Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Energy Policy WA

Meeting Agenda

Meeting Title:	Reserve Capacity Mechanism Review Working Group (**RCMRWG**)
Meeting Number:	2023_02_01
Date:	Wednesday 1 February 2023
Time:	9:00 AM to 11:00 AM
Location:	Online, via TEAMS.

Item	Item	Responsibility	Type	Duration
1	Welcome and Agenda	Chair	Noting	2 min
2	Meeting Apologies/Attendance	Chair	Noting	2 min
3	Minutes of Meeting 2022_12_15	Chair	Decision	2 min
4	Action Items	Chair	Discussion	2 min
5	Peak IRCR	RBP	Discussion	60 min
6	Flex IRCR	RBP	Discussion	20 min
7	DSP CRC	RBP	Discussion	30 min
8	Next Steps	Chair	Discussion	5 min
9	General Business	Chair	Discussion	2 min
	Next Meeting: 16 February 2023			

Please note this meeting will be recorded.

Competition and Consumer Law Obligations

Members of the MAC's Reserve Capacity Mechanism Review Working Group (**Members**) note their obligations under the *Competition and Consumer Act 2010* (**CCA**).

If a Member has a concern regarding the competition law implications of any issue being discussed at any meeting, please bring the matter to the immediate attention of the Chairperson.

Part IV of the CCA (titled "Restrictive Trade Practices") contains several prohibitions (rules) targeting anti-competitive conduct. These include:

(a) **cartel conduct**: cartel conduct is an arrangement or understanding between competitors to fix prices; restrict the supply or acquisition of goods or services by parties to the arrangement; allocate customers or territories; and or rig bids.

(b) **concerted practices**: a concerted practice can be conceived of as involving cooperation between competitors which has the purpose, effect or likely effect of substantially lessening competition, in particular, sharing Competitively Sensitive Information with competitors such as future pricing intentions and this end:

- a concerted practice, according to the ACCC, involves a lower threshold between parties than a contract arrangement or understanding; and accordingly; and
- a forum like the MAC's Reserve Capacity Mechanism Review Working Group is capable being a place where such cooperation could occur.

(c) **anti-competitive contracts, arrangements understandings**: any contract, arrangement or understanding which has the purpose, effect or likely effect of substantially lessening competition.

(d) **anti-competitive conduct (market power)**: any conduct by a company with market power which has the purpose, effect or likely effect of substantially lessening competition.

(e) **collective boycotts**: where a group of competitors agree not to acquire goods or services from, or not to supply goods or services to, a business with whom the group is negotiating, unless the business accepts the terms and conditions offered by the group.

A contravention of the CCA could result in a significant fine (up to $500,000 for individuals and more than $10 million for companies). Cartel conduct may also result in criminal sanctions, including gaol terms for individuals.

Sensitive Information means and includes:

(a) commercially sensitive information belonging to a Member's organisation or business (in this document such bodies are referred to as an Industry Stakeholder); and

(b) information which, if disclosed, would breach an Industry Stakeholder's obligations of confidence to third parties, be against laws or regulations (including competition laws), would waive legal professional privilege, or cause unreasonable prejudice to the Coordinator of Energy or the State of Western Australia).

Guiding Principle – what not to discuss

In any circumstance in which Industry Stakeholders are or are likely to be in competition with one another a Member must not discuss or exchange with any of the other Members information that is not otherwise in the public domain about commercially sensitive matters, including without limitation the following:

(a) the rates or prices (including any discounts or rebates) for the goods produced or the services produced by the Industry Stakeholders that are paid by or offered to third parties;

(b) the confidential details regarding a customer or supplier of an Industry Stakeholder;

(c) any strategies employed by an Industry Stakeholder to further any business that is or is likely to be in competition with a business of another Industry Stakeholder, (including, without limitation, any strategy related to an Industry Stakeholder's approach to bilateral contracting or bidding in the energy or ancillary/essential system services markets);

(d) the prices paid or offered to be paid (including any aspects of a transaction) by an Industry Stakeholder to acquire goods or services from third parties; and

(e) the confidential particulars of a third party supplier of goods or services to an Industry Stakeholder, including any circumstances in which an Industry Stakeholder has refused to or would refuse to acquire goods or services from a third party supplier or class of third party supplier.

Compliance Procedures for Meetings

If any of the matters listed above is raised for discussion, or information is sought to be exchanged in relation to the matter, the relevant Member must object to the matter being discussed. If, despite the objection, discussion of the relevant matter continues, then the relevant Member should advise the Chairperson and cease participation in the meeting/discussion and the relevant events must be recorded in the minutes for the meeting, including the time at which the relevant Member ceased to participate.

Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**
Energy Policy WA

Minutes

Meeting Title:	Reserve Capacity Mechanism Review Working Group (**RCMRWG**)
Date:	15 December 2022
Time:	9:00 AM to 11:00 AM
Location:	Microsoft TEAMS

Attendees	Company	Comment
Dora Guzeleva	Chair	
Rhiannon Bedola	Synergy	
Toby Price	AEMO	Subject matter expert
Jacinda Papps	Alinta Energy	
Peter Huxtable	Water Corporation	
Paul Arias	Shell Energy	
Patrick Peake	Perth Energy	
Matt Shahnazari	Economic Regulation Authority	
Noel Schubert	Small-Use Consumer representative	
Andrew Stevens	Consultant	
Rebecca White	Collgar Wind Farm	
Tessa Liddelow	Shell Energy	
Andrew Walker	South32 (Worsley Alumina)	
Daniel Kurz	SSCP Power	
Tim Robinson	Robinson Bowmaker Paul (**RBP**)	
Oscar Carlberg	Alinta Energy	
Jake Flynn	Collgar Wind Farm	
Mark McKinnon	Western Power	
Shelley Worthington	EPWA (**EPWA**)	
Isadora Salviano	EPWA	

Apologies	From	Comment
Manus Higgins	AEMO	
Dev Tayal	Tesla Energy	
Kiran Ranbir	ATCO Australia	
Dale Waterson	Merredin Energy	
Stephen Eliot	EPWA	
Laura Koziol	EPWA	

Item	Subject	Action
1	**Welcome** The Chair opened the meeting at 9:00am.	
2	**Meeting Apologies/Attendance** The Chair noted the attendance as listed above.	
3	**Minute of RCMRWG meeting 2022_10_13** The Chair sought comments on the draft minutes of the RCMRWG meeting held on 24 November 2022. Dr Shahnazari noted that his last name has been misspelt and Mr Arias noted that his organisation has not been updated from Bluewaters Power to Shell Energy. The Chair noted the comments on the minutes and advised that EPWA will rectify the issues. The RCMRWG accepted the minutes as a true and accurate record of the meeting.	
	Action: RCMRWG Secretariat to rectify and publish the minutes of the 24 November 2022 RCMRWG meeting on the RCMRWG web page as final.	**RCMRWG Secretariat**
4	**Action Items** The paper was taken as read.	

5	**Purpose of this session**
	Mr Robinson noted the purpose of the session is to:
	• present the analysis of:
	  ○ the three proposed methods to allocate Certified Reserve Capacity (**CRC**) to intermittent generators; and
	  ○ options to mitigate volatility of method outputs; and
	  ○ seek RCMRWG views on a preferred option to allocate CRC to intermittent generators.	

