



## Minutes

<b>Meeting Title:</b>	Cost Allocation Review Working Group (CARWG)
<b>Date:</b>	2 May 2023
<b>Time:</b>	1:00pm – 2:40pm
<b>Location:</b>	Microsoft TEAMS

<b>Attendees</b>	<b>Company</b>	<b>Comment</b>
Dora Guzeleva	Chair	
Donna Todesco	AEMO	
Mena Gilchrist	AEMO	Observer
Toby Price	AEMO	Observer
Nicholas Nielsen	AEMO	Observer
Oscar Carlberg	Alinta Energy	
Tom Froud	Bright Energy	
Jake Flynn	Collgar Wind Farm	
Paul Arias	Shell Energy	
Tessa Liddelow	Shell Energy	
Noel Schubert	Small-Use Consumer Representative	
Genevieve Teo	Synergy	
Jason Froud	Synergy	
Daniel Kurz	Summit Southern Cross Power	
Mark McKinnon	Western Power	
Grant Draper	Marsden Jacob Associates (MJA)	Presenter
Stephen Eliot	Energy Policy WA (EPWA)	
Shelley Worthington	EPWA	

<b>Apologies</b>	<b>From</b>	<b>Comment</b>
Cameron Parrotte	Woodside	
Tom Geiser	Neoen	

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1	<p><b>Welcome and Agenda</b></p> <p>The Chair opened the meeting at 1:00pm.</p>	
2	<p><b>Meeting Apologies/Attendance</b></p> <p>The Chair noted the attendance as listed above.</p> <p>The Chair noted the competition law obligations of CARWG members.</p>	
3	<p><b>Minutes of CARWG Meeting 2023_03_21</b></p> <p>The minutes of the CARWG meeting held on 21 March 2023 were accepted as a true and accurate record of the meeting.</p> <p><b>Action: The CARWG Secretariat is to publish the minutes of the 21 March 2023 CARWG meeting on the Coordinator’s website as final.</b></p>	<p><b>CARWG Secretariat</b></p>
4	<p><b>Action Items:</b></p> <p>The CARWG took the paper as read.</p> <p>The Chair noted that Neoen had not provided a response on Action Item 13.</p> <ul style="list-style-type: none"> <li>• Ms Gilchrist noted that AEMO provided a response on Action Item 14, indicating that AEMO does not yet have significant experience with Electric Storage Resources (ESR) and would require more time to develop a response.</li> <li>• Mr Price indicated that this would require detailed data analysis. This Action Item was closed.</li> </ul> <p>The Chair noted that AEMO had not provided a response on Action Item 15.</p>	
5	<p><b>Timeline and Purpose</b></p> <p>Mr Draper went through the project timeline and indicated that the intent is to implement the outcomes the review by 1 October 2025 because AEMO has a lot to do before then with the new market start.</p> <p>The Chair added that October 2025 also aligns with the timing for commencing five-minute settlement.</p> <p>Mr Draper indicated that the purpose of the meeting was to address the final proposals for allocating Frequency Regulation, Contingency Reserve Lower, Contingency Reserve Raise and Market Fees.</p>	
6	<p><b>Final Design</b></p> <p><b>(a) Frequency Regulation – Amended WEM Deviation Method</b></p> <p>Mr Draper outlined the previous proposals for the WEM Deviation Method and the concerns that had been raised with those proposals, including that:</p>	

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- measuring deviations over a 30-minute period is inconsistent with five-minute dispatch; and
- the WEM Dispatch Engine (WEMDE) will provide the information to set five-minute dispatch targets for Scheduled Facilities and Semi-Scheduled Facilities that provide Essential System Services (ESS), but not for Semi-Scheduled Facilities or Non-Scheduled Facilities.

Mr Draper indicated that the revised proposal is to modify the WEM Deviation Method to:

- apply to a 5-minute Dispatch Interval;
- use the WEMDE data to set the targets for Scheduled Facilities and Semi-Scheduled Facilities that provide ESS; and
- use forecasts determined by AEMO to set the targets for Semi-Scheduled Facilities and Non-Scheduled Facilities, but allow Facility operators to provide their own forecast.

Mr Draper advised that AEMO indicated that it would want to exclude Scheduled Facilities that provide regulation services. Mr Draper suggested that this makes sense and that a procedure would be needed to also exclude primary frequency response provided by Facilities.

Mr Draper indicated that the revised WEM Deviation Method is similar to the Forecast Range Method that was outlined in the Consultation Paper, which was published on 15 December 2022, but addresses some of the gaming concerns identified with that proposal.

