Government of **Western Australia**
Energy Policy WA

WEM Investment Certainty Review Working Group

Meeting 2023_12_06

6 December 2023

Working together for a **brighter** energy future.

Meeting Protocols

- Please place your microphone on mute, unless you are asking a question or making a comment
- Please keep questions relevant to the agenda item being discussed
- If there is not a break in discussion and you would like to say something, you can ‘raise your hand’ by typing ‘question’ or ‘comment’ in the meeting chat
- Questions and comments can also be emailed to EPWA - Energy Markets energymarkets@dmirs.wa.gov.au after the meeting
- The meeting will be recorded and minutes will be taken (actions and recommendations only)
- Please state your name and organisation when you ask a question
- If you are having connection/bandwidth issues, you may want to disable the incoming and/or outgoing video

Agenda

Item	Item	Responsibility	Type	Duration
1	Welcome and agenda	Chair	Noting	2 min
2	Meeting apologies/attendance	Chair	Noting	2 min
3	Minutes of previous meeting	Chair	Noting	2 min
4	RCP Curve – options	RBP	Discussion	
5	Option evaluation	RBP	Discussion	
6	Price implications	RBP	Discussion	
7	Modelling Approach	RBP	Discussion	
8	General business	Chair	Discussion	5 min
9	Next steps	Chair	Noting	5 min

4. RCP Curve - Options

Issues with the current RCP Curve

The RCM review identified two issues with the existing price curve:

1. The absolute zero point used is relatively high compared to other jurisdictions.
2. Because the price is set at the cap at the Reserve Capacity Target, the investment signal does not change when there is a shortfall.

It also proposed to use the same parameters to set the price curve for both peak and flexible capacity

The BRCP Reference Technology review has identified a further issue:

3. If there is no difference between the reference technology for peak capacity and flexible capacity, then a peak capacity shortfall will mean a zero price differential for flexible capacity, even if there is also a shortfall of flexible capacity.

Options

At the previous working group, four options were identified:

2. Adjusted four segment curve, with the same curve for both products
3. Separate four segment curves for each product
4. Separate five segment curves with deadband for each product
7. Smooth curve with no absolute zero point

Reference points: price at Reserve Capacity Target

Prior to 2019, if there was exactly enough capacity to meet the target, the capacity price would be the BRCP.

In the current RCP Curve, if there is exactly enough capacity to meet the target, the capacity price will be 1.3 times the BRCP. This was implemented on the basis that a capacity pricing signal can take multiple years to result in actual build, and having a price above the BRCP when there is a small surplus will encourage early commitment.

EPWA considers that this approach adds an unnecessary premium to the capacity price, and incentivizes building more capacity than required by the Reserve Capacity Target (which is already based on a 1 in 10-year peak). International practice is consistent with the pre-2019 WEM approach, and

All options propose that at the Reserve Capacity Target, the capacity price is the BRCP.

Reference points: absolute zero point

The WEM uses an absolute zero point of 130% of the capacity target. This means that if there is a capacity surplus of 30% of the Reserve Capacity Target, the capacity price will be zero.

This can occur if the marginal capacity holder is receiving sufficient income from other revenue streams that it is still worth building – or not retiring – even in the absence of capacity payments.

This value is higher than most (but not all) international comparators. EPWA considers that for a relatively small, isolated power system, it is appropriate that the WEM has a higher absolute zero point than larger, interconnected markets.

All options (other than option 7) retain an absolute zero point at 130% of the capacity target.

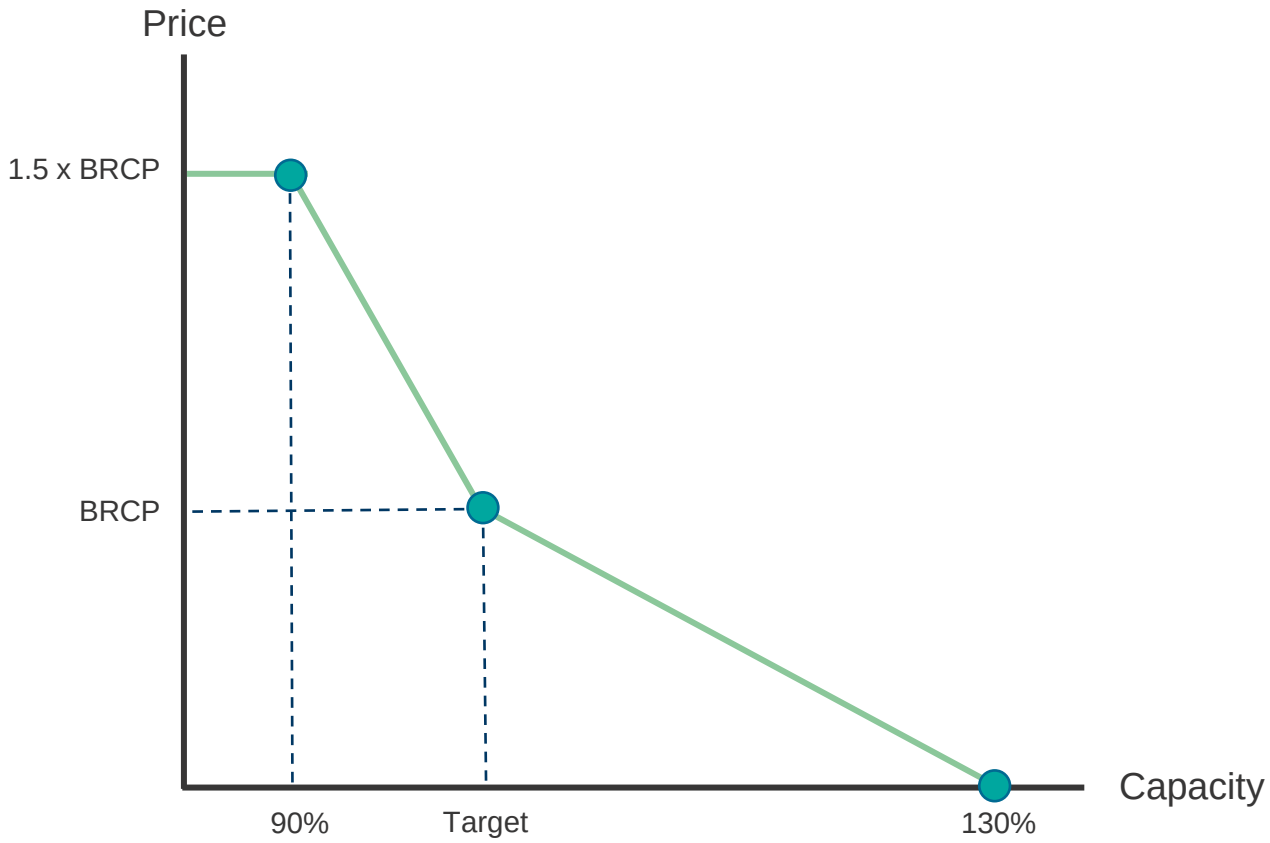
Option 2: Adjusted Four Segment Curve

Four segment curve for both services with the following parameters:

Price at Capacity Target: BRCP (CONE)

Maximum Price: 1.5 * BRCP at 90% of Target Capacity

Minimum Price: 0 at 130% of Target Capacity



Option 3: Separate Four Segment Curves

For Peak services:

Price at Capacity Target: BRCP (CONE)

Maximum Price: 1.5 * BRCP at 90% of Target Capacity

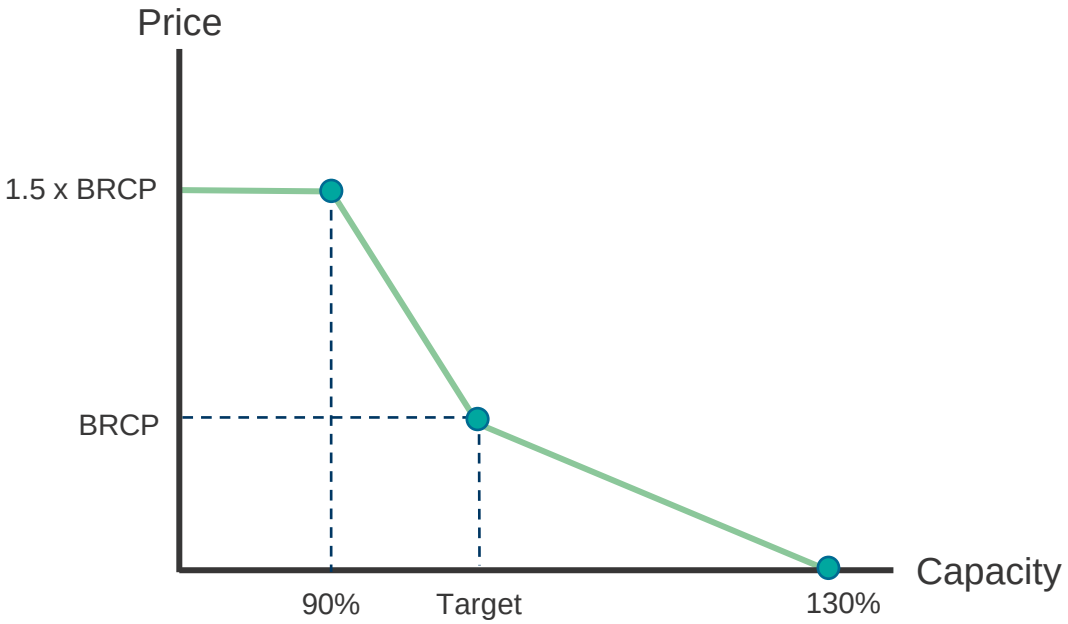
Minimum Price: 0 at 130% of Target Capacity

