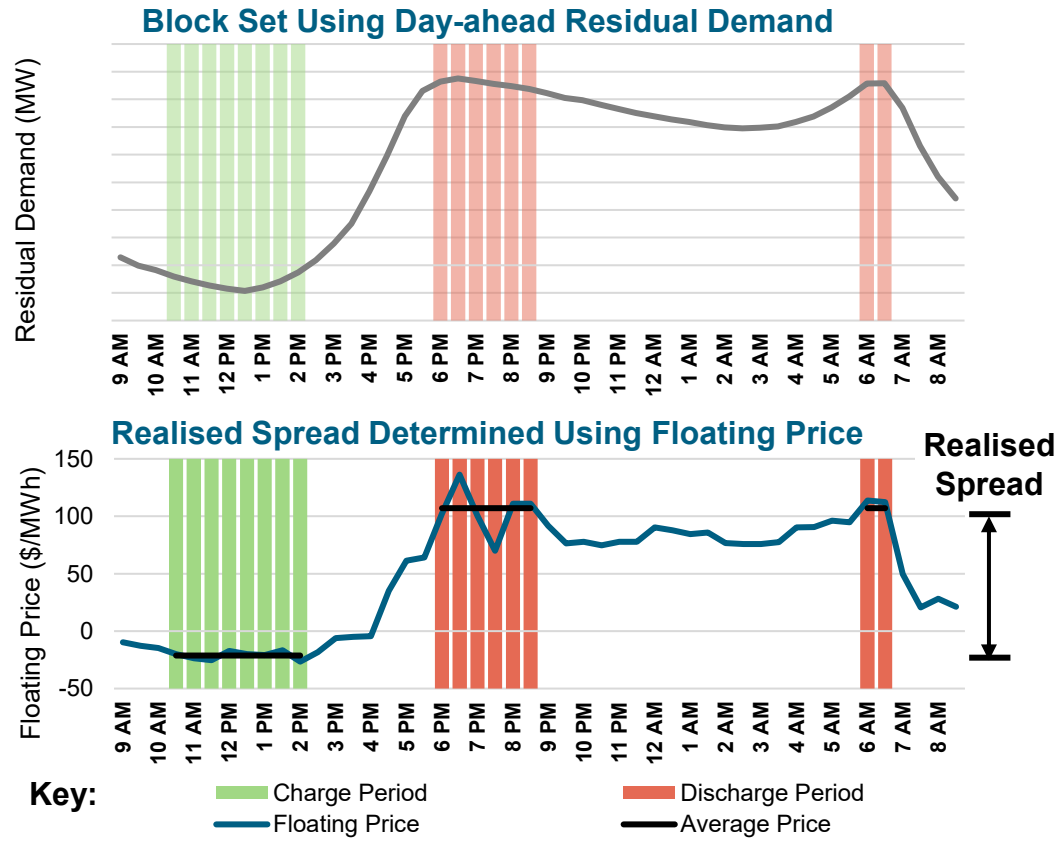
The Dynamic Time of Day (ToD) Spread Swap contracts the **difference between the price in daily charge and discharge periods** (the spread), which are nominated a day ahead using Residual Demand forecasts.

Dynamic ToD Spread Swap Overview

- Proponents nominate their **Fixed Spread** ($/MWh) and **Contract Capacity** (MW).
- Charge and Discharge Periods determined day-ahead, based on forecast Residual Demand.
- On a given Daily Shaping Period, each Charge and Discharge Period must be **at least 30 minutes**, and there can be **at most two of each Period type**.
- A daily Realised Spread is calculated ex-post as the difference between the average Floating Price during the charge and discharge periods.
- Weekly settlement minimises buyer and seller prudential requirements and smooths cash-flows.
- The swap is a purely financial agreement and does not require operator to charge/discharge during nominated periods.

If the Realised Spread is **below the Fixed Spread**	Buyer pays the difference between the Realised Spread and the Fixed Price per notional quantity.
If the Realised Spread **exceeds the Fixed Spread**	Seller pays the difference between the Realised Spread and the Fixed Price per notional quantity.

Example Dynamic ToD Spread Swap Mechanism



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For discussion

Analysis Purpose

The CCD WG has requested analysis to support consideration of the following questions:

Core questions related to contract structure performance

1. How closely do pre-dispatch forecasts of Residual Demand **correlate** with realised Residual Demand? How does selection of Daily Shaping Period impact this correlation?
2. How accurately do pre-dispatch forecasts of Residual Demand hedge against daily high/low price ***periods***?
3. How effectively do charge/discharge blocks nominated using pre-dispatch residual demand forecasts capture daily ***price spreads***?
4. How variable is the historical **distribution** of high/low price periods?

Additional design question

1. What is the risk of back-to-back discharge periods across the end and start of the daily periods? How does selection of Daily Shaping Period impact this risk?

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Analysis Findings Summary

Question	Findings
Core contract structure questions	
How closely do pre-dispatch forecasts of Residual Demand correlate with realised Residual Demand? How does selection of Daily Shaping Period impact this correlation?	• Pre-Dispatch **Residual Demand forecasts exhibit strong positive correlation with actual Residual Demand**. • **The Pre-Dispatch forecasts exhibit materially greater correlation to realised Residual Demand than ST-PASA forecast**, supporting the WG's decision to move away from a 9am-9am Daily Shaping Period. • No material differences in the correlation between Pre-Dispatch forecasts using 4pm-4pm and 4am-4am shaping periods were observed for mainland states.
How accurately do Pre-Dispatch forecasts of Residual Demand hedge daily high/low price *periods*?	• **Pre-Dispatch Residual Demand was found to nominate charge/discharge/idle blocks aligned with Perfect Blocking in ~73% of intervals**, averaging across all durations and regions analysed. Placement accuracy for mainland states was materially higher than for TAS.
How effectively do Charge/Discharge Periods nominated using Pre-Dispatch Residual Demand forecasts capture daily *price spreads*?	• **On average for all durations and regions considered, the Pre-Dispatch Residual Demand forecast captured ~75% of price spreads earned under revenue-maximising Perfect Blocking, which was ~ 7% higher than Fixed Blocking approach**. The spread capture effectiveness was materially higher for the mainland states than for TAS. • No material differences in the spread capture between 4pm-4pm and 4am-4am shaping periods were observed for mainland states.
How variable is the historical distribution of high/low price periods?	• **The distribution of charge and discharge periods varied significantly between NEM regions**, which was attributed to their generation mix and demand profiles. Placement of Discharge Periods over the morning peak was least likely in QLD in comparison to the other states.
Additional design questions:	
What is the risk of back-to-back Discharge Periods across the end and start of the Daily Shaping Periods? How does selection of Daily Shaping Period impact this risk?	• Historical analysis (ASL): **04:05-04:00 was observed to result in lower frequency of undefendable blocks than 16:05-16:00 for all NEM regions, except SA.** During boundary periods with undefendable blocks, **the average spot price was found to be materially lower for 04:05-04:00 than 16:05-16:00**. • Forward looking analysis (completed by Griffith University): **16:05-16:00 was observed to result in lower frequency of undefendable blocks than 04:05-04:00** for all states.

Analysis Supporting Core Questions



Contract Performance Analysis Overview

- ASL utilised **five years of historical dispatch, pre-dispatch and ST-PASA data across 4hr and 8hr block durations for all NEM regions** to assess both dynamic and fixed block setting strategies against four identified performance metrics.
- Whilst perfect foresight is a useful metric from a buyer's perspective, it is an impossible benchmark for the product to reach given the product design and hence an additional benchmark 'Perfect Blocking' has been derived for comparative purposes. Perfect Blocking represents the outcome from charge discharge blocks placed with perfect foresight according to the product rules (e.g. two blocks, > 30 minutes duration).
- No restrictions have been placed on block setting across multiple shaping periods, however, ASL tested for occurrences of 'undeliverable' blocks in the nominations across the historical period.

Block-Setting Strategies

Key Strategies

Residual Demand (Forecast, 30-min)
Discharge and charge periods set using day-ahead residual demand forecast and with block constraints.

Fixed Blocking (30-min)
Charge and discharge periods fixed to commence at 8am and 4pm respectively.

Performance Benchmarks

Perfect Foresight (Floating Price, 5-min)
Charge and discharge optimised to maximise daily revenue (no blocking constraints).

Perfect Blocking (Floating Price, 30-min)
Discharge and charge periods set to optimise daily Seller revenue (blocking constraints applied).

Performance Metrics

Forecast Accuracy
How well do the day-ahead residual demand forecasts align with realised residual demand?

Spread Capture
How well do the blocks set using the day-ahead residual demand forecasts capture daily price spreads?

Placement Accuracy
How well does the day-ahead residual demand forecasts identify the lowest/highest price periods?

Placement Variability
How variable are the placement of charge and discharge periods?

