



Government of Western Australia  
Energy Policy WA

# Reserve Capacity Mechanism Review Working Group Meeting 2022\_10\_13

13 October 2022

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 [energymarkets@energy.wa.gov.au](mailto:energymarkets@energy.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	5 min
2	Meeting Apologies/Attendance	Chair	Noting	2 min
3	(a) Minutes of meeting 2022_07_14	Chair	Noting	2 min
	(b) Minutes of meeting 2022_07_21	Chair	Noting	2 min
4	Action Items	Chair	Discussion	2 min
5	Purpose of this session	RBP	Discussion	2 min
6	Policy statement principles	RBP	Discussion	15 min
7	Penalty implementation options	RBP	Discussion	45 min
8	Common elements	RBP	Discussion	35 min
9	Options for distributing support payments	RBP	Discussion	30 min
10	Next Steps	Chair	Discussion	5 min
11	General business	Chair	Discussion	5 min

# 5. Purpose of this Session

# Purpose of this Session

- Seeking input on the options EPWA has identified to implement penalties for high emission technologies and support for firming technologies.
- Participants are invited to comment on alternative ways to meet the key policy conditions

## 6. Policy Principles

# Constraints for Penalty Design

The minister issued a draft statement of policy principles in July 2022, and is currently reviewing the principles following input from the MAC. In the meantime, EPWA has begun investigating policy options

The purpose of the policy is to impose a financial penalty on existing and new high emission technologies

Key policy constraints:

1. There will be a penalty on high-emission technologies
2. The penalty will apply to all facilities, new and existing
3. The penalty will be implemented through the WEM
4. The penalty should result in net zero cost impact on consumers
5. The accumulated penalties will be used to incentivize firming solutions to facilitate the growth in renewable intermittent generation

# Areas of Flexibility for Penalty Design

EPWA is seeking to examine credible options for implementation of the policy that meet the policy principles

This includes options for penalty application and for distribution of accumulated penalty amounts.

There is flexibility over:

- Implementation through the energy market, the RCM, or as a separate settlement segment
- Where practical, targeting actual facility emissions
- How and what cost of carbon is factored in the relevant calculations
- How accumulated penalties are used to encourage firming technology
- The detail of required processes and calculations



# 7. Policy Implementation Options

# Policy Implementation Options

An important aspect of the penalty design is whether the penalty relates to the actual quantity of emissions produced, or the potential for emissions to be produced

EPWA has identified four main options for implementing penalties based on:

1. estimated emissions produced in each interval
2. estimated emissions produced in each settlement period
3. historical emissions produced in the prior capacity year
4. theoretical maximum emissions that could be produced in each settlement period (least preferred option)

In this session, the latter three options are presented as implemented through the RCM to illustrate the considerations, though they can equally be implemented outside of the RCM.

EPWA intends to model each of these options to estimate emissions penalties for existing and generic new facilities

The method used to distribute accumulated penalty amounts to encourage entry of firming technologies (policy constraint 5) is presented separately to the approach to penalty implementation

# Option 1 – Penalty on Trading Interval Emissions

For each facility, determine:

- emissions in each trading interval (tCO<sub>2</sub>e) as:

*facility generation (in MWh) \* facility emissions rate*

- emissions penalty (\$) as:

*facility emissions \* penalty rate*

This option could be applied as a separate settlement segment, or with the penalty subtracted from real time energy market revenues. It would not affect RCM operation.

