Department of Energy, Mines, Industry Regulation and Safety
Energy Policy WA
GOVERNMENT OF WESTERN AUSTRALIA

Minutes

Meeting Title:	Essential System Services Framework Review Working Group (ESSFRWG)
Date:	26 February 2025
Time:	3:00pm – 4.45pm
Location:	Online, via TEAMS

Attendees	Company	Comment
Dora Guzeleva	Chair, Energy Policy WA (EPWA)	