6	**Determining the Fleet ELCC** Mr Robinson presented the approach used to determine the Fleet Effective Load Carrying Capability (**ELCC**) (slides 7 to 13). The following was discussed: • Dr Shahnazari noted that currently the first limb of the Planning Criterion is the dominant one and expressed his concern that by measuring capacity value of renewable generators based on Expected Unserved Energy (**EUE**), the effects might not be consistent with the dominant limb of the Planning Criterion. He considered that there is a risk of undervaluing or overvaluing the intermittent generators. Dr Shahnazari also noted that 50 iterations might not be enough. ○ Mr Robinson acknowledged Dr Shahnazari's concern and noted that, as indicated on the slide, the approach to calibrate the target used to set the fleet ELCC will be further investigated.	

Item	Subject	Action
	○ The Chair noted that RBP will also model a scenario with an EUE target of 0.0015% to assess the effect. • In response to a question from Mr Carlberg, Mr Robinson clarified that the reference period for the individual years of Fleet ELCC is the 12 months of the relevant Capacity Year and not a historical five year period. • Dr Shahnazari referred to an email he circulated to the RCMRWG before the meeting and noted that the ERA had previously proposed a similar approach to determine the fleet ELCC in the Rule Change Proposal RC_2019_03 (Method used for the assignment of Certified Reserve Capacity to Intermittent Generators). ○ The Chair noted that system reliability must not be compromised. Therefore, it is appropriate to use the lower of the average of the annual ELCC and the whole period ELCC to set the fleet ELCC as this will determine the total Capacity Credits received by the fleet of intermittent generators and is the most important value in terms of system reliability.	
7	**Determining Facility ELCCs** Mr Robinson presented the three Methods assessed for distributing the fleet ELCC to the individual Facilities (slides 14 to 27). The following was discussed: • Dr Shahnazari expressed concerns about the application of the Delta Method at individual Facility level and suggested considering applying delta method at facility class level (as being pursued in the PJM). ○ The Chair noted that Dr Shahnazari had submitted those concerns via email to the RCMRWG before the meeting. ○ Mr Carlberg agreed with Dr Shahnazari's comment. • Mr Schubert commented that using Load for Scheduled Generation (**LSG**), as suggested under EPWA's hybrid method, eliminates high demand intervals in which intermittent facilities perform well, which is a disadvantage for the intermittent generators. ○ Mr Robinson agreed that using LSG creates disadvantages for the intermittent facilities. He explained the rationale for assessing LSG is to account for the correlation between the Facilities' outputs. • Mrs Bedola asked why, under the hybrid methods, the share allocated to solar facilities increases if less intervals are chosen (slide 21). ○ Mr Robinson explained that this related to the distribution of system stress intervals: if more intervals are chosen,	

Item	Subject	Action

	there are more intervals in the evening when there is no sun.
	• Mr Peake commented that in all Methods, new wind facilities affect the certification level for existing Facilities. He asked if it is possible for the first machines built to retain their certification with new plant receiving what is left over.
	  ○ The Chair noted the complexity of the Network Access Quantity (**NAQ**) model for which the treatment of existing against new facilities has been analysed extensively with the result that a new facility becomes an existing facility upon connection.
	  ○ Mr Robinson added that the analysis indicate that the effect of new entrants is relatively small and does not warrant the complexity of differential treatment.
	• Mr Schubert commented that the weather patterns that cause the stress events are very well known and predictable and noted that looking more at the typical weather patterns and synoptic charts for particular days might help with the analysis but would add complexity.
	• Mr Robinson noted that the analysis of the methods for individual years indicates that the allocation of the fleet ELCC to individual facilities under the delta method is closest to the facilities' performance during the 12 intervals with the highest demand in a year (slide 24).
	• Mr Robinson noted that the challenge is to assess contribution to reliability during only a few intervals, while selecting a method that tries to keep volatility low.
	• In response to a question from Ms White, Mr Robinson clarified that the main reason that the results for Collgar Wind Farm are highlighted in red more than other facilities on slide 24 is that it is the biggest facility. This is because only facilities for which actual meter data, instead of expert reports, exists are assessed in the table. He added that there are two aspects driving the outcomes in the table, one is the size of the facility, and the other is that the use of least squares analysis amplifies the differences.
	• In response to a question from Ms White, Mr Robinson confirmed that the concern about the averaging proposed in the	

Collgar method is that the results differ too much from actual facility performance.

- Mr Schubert questioned if determining a weighted average could be an alternative, for example weight the years based on how high the demand is.
  - The Chair noted that this approach could be assessed but would likely add complexity.
  - Mr Robinson considered that weighing the years by peak demand may not create a better outcome. He noted that the concern about reliability is addressed by the approach determining the Fleet ELCC.
- Mr Price asked how firming of intermittent generators is incentivised, given CRC is applied at a technology level.
  - Mr Robinson referred to the consultation paper where applying CRC at a facility level rather than the technology level was discussed.
- Mr Schubert questioned if the allocation of CRC to intermittent generators could be up to a set level; and reserve the remaining CRC for firm and flexible capacity.
  - The Chair acknowledged the comment and explained that this is addressed by the proposed introduction of three Capacity Classes and a flexibility product.
- In response to a question from Mrs Bedola, Mr Robinson confirmed that for the calculation of the annual ELCC for 2018 the demand of a 35°C day was scaled to a hypothetical 42°C day and the intermittent generation was assumed to be as recorded.
  - Mr Schubert noted that the reason a 42°C day has high demand is the wind pattern and added that, as a result, there is no wind in the North Country. He added that weighting the individual years by peak demand would be more representative but also more complex.
- Mrs Bedola agreed that the scaling is a concern. She asked if it is possible to look at high temperature days with lower demand (e.g. weekends).
  - The Chair noted that such an approach had been considered but not pursued due to the high complexity.
  - Mr Robinson added that the issue with creating synthetic high demand days is that the amount of analysis that will be required from AEMO is too high.
- Mr Stevens suggested that AEMO should provide downloadable tools for the calculation of CRC for intermittent generators. Mr Robinson, Ms White, Mr Peake, Dr Shahnazari, Mrs Bedola and Mr Walker agreed.

- Ms White commented that an analytical tool from AEMO would be really useful, as long as it is cost effective to produce.
  - Mr Peake, Mr Andrew Dr Shahnazari and Mrs Bedola agreed.
  - Mr Robinson agreed that that should be considered.
- Mr Stevens commented that the method should be designed so it can be understood, and analysed by investors and asset owners and provide them with reasonable certainty of their future capacity allocations. He expressed concerns that the methods are complex and difficult to explain to investors.
  - Ms White, Dr Shahnazari and Mr Carlberg agreed with Mr Stevens comment.
  - The Chair agreed with Mr Stevens and noted that one of the key principles is that the Method should be simple. However, a simple method does not address volatility, which will also impact reliability and investment, and that the feedback to date was that it is important to avoid volatility.
  - Mr Carlberg agreed with the Chair consideration and that the Fleet ELCC is essential for reliability. He considered that, when allocating the Fleet ELCC to individual facilities it would be best to keep it simple as it will be important to send a clear investment signal to the industry. He added that the analysis indicated that the averaging applied to the delta method still produces a similar output as the pure delta method and therefore may not be worthwhile.
- The Chair noted that it would be difficult to simplify the determination of the Fleet ELCC because this would be a risk to system reliability. However, EPWA will investigate simplifying the allocation of the Fleet ELCC to individual facilities.
- Mr Schubert noted that that perhaps the message for investors is to include firming capacity for the facility.
  - The Chair agreed.
- Mr Carlberg noted his preference for the allocation approach proposed in the hybrid method using a combination of peak LSG and peak demand. He considered that the Delta Method does not provide a clear investment signal about when capacity is needed in future.
- Dr Shahnazari suggested that applying the delta method to facility classes, creating a facility class ratings, would give investors more certainty.
- The Chair noted that the simplest way to allocate the Fleet ELCC to individual Facilities is to base the allocation on performance over the Individual Reserve Capacity Requirement (**IRCR**)