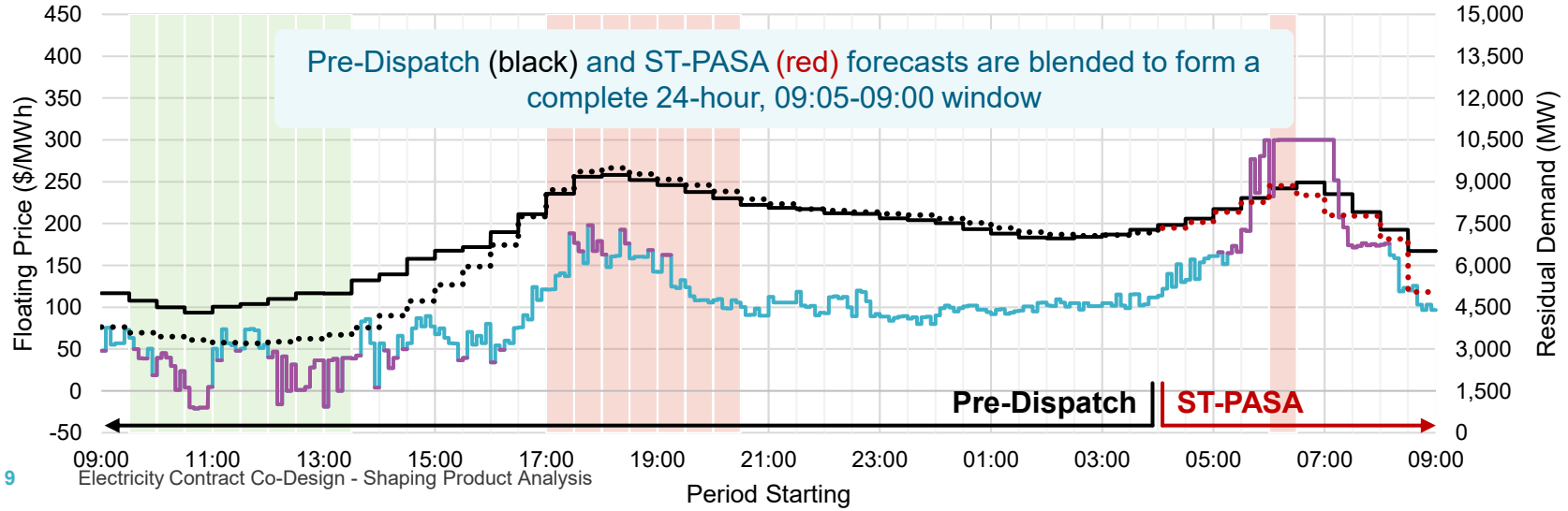
Blended Forecast Approach Example

The WG consulted on proposed 09:05-09:00 Daily Shaping Periods. However, it has emerged that this would require blending Pre-Dispatch and ST-PASA data to cover the last 5 hours of the period. The below example shows how the potential blended forecast has been compiled and tested, using a single day in NSW as an example.

Spread Capture – Average Floating Price*, by period

Average Floating Price ($/MWh)	**Perfect Foresight (5min)** Charge/Discharge freely, maximising revenue	**Perfect Blocking (30min)** Charge/Discharge Periods maximise revenue	**Residual Demand, Blended (30min)** Blocks set using ex-ante Residual Demand with blended forecast [1]
Discharge	220.9 (+1%)	218.9	160.7 (-27%)
Charge	24.5 (-13%)	28.1	30.2 (+7%)
Spread	196.4 (+3%)	190.8	130.5 (-32%)

Blended Residual Demand (1 April 2025 09:05 → 2 April 2025 09:00, set at 31 March 2025 16:05)



Key

- Pre-Dispatch Residual Demand
- ST-PASA Residual Demand
- Realised Residual Demand
- Floating Price
- Highest/Lowest Floating Prices
- Discharge Interval
- Charge Interval

Note/s:

* All values are rounded to 1 decimal place

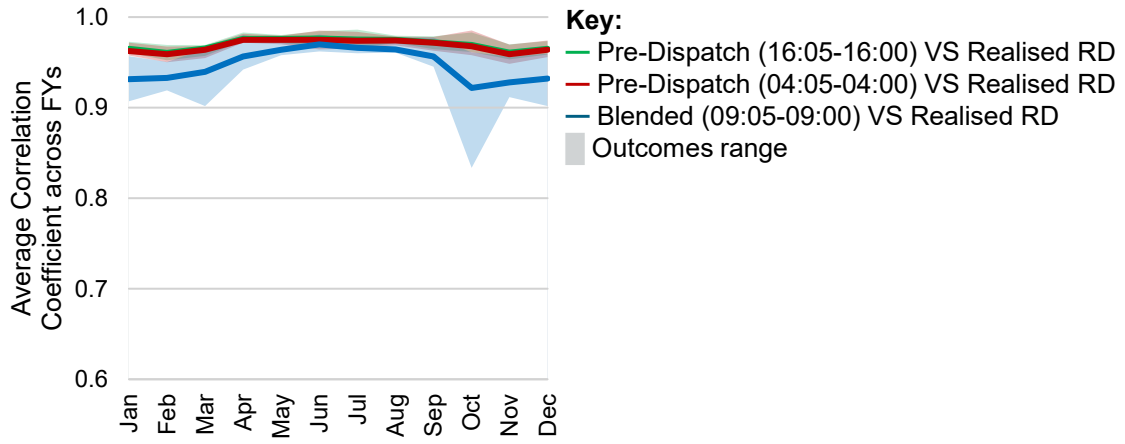
[1] "Blended" uses the Pre-Dispatch forecast from 09:05-04:00 and STPASA from 04:05-09:00.

For discussion

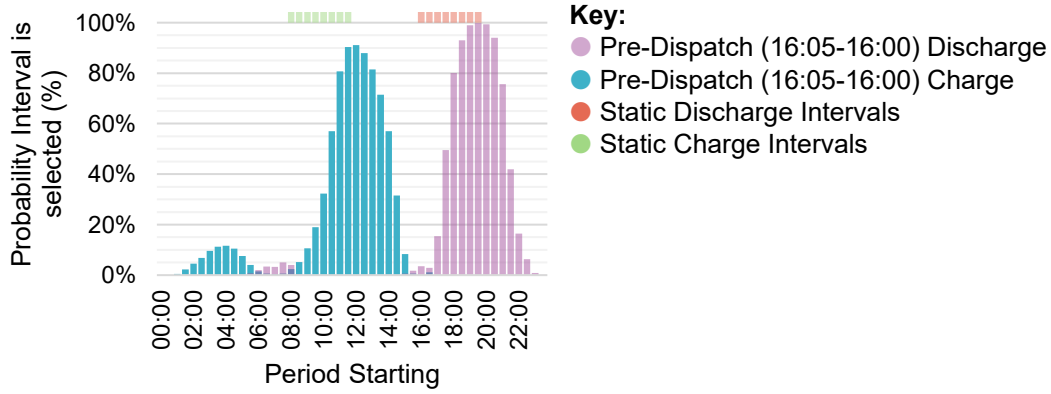
Performance Metrics, FY22-26

NSW 4hr

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	270.5	(+4%)	261.2	224.7	(-14%)	220.9	(-15%)
Charge	30.9	(-17%)	37.0	50.5	(+36%)	63.9	(+73%)
Spread	239.6	(+7%)	224.2	174.2	(-22%)	157.0	(-30%)

Placement Accuracy – VS Perfect Blocking Price

% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	60%	59%
Charge	60%	47%
Discharge, Charge & Idle	74%	69%

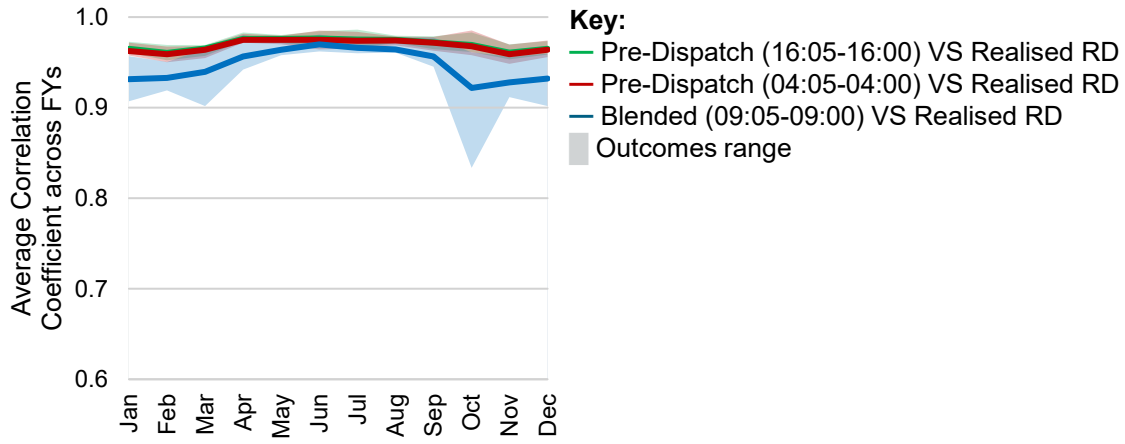
- Pre-Dispatch residual demand selects the same behaviour as Perfect Blocking in **74% of periods**, capturing **~78% of the spread** from optimal block placement.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $2/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 60% of the time** on average, this only represented a **14% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

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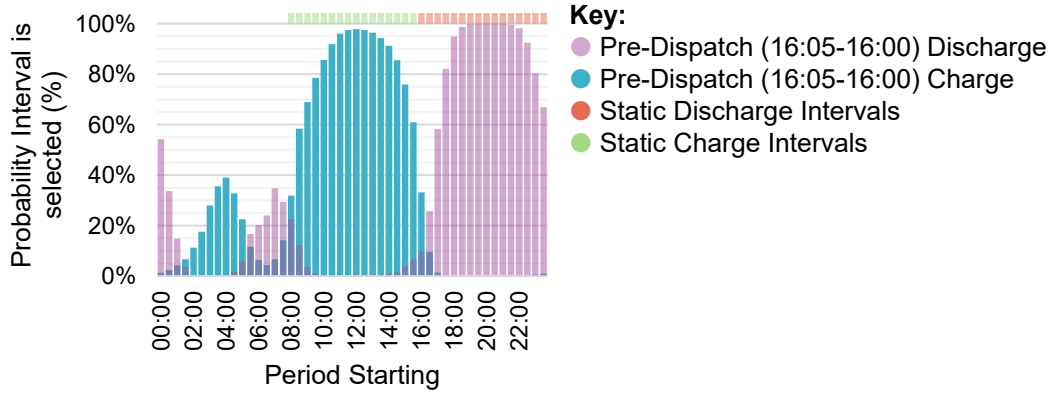
Performance Metrics, FY22-26

NSW 8hr

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	202.0	(+2%)	197.4	184.3	(-7%)	174.8	(-11%)
Charge	47.6	(-7%)	51.3	60.4	(+18%)	69.8	(+36%)
Spread	154.4	(+6%)	146.1	123.9	(-15%)	105.0	(-28%)