- Mr Frod asked what AEMO would do if it does not believe that a Non-Scheduled Facility is forecasting accurately – would they apply their own forecast or challenge the Non-Scheduled Facility.

The Chair indicated that AEMO will develop its own forecasting capability and will use its forecast for:

- scheduling and dispatch, to maintain system security and reliability; and
- allocating Frequency Regulations costs, unless the Facility provides a forecast, in which case AEMO would:
  - still use its own forecast for scheduling and dispatch; but
  - use the Facility's forecast for allocating Frequency Regulation costs.
- Mr Carlberg indicated that he supports the option for central forecasting and the option for Facilities to provide forecasts.
- Mr Carlberg asked how complying with a five-minute Dispatch Instruction would flow through to a reduced Frequency Regulation requirement. Mr Carlberg suggested that a wind

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farm is not going to have the same impact on the regulation requirement as rooftop solar.

The Chair indicated that there will be no changes to the dispatch rules, and that the method is just using an implied target against which the deviations are measured.

- Mr Carlberg indicated that he wants to be sure that getting participants to more closely comply with a five minute dispatch target will reduce the Frequency Regulation requirement.

The Chair indicated that the idea is that participants will try to reduce their volatility if they are given a financial incentive to do so.

- Mr Carlberg asked how this factors into the frequency keeping requirement and if it is fair across different technologies in terms of how they contribute, because wind would contribute less than rooftop solar. Mr Carlberg also asked about the contribution of loads.

The Chair indicated that wind and solar would be treated in exactly the same way.

Mr Draper indicated that previous analysis found that wind was the biggest contributor amongst generators, at about 26%, and large scale solar contributed about 10%; while loads (which implicitly incorporate behind-the-meter solar) contributed about 50%.

- Mr Froud asked whether deviations of actuals from an unconstrained injection forecast for a Semi-Scheduled Facility will be used to determine its contribution, and what happens if a constraint is applied that affects the Facility's actuals.

The Chair indicated that a Facility may be constrained from time-to-time, but its unconstrained injection forecast would be used to measure its overall contribution.

- Mr Froud asked how the deviations and the cost associated with those deviations would be applied to a Semi-Scheduled Facility if AEMO provides an unconstrained injection forecast but it turns out that a constraint is applied.
- Mr Price indicated that the constrained target would replace the unconstrained target.

The Chair noted that slide 9 is not clear on this – it should say that a Facility's deviation will be measured on the constrained target if the Facility is constrained.

Mr Draper noted that the Consultation Paper indicated that a cost-benefit assessment would be undertaken of the WEM Deviation Method and presented a high-level qualitative assessment (see slides 11-17) indicating that:

- implementation costs are likely to be relatively modest; and
- benefits are likely to be substantial because adopting a causer-pay approach will help reduce Frequency Regulation requirements (the introduction of intermittent generation has

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driven substantial LFAS increases, which will continue and could lead to costs of up to \$43 million/year by 2026/27).

The Chair asked Mr Carlberg if he is questioning the validity of the assumption that variability of generation on the system drives the requirement for Frequency Regulation.

- Mr Carlberg indicated that this is what he is questioning.
- Mr Carlberg indicated that he wants to understand how generators following dispatch targets more closely will translate to a lower frequency keeping requirement. Mr Carlberg suggested that rooftop solar would set the frequency keeping requirement, so it is not clear how it will help if wind farms get closer to forecast.

The Chair indicated that wind farms will not pick up a big proportion of costs if they are not contributing to volatility.

- Mr Carlberg questioned how AEMO will reduce the frequency keeping requirement if a Facility starts following its implied targets more closely.
- Mr Price indicated that AEMO has not yet fully consulted on its ESS Quantity WEM Procedure, but there is not a linear relationship between the volatility of any one Facility and the amount of regulation required. However, all generation and load that does not do what is expected will contribute to the overall risk of demand not equaling supply, which will drive the quantity of regulation that is needed. Given the expectation that the system will have a large proportion of intermittent generation in the future, a causer-pays approach is a reasonable construct to incentivise more accurate forecasting and delivery.
- Mr Carlberg asked if it is equitable to have wind farms pay more.

The Chair indicated that solar will pay more if it has higher proportion of deviation from implied targets and has a higher penetration in the market. The WEM Deviation Method will account for which Facilities contributed to the deviation.