Item	Subject	Action

	intervals in the past five years for each facility. However, that may lead to the volatility issue.
	• Mr Robinson explained that the aim is to incentivise investors to firm up their intermittent capacity. He also explained that facilities are needed most when the margin between available capacity and demand is lowest.
	  ○ Mr Carlberg agreed and noted that the issue is that the reserve margin is only small so often and the times of low margin will be different in future. Therefore, a broader range should be applied to provide investors with more certainty.
	• The Chair noted that the IRCR intervals are readily accessible for investors.
	• Mrs Bedola commented that, when using the IRCR intervals, it is important to consider adjustment for Distributed Energy Resources (**DER**) as well.
	  ○ The Chair agreed.
	• Mr Stevens noted that investments in generation in WA are already complicated for investors and stressed that the method for assigning CRC to intermittent generators must enable investors to understand the range of CRC they can expect.
	• The Chair asked members to provide suggestions how to simplify the method for allocating the Fleet ELCC to individual Facilities.
	• Mr Carlberg reiterated his preference for the Hybrid and the ERA’s Methods. He commented that peak demand and peak LSG are well understood, and that the ERA provided strong rationale for using its proposed method in its 2018 review of the Relevant Level Methodology.
	• Ms White requested to provide comments after the meeting. The Chair agreed and requested comments as soon as possible but by the following Friday at the latest.	

	Action: Members are to provide suggestions by 23 December 2022 on how to simplify the Method for allocating the Fleet ELCC to individual facilities.	**RCMRWG members**
8	**Impact of New Entry** Mr Robinson presented the impact of new entry (slides 28 to 32). Mr Peake acknowledge the analysis on adding new plant as reassuring. There was no further discussions.	
10	**Next Steps** The Chair noted the next steps.	

Item	Subject	Action
11	**General Business** The Chair acknowledged that this was Ms White's last meeting and expressed gratitude for her contributions.	

The meeting closed at 10:30am

Agenda Item 4: RCMRWG Action Items

Reserve Capacity Mechanism Review Working Group (**RCMRWG**) Meeting 2023_02_01

Shaded	Shaded action items are actions that have been completed since the last MAC meeting.
Unshaded	Unshaded action items are still being progressed.
Missing	Action items missing in sequence have been completed from previous meetings and subsequently removed from log.

Item	Action	Responsibility	Meeting Arising	Status
12	RCMRWG Secretariat to publish the minutes of the 24 November 2022 RCMRWG meeting on the RCMRWG web page as final.	RCMRWG Secretariat	2022_12_15	**Closed** Minutes published 6 December 2022
13	Members are to provide suggestions by 23 December 2022 on how to simplify the Method for allocating the Fleet ELCC to individual facilities.	RCMRWG Members	2022_12_15	**Closed**

Government of Western Australia
Energy Policy WA

Reserve Capacity Mechanism Review Working Group

Meeting 2023_02_01

1 February 2023

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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

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1	Welcome and Agenda	Chair	Noting	2 min
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9	General business	Chair	Discussion	2 min

5. Peak IRCR

Goal

To determine a method for Individual Reserve Capacity Requirements (IRCR) for consuming participants that:

1. Ensures that capacity payments are fully recovered from electricity consumers;
2. Allocates costs based on consumers’ contribution to the Reserve Capacity Requirement (RCR);
3. Provides a signal to consumers to amend their electricity use in a way that reduces the RCR;
4. Allows costs to be allocated to new loads added during a capacity year (which may provide no or minimal notice of coming online);
5. Is simple, cost effective, and easy to understand;
6. Ideally aligns with the method(s) used to allocate Certified Reserve Capacity (CRC);
7. Ideally minimises year to year volatility for consumers;
8. Ideally can be replicated by potential investors and other stakeholders; and
9. Is predictable so it incentivises effective management of load during system stress events.

Current IRCR

At present, IRCR is calculated for each meter, for each month.

First, the representative load at the meter is calculated. There are two methods for this calculation, depending on how long the meter has been registered with AEMO (which is a proxy for the duration that meter data is available).

- If the meter was measuring load during the hot season in the previous capacity year (0800 on 1 December to 0800 on 1 April), the representative load is the median load in 12 intervals selected from the previous hot season as follows:
  - For each of the 4 trading days in the hot season with the highest maximum demand in any Trading Interval (defined as Total Sent Out Generation), the 3 Trading Intervals with the highest Total Sent Out Generation.
- If the meter was not measuring load during all of the 12 selected intervals, the representative load is its median load in 4 intervals selected from month n-3 as follows:
  - The four intervals with the highest Total Sent Out Generation from that month;
  - Multiplied by 1.3 if it is a Temperature Dependent Load (TDL) and 1.1 if it is a Non-Temperature Dependent Load (NTDL) – this allows for expected increase in the hot season months; and
  - Prorated to the proportion of the month that the meter measured load.

Secondly, the representative TDLs and NTDLs are summed for each participant, with another ratio applied to account for meters which were present in the previous hot season.

Finally, IRCRs are set to sum to the reserve capacity requirement by allocating to participants in proportion to their total load.

Only Time of Use (TOU) meters are explicitly included. All remaining meters are represented by the “Notional Wholesale Meter”, which is the total generation less demand measured by TOU meters. This is treated as a Temperature Dependent Load.

Issues with current IRCR

The current IRCR method does not consider demand in all system stress intervals.

- Some years, the highest demand intervals are spread across six or seven days. Current IRCR only considers four days in summer.
- Sometimes, system stress occurs in lower demand intervals where lower available capacity means a lower reserve margin. The current IRCR method is based on sent-out generation only.

The peak demand period is expected to become longer and flatter over time. The current IRCR method captures only three intervals on each selected day, which means that IRCR could be calculated based on only part of the peak period.

There is opportunity to amend the IRCR calculation to better align with system stress periods.

Options for IRCR

1. Equivalent firm capacity
2. Ex-ante notification by AEMO
3. Ex-post interval selection based on reserve margin (available capacity minus load)
4. Ex-post interval selection based on peak load (amend current method)

Option 1: Equivalent firm capacity

It is possible to apply an ELCC-like approach at a participant portfolio level as follows:

1. Using historical load, historical intermittent fleet output, and randomized forced outages for firm generation, find the load at which EUE is at a pre-set level.
2. For each participant:
   - Sum all associated loads, resulting in an interval-by-interval demand profile;
   - Subtract the interval-by-interval demand profile from the interval-by-interval historical load;
   - Increase demand until EUE is at the same level it was in step 1; and
   - The participant's Equivalent Firm Capacity is the MW quantity of demand added.
3. Allocate IRCR in proportion to Equivalent Firm Capacity, so that the total IRCR allocated equals the reserve capacity requirement.

IRCR would need to be recalculated daily to account for switching.

This approach would not allow a common set of intervals to be used for CRC allocation.

Option 2: Ex-ante notification by AEMO

Under this option, IRCR would be allocated based on participant offtake in specific intervals.