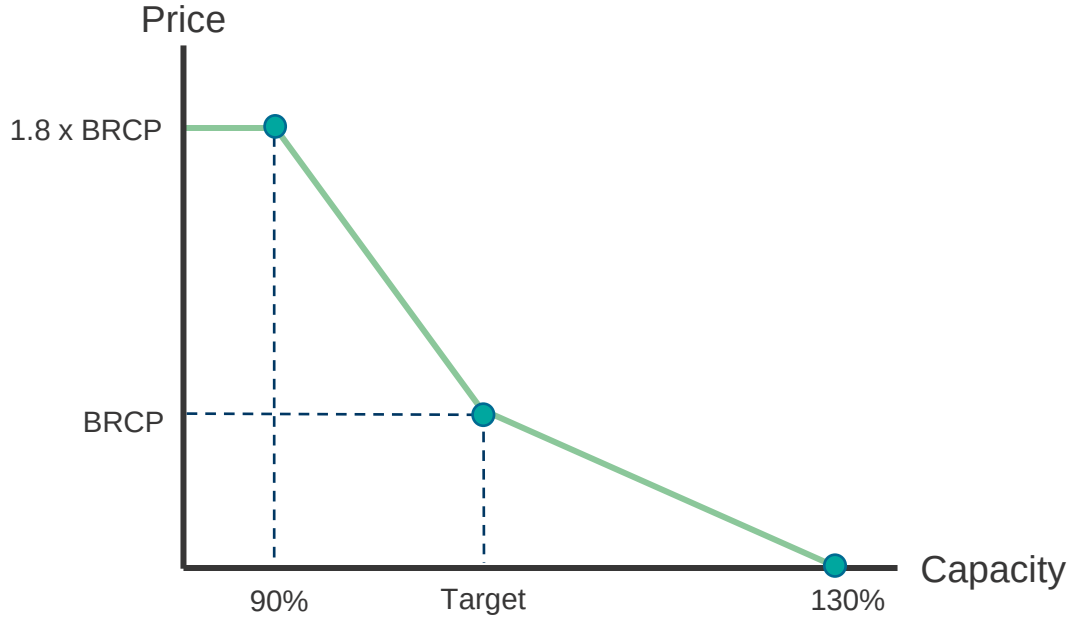
For Flex services:

Price at Capacity Target: BRCP (CONE)

Maximum Price: 1.8 * BRCP at 95% of Target Capacity

Minimum Price: 0 at 130% of Target Capacity





Option 4: Separate Five Segment Curves with deadband

For Peak services:

Price at Capacity Target: BRCP (CONE)

Maximum Price: 1.5 * BRCP at 90% of Target Capacity

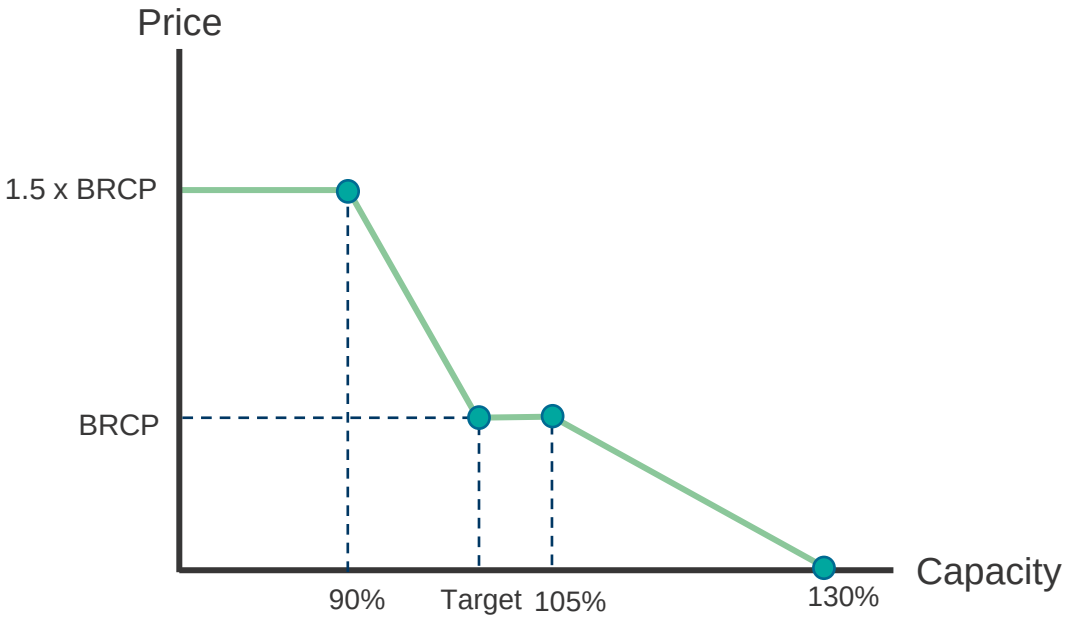
Minimum Price: 0 at 130% of Target Capacity

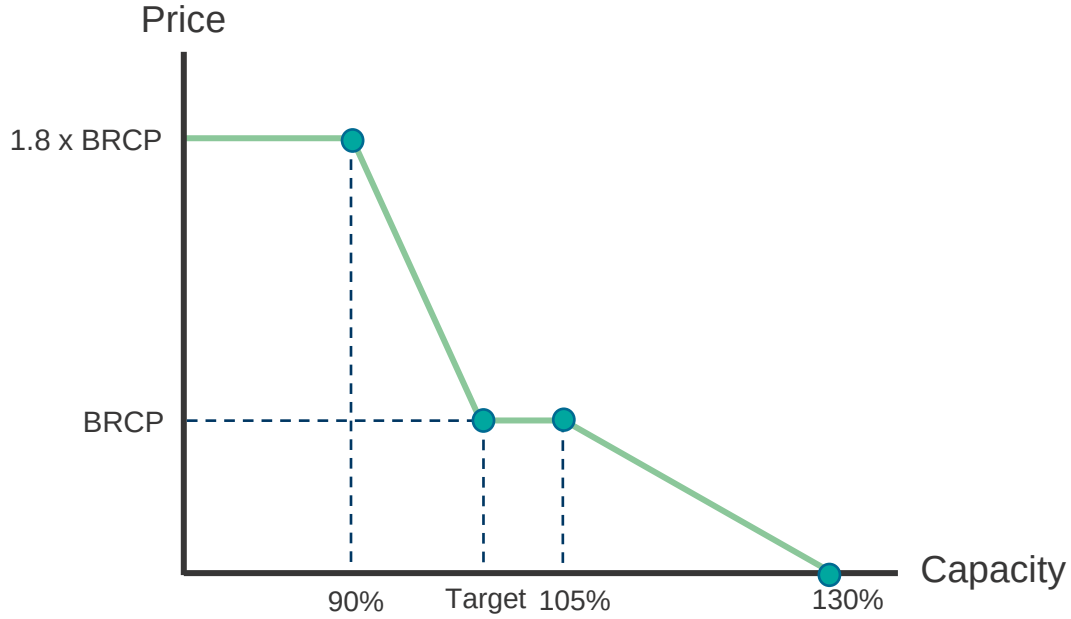
For Flex services:

Price at Capacity Target: BRCP (CONE)