Mr Draper indicated that the 50/50 allocation of costs between generation and load that was illustrated in the Consultation Paper was based on historic data. More of the Frequency Regulation costs will shift to loads if wind farms and solar get better at meeting their forecasts.

- Mr Flynn indicated that:
  - the chart on slide 14 was based around the fact that AEMO forecasted that it would need more ESS when Badgingarra and Yandin came online, but AEMO did not end up needing those services, and solar was the main driver in increasing the ESS requirement;

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- the ERA could not account for the actual increase in the wind generation and the extent to which this was driving increases in ESS; and
- while AEMO had forecasted that it needed more ESS services due to the increase in wind generation, this has not turned out to be the case.

The Chair indicated that the WEM Deviation Method will properly account for this – if wind is not contributing to the deviations, the WEM Deviation Method will allocate more costs to solar, and vice versa if solar is less volatile. Percentages would not be specified in the WEM Rules.

Mr Draper indicated that causer-pays factors would be based on the deviations – Facilities will pay less if the deviations are small because of better forecasting by AEMO or by the Facilities themselves.

The Chair indicated that a direct parallel should not be drawn between the contribution of each Facility to the overall volatility on the system and AEMO’s setting of the requirement for frequency response.

- Mr Price agreed with this.
- Mr Froud asked how a Market Participant that has about 400,000 customers with rooftop PV would be treated.

Mr Draper confirmed that they would be treated as a load, which will be allocated the residual contribution, and that they will bear more Frequency Regulation costs if intermittent generators improve their forecasts.

- Mr Froud asked:
  - how its contribution would be accounted for if the Market Participant installed storage to offset the volatility from the residential customers; and
  - does the storage have to be co-located with the asset or can it be in another place and, if so, how is that going to be accounted for.

The Chair indicated that:

- as long the Notional Wholesale Meter concept exists, there is no other way to measure the residual contribution of the relevant loads; and
- the WEM Rules do not allow the registration of hybrids for which one part of the Facility is connected at one connection point and another part is connected at a different connection point in the network.
- Mr Froud noted Mr Draper’s comment that the WEM Deviation Method might provide an incentive for facilities to install storage, but presumably this would be a behind-the-meter storage.

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- Mr Froud indicated that a battery that is configured to load follow will reduce regulation costs to the market.

The Chair noted that the WEM Rules do not have the concept of load following by a battery that is not on the same site.

- Mr Schubert noted that, ideally, any generator should be able to contract with storage anywhere on the network to manage their volatility.
- Mr Schubert noted, however, that storage will likely be charging to be ready for the next peak or will be used for ESS, it will not likely be initially used for load following.

The Chair indicated that this concept can be considered in future market reforms and noted that people can contract outside of the market to share the benefit of reduced volatility.

- Mr Carlberg noted the comments that, if all of the renewable generators performed well, then more costs would go to loads, and asked how that would work (i.e. how are the contributions calculated).

Mr Draper indicated that the contribution of loads is calculated as a residual – the causer-pays factors are calculated for all generators and the residual is allocated to loads.

- Mr Froud asked if there is there any incentive on Western Power to address network constraints.
- Mr Price noted clause 4.5B.4 of the WEM Rules:

*A Transmission System Plan must include:*

- (a) *a summary of any significant costs to the Wholesale Electricity market that may have arisen, or may potentially arise, due to the condition of the transmission network, including:*
- i. binding Network Constraints, and the estimated market costs of those binding Network Constraints; and*
  - ii. the frequency and magnitude for Energy Uplift Payments, including for Facilities subject to Network Constraints;*

- Mr Froud asked if there was a reason why AEMO has not had to procure more ESS due to wind generation.

The Chair indicated that she is not sure that minimum frequency keeping has increased.

- Mr Price indicated that he cannot provide a firm answer, and that there are a lot of differences between the NEM and the WEM. Therefore, it would be difficult to apply the lessons from the drivers for increased LFAS versus regulation, but this will be a lot easier after new WEM commencement.

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**(b) Contingency Reserve Lower – Amended Allocation Method**

Mr Draper provided context for the proposal for allocating Contingency Reserve Lower costs. Mr Draper noted that there was concern that major new loads would enter the system and that the requirement for Contingency Reserve Lower would increase significantly from 90MW (to account for the largest current load).

Mr Draper noted that MJA had looked at 12 months of data from the Lake Bonney energy storage system reliability report, which indicated that batteries themselves had a low outage factor. However, there was still a network connection outage risk, and the associated costs needed to be managed.