AEMO would designate specific upcoming intervals as “performance intervals”. Participants would have advance notice, likely between 2 and 48 hours.

This option would give AEMO flexibility to respond to specific circumstances, but it would need to develop procedures to define how it would use this flexibility. AEMO would be restricted to a certain number of days on which it could designate intervals.

This approach would mean:

- Intervals less likely to be designated early in the hot season (as AEMO ‘saves up’ intervals in case of greater need later) and more likely to be designated later in the hot season (as AEMO is freer to ‘use up’ remaining intervals).
- Different numbers of performance intervals in each year.
- Potential for no performance intervals to be called in a mild year.

Option 3: Ex-post intervals by reserve margin

Under this option, IRCR would be allocated based on participant offtake in the intervals with the lowest reserve margin: firm capacity plus intermittent output less demand.

AEMO would publish reserve margin data. Participants would need to monitor this data and judge whether each interval could potentially affect their IRCR allocation, and whether to reduce demand accordingly.

Given that the projected reserve margin can change at short notice based on facility forced outages (which consumers do not have any control over), consuming participants would need to be more responsive to system conditions in order to manage their IRCR exposure.

Over time, this method would be likely to identify more intervals in shoulder seasons than a demand-based method. It would also be less predictable than a demand based method, as historical outage data is less predictive of future outages and fuel supply issues than historical demand data is of future demand.

Option 4: Ex-post intervals by demand

Under this option, IRCR would be allocated based on participant offtake in the intervals with the highest demand.

This option is the closest to the current method, but the definition of intervals used would be amended to better capture the pattern of system stress events in the SWIS.

This option would be more predictable than a reserve margin based method, and over time, would be less likely to identify intervals outside the summer hot season.

Assessing options (1)

Goal	1. Equivalent firm capacity	2. Ex-ante notification	3. Ex-post by reserve margin	4. Ex-post by demand
Capacity payments fully recovered from consumers	●	●	●	●
Allocates costs based on contribution to the Reserve Capacity Requirement (RCR)	●	◕	◕	●
Provides a signal to amend electricity use in a way that reduces the RCR	●	◕	◕	●
Allows costs to be allocated to new loads added during a capacity year	●	●	●	●
Simple, cost effective, and easy to understand	◑	●	◕	●
Aligns with CRC methodology	◑	◕	◕	◕
Minimises year to year volatility	◑	◑	◑	◑
Can be replicated by potential investors and other stakeholders	◑	◔	●	●
Is predictable so it incentivises effective load management during system stress events	◑	◔	◑	◕

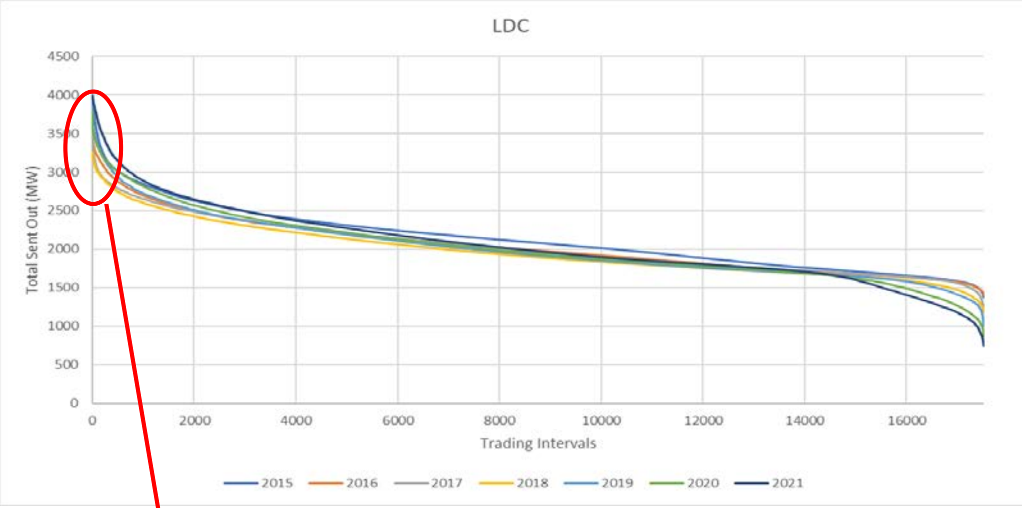
Assessing options (2)

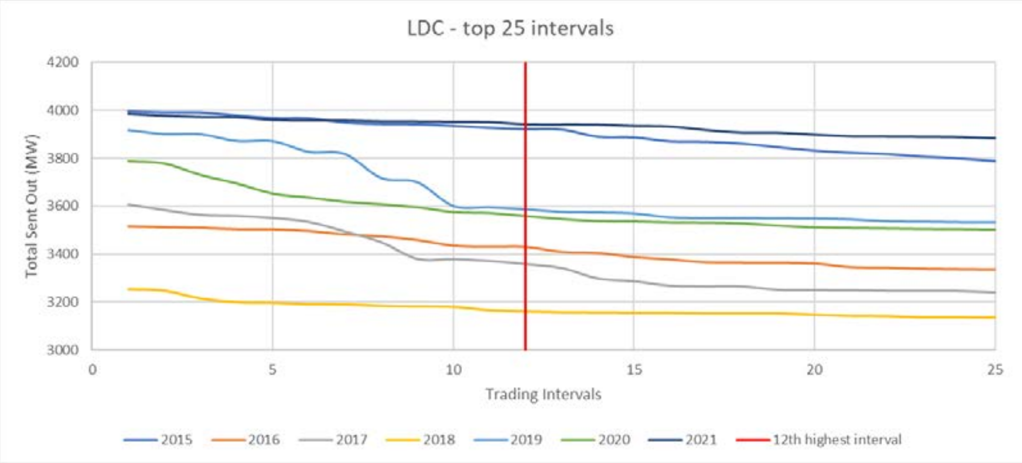
- All options will fully recover capacity payments from consumers, and can account for new loads being added during a capacity year.
- Options 1 and 4 come closest to allocating costs by consumer contribution to the reserve capacity requirement. Options 2 and 3 are less directly related to the way the RCR is calculated, and so the signal they provide is less likely to result in a reduction in the RCR.
- Options 2 and 4 are both relatively simple, while option 1 is the most complex.
- Option 1's ELCC-like calculation is aligned with the fleet portion of the intermittent generation methodology but would not provide intervals to be used in allocating the fleet ELCC across individual facilities.
- With a single year lookback, all methods are likely to have some volatility, but only insofar as consumption profiles are volatile.
- Options 3 and 4 are the easiest for stakeholders to replicate.
- Option 4 should be reasonably predictable, while ex-ante notification would be most difficult to forecast for a future year.

Characteristics of high load periods (1)

- The charts on the right shows the Load Duration Curve (based on total sent out generation) for 2015-2021.
- In most years, the load drops off visibly somewhere between the 5th and 20th interval.
- The table below shows the load in the top 12 TIs.