This option could be applied to all facilities, or only to facilities with annual emissions above a defined threshold – an alternative approach to defining “high emission facilities”

# Option 1 – Penalty on Trading Interval Emissions

Under this approach:

- It is expected that owners of high emission facilities would prefer to adjust energy offer prices for those facilities upwards to account for the penalty amount, especially when marginal. Peaking facilities (which are usually marginal when operating) would see the highest impact on short-run operating incentives.
- Allowing emission penalties to be included in offer prices would mean additional costs being passed through to consumers, which would seem counter the purpose of it being a penalty.
- Treatment of penalty amounts would require assessment under the market power mitigation regime, increasing the complexity of ERA activity

This option:

- Would meet policy constraints 2 and 3.
- If penalty amounts are not accounted for in offer prices, may lead to penalties being passed to consumers through contracts initially – thus not meeting policy constraint 4 (net zero impact on consumers) – and then would be a short-run cost to generators once contracts expire.
- If penalty amounts are accounted for in offer prices:
  - would not meet policy constraint 4, as overall market energy prices would be expected to increase to incorporate the previously externalized emissions cost when high emission facilities are marginal, increasing costs to consumers
  - may not meet policy constraint 1 (penalty to high emission facilities), as initial analysis suggests that gas facilities could conceivably end up *increasing* profit due to higher infra-marginal rents when coal is marginal

# Option 2 – RCM Penalty on Settlement Period Emissions

For each facility:

- determine facility emissions (tCO<sub>2</sub>e) in settlement period as:

$$\text{facility generation} * \text{facility emissions rate}$$

- determine facility emissions per capacity credit (tCO<sub>2</sub>e/MWCC) as:

$$\text{facility emissions} / \text{capacity credits}$$

- identify facility reserve capacity price (may be standard, transitional, or fixed) for the settlement period as:

$$\text{annual FRCP (in \$/MW)} / \text{number of settlement periods in a year}$$

- determine emissions-adjusted facility reserve capacity price for the settlement period as:

$$\text{Settlement period FRCP} - (\text{Facility emissions per CC} * \text{penalty rate})$$

- apply emissions-adjusted FRCP to capacity payments, and non-adjusted FRCP to capacity cost recovery calculations

# Option 2 – RCM Penalty on Settlement Period Emissions

Under this approach:

- The overall market outcomes should be very similar to option 1
- Participant exposure to refunds would be reduced, as refunds are proportionate to facility RCPs – this would somewhat weaken incentives for availability
- Penalties would only be applied to facilities holding capacity credits.
- RCM cost recovery calculations would need amendment to ensure that:
  - the full facility RCP is collected from customers, but only the adjusted (reduced) facility RCP is paid out to high emission facilities
  - where capacity credits from a high emissions facility have been bilaterally traded, the penalty is still recovered, either from the generator or the purchaser

Like option 1, this option:

- may not meet policy constraints 1 and 4, if participants can pass penalties through to consumers
- meets policy constraints 2 and 3

# Option 3 – RCM Penalty on Historic Emissions

For each facility:

- determine facility emissions in previous capacity year or years (tCO<sub>2</sub>e) as:

*facility generation \* facility emissions rate / number of years*

- determine facility emissions per capacity credit (tCO<sub>2</sub>e/MWCC) as:

*facility emissions / average capacity credits in selected years*

- identify facility reserve capacity price (may be standard, transitional, or fixed) for the upcoming capacity year

- determine emissions adjusted facility reserve capacity price for the upcoming capacity year period as:

*FRCP – (Facility emissions per capacity credit \* penalty rate)*

# Option 3 – RCM Penalty on Historic Emissions

Under this approach:

- Participants would only need to take a view on capacity penalties once per year rather than continuously
- The link between short run operations and long run revenue is weaker and less direct (as operation does not affect capacity payments until the following capacity year), so participants would face less incentive to account for penalty costs in offer prices.
- Using multiple years of historical operation would further reduce the strength of the link between short run operations and long run revenue

This approach would:

- meet policy constraints 2 and 3
- may come closer to meeting policy constraints 1 and 4



# Option 4 – RCM Penalty on Theoretical Maximum Emissions

For each facility, determine:

- the maximum possible emissions per CC as:

*facility emissions rate \* hours in year*

- emissions-adjusted facility reserve capacity price for the capacity year as:

*FRCP – (Facility max emissions per CC \* penalty rate)*

# Option 4 – RCM Penalty on Theoretical Maximum Emissions

Under this approach:

- Penalties would be independent of short run activity.
- Short run energy prices would still be affected by entry and retirement decisions
- Peaking plant would be much more heavily affected than under other options, potentially leading to accelerated exit, to the detriment of system reliability – this would likely require a threshold
- The same RCM operations considerations would apply as option 2

This approach would:

- Not meet policy constraint 1, as it would apply penalties to facilities with high potential emissions rather than those with high actual emissions.
- meet policy constraints 2 and 3
- If applied without a threshold, may not meet policy constraint 4, as it would be more likely to impact consumers through system reliability measures

# 8. Common Elements

# Facility Emissions Rates

- All penalty collection methodologies require an estimate of facility emissions
- For simplicity, Facility emission rates should be expressed in tCO<sub>2</sub>e (tonnes of Carbon Dioxide equivalent) per MWh. The National Greenhouse Emission Register methodologies are based on fuel inputs rather than electrical output.
- The method for setting facility emissions rates could involve (in order of effort):
  - (a) setting a default value for each combination of technology type and fuel type
  - (b) determining a single emissions content value for each type of fuel, and combining with a facility specific heat rate to determine a single value for each facility
  - (c) as for (b) plus developing an efficiency curve with different emission rates for different load levels (e.g. per UNFCCC Tool 09 methods A-E)
  - (d) as for (c) plus accounting for the composition of the specific gas or coal used in the facility (e.g. per ACER Opinion 22/2019), along with measurement and testing processes, and allocation of some emissions to process heat components of cogeneration facilities
- Preliminary proposal: use option (b) – it balances accuracy with implementation complexity
  - The specific method used would be based on existing methodologies as far as possible, and tie in with assumptions made for other WEM processes that consider emissions, such as the WOSP
- EPWA will quantify expected emissions rates and total quantities for existing and generic new facilities

# Emission Penalty Rate

- All methods determine penalty amounts as a function of facility emission quantities and the per unit cost of those emissions (the penalty rate)
- With the same \$/tCO<sub>2</sub>e penalty rate for all facilities (rather than it differing by technology), the penalty rate could be:
  - (a) set administratively: either flat, inflation indexed, or increasing over time
  - (b) linked to a publicly available emission price index (e.g. for ACCUs, NZUs or European carbon units), changing every settlement period; or
  - (c) a historical average of a publicly available emission price index, changing once per capacity year
- Preliminary proposal:
  - link to a publicly available index
  - mitigate volatility by putting bounds on the maximum percentage change per period
  - smooth the impact of the policy by starting from a low-priced index (e.g. from a voluntary surrender program) and transitioning over time to higher-priced indices (e.g. from a compliance based program with binding limits)
- EPWA will quantify the size of penalty at different penalty rates

# Meter Data

- Almost all aspects of the WEM operate on a sent-out basis:
  - WEM meter data is measured at the network connection point
  - If WEM meter data is the basis for emission penalty calculations, emissions from energy consumed behind the meter will not be directly measured and penalized
  - If as-generated SCADA data is the basis for emission penalty calculations, settlement calculations would be more complex
- Preliminary proposal: apply penalties on the basis of emissions from *sent-out* energy and factor in the rate of self-consumption when determining emissions rates for each facility

# Interaction with other Schemes

- Facilities in the SWIS generation fleet do not currently face financial costs of their emissions
- While emissions from large electricity generators are captured under the safeguard mechanism, the sector as a whole does not currently exceed the baseline, so these emissions are not required to be offset by ACCUs
- It may be appropriate to review the penalty regime if this situation changes – e.g. if the safeguard mechanism sectoral baseline for electricity production is exceeded or if a federal emissions pricing scheme is introduced.