Placement Accuracy – VS Perfect Blocking Price

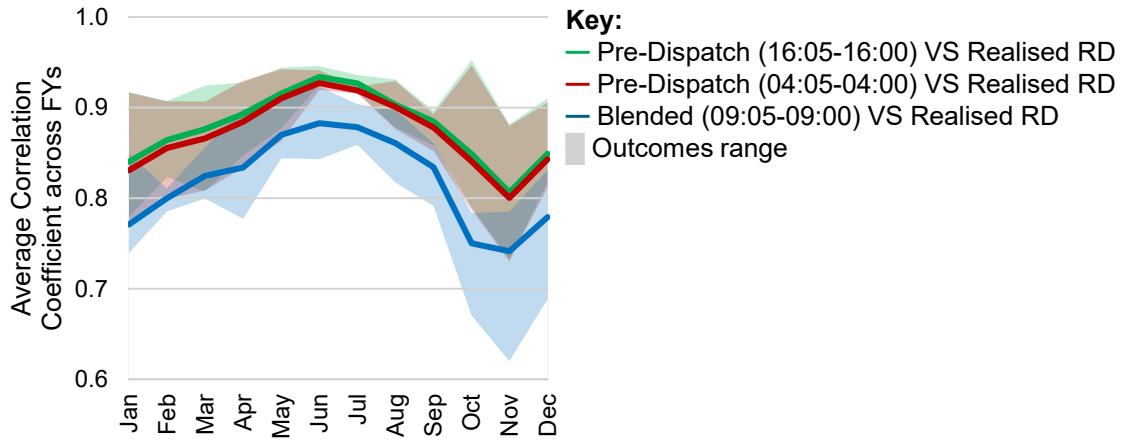
% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	75%	68%
Charge	78%	74%
Discharge, Charge & Idle	71%	66%

- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **71% of periods**, capturing **~85% of revenues**.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $0.3/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 75% of the time** on average, this only represented a **7% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

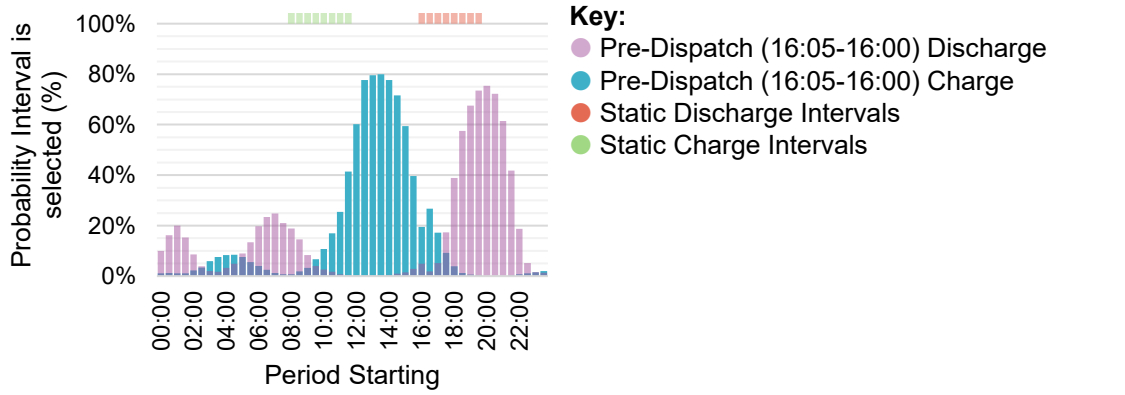
Performance Metrics, FY22-26

SA **4hr**

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	293.5	(+4%)	281.1	221.6	(-21%)	178.4	(-37%)
Charge	-21.2	(+34%)	-15.8	5.4	(+134%)	49.6	(+414%)
Spread	314.7	(+6%)	296.8	216.2	(-27%)	128.8	(-57%)

Placement Accuracy – VS Perfect Blocking Price

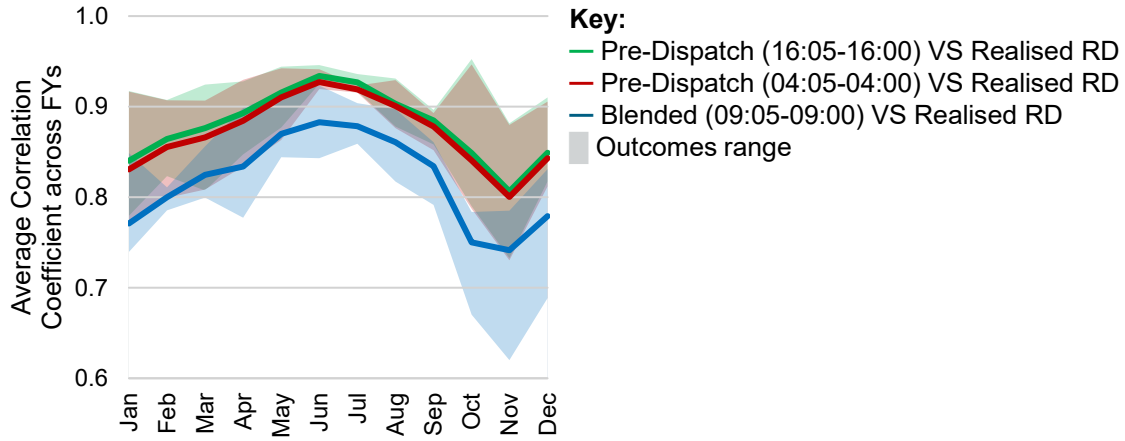
% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	53%	44%
Charge	61%	32%
Discharge, Charge & Idle	72%	61%

- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **72% of periods**, capturing **~73% of the spread** from optimal block placement.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $6/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 53% of the time** on average, this only represented a **21% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

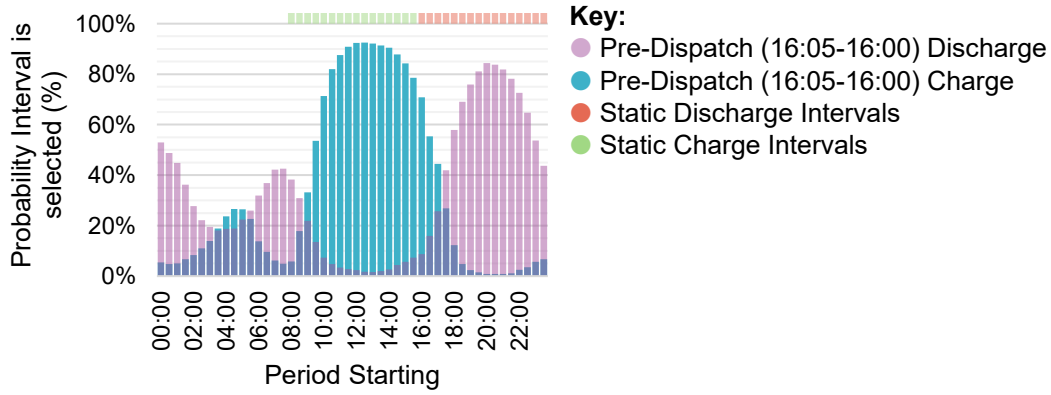
Performance Metrics, FY22-26

SA **8hr**

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	210.2	(+3%)	204.9	181.6	(-11%)	156.9	(-23%)
Charge	2.4	(-61%)	6.1	21.1	(+246%)	35.1	(+475%)
Spread	207.8	(+5%)	198.8	160.5	(-19%)	121.8	(-39%)

Placement Accuracy – VS Perfect Blocking Price

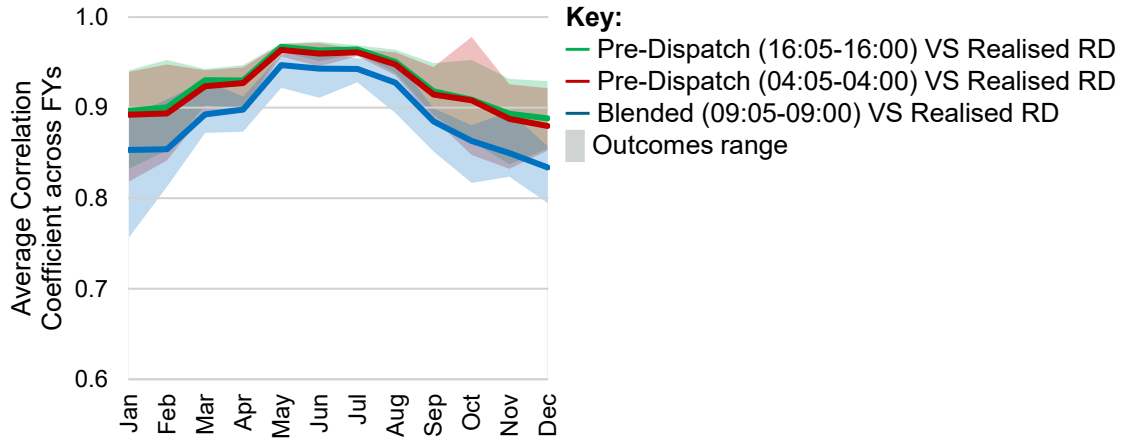
% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	68%	60%
Charge	77%	73%
Discharge, Charge & Idle	66%	62%

- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **66% of periods**, capturing **~81% of revenues**.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $0.3/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 68% of the time** on average, this only represented an **11% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

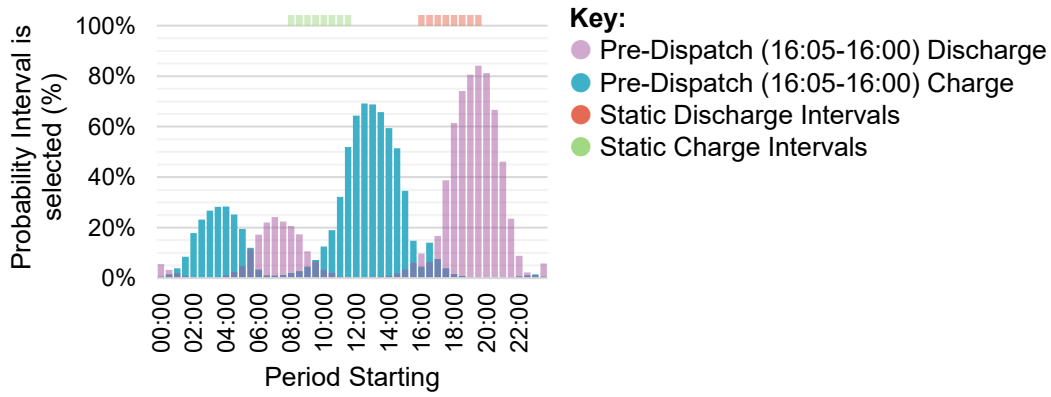
Performance Metrics, FY22-26

VIC 4hr

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	189.2	(+4%)	182.4	161.0	(-12%)	142.9	(-22%)
Charge	-4.4	(+389%)	-0.9	10.0	(-1,211%)	39.8	(-4,522%)
Spread	193.6	(+6%)	183.3	151.0	(-18%)	103.1	(-44%)