Trading periods	2015	2016	2017	2018	2019	2020	2021
1	3995	3516	3609	3256	3919	3789	3984
2	3990	3512	3586	3249	3903	3779	3976
3	3990	3510	3566	3217	3902	3731	3972
4	3978	3504	3561	3201	3874	3695	3970
5	3967	3503	3552	3199	3873	3653	3959
6	3966	3497	3536	3193	3828	3636	3957
7	3948	3483	3496	3193	3819	3618	3957
8	3942	3475	3452	3187	3719	3608	3953
9	3941	3460	3382	3184	3701	3596	3952
10	3935	3436	3381	3182	3602	3575	3951
11	3927	3432	3373	3168	3597	3571	3950
12	3921	3431	3360	3163	3588	3559	3941





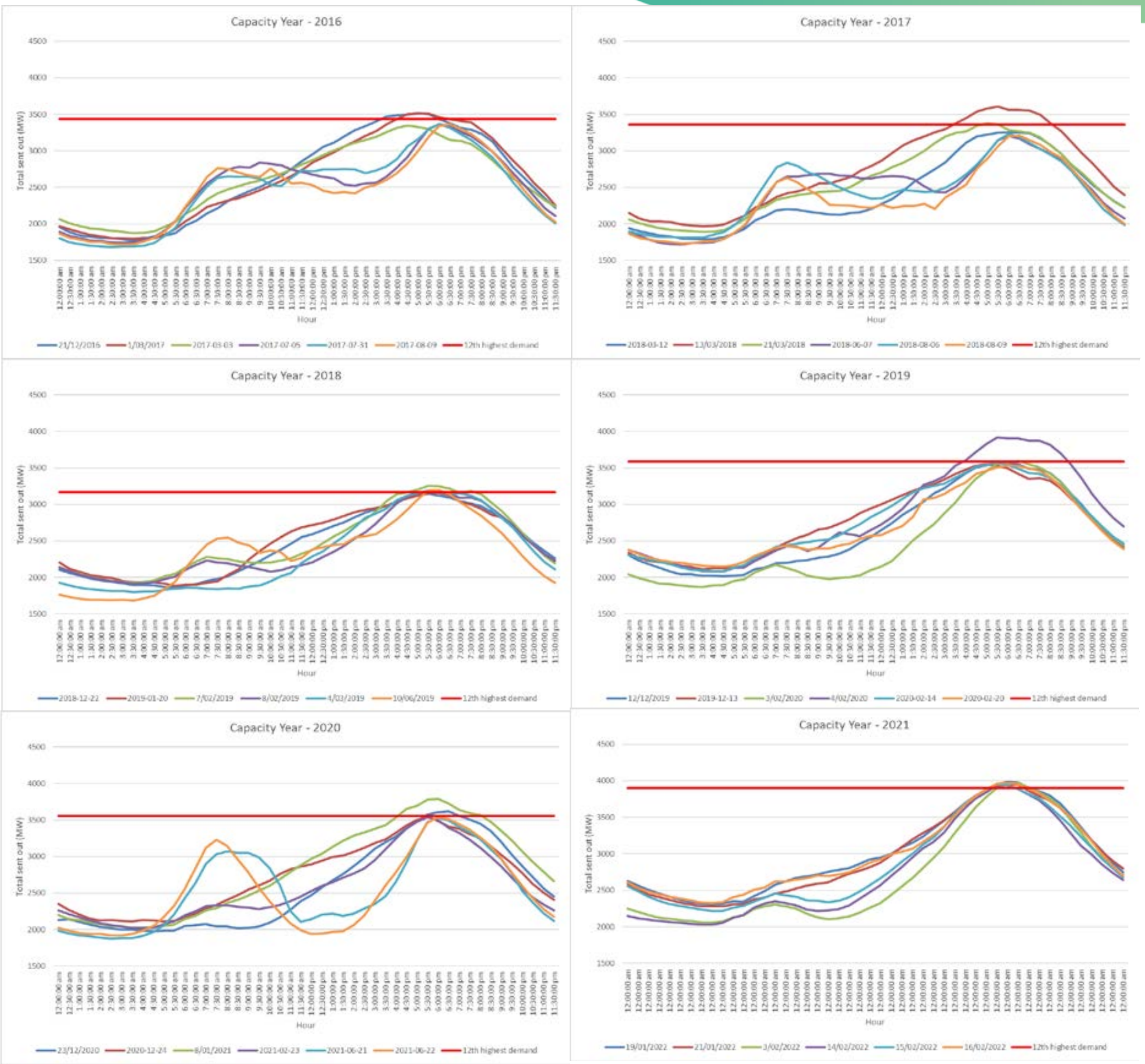
Characteristics of high load intervals (2)

These charts show the six days with the highest peak demand. The red line shows the load in the 12th highest interval.

The shape of the load on the peak demand days varies. For example:

- In CY 2017 and 2019, 10 of the 12 highest load intervals occurred on a single day.
- In other years, there were several days with similarly high levels of load.
- In CY2018, the one winter day had a short spike, while other days had longer, flatter peaks.

Ideally, the IRCR methodology would capture an appropriate set of intervals no matter the load characteristics.



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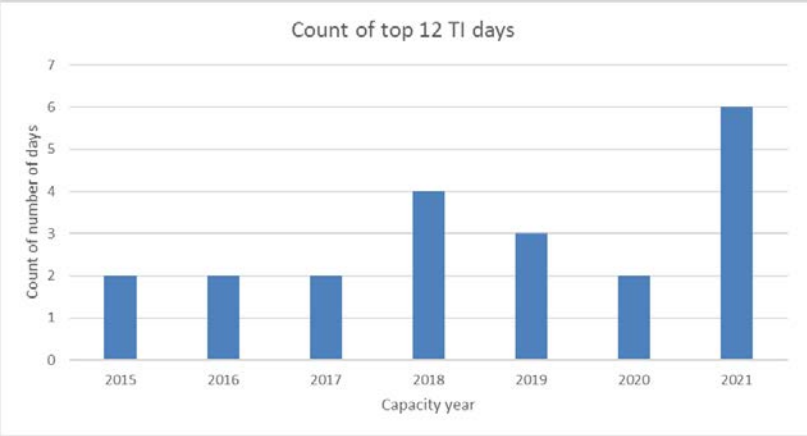
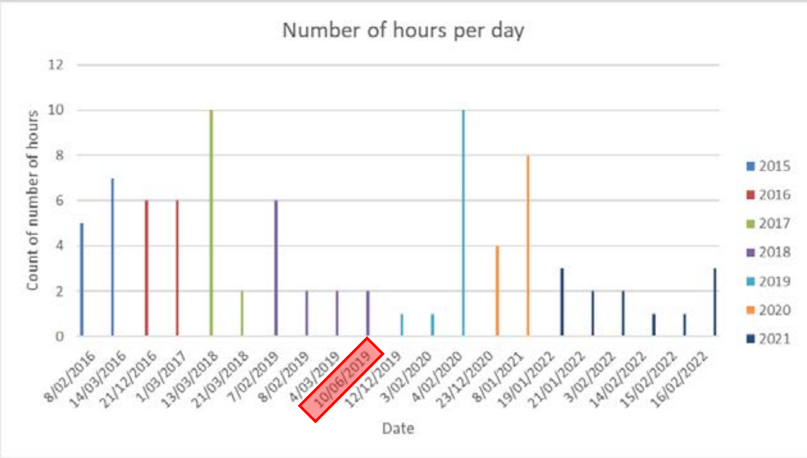
Characteristics of high load intervals (3)

- In 2015, 2016, 2017, and 2020 the peak TIs fall only on two days. In other years, the highest demand periods are distributed over a wider range of days, especially in 2021 where they occur on six different days.
- All peak intervals were experienced in the hot season except for one interval in 2018 (highlighted in red).
- In capacity years 2017 and 2019, ten of the twelve highest demand intervals fell on a single day.





cont.