Maximum Price: 1.8 * BRCP at 90% of Target Capacity

Minimum Price: 0 at 130% of Target Capacity

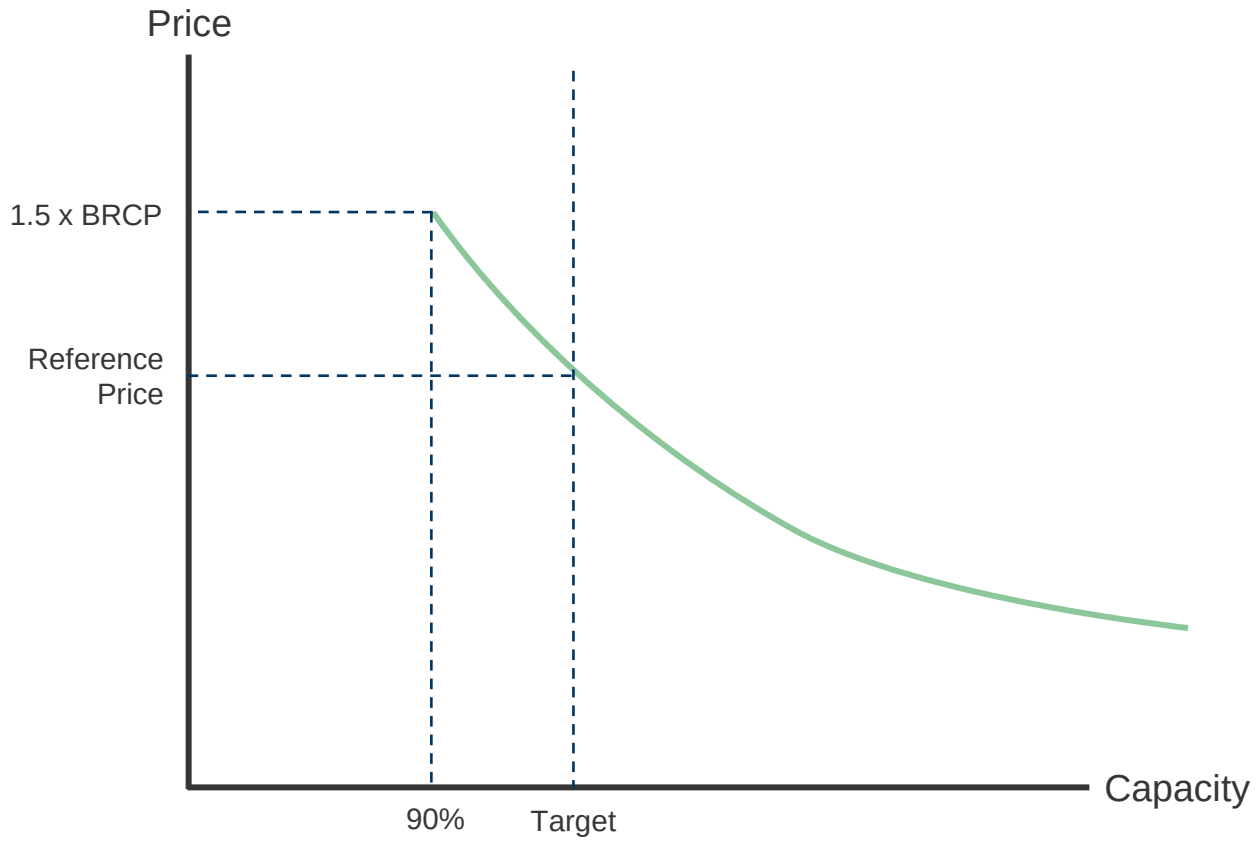




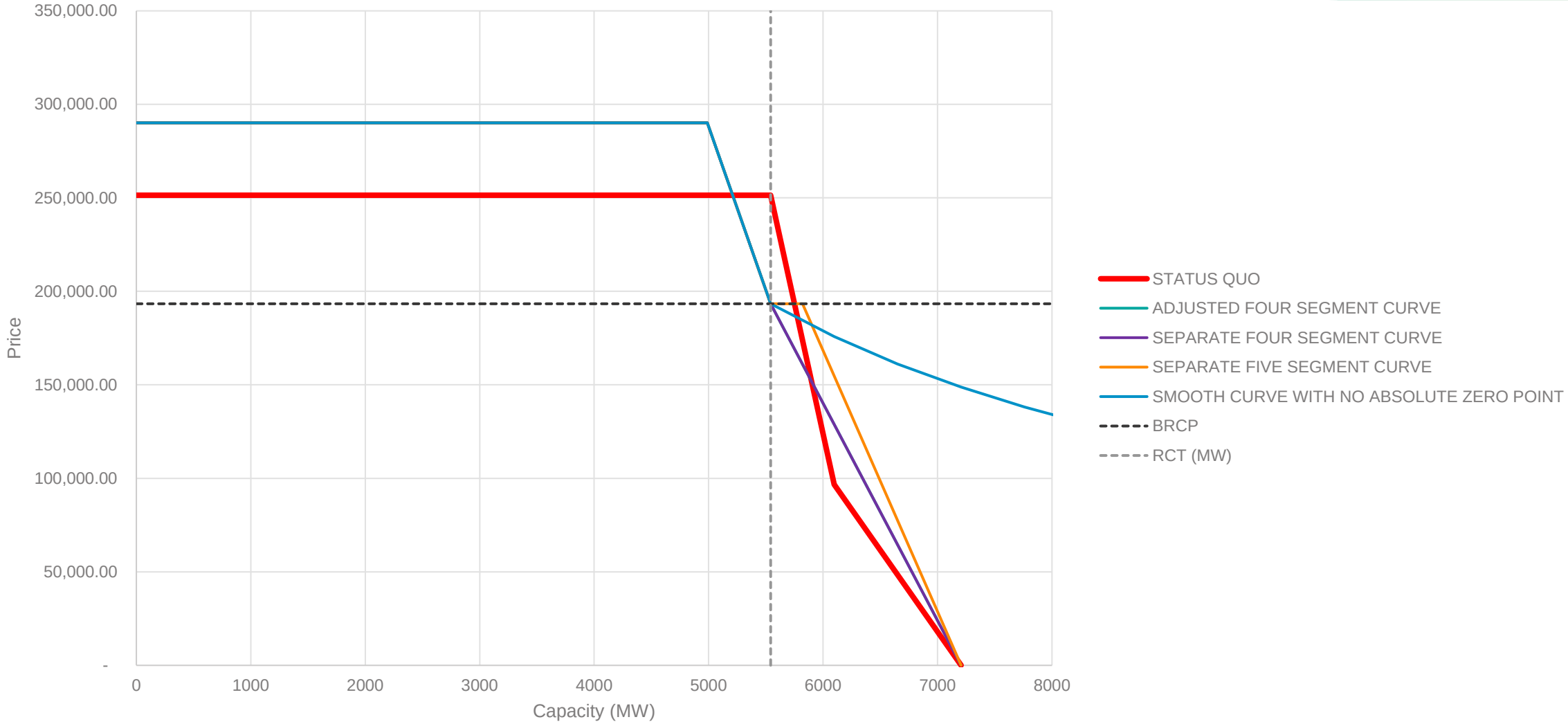
Option 7: Smooth curve with no absolute zero point

The pre-2019 RCP Curve was convex. The capacity price was set by calculating a total capacity payment (RCT x BRCP), and then dividing by the total issued Capacity Credits to determine the capacity price.