Placement Accuracy – VS Perfect Blocking Price

% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	61%	51%
Charge	64%	33%
Discharge, Charge & Idle	75%	63%

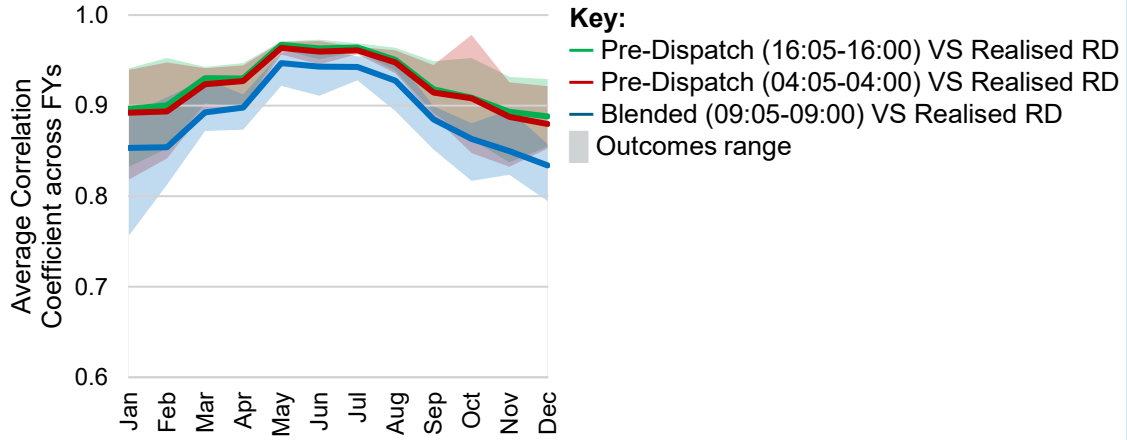
- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **75% of periods**, capturing **~82% of revenues**.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $2/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 61% of the time** on average, this only represented a **12% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

For discussion

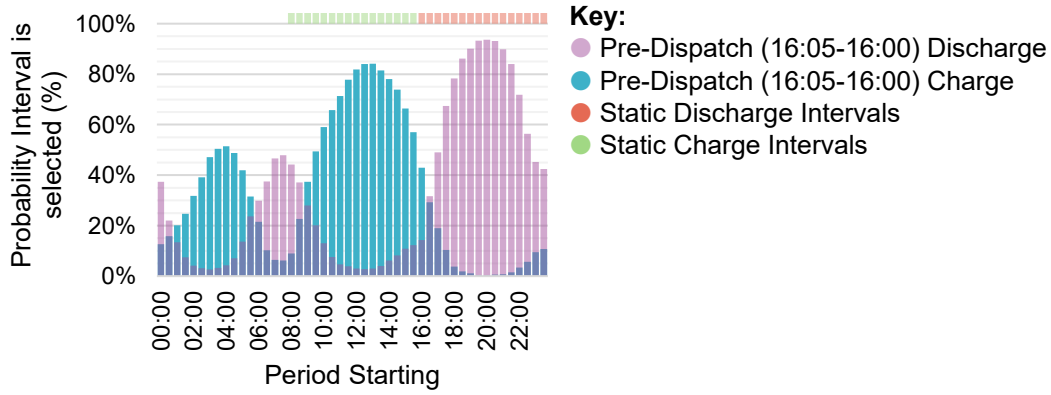
Performance Metrics, FY22-26

VIC 8hr

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	150.8	(+3%)	147.0	135.8	(-8%)	123.9	(-16%)
Charge	12.0	(-18%)	14.7	22.4	(+52%)	36.1	(+146%)
Spread	138.8	(+5%)	132.3	113.4	(-14%)	87.8	(-34%)

Placement Accuracy – VS Perfect Blocking Price

% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	76%	64%
Charge	78%	70%
Discharge, Charge & Idle	71%	62%

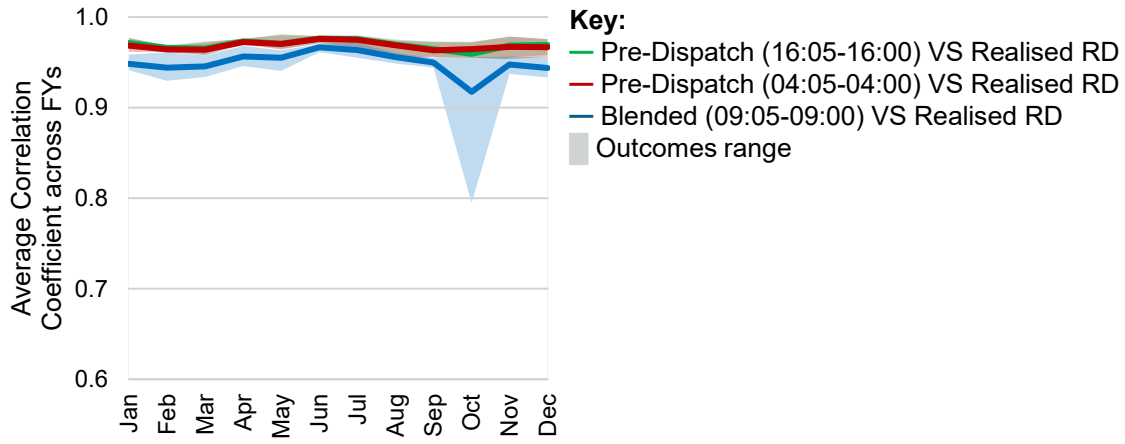
- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **71% of periods**, capturing **~86% of revenues**.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $3/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 76% of the time** on average, this only represented an **8% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

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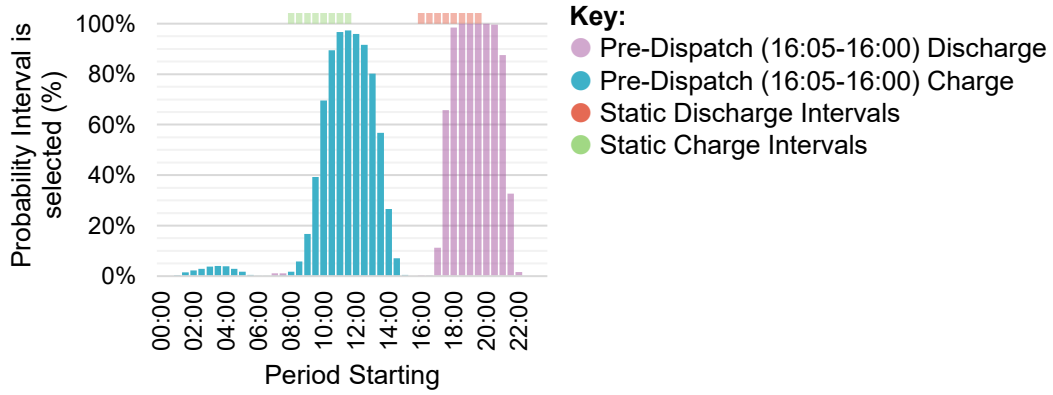
Performance Metrics, FY22-26

QLD 4hr

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	290.6	(+3%)	281.1	252.1	(-10%)	246.8	(-12%)
Charge	12.2	(-28%)	16.9	24.9	(+47%)	37.2	(+120%)
Spread	278.4	(+5%)	264.2	227.2	(-14%)	209.6	(-21%)

Placement Accuracy – VS Perfect Blocking Price

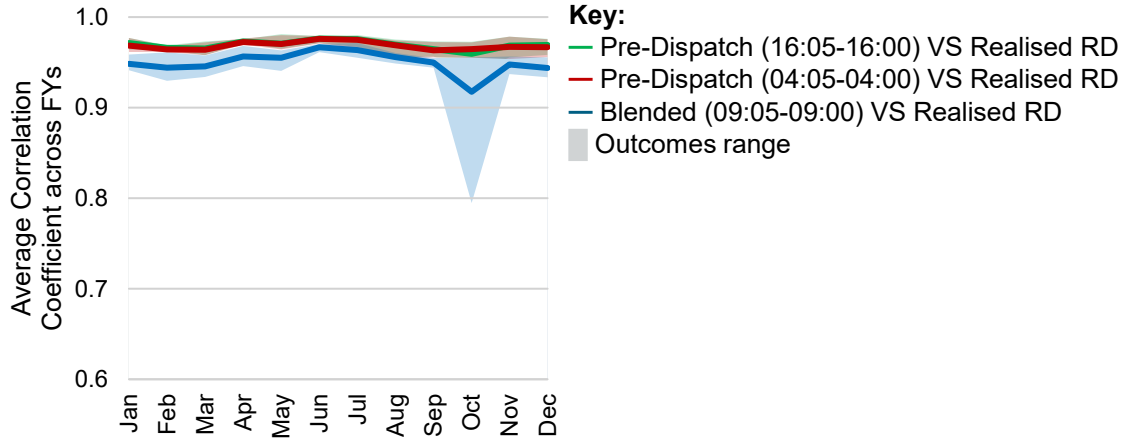
% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	67%	65%
Charge	69%	57%
Discharge, Charge & Idle	79%	74%

- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **79% of periods**, capturing **~86% of revenues**.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $2/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 67% of the time** on average, this only represented a **10% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