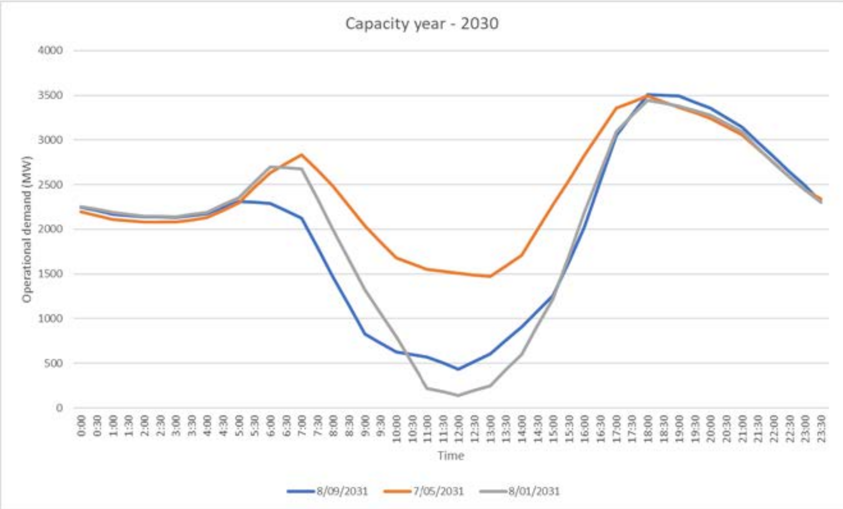
Characteristics of high load intervals (4)

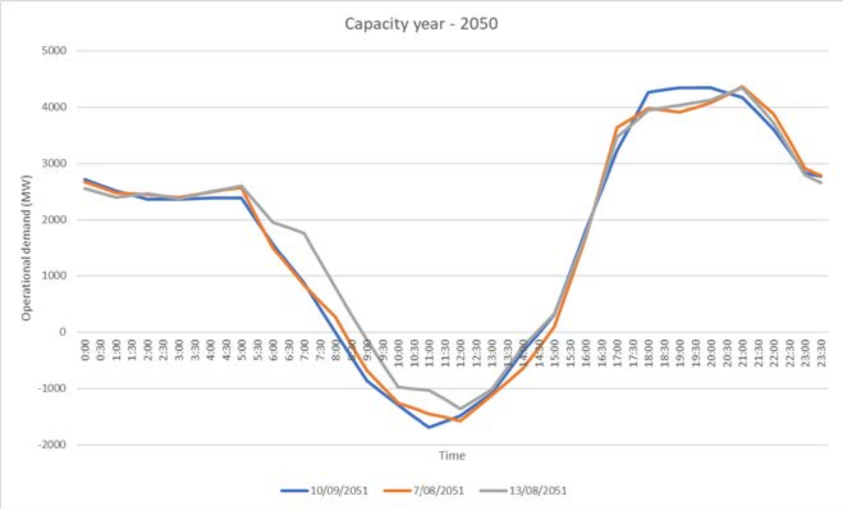
- The table below shows the distribution of peak TIs in the day.
- Most of the peak TIs fall in continuous intervals.
- The peak intervals always fall between 3:30pm and 8:30pm.

Capacity year	2015		2016		2017		2018				2019			2020		2021					
Days	**1**	**2**	**1**	**2**	**1**	**2**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**1**	**2**	**1**	**2**	**3**	**4**	**5**	**6**
3:30 pm			1		1																
4:00 pm		1	1	1	1								1								
4:30 pm	1	1	1	1	1		1						1		1						
5:00 pm	1	1	1	1	1	1	1						1		1						
5:30 pm	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1				1	1
6:00 pm	1	1	1	1	1		1	1	1	1			1	1	1	1	1	1	1		1
6:30 pm	1	1		1	1		1					1	1	1	1	1	1	1			1
7:00 pm		1			1								1	1	1						
7:30 pm					1		1						1		1						
8:00 pm					1								1		1						
8:30 pm													1								

Characteristics of high load intervals (5)

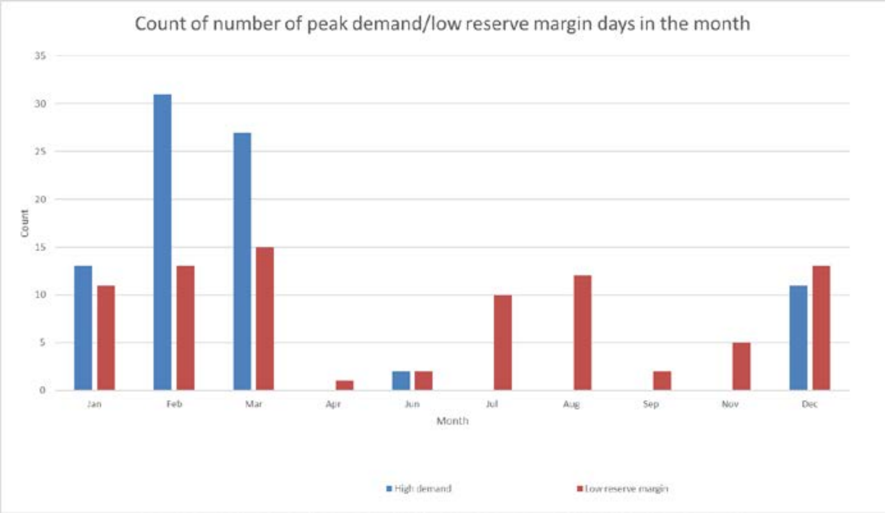
- The charts on the right show the projected load profiles during high demand periods in capacity years 2030 and 2050.
- The peak is expected to get flatter and longer during the evening periods in 2030 and even more so in 2050.
- The IRCR methodology must be robust to these changes.

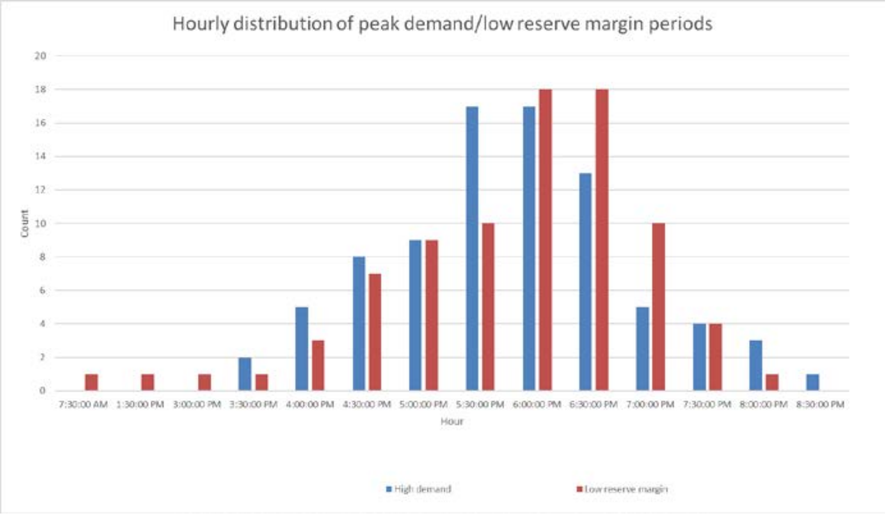




Coincidence of high demand and low reserve margin intervals

- When comparing the top 12 peak intervals with the 12 lowest reserve margin intervals for each capacity year (2015-2021), only **24%** of the intervals are captured by both the methods.
- The peak intervals fall between December and March, while the periods with low reserve margin occur throughout the year. This is because of the seasonal variation of intermittent generation affecting the available capacity for dispatch.
- The peak intervals are distributed between 3:30pm and 8:30pm while some handful of low reserve margin periods fall earlier during the day (7:30am and 1:30pm).
- This highlights the difficulty in predicting low reserve margin intervals ahead of time.