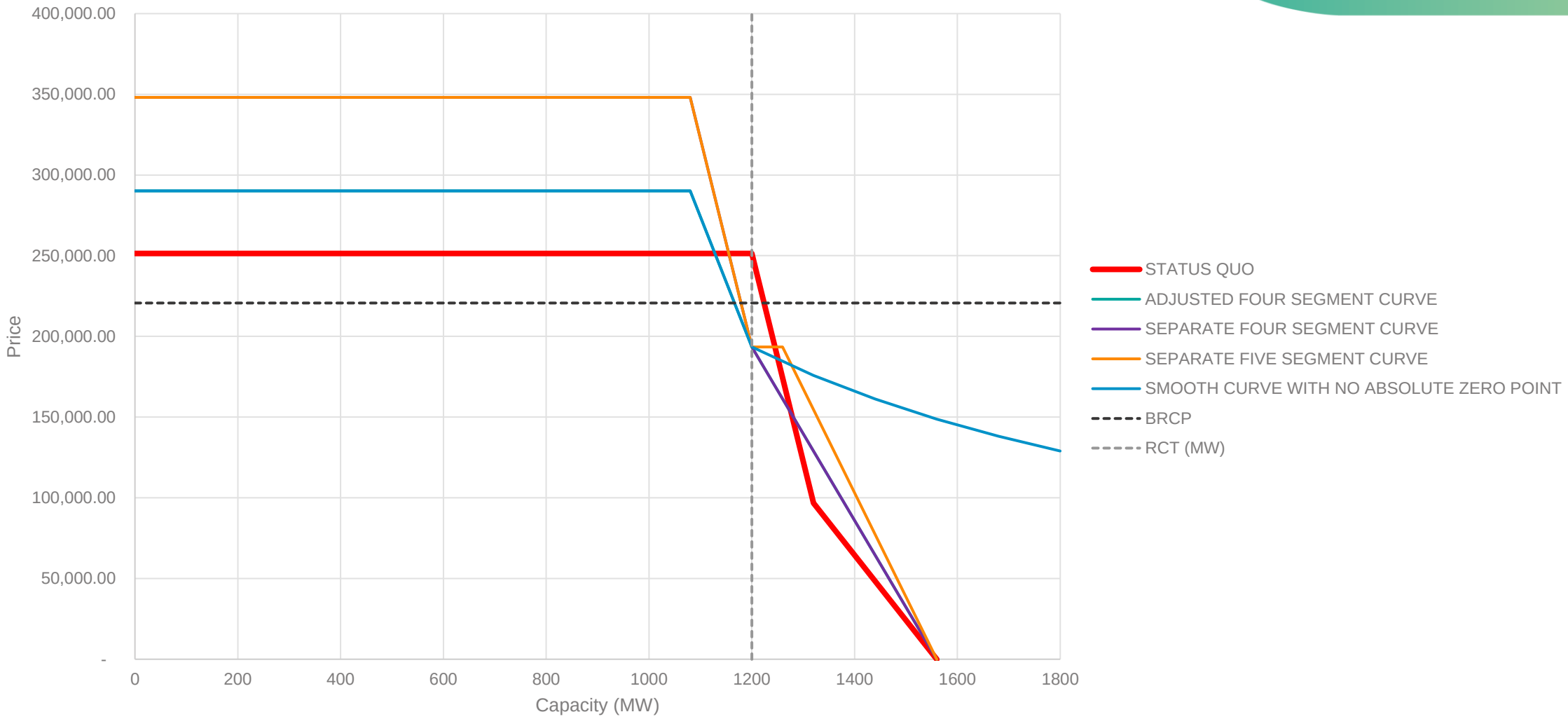
This option would replicate that curve, but increase the cap.



Option Curves (2025-26) – Peak Services



Option Curves (2025-26) – Flex Services[1]



[1] There is no current capacity target for Flex Services. The assumed RCR of 1,200 MW is indicative only.

5. Option evaluation

WIC review scope – Initiative 1: RCP Curve

The WIC review must consider whether:

1. The overall methodology for setting the RCP Curve is appropriate
2. The shape of the price curve is appropriate
3. The parameters for the price curve are appropriate
4. The transitional arrangements are appropriate

The review also needs to consider whether there should be a difference between the price curves used to set the peak and flexible capacity prices.

Design principles / evaluation criteria

Ideally, the Reserve Capacity Price should provide:

- A price signal for investment when there is insufficient capacity
- Appropriate exposure to risk for capacity suppliers and the consumers who pay for it
- Signals for capacity withdrawal or retirement when there is surplus capacity

The RCM overall should ensure that:

- Equal qualifying resources receive the same capacity price
- Capacity payments only compensate credible, verifiable resources
- There is a binding contract against exit for capacity resources that are needed.

The WEM overall should promote the most appropriate capacity mix over time as demand profiles change.

Option evaluation

Design principle	OPTION 1: Status Quo	OPTION 2: Adjusted Four Segment Curve	OPTION 3: Separate Four Segment Curve	OPTION 4: Separate Five Segment Curves with deadband	OPTION 7: Smooth curve with no Absolute Zero Point
Provides signal when there is insufficient capacity	◔	◑	◕	●	◕
Appropriate risk exposure for suppliers and consumers	◑	◕	◕	◕	◑
Signals for withdrawal/retirement when there is oversupply	●	●	●	◕	◔

Evaluation notes

All options provide a signal for investment when there is insufficient capacity. Option 4 provides a greater signal at small levels of surplus than the others, and option 2 mutes the flexible capacity signal when there is a shortfall of peak capacity.

Options 2, 3 and 4 balance exposure to risk between suppliers and purchasers. The option 4 deadband means that, close to the capacity target, the capacity price is less sensitive to state build and retirement decisions. Option 7 would have purchasers continue to pay the same total amount regardless of the level of overcapacity.

Options 2 and 3 provide a clear signal when there is overcapacity. Under option 4, there is no retirement signal until the deadband is cleared.

Review of price curve parameters

Currently:

- Clause 2.26.3 requires the ERA to review the BRCP method every five years
- Clause 2.26.3A extends this to the price curve parameters (including the cap, the economic zero point and the absolute zero point)
- Clause 4.16.9 requires the ERA to review its BRCP procedure at least every five years

The RCM Review amending rules will consolidate ERA BRCP review into 4.16, including triggering an ERA review if the benchmark technology changes

It is proposed to add the Coordinator's review of the price curve to the regular review of the BRCP reference technology. As a result, the ERA review of the BRCP methodology will not include the price curve parameters, as these will be considered by the Coordinator (as in this WIC Review).

Transitional arrangements for existing facilities

In the 2019 reform, transitional pricing arrangements were implemented for existing facilities on the basis that they had invested under a particular pricing arrangement, with no absolute zero point.

These facilities have a cap and floor applied to their Reserve Capacity Price.

Because the new proposal does not significantly change the downside risk, there is limited argument for applying a floor for facilities that have commissioned since 2019. However, the new proposal does increase the potential upside for new facilities, because the price cap is increased. Accordingly, an increase in the Reserve Capacity Price due to this factor would be a windfall for existing facilities commissioned since 2019.

Inflation adjustment for transitional facilities

The transitional cap and floor is inflation adjusted each year, using RBA forecasts. Forecasts must be used due to the timing of the price calculation, and there is no mechanism to reflect actual inflation, even where it differs significantly from the forecast, as it has in recent years.

Per discussion at the previous WICRWG, EPWA proposes to add a lookback adjustment in future capacity price calculations to reflect differences between forecasts and actuals, in the form:

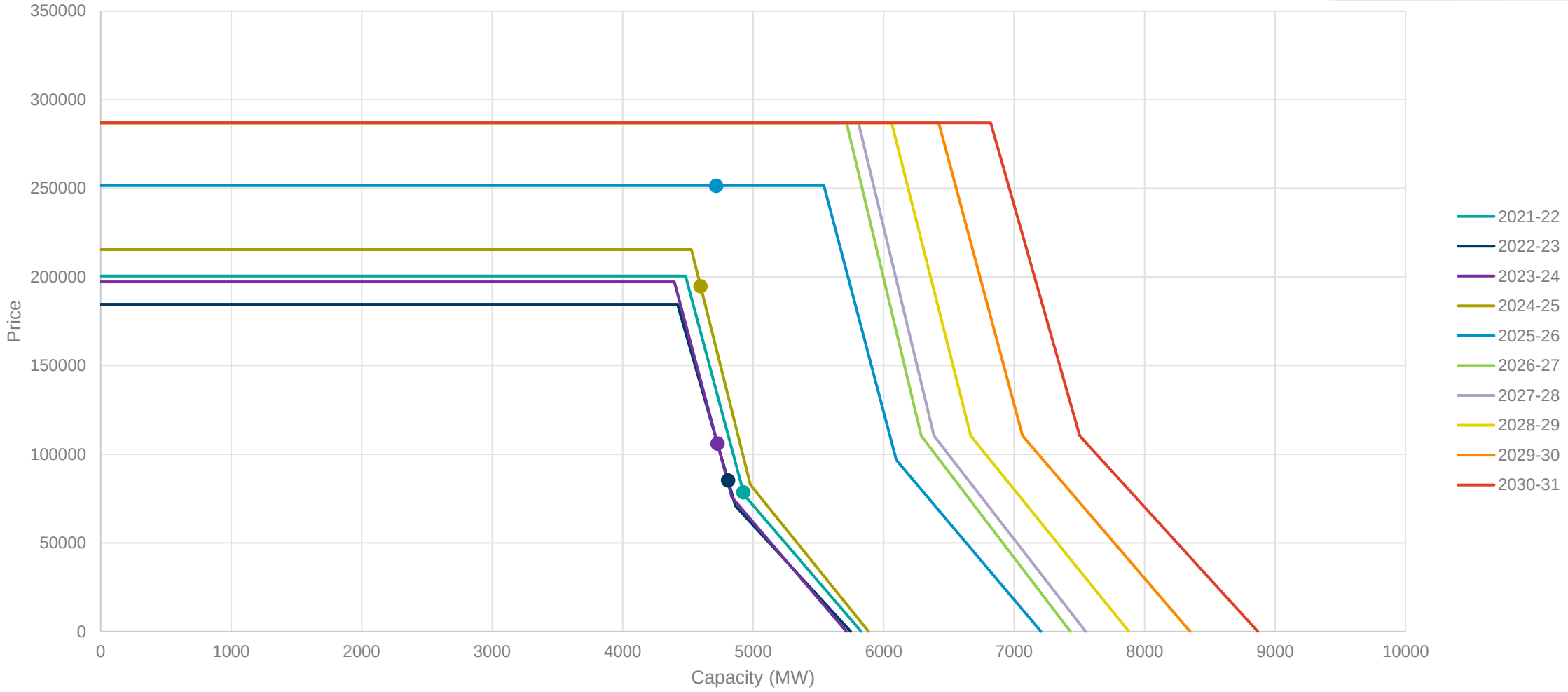
$$\text{Trans\_Ceiling} = \text{Trans\_Ceiling}_{[\text{previous}]} \times \max\left(1, \left(1 + \text{Forecast}\text{CPI} + \text{ActualCPI}_{[\text{previous}]} - \text{ForecastCPI}_{[\text{previous}]}\right)\right)$$

The first year would adjust for the period since 2019, while subsequent years would adjust for the previous year only.