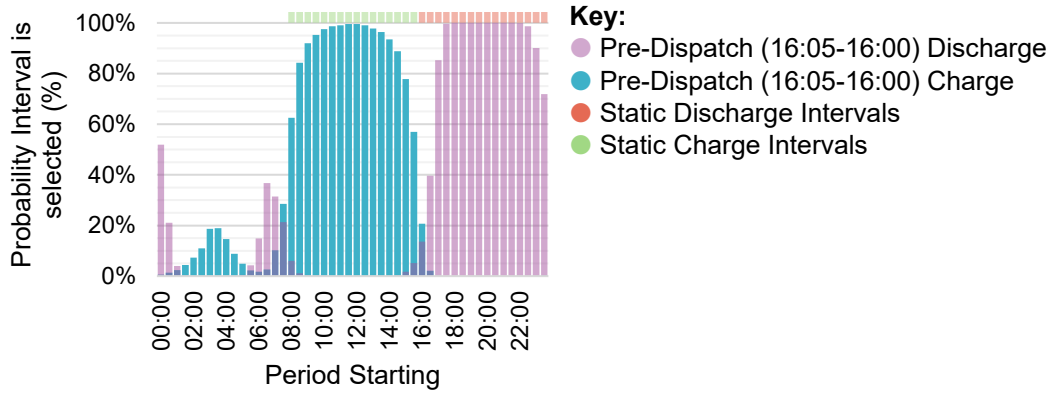
Performance Metrics, FY22-26

QLD 8hr

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	213.5	(+2%)	208.9	198.2	(-5%)	190.0	(-9%)
Charge	29.6	(-9%)	32.7	37.4	(+14%)	46.8	(+43%)
Spread	183.9	(+4%)	176.2	160.8	(-9%)	143.2	(-19%)

Placement Accuracy – VS Perfect Blocking Price

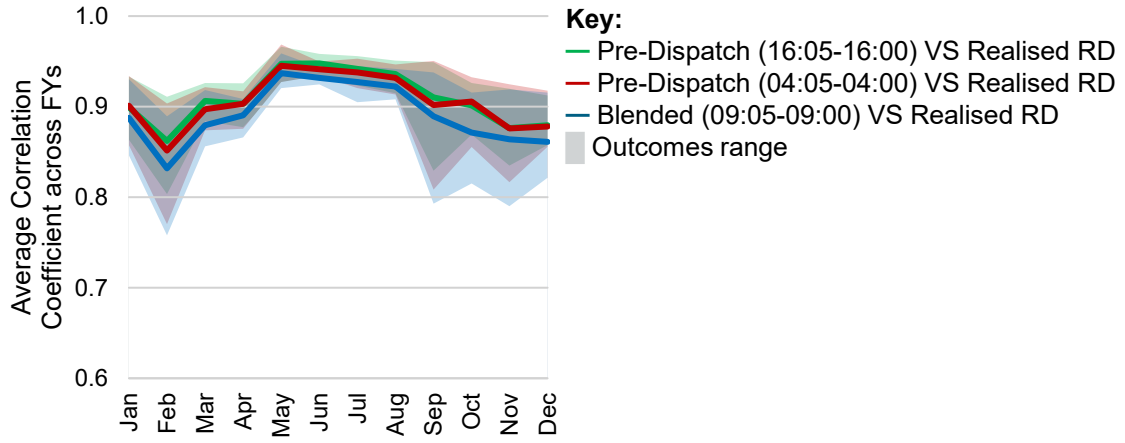
% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	81%	75%
Charge	86%	80%
Discharge, Charge & Idle	78%	73%

- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **78% of periods**, capturing **~91% of revenues**.
- The Pre-Dispatch Residual Demand spreads between 04:05-04:00 and 16:05-16:00 were within $1/MWh of each other.
- Whilst the blocks were placed in the **optimal discharge position 81% of the time** on average, this only represented a **5% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

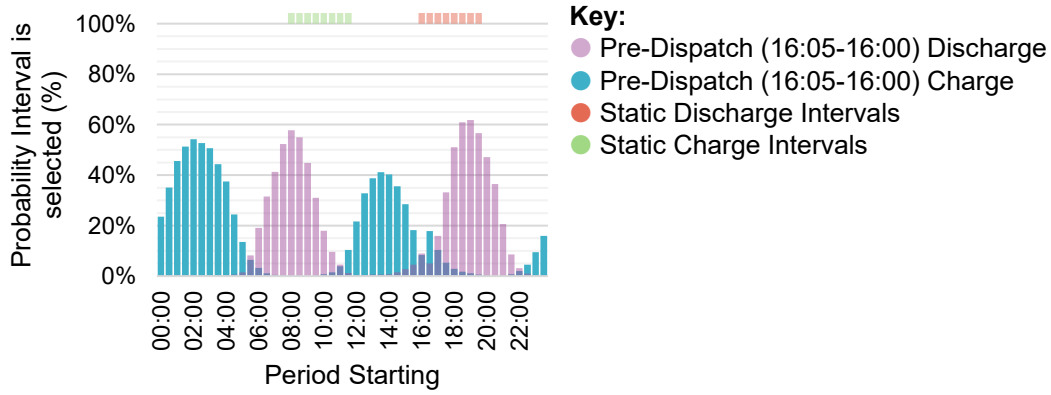
Performance Metrics, FY22-26

TAS **4hr**

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking (30-min)	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	167.3	(+5%)	159.1	116.6	(-27%)	117.9	(-26%)
Charge	39.1	(-9%)	42.8	71.4	(+67%)	79.1	(+85%)
Spread	128.2	(+10%)	116.3	45.2	(-61%)	38.8	(-67%)

Placement Accuracy – VS Perfect Blocking Price

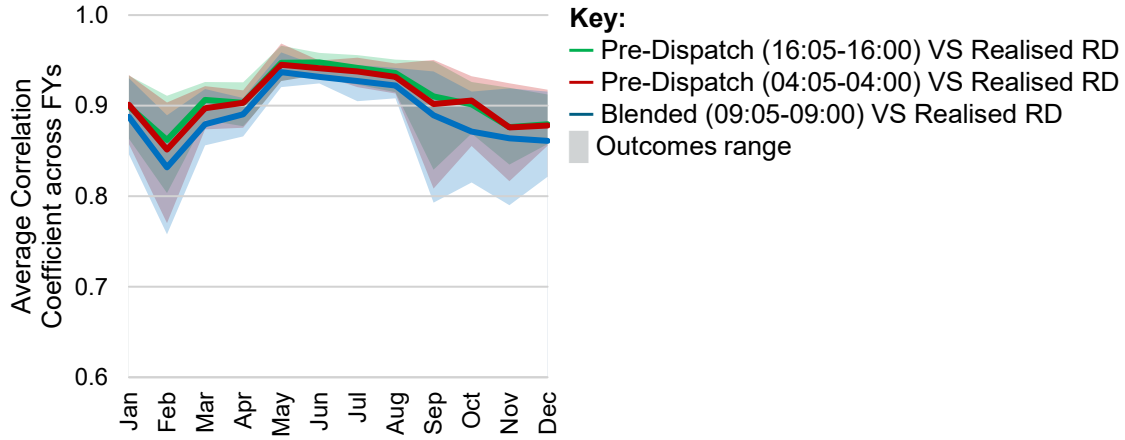
% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	41%	39%
Charge	33%	25%
Discharge, Charge & Idle	60%	58%

- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **60% of periods**, capturing **~39% of revenues**.
- The Pre-Dispatch Residual Demand spread for 04:05-04:00 was $14/MWh higher than 16:05-16:00.
- Whilst the blocks were placed in the **optimal discharge position 41% of the time** on average, this only represented a **27% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

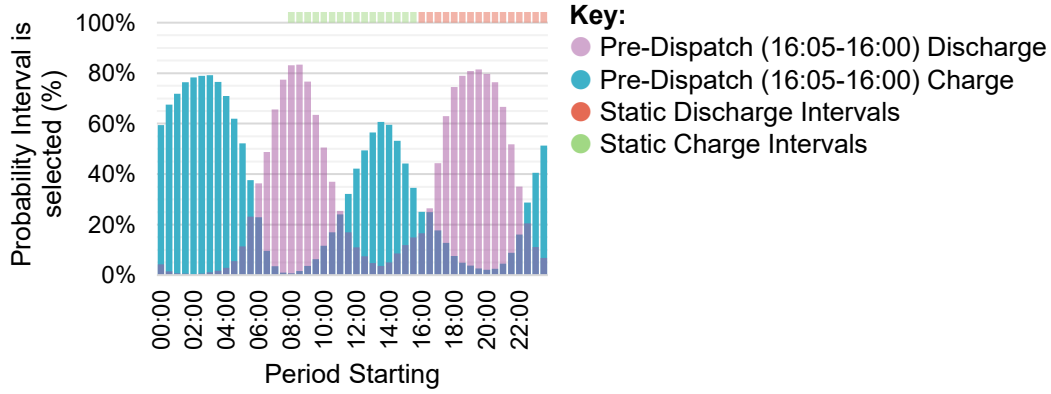
Performance Metrics, FY22-26

TAS **8hr**

Forecast Accuracy – Average correlation, by month



Placement Variability – Proportion of set intervals



Spread Capture – Average Floating Price, by period

Floating Price ($/MWh)	Perfect Foresight (5-min)		Perfect Blocking Price	Residual Demand Pre-Dispatch (16:05-16:00)		Fixed Blocking	
Discharge	137.1	(+3%)	132.9	110.6	(-17%)	107.2	(-19%)
Charge	50.0	(-5%)	52.9	73.9	(+40%)	75.4	(+43%)
Spread	87.1	(+9%)	80.0	36.7	(-54%)	31.8	(-60%)

Placement Accuracy – VS Perfect Blocking Price

% of periods with aligned behaviour	Residual Demand Pre-Dispatch forecast (16:05-16:00)	Fixed Blocking Charge from 08:05, Discharge from 16:05
Discharge	55%	51%
Charge	48%	55%
Discharge, Charge & Idle	47%	50%

- Pre-Dispatch Residual Demand selects the same behaviour as Perfect Blocking in **47% of periods**, capturing **~46% of revenues**.
- The Pre-Dispatch Residual Demand spread for 04:05-04:00 was $6/MWh higher than 16:05-16:00.
- Whilst the blocks were placed in the **optimal discharge position 55% of the time** on average, this only represented a **17% reduction in spread capture**, indicating on average, the blocks selected represented high/low periods.