# 9. Options for Distributing Support Payments



# Options for Distributing Support Payments

- Options for distributing support payments are largely independent of how penalties are implemented
- EPWA has identified four main options for distribution of support payments:
  1. Distribution to firming facilities pro-rata to Capacity Credits held
  2. Adjustment to firming facility reserve capacity prices
  3. Contestable fund for new firming facilities
  4. Standby fund for non-standard capacity procurement

# Option 1 – Distribution to Firming Facilities Pro-Rata to Capacity Credits

- Take the total amount of penalties collected in \$
- Sum the Peak Capacity Credits allocated to all low emission firming facilities – those in capability class 1 or 2 which have not paid emissions penalties, or with penalties under a threshold
- Determine the incentive price in \$/MW by dividing the penalties collected by the total Capacity Credits held by qualifying firming facilities
- Pay each applicable facility the incentive price \* MWCC as part of capacity payments
- Under this approach:
  - Designated facilities would receive an additional revenue stream
  - Additional revenue would depend on the size of the facility and the size of other eligible facilities, not the facility's short-run behaviour.
  - Depending on the penalty approach, the amount of revenue may not be known before real time

# Option 2 – Adjustment to Firming Facility Reserve Capacity Prices

- Under penalty options 3 and 4, the total quantity of penalties will be known at the start of the capacity year
- The collected quantity can be allocated through an adjustment to firming facility capacity prices
  - take the total amount of penalties in \$
  - determine the total qualifying Capacity Credits as the sum of Capacity Credits allocated to low emission firming facilities
  - identify the facility reserve capacity price (may be standard, transitional, or fixed) for each qualifying facility for the coming capacity year
  - determine support adjusted facility reserve capacity price for the upcoming capacity year period as:  
$$FRCP + (\text{penalties collected} / \text{total qualifying Capacity Credits})$$
  - apply support-adjusted FRCP to capacity payments, and non-adjusted FRCP to capacity cost recovery calculations

# Option 2 – Adjustment to Firming Facility Reserve Capacity Prices

- Under this approach:
  - Designated facilities would receive increased capacity revenue, with the amount known at the start of the capacity year
  - Additional revenue would depend on the size of the facility and the size of other eligible facilities, not the facility's short-run behaviour
  - Eligible facilities would face higher refunds, slightly increasing incentives for availability
  - RCM cost recovery calculations would need to be amended to ensure that the adjusted (increased) facility RCP is paid to firming facilities, but the unadjusted facility RCP is collected from customers (i.e. those who have purchased Capacity Credits from firming facilities still pay what they would have paid without the additional support)

# Option 3 – Contestable Fund for New Firming Facilities

- AEMO collects penalties in settlement, and pays them into a segregated fund
- A responsible party (likely either AEMO or the Coordinator) specifies characteristics of desired facilities
- Responsible party seeks interest from new entrant firming facilities which are not commercially viable without additional financial support
- Successful respondents are paid out of the segregated fund
- Unpaid funds are distributed to capacity purchasers after 3-5 years.
- Under this approach:
  - significant new processes would be required to design and run competitive tender processes
  - the responsible party would need to assess commercial viability of prospective new entrants – potentially introducing subjectivity into the funding process

# Option 4 – Standby Fund for Non-Standard Capacity Procurement

- AEMO collects penalties in settlement, and pays them into a segregated fund
- If/when SESSM, NCESS, or supplementary capacity is needed, AEMO draws on the segregated fund to pay for those costs
- When the fund is exhausted, AEMO allocates any remaining costs under current approaches
- Unpaid funds are distributed to capacity purchasers after 3-5 years
- Under this approach:
  - funds are targeted to specific capacity needs outside of the regular processes
  - collected penalties could sit unused for extended periods of time

# 10. Next Steps

# Next Steps

- RCMRWG members to provide feedback and alternatives by 28 October 2022
- EPWA to analyse likely effects and impact of the various options
- Discuss analysis and indicative approach in next RCMRWG meeting (24 November 2022)
- In parallel, EPWA will continue work on CRC volatility mitigation options (to discuss findings at RCMRWG meeting on 15 December 2022)
- Questions or feedback can be emailed to [energymarkets@energy.wa.gov.au](mailto:energymarkets@energy.wa.gov.au)



# 11. General Business

*We're working for  
Western Australia.*