Prices already published for previous capacity cycles will not be adjusted.

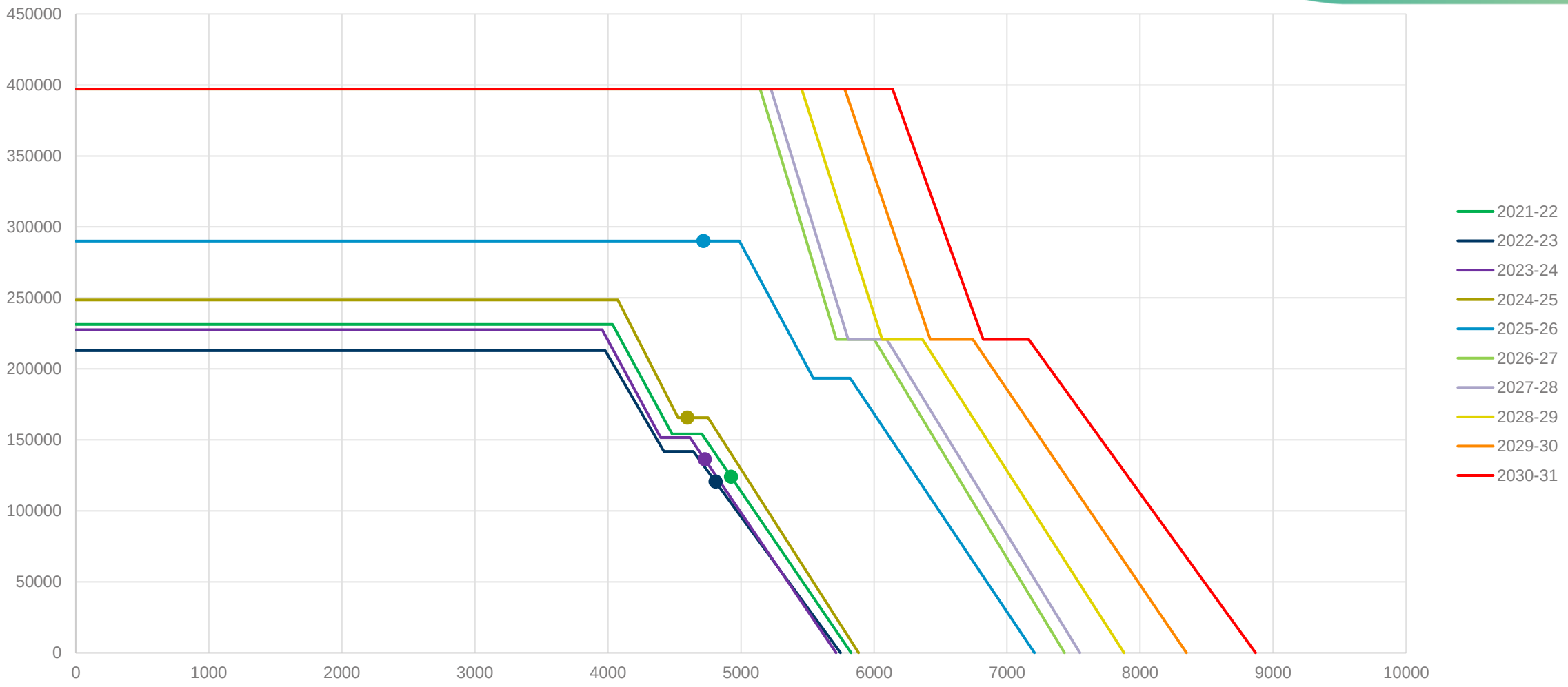
6. Price implications

Current RCP Curve through the years[1]



[1] BRCP for 2026 onwards is assumed to be the 2025-2026 BRCP

Preferred option – price curve through the years[1]



[1] BRCP for 2026 onwards is assumed to be the 2025-2026 BRCP

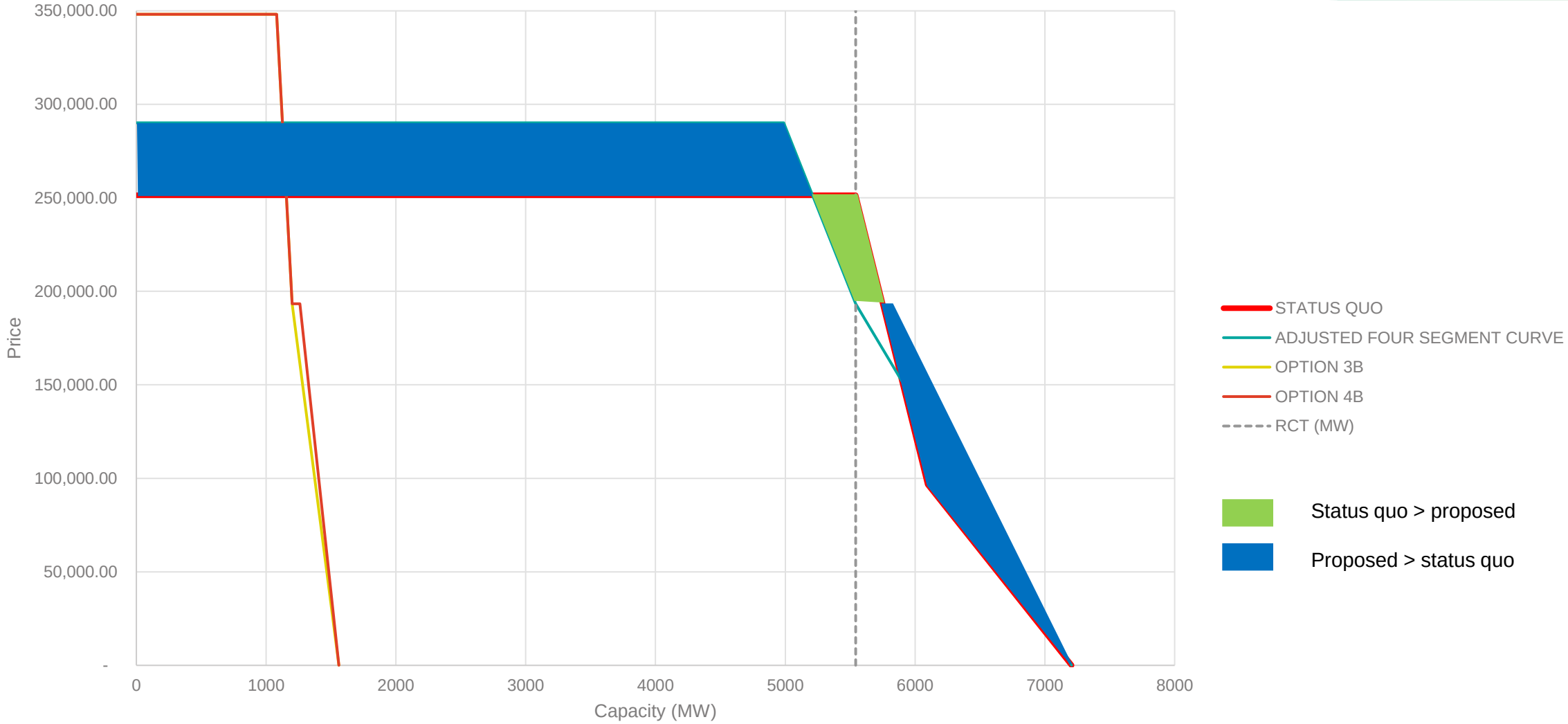
RCP Curve parameters

Capacity Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Price Cap ($)	200,460.00	184,470.00	197,210.00	215,410.00	251,420.00	286,910.00	286,910.00	286,910.00	286,910.00	286,910.00
Target (MW)	4,482.00	4,421.00	4,396.00	4,526.00	5,543.00	5,716.00	5,806.00	6,061.00	6,422.00	6,821.00
Economic Zero ($)	77,100.00	70,950.00	75,850.00	82,850.00	96,700.00	110,350.00	110,350.00	110,350.00	110,350.00	110,350.00
110% of Target (MW)	4,930.20	4,863.10	4,835.60	4,978.60	6,097.30	6,287.60	6,386.60	6,667.10	7,064.20	7,503.10
Absolute Zero ($)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130% of Target (MW)	5,826.60	5,747.30	5,714.80	5,883.80	7,205.90	7,430.80	7,547.80	7,879.30	8,348.60	8,867.30
Reserve Capacity Price ($)	**78,573**	**85,294**	**105,949**	**194,783**	**251,420**	-	-	-	-	-
Capacity Credits Assigned (MW)	**4,925**	**4,807**	**4,727**	**4,596**	**4,717**	-	-	-	-	-