02

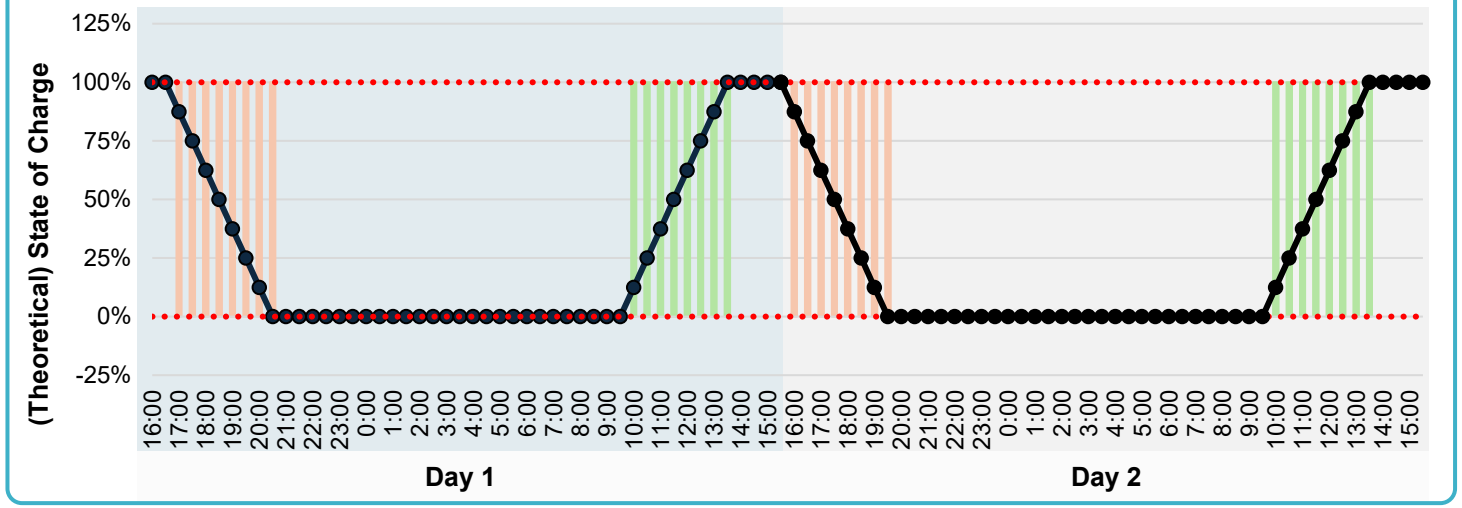
Block Defending Analysis



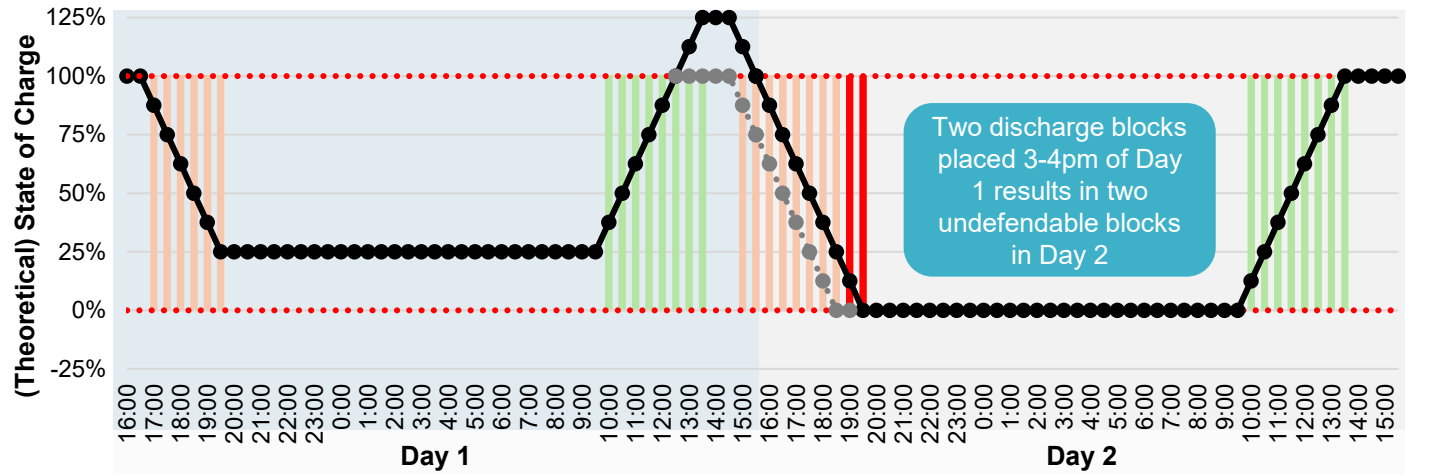
Block defending overview

- The WG identified that the proposed approach to block setting poses the risk of undefendable positions.
- **The risk of undefendable blocks is concentrated at the intersection of two Daily Shaping Periods**, where sellers have little ability to defend their financial position through additional cycling of their asset (see right).
- Whilst there is also a risk of the order of charge/discharge blocks being placed outside of the intersection of two Daily Shaping **this is considered to be less significant with Sellers having greater ability to manage their positions through additional battery cycling** (i.e. those blocks are anticipated to be 'physically defendable').

Illustrative Daily Shaping Periods 1 (defendable positions)



Illustrative Daily Shaping Periods 2 (undefendable periods)

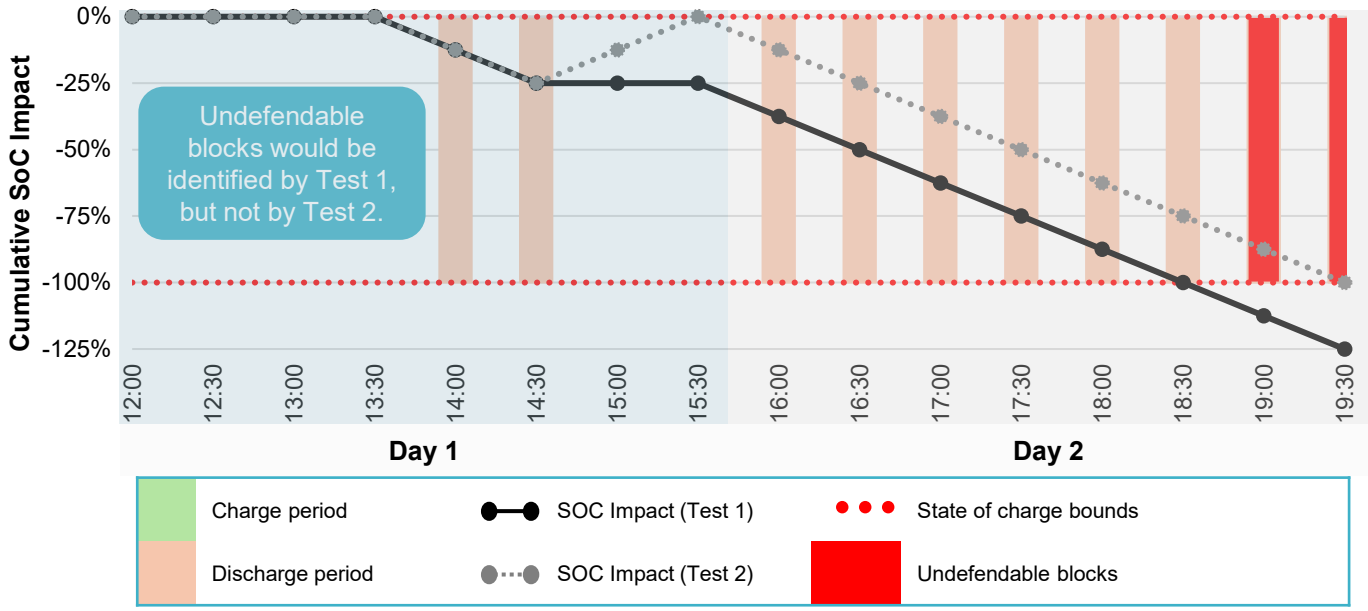




Testing Approach

- ASL utilised the previous block setting work undertaken for all regions and durations previously tested, and for Daily Shaping Periods spanning 16:05-16:00 and 04:05-04:00 to test for undefendable nomination periods.
- **To do this, the study area was constrained to the intervals either side of the boundary of Daily Shaping Periods which are within the duration of the Project**
  - E.g., for a 4hr duration and 16:05-16:00 Daily Shaping Period, consider the intervals within 12:05-20:00
- **A Daily Shaping Period is flagged to contain 'undefendable' periods if the cumulative state of charge impact during the period reaches less than -100%.**
- ASL assessed the cumulative (virtual) state of charge impact of the nominations during the study period under two cases:
  - **Test 1: Seller strictly follows nominations (i.e. does not seek to use idle periods).**
  - **Test 2: Seller actively uses idle periods to defend nominations to the extent possible**.
- The illustrative example (right) shows how Sellers could use idle periods to mitigate back-to-back risks and how Test 1 is a more stringent test of nomination blocking than Test 2.