Mr Draper noted that representatives from Neoen had raised a late concern that the proposal would deter the entry of new storage systems that was required to firm up renewables.

Mr Draper noted that MJA had assessed the methodology to ascertain whether the cost burden on the first one or two batteries could be reduced, focusing on the network outages rather than the facility outages of a battery. The modelling (see slide 21) was undertaken on Contingency Reserve Lower cost allocation for new Facilities under three cost recovery options to determine the implications:

- Option One – the current allocation method (prorating);
- Option Two – the runway method above a threshold (120MW) and prorating below the threshold, with separate allocation of facility and network risks; and
- Option Three – runway method above a threshold (120MW) and prorating below the threshold, but only allocating according to the facility risk (the option identified by CARWG on 21 March 2023).
- Mr Frod asked if there was any incentive on the network operator to address network risk.

The Chair responded that the WEM Rules provide a direct incentive to Western Power to ensure that it takes market outcomes into account in its transmission planning activities, to assess the market impacts of constraints.

Mr Draper indicated that, under Scenario 1 (slide 21) under Option One, small customers (Synergy) would pay close to 50% of the Contingency Reserve Lower cost because of the amount of energy consumed. He added that the allocation under Options Two and Three was quite similar, with the first battery bearing the majority of the cost, almost 60%.

Mr Draper noted that, under the runway method, significant costs were going to participants causing the higher requirement for Contingency Reserve Lower, whether this was caused by a facility or network risk, and that this reflects the causer-pays principle.



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	<p>Mr Draper noted that, under Scenario 2 (slide 23), the impact was smoother using Option 2, with the first battery attributed a lower contribution than the two other batteries that were located on the same network component and, therefore, posing more risk to the system.</p> <p>Mr Draper noted that, as recommended in the Consultation Paper, EPWA considers that Option 2 is the most appropriate as it provides the right signals to not locate batteries on the same network element. He added that other incentives are provided for in the WEM Rules for Western Power to consider the implications of large load or battery connecting to the network.</p> <p>The Chair noted that it was unfortunate that a Neoen representative was not present to provide comment, as it had previously raised the most concern with this proposal. The Chair noted that the main objective of the proposal was to ensure that proponents considered the implications, and to not connect very large loads through a single connection but to try and separate the loads into component parts to lower their impact on the Contingency Reserve Lower requirement.</p> <p>The Chair noted that the WEM would be the first in the world to introduce the runway method for Contingency Reserve Lower.</p> <ul style="list-style-type: none"> <li>Mr Schubert noted that, if the battery is charging during the middle of the day when there is a lot of solar, and the battery trips, the frequency will go up which will automatically be matched by reducing solar output. However, if the battery is charging during the night, that automatic response from solar would not occur.</li> </ul> <p>The Chair noted that there was some ability to mitigate a trip of a large load but that instantaneously tripping large loads has consequences.</p> <ul style="list-style-type: none"> <li>Mr Schubert noted that solar PV would go off automatically, depending on inverter settings, and that this would not happen all at once unless you had a huge frequency increase.</li> </ul> <p>The Chair noted that, while this is probably true, AEMO would still keep a load rejection reserve to cover the trip. She sought clarification from AEMO that its requirement for load rejection reserves would be the same no matter what, i.e. that AEMO would continue to carry 70% of the largest load.</p> <ul style="list-style-type: none"> <li>Mr Price noted that AEMO has flexibility under the new WEM Rules. Mr Price added that the ESS quantity procedure would map out how AEMO would set the load rejection reserve requirement and that there is plenty of opportunity to reflect positive and negative system conditions under that framework. That is, the presence of distributed PV exacerbating one type of contingency and potentially benefiting another can be reflected, and the result may not be a linear percentage of the largest risk.</li> </ul>	

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There were no further comments from the CARWG.

**(c) Market Fees –Energy Storage Resource Cost Recovery**

Mr Draper noted that there had been concerns around the impact for ESR if fees were charged on both their discharge and recharge, and effectively overcharging batteries relative to other technologies.

Mr Draper noted that AEMO’s current approach in the NEM is to recover fees based on both ESR imports and exports. He noted that EPWA had revised its proposal, and was proposing to similarly allocate Market Fees to ESR based on both imports and exports. This would keep all technologies consistent and take into account emerging hybrid technologies.

The Chair noted that the CARWG had concluded that Market Fees do not influence behaviour, so excluding withdrawals from the allocation Market Fees to ESR will not influence decisions, but would increase complexity and cost to administer the arrangements.