Reserve Capacity Price outcomes

Capacity Year	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
Price Cap	231,300.00	212,850.00	227,550.00	248,550.00	290,100.00	331,050.00	331,050.00	331,050.00	331,050.00	331,050.00
90% of Target	4,033.80	3,978.90	3,956.40	4,073.40	4,988.70	5,144.40	5,225.40	5,454.90	5,779.80	6,138.90
BRCP	154,200.00	141,900.00	151,700.00	165,700.00	193,400.00	220,700.00	220,700.00	220,700.00	220,700.00	220,700.00
Target	4,482.00	4,421.00	4,396.00	4,526.00	5,543.00	5,716.00	5,806.00	6,061.00	6,422.00	6,821.00
BRCP	154,200.00	141,900.00	151,700.00	165,700.00	193,400.00	220,700.00	220,700.00	220,700.00	220,700.00	220,700.00
105% of Target	4,706.10	4,642.05	4,615.80	4,752.30	5,820.15	6,001.80	6,096.30	6,364.05	6,743.10	7,162.05
Absolute Zero	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
130% Target	5,826.60	5,747.30	5,714.80	5,883.80	7,205.90	7,430.80	7,547.80	7,879.30	8,348.60	8,867.30
Reserve Capacity Price ($)	**124,097**	**120,692**	**136,410**	**165,700**	**290,100**	**-**	**-**	**-**	**-**	**-**
Capacity Credits Assigned (MW)	**4,925**	**4,807**	**4,727**	**4,596**	**4,717**	**-**	**-**	**-**	**-**	**-**

Price increases and decreases



7. WIC Modelling

Modelling approach

In order to assess the impact of the policy changes proposed in the WIC Review, the project includes a modelling component.

Modelling will use RBP's fundamental dispatch tool WEMSIM (see appendix).

Key items to explore:

- Revenue projections for different technologies
- Capacity factors for facilities affected by emissions thresholds
- Effects of EPA thresholds
- Interaction with Commonwealth Capacity Investment Scheme

Two modes of modelling:

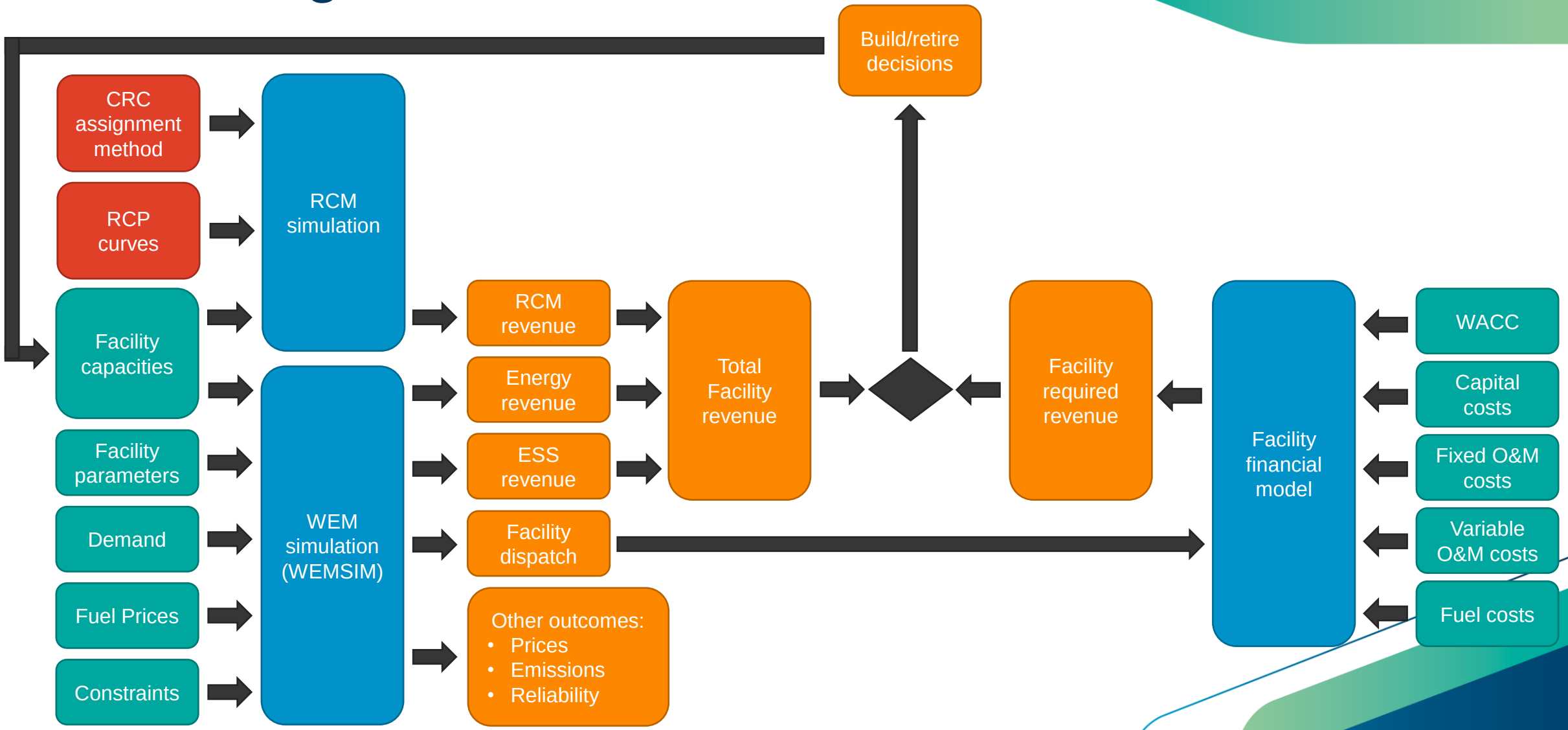
1. Assume build/retirement programme meets the capacity target

   This mode will explore potential missing revenue for new build, and the effects of different weather and demand patterns on dispatch.