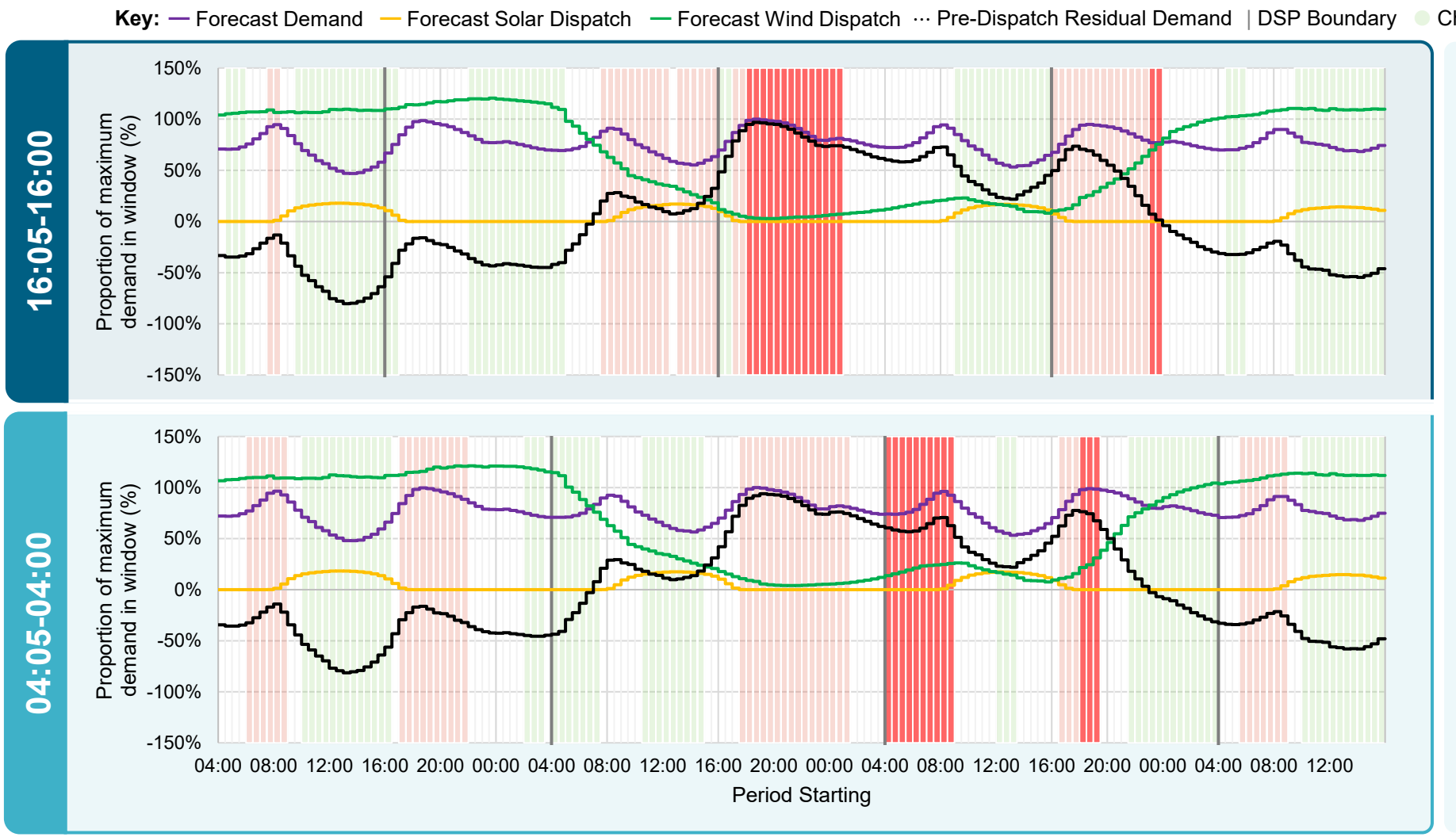
Illustrative Daily Shaping Periods Applying Tests 1,2



TI	Nominated Block	Test 1: Cumulative SoC Impact	Test 2: Cumulative SoC Impact
12:00	Idle	0.0%	0.0%
12:30	Idle	0.0%	0.0%
13:00	Idle	0.0%	0.0%
13:30	Idle	0.0%	0.0%
14:00	Discharge	-12.5%	-12.5%
14:30	Discharge	-25.0%	-25.0%
15:00	Idle	-25.0%	**Charge: -12.5%**
15:30	Idle	-25.0%	**Charge: 0.0%**
16:00	Discharge	-37.5%	-12.5%
16:30	Discharge	-50.0%	-25.0%
17:00	Discharge	-62.5%	-37.5%
17:30	Discharge	-75.0%	-50.0%
18:00	Discharge	-87.5%	-62.5%
18:30	Discharge	-100.0%	-75.0%
19:00	Discharge	**-112.5%**	-87.5%
19:30	Discharge	**-125.0%**	-100.0%

For discussion

Example day: SA 8hr



- The charts on the left show the blocking behaviour and Residual Demand components between 9 June 2026 04:00 and 12 June 2026 16:00 and the differences in blocking approaches.
- This window depicts 3 full Daily Shaping Periods (DSPs) for both the 16:05-16:00 and 04:05-04:00 Pre-Dispatch blocking approaches.
- Proportions are relative to absolute maximums in the shown period.
- **Block are set by similar Residual Demand forecasts, however, the timing of DSPs introduces changes block allocation materially.**

ASL Official

Block Defending Risks Analysis Results

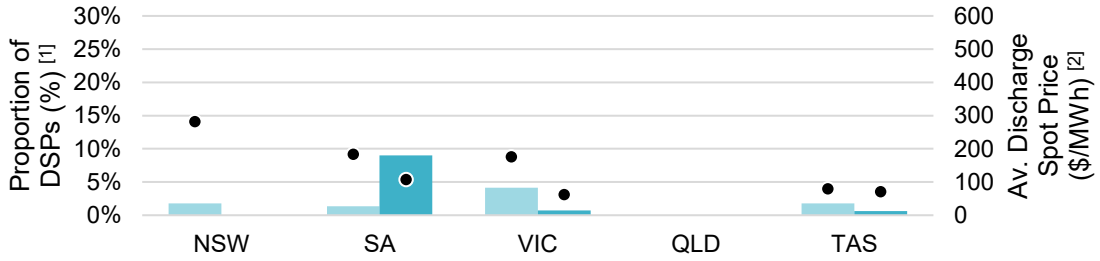
- A lower frequency of undefendable blocks is observed for 04:05-04:00 than 16:05-16:00 in all states bar SA. Furthermore, the average spot price during these periods was found to be materially lower for 04:05-04:00 than 16:05-16:00.
- 8hrs shaping duration has an increased number of days with undefendable blocks over 4hrs.
- As expected, the number of flagged undefendable days decreases from Test 1 to Test 2 where the Seller uses idle periods to defend their position.

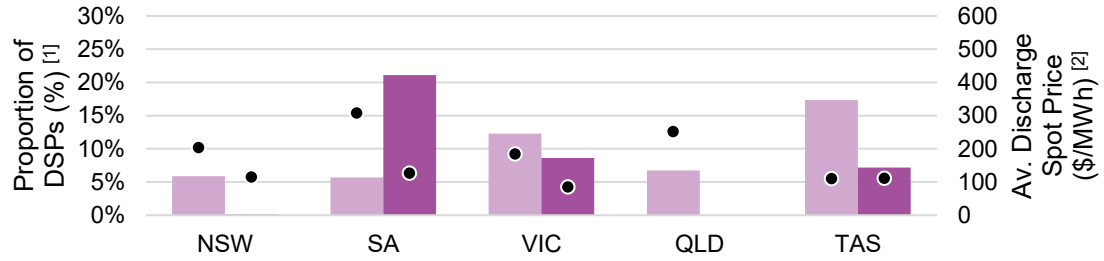
Daily Shaping Period Pre-Dispatch Blocking Options

Option		1	2
Residual Demand Forecast		Pre-Dispatch	Pre-Dispatch
Nomination Time (Ending)		13:05, Same Day	16:05, Day-Ahead
Daily Shaping Period (Ending)		16:05-16:00	04:05-04:00
Inter-Day Window (Ending)	4hr	12:05-20:00	00:05-08:00
	8hr	08:05-00:00	20:05-12:00

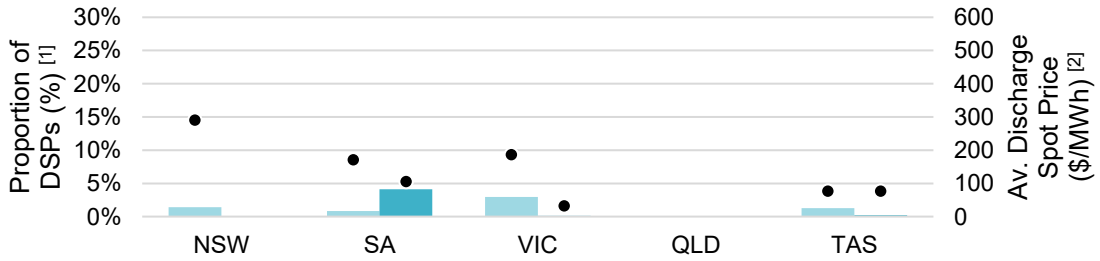
Key: 16:05-16:00 4hr | 04:05-04:00 4hr | 16:05-16:00 8hr | 04:05-04:00 8hr | Average Floating Price

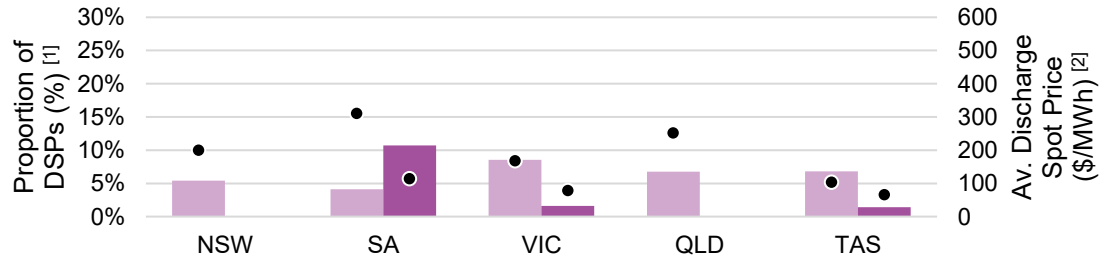
% Days with Undefendable Periods – Test 1 (Strict nomination following)





% Days with Undefendable Periods – Test 2 (Seller defends using idle periods where required)





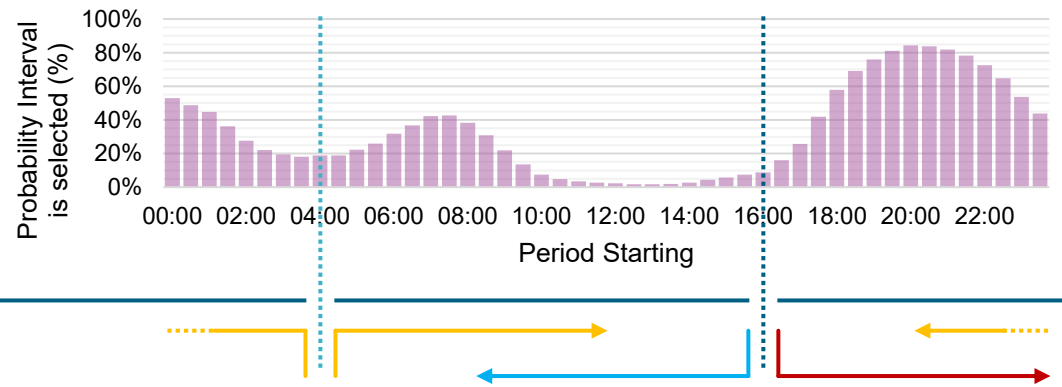
[1] Total DSP count used in calculating these proportions is 1 less than the number of DSPs tested, as each DSP needs a valid subsequent DSP.
[2] Values are the average Spot Price during nominated Discharge Periods within the flagged inter-day window.