There were no further comments from the working group.

**(d) Contingency Reserve Raise – Treatment of Facilities with multiple connections under the Runway Method**

Mr Draper noted that wind farms or solar farms with a separate set of inverters and separate network connections have a lower risk of losing their total output.

Mr Draper noted that there had been discussions as to whether the WEM Procedure should be amended to give AEMO the flexibility to separately treat the units within such a Facility for the purposes of the Runway Method, so that AEMO does not overinflate the Facility risk value.

Mr Draper noted that clarification was required as to whether AEMO considered this a significant issue and whether there were currently any existing Facilities that would benefit if such a change were made.

- Mr Price noted that there are Facilities in the SWIS with multiple connection points and therefore the units would have separate risks, but that this may not be as simple as reducing the risk by half.
- Mr Price noted that the calculation of Credible Contingencies is complex – the procedure is dynamic because it changes with network and weather conditions. AEMO does not consider that it would be appropriate to have a causer-pays structure that tried to mimic the largest Credible Contingency assessments undertaken by AEMO at an engineering level.
- Mr Price noted that Collgar’s Facility had been raised previously as an example and it has two connection points. AEMO would need to have the Facility’s design to be able to assess the risk at each connection point.

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- Mr Price noted that AEMO will need to be able to assess its largest risk, and unless it has information about what each connection point is going to deliver, it would be difficult for AEMO to determine the actual largest contingency.

The Chair noted that AEMO had advised that it believes that there were currently no Facilities:

- configured in a manner which makes the units completely independent in practice; and
  - that would benefit from a change such as what has been proposed, but that a change would be necessary at some point.
- Mr Price recalled that statements were made that the largest risk would determine the quantity of the Contingency Raise service and that, from a market perspective, everything with a smaller risk was just about cost allocation. Mr Price noted that AEMO do not believe that that there is a Facility with two connection points that would otherwise set the largest contingency which, due to this change, would no longer be the largest contingency.

The Chair responded that the Appendix 2A treats Facilities as a single block under the Runway Method. The issue is that there may be circumstances where the Facility with more than one connection is configured in a way that the units behind the connection points operate independently and should be treated independently for the purpose of the Runway Method.

The Chair noted that it is a matter of how much cost such a Facility will incur with or without this change, and that AEMO has advised that there is currently no Facility that would benefit from this change from reduced Contingency Reserve Raise costs.

- Mr Price noted there may have been a misunderstanding of the question and that he would provide a response in writing.
- Mr Schubert noted that he believed that it needed to be clear whether Collgar would benefit from the change but that, either way, the largest contingency is what needs to be covered.

Mr Draper noted that the recommendation was for AEMO to have the discretion to separately treat units within a Facility under the Runway Method for the allocation of Contingency Reserve Raise costs, and that it was not currently proposed to implement this until 2025.

- Mr Price sought to clarify whether this was already the current practice for the Runway Method.

The Chair responded that her understanding was that currently under Appendix 2A any Facility with multiple connections would be treated as a single Facility. However, if there is a Facility currently on the system that should be treated differently because its largest

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	<p>contingency would never be its multiple units tripping together, then the proposed change should be made to make sure the Facility is treated fairly under the causer-pays principle.</p> <p>The Chair added that, if that circumstance does not exist today, then implementation of the change could be deferred. However, Collgar had flagged in the past that it may be in this category, so confirmation from AEMO is required.</p>	
	<p><b>Action: AEMO to confirm whether any current Facilities would benefit from the proposal to treat a Facility differently under the Runway Method, if the facility has multiple network connections, which allow the facility to continue to export all or most of its output if one of the connections trip.</b></p>	<p><b>AEMO</b></p>
<p><b>7</b></p>	<p><b>Next Steps</b></p> <p>EPWA will draft an Information Paper with final Review Outcomes. The Information Paper will be presented to the MAC on 8 June 2023 and will be published once the MAC has provided final comments.</p> <p>Drafting of the Amending Rules will commence after the Information Paper is published and EPWA will consult with the MAC/CARWG on the draft rules.</p> <p>The Amending Rules will then be presented to the Minister for his approval and the intent is for AEMO to implement them on 1 October 2025, concurrent with five-minute settlement.</p> <p>The Chair asked for any final observations or comments. No further comments were provided.</p> <p>The Chair thanked the CARWG members for their contributions.</p>	
<p><b>8</b></p>	<p><b>General Business</b></p> <p>No general business was discussed.</p>	

**The meeting closed at 2:40pm.**