1. Commercially driven build

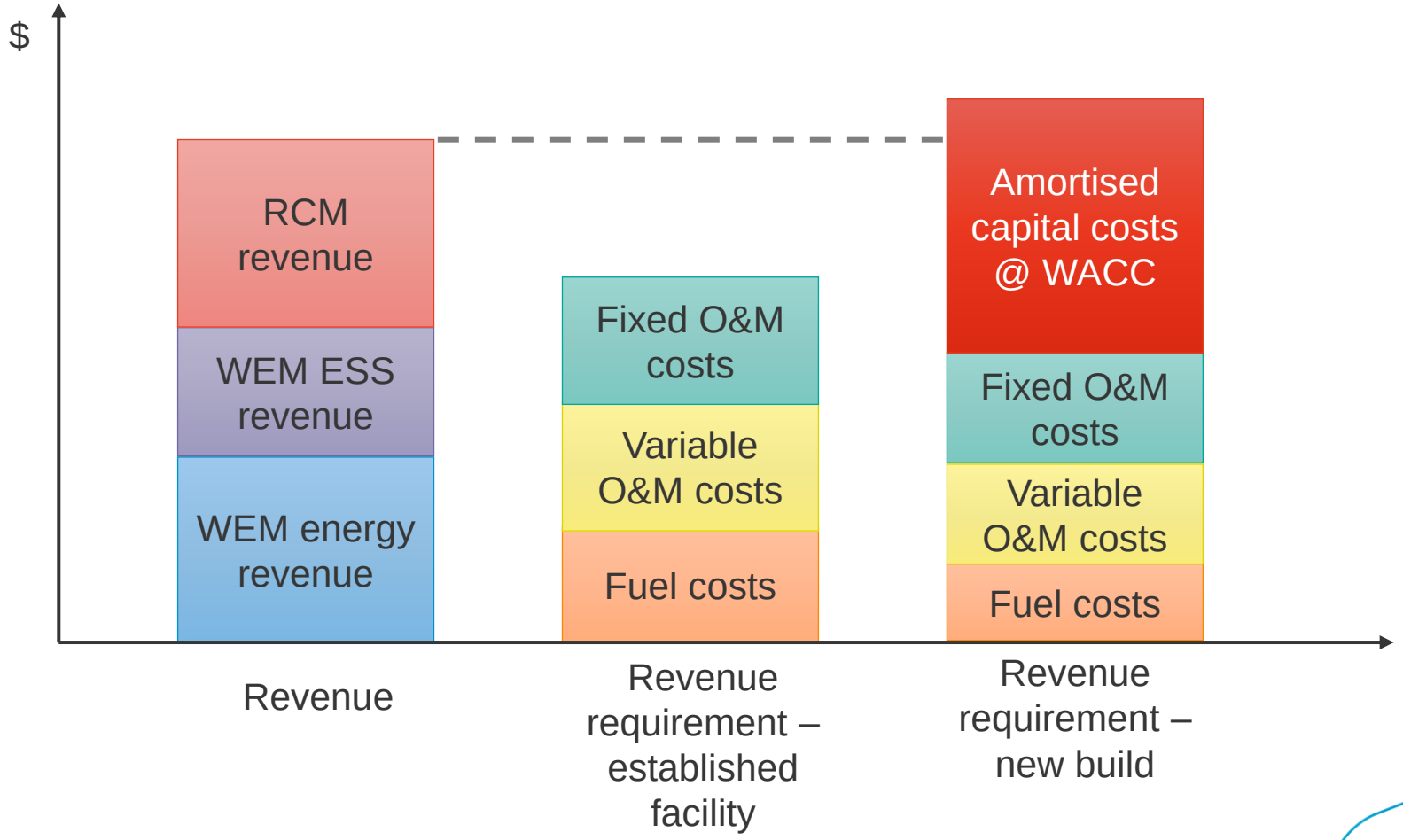
   This mode will explore whether the policy suite provides sufficient financial incentive for build to meet future capacity targets.

Modelling market outcomes



Revenue vs Revenue Requirement

The calculation of the required revenue for a facility depends on whether it is an established facility or a new build:



8. Next steps

Upcoming meetings

24 January:

- Price curve final proposal
- Price guarantee options

February:

- Price guarantee analysis
- Price guarantee initial proposal

March:

- Price guarantee final proposal.

April – Consultation paper released

June:

- Updates to proposals based on submissions.

June – Information paper released

July:

- Draft amending rules.

Questions or feedback can be emailed to energymarkets@dmirs.wa.gov.au

9. General Business

We're working for Western Australia.

Appendix. The current RCP curve

WEM RCP Curve

Price Curve: based on lines joining the following price points:

- Price cap equal to 1.3 times BRCP at the RC Target
- Absolute Zero point at 30% excess capacity
- Economic Zero point at Price of 50% of BRCP and Capacity of 10% excess capacity.

Formula is given as: $Max(Segment\ 1, Segment\ 2, 0) * BRCP$

$$Segment\ 1 = \left(\frac{EZ\ BRCP\ Factor - BRCP\ Cap\ Factor}{EZ} \times Excess\ Capacity + BRCP\ Cap\ Factor\right)$$

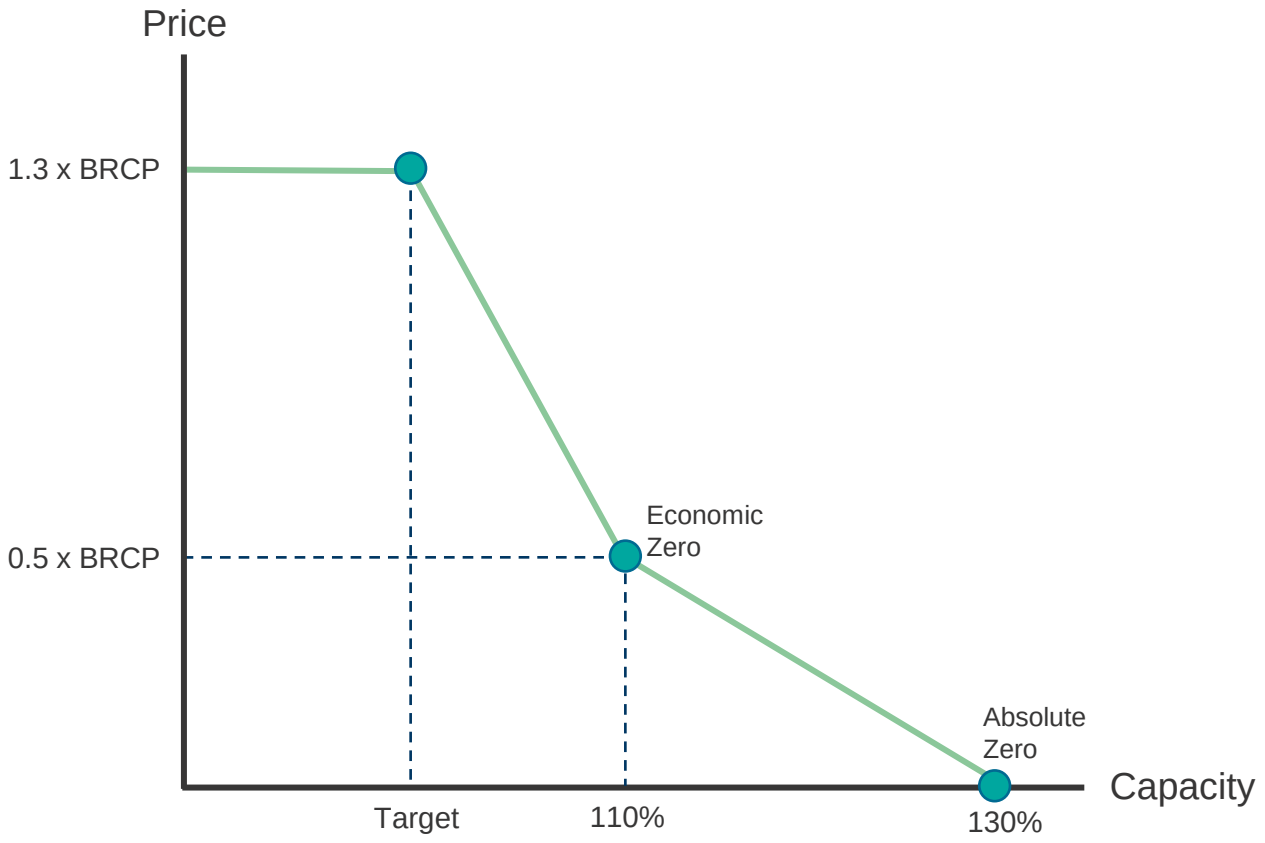
$$Segment\ 2 = \left(\frac{EZ\ BRCP\ Factor}{EZ - AZ}\right) \times (Excess\ Capacity - AZ)$$

Reference Price: CONE

Price at Capacity Target: Price Cap

Maximum Price: 1.3 * BRCP at zero excess capacity

Minimum Price: 0 at 30% of excess capacity



Key parameters of the current RCP curve

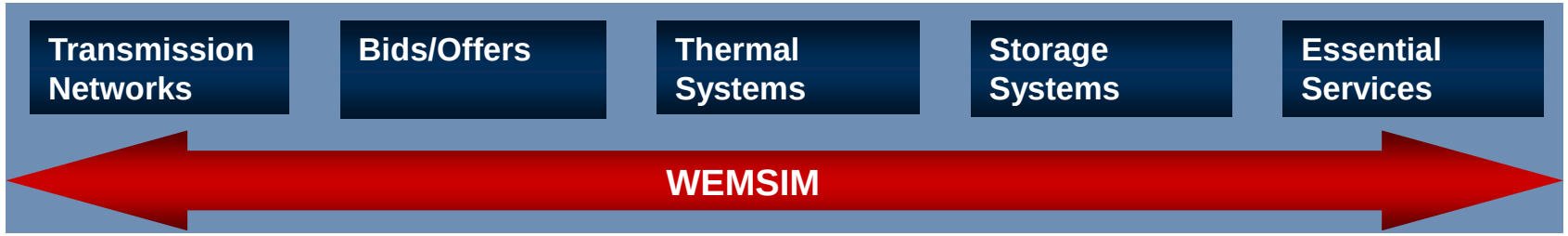
The current price curve is defined using three points:

- The price cap. At the Reserve Capacity Target or below, the capacity price will be 1.3 times the BRCP.
- The economic zero point. A “level of capacity surplus and price at which no additional resources will enter the system under a very wide variety of market conditions”. This is set at 50% of the BRCP and a 10% surplus above the Reserve Capacity Target
- The absolute zero point. The “point where the amount of excess capacity is deemed to be sufficiently high for the capacity price to be zero”. This is set at a 30% surplus above the Reserve Capacity Target.