Deep dive: Historical SA vs VIC 8hr results

- SA and VIC had contrasting results with respect to the frequency of undefendable blocks for an inter-day boundary at 4am or 4pm, with SA having a materially higher number of identified undefendable blocks at 4am than VIC. The reason for this is hypothesised to be attributable to the trends shown in frequency charts below, which show:
  - VIC has historically had lower chance of discharge blocks being placed between 12am-6am than SA (i.e. VIC has historically lower overnight residual demand) and hence therefore the frequency of back-to-back discharges immediately either side of 4am is lower.
  - Conversely, VIC has a higher proportion of blocks placed over the evening peak.
- Both states have a very low percentage or discharge blocks placed during solar hours, highlighting that the probability of back-to-back discharges on both sides of 4pm is low.

SA 8hr Dispatch Placement Variability

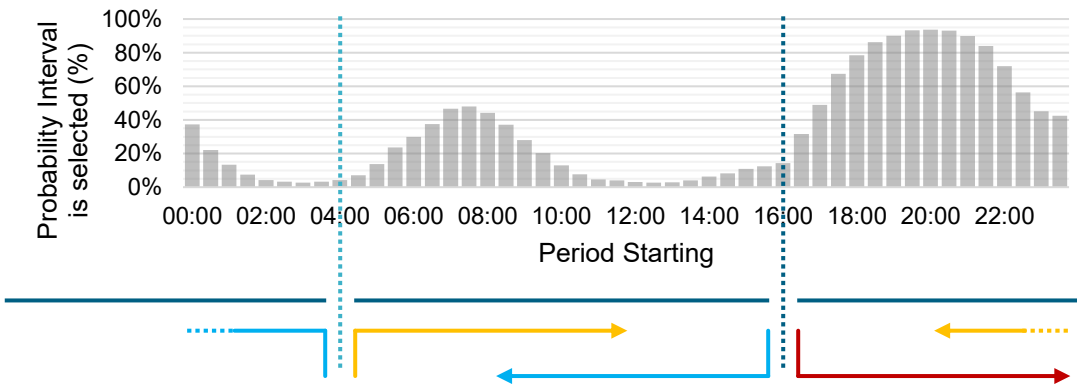
16:05-16:00



04:05-04:00 DSP
(20:05-12:00 Checked)
Medium likelihood of continuous discharge in **both** directions

16:05-16:00 DSP
(08:05-00:00 Checked)
High likelihood of discharge in **one** direction

VIC 8hr Dispatch Placement Variability



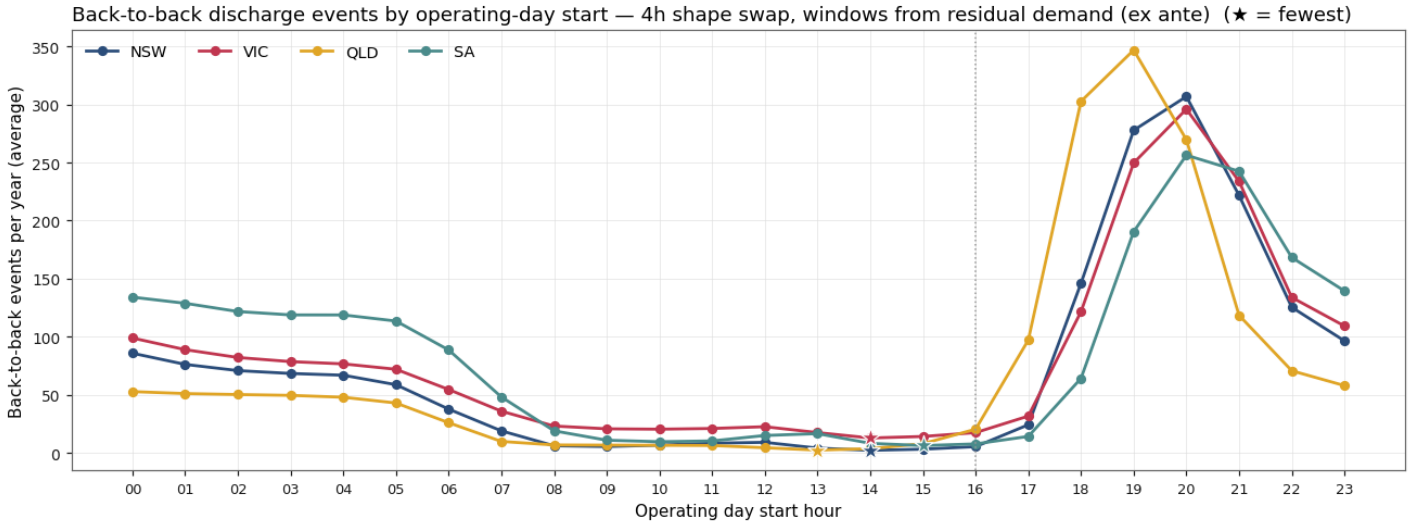
04:05-04:00 DSP
(20:05-12:00 Checked)
Medium likelihood of discharge in **one** direction

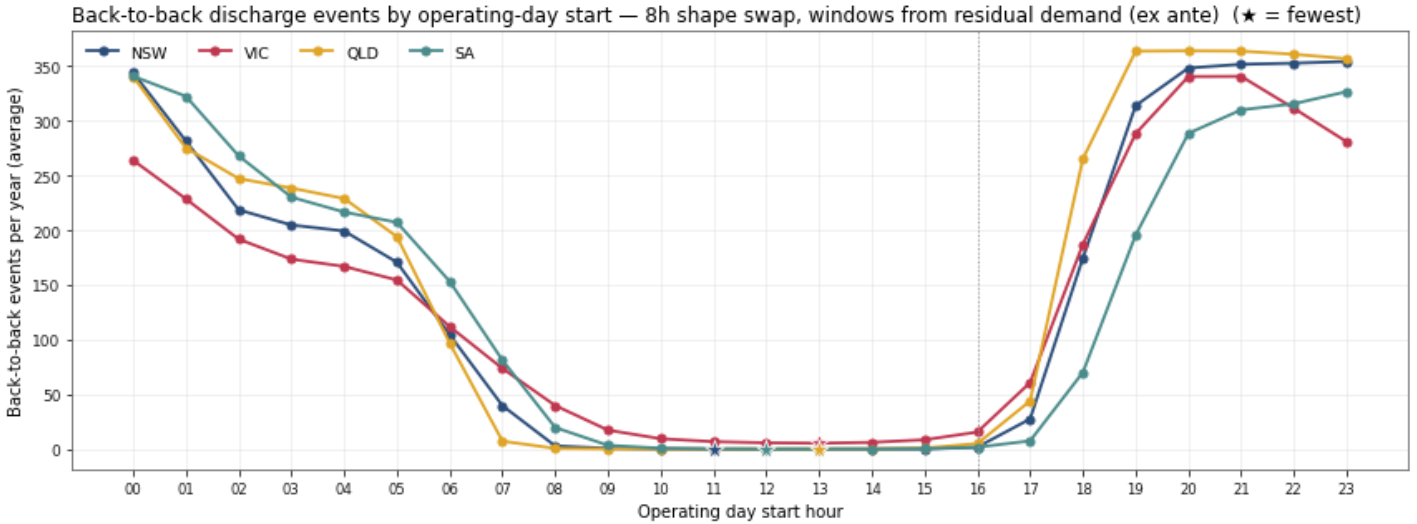
16:05-16:00 DSP
(08:05-00:00 Checked)
High likelihood of discharge in **one** direction

Griffith University Forward Looking Analysis

- The Griffith team's forward-looking analysis (based on future NEM state with high renewables and tested using a large number of weather years) shows a materially higher likelihood of undefendable discharge periods for a 4am-4am shaping period than 4pm-4pm across all states for 4hr and 8hr shaping periods, with the difference more pronounced for 8hr.
- This suggests some convergence of residual demand trends in comparison to observed behaviour in ASL's historical analysis.
- The analysis suggested optimal boundary periods during afternoon (solar) hours.

Region	best start	events/ yr at best	events/yr at 16:00	worst start	event s/yr at worst
4hr results					
NSW	14:00	2.3	5.4	20:00	306.8
VIC	14:00	12.9	17.5	20:00	295.9
QLD	13:00	2.5	20.5	19:00	346.8
SA	15:00	6.4	7.8	20:00	256.3
8 hr results					
NSW	11:00	0.1	2	23:00	353.8
VIC	13:00	5.6	15.8	21:00	340.2
QLD	13:00	0.3	5.2	20:00	363.6
SA	12:00	0.4	2.0	00:00	340.4







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