Potential new interval selection rule

Based on the characteristics of the high demand intervals, to ensure the highest intervals are considered and the effects of the extended peak are accounted for, the existing method could be amended as follows:

1. Identify the 12 intervals from the previous capacity year with the highest total sent out generation (SOG).
2. Identify the trading days on which those intervals fell.
3. For each identified day, select:
    a. The interval with the highest SOG;
    b. All other intervals that are in the top 12 intervals;
    c. All intervals between the intervals selected in steps 4a and 4b; and
    d. If fewer than three intervals have been selected, select the next highest SOG intervals on either side of the selected intervals to make up to three intervals.

Participant IRCR must change throughout the year

Loads have different characteristics to intermittent generators:

- Demand profile is more likely to change over time;
- Demand profile is more likely to be volatile;
- There are many more of them, which provides diversity but potentially increases the number of calculations to make;
- Likely to commission frequently at all times of the year; and
- Likely to change ownership (or responsible party) more frequently, including during the capacity year.

This means that a participant's IRCR must be able to change throughout the year, to account for commissioning and ownership changes.

Treatment of new loads

When a load commissions or installs time of use metering during the year, there will not be a record of its load during the selected intervals in the previous capacity year.

As a proxy, the current IRCR methodology uses the highest demand in month n-3 with a multiplier of between 110% and 130%. This introduces considerable complexity into the IRCR process, and requires a separate process to determine the TDL status of a small number of loads each year.

To simplify the process, EPWA proposes to instead use either:

- historical maximum consumption; or
- maximum allowed network offtake as held in standing data.

The notional wholesale meter would continue to have a ‘new’ component based on non-interval meter growth, but the median notional wholesale meter would be based on load in the relevant hot season intervals.

Reference period

The current IRCR approach uses a single year of data to determine IRCR. This contrasts with approaches explored for CRC allocation, in which multiple years of data were assessed to manage volatility and capture infrequent system stress events.

Use of multiple years of data is appropriate for CRC allocation, where intermittent generators have limited control of their output.

Because loads have more control of their consumption, there is less need to look back multiple years to avoid volatility. Using multiple years would also smooth out the consequences a participant faces from failing to respond in a single year.

EPWA proposes to retain a single year lookback for IRCR determination, while using a five year period for CRC allocation.

6. Flex IRCR

Options for flex IRCR

The reserve capacity requirement for Flexible capacity is proposed to be set based on AEMO's forecast of the highest expected system ramp in the relevant capacity year. The shape of the load drives the Flex RCR.

There are two main options for determining IRCR for flexible capacity product:

- Option 1: Use the peak IRCR. That is:

  Flex IRCR = Peak IRCR * (Flex RCR / Peak RCR)

- Option 2: base the Flex IRCR on a load's expected share in the steepest ramp using historical data to calculate participant contributions to high ramping situations.

Option 1 would be simple to implement but would not provide an incentive to participants to reduce their contribution to the evening ramp.

Option 2 would be more complex to implement, but would provide that incentive.

Proposed method for IRCR for flexible capacity

1. For each day in the previous capacity year:
    a. Find the trading interval with the highest ramp up rate;
    b. Select the interval adjacent to the interval identified in step a with the highest ramp rate;
    c. Repeat step b until [eight] intervals have been selected; and
    d. Find the difference between the total system load at the start of the earliest selected trading interval and the load at the end of the latest selected trading interval.
2. Find the [four] days with the highest total difference in MW in step 1d.
3. For each participant load portfolio, and each day selected in step 2, calculate the facility ramp contribution as the difference between consumption at the start of the earliest selected trading interval and the end of the latest selected trading interval.
4. Calculate scaling factor R as the Flex RCR divided by the sum of all facility ramp contributions.
5. For each participant load portfolio, set the Flex IRCR as the facility ramp contribution multiplied by the scaling factor.

The flex IRCR could be recalculated daily to account for switching and new loads.

7. DSP CRC

Options for DSP CRC

Currently each DSP is allocated CRC based on the lower of:

- the aggregate IRCRs of its Associated Loads; or
- its historical 95% POE consumption during the 200 intervals with the highest generation.

The CRC allocation needs to be performed ahead of time (so AEMO can be sure of having sufficient capacity), as it is for generators, rather than being assessed during the capacity year.

The same value is used as the benchmark for DSP dispatch. That is, a DSP is required to reduce its consumption from its “Relevant Demand”, which is the 95% POE consumption during the top 200 intervals.

This method favours a flat load profile, significantly muting the incentive for loads with a variable profile to participate in the market, as noted in RC_2019_01.

There are three options for allocating DSP CRC that align with the IRCR and intermittent generation CRC methods identified to date:

1. Using an ELCC approach (either by fleet or individually)
2. Based on load in historical IRCR intervals.

A third option is to have the DSP proponent nominate a CRC, accompanied by evidence that there is sufficient load associated with the programme to deliver that CRC at expected dispatch times.

Option 1: determining DSP CRC by ELCC

Applying an approach similar to the ELCC approach that to be used for intermittent generators could allow more effective participation by a wider range of loads, while increasing consistency of incentives to perform across all types of participant.

The ELCC could be calculated for each DSP individually, or as a fleet with fleet ELCC allocated to individual DSPs based on their available curtailment in the same intervals used for IRCR. A fleet approach may be less appropriate given the different operating constraints of loads vs generators.

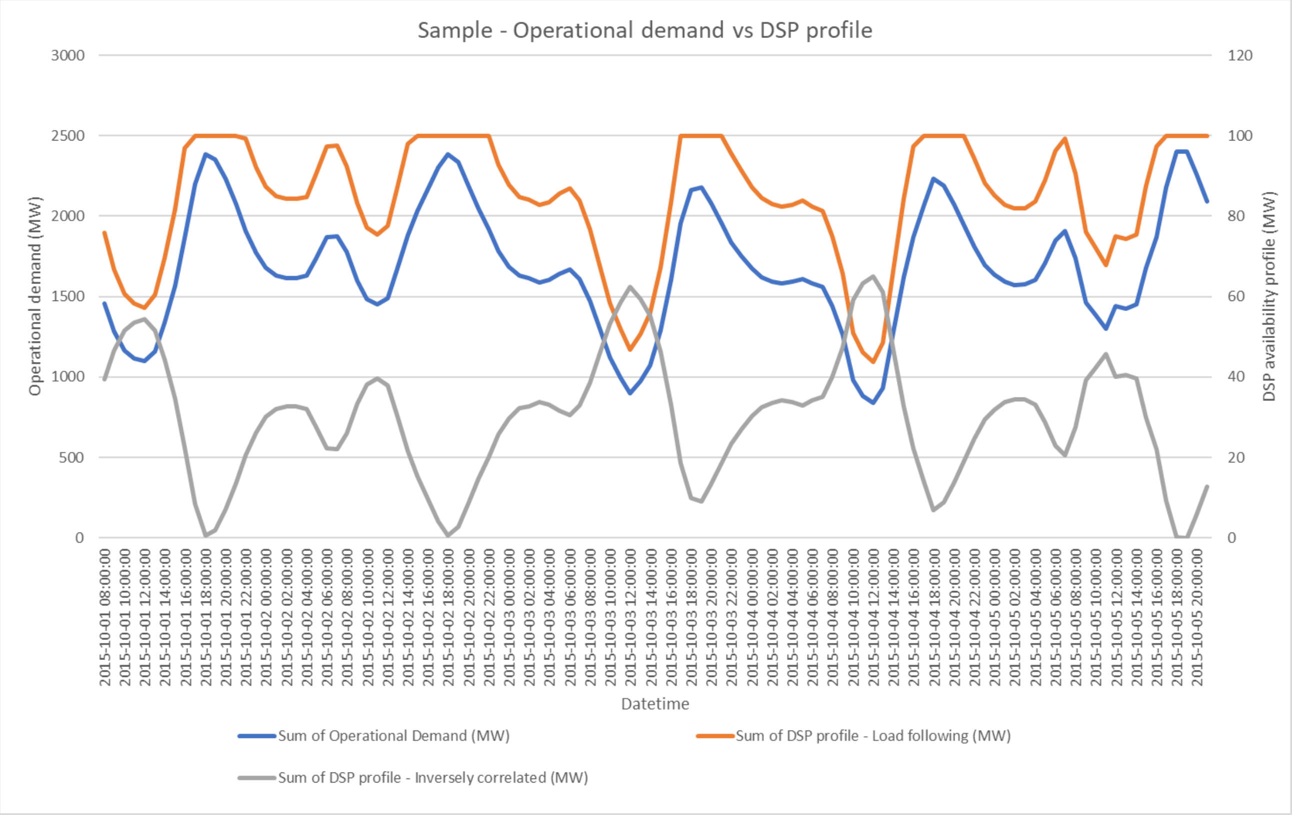
The overall contribution of registered DSPs to system reliability can be assessed in the same way as intermittent generators:

1. Using historical load and historical intermittent fleet output (adjusted for DER penetration, DSP dispatch, ***and NCESS minimum load support***), find the load at which EUE is at a pre-set level.
2. For each DSP, identify available curtailment in each interval in the previous capacity year.
3. Adjust historical load trace to subtract available DSP curtailment.
4. Increase load until EUE is the same as it was in step 1.
5. Added load (MW) = DSP ELCC.

Option 1: Application to different DSP profiles (1)

To assess the potential CRC for DSP of different types, a 100 MW portfolio is introduced into the system with three different profiles

- **Flat** – DSP can provide 100 MW curtailment at all times.
- **Load following** - DSP can provide 100% of its availability when system load is above 80% of maximum. Below 80%, DSP's ability to curtail is proportional to the shape of the load.
- **Inversely correlated** – Available curtailment is inversely correlated to the shape of the load.



Option 1: Application to different DSP profiles (2)

- As expected, a DSP with constant availability would have ELCC equivalent to firm capacity.
- A DSP where maximum available curtailment is correlated with peak demand would have an ELCC close to 100% of its maximum available curtailment. This is because some of the UE intervals fall over the shoulder periods.
- A DSP with an inversely correlated shape would have an ELCC of 0 as it is not available to curtail during system stress intervals. Such a fleet could help with minimum demand issues, but this would be recognised outside the RCM.

	ELCC allocation (MW)		
Scenario	**Flat**	**Load following**	**Inversely correlated**
2015	100	99.5	0
2016	100	100	0
2017	100	98.4	0
2018	100	99.5	0
2019	100	100	0
2020	100	100	0

Option 2: Determine DSP CRC based on IRCR intervals

Under this option, DSP CRC levels would be set based on median consumption in the same intervals used to determine IRCR. In the language of RC_2019_01, this is an “X of Y” method, where the Y is the previous capacity year (a single year lookback is sufficient for the same reasons as for IRCR) and the X is the intervals selected from that year.

This approach would mean a direct balance between a participant’s incentives to minimise IRCR (by having low load at times of system stress) and maximise DSP CRC (by having high load at times of system stress that can then be curtailed).

This approach would not account for synergies or antagonisms between the load profiles of different DSPs.

Option 3: Participant nominated CRC

Under this option, the responsible participant would nominate a performance level for the DSP – the MW of load response it commits to providing when called.

Historical load data would not be used directly to set the CRC level, but the participant would need to show evidence that it has sufficient associated load to deliver the nominated reduction, and this would be confirmed through reserve capacity testing.

Alternatively, DSPs consisting of a small number of large industrial loads could be assessed by one of the other methods, and option 3 applied only to aggregations of multiple smaller loads, particularly where the associated loads are likely to change from year to year.

DSP dispatch, performance, and refunds (1)

When a DSP is dispatched, its performance is currently measured against a static baseline called the Relevant Demand, which is set in advance, and represents the level of demand against which the programme is curtailed.

This approach could clearly be continued under option 2 or 3, as there is a specific quantity of demand expected in specific intervals.

An ELCC approach could potentially see a load credited for good performance weighted outside the specific highest demand intervals, so there is no longer a direct mapping from CRC to dispatch baseline – in some intervals the expected load will be lower, but the contribution to system reliability overall remains at the higher level.

Nevertheless, the expected curtailment could still be set at the CRC level, on the assumption that ELCC performance aligns with performance at expected dispatch times.

DSP dispatch, performance, and refunds (2)

All three options would also work with a dynamic dispatch baseline, where curtailment is measured against a counterfactual derived from consumption in similar and surrounding intervals, calculated closer to real time.

Under this approach, the dispatch in any particular interval could be more or less than the CRC value.

Amendments to the refund regime would be needed. These may include:

- Prorating non-performance refunds (4.26.2D) by the ratio of dispatched MW to CRC, and applying the same dynamic multiplier as used for other refunds
- Considering removal of under-procurement refunds in 4.26.1A(a)(ii)(6) and 4.26.6(d)(ii), with under-procurement of load instead managed by RC testing and subsequent reduction in CRC level (either in the current year or in the following CRC allocation process).

Other aspects of DSP participation in the RCM

- The current DSP CRC allocation approach allows participants to nominate specific intervals as maintenance intervals, and have those excluded from the CRC assessment. The new approach would remove this activity to ensure allocation is based on actual availability at times of need.
- Where a participant has both load and storage at a single location, the site could choose to participate as part of a DSP if the storage were small enough to not require registration. Otherwise it could participate in the RCM as a Capability Class 2 Facility.
- Where a participant has both load and intermittent generation at a single location, the magnitude of potential injection would determine whether the site could participate in the RCM as part of a DSP or whether it would need to be registered as a Capability Class 3 facility.

Assessing options

Options 1 and 2 would better align DSP incentives with those provided by IRCR and intermittent CRC processes, but only for DSPs where historical load is a good predictor of future availability for curtailment.

Option 1 – DSP ELCC:

- Would allow more nuanced assessment of loads with widely varying profiles
- If done at fleet level, would allow synergies to be assessed
- Would necessitate changes in downstream dispatch and refund mechanisms

Option 2 – IRCR intervals:

- Would balance incentives for IRCR and DSP CRC
- Would not account for synergies between different DSPs
- Would be compatible with but not require changes in downstream mechanisms

Option 3 – nominated performance levels:

- Is more robust to potential ex-post cherry-picking of unpredictable load
- Would be compatible with but not require changes in downstream mechanisms

8. Next steps

Next Steps

- Financial analysis (as part of overall assessment of package)
- Consultation paper
- Questions or feedback can be emailed to energymarkets@energy.wa.gov.au

9. General Business

We're working for Western Australia.