Appendix. Introduction to the Modelling Tool

Overview

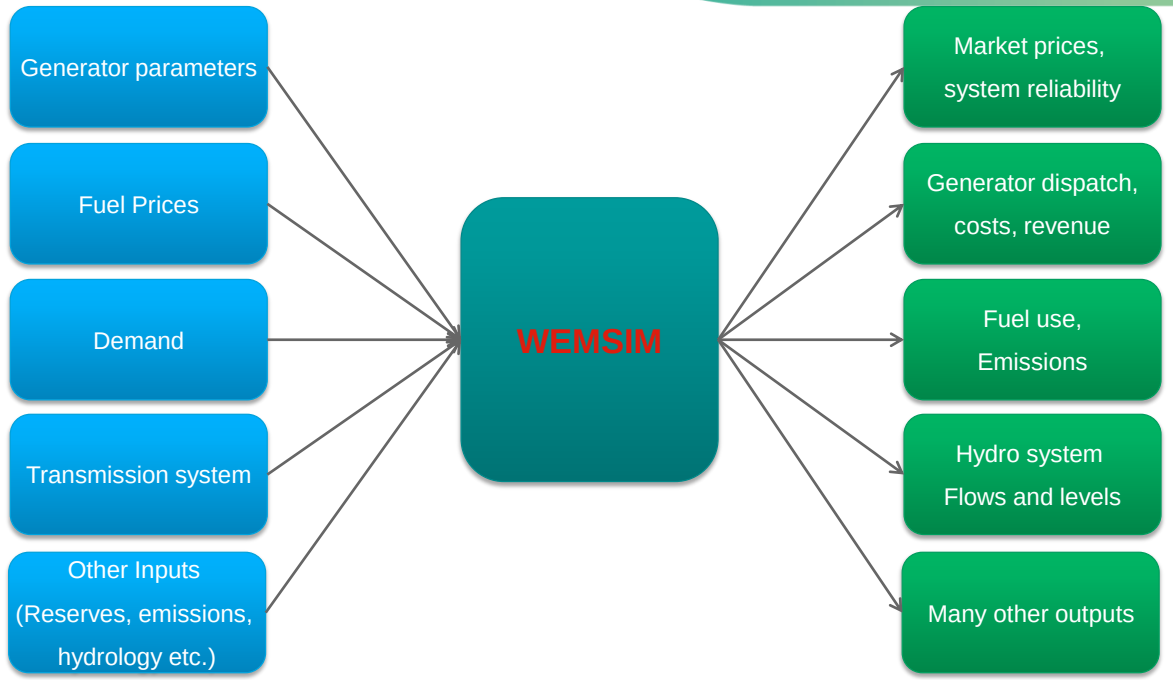
Wholesale Electricity Market Simulation (WEMSIM) is a linear programming modelling tool used to simulate cost- and bid-based electricity markets



- Flexible in its level of aggregation:
  - Time steps
  - Time horizons
  - Plant operational details
  - Transmission details
- Has been used to simulate power market outcomes in Australasia, Asia, Middle East, Europe and Central America
- Projects have included pool pricing analysis, revenue estimation and asset valuation, transmission constraint analysis, fuel contract structure comparison, market sensitivity, storage resource management, and policy analysis

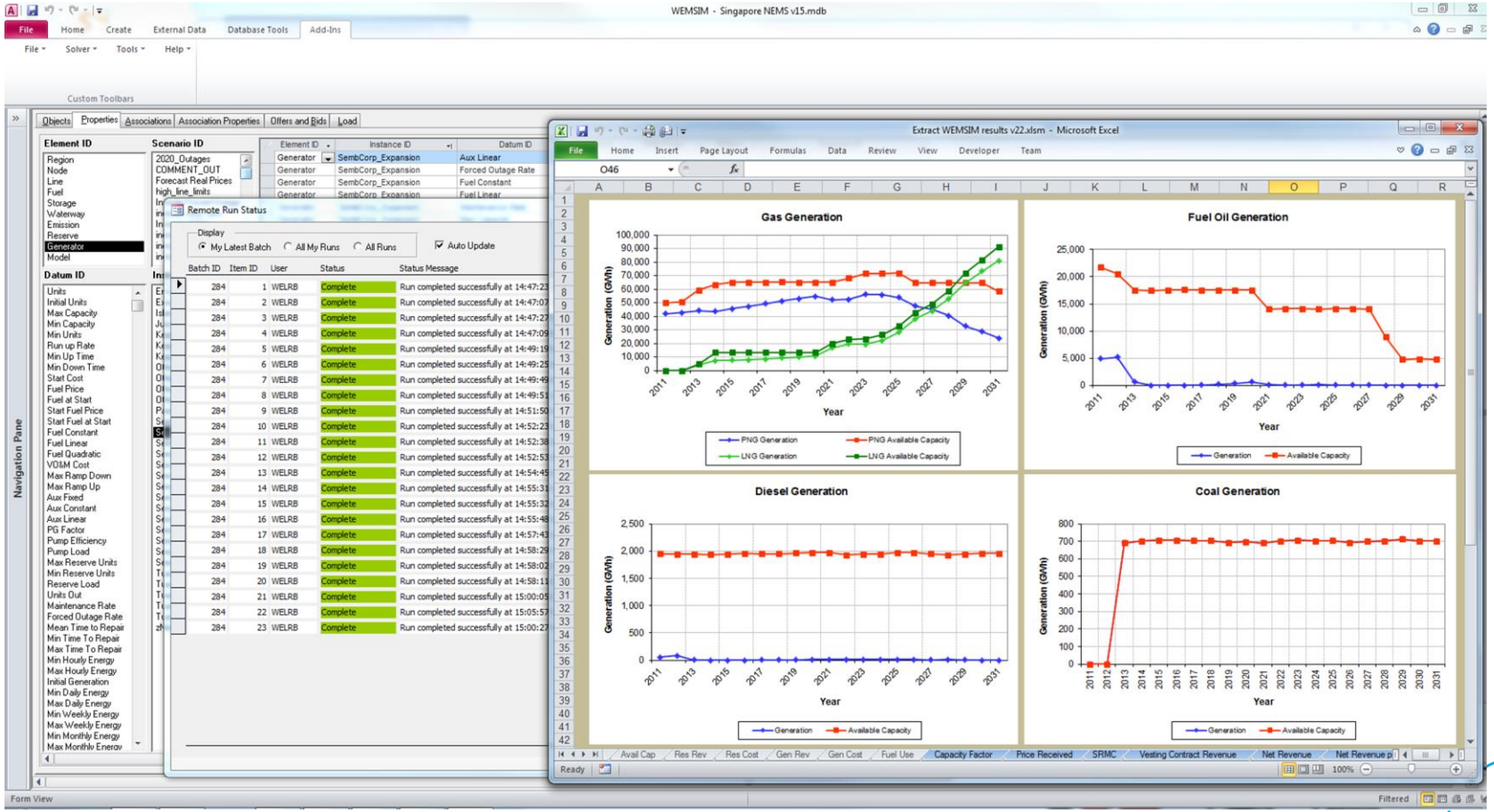
The Dispatch Simulation Model

- **WEMSIM (Wholesale Electricity Market Simulation):**
  - Simulates the dispatch of thermal and hydro generation resources in a multi-regional transmission framework
  - is an analytical dispatch planning and analysis tool with an optimization engine based on linear and mixed integer programming
  - Simultaneously optimizes generation dispatch, reserve provision (and, in MIP mode, unit commitment)



Rich Outputs

Outputs available include: period-by-period energy and ESS prices, dispatch, fuel use, emissions, revenue, capacity factors, unserved energy, storage volumes, network flows, and transmission constraints



Supporting Modules

- The Market Clearing Engine Simulator is the core of the platform, performing security constrained economic dispatch with ESS co-optimization
- The Demand Forecast Model transforms a given demand shape and long-term peak and energy forecasts into realistic demand data that captures both long-term trends and short-term volatility
- The Generator Build/Retirement Model can take manual entries where known or expected, and supplement with economic build/retirement decisions
- The Generator Offer Model can provide for offers based on cost, market power (Bertrand gaming), water values/stored energy values for hydro/storage systems, or derived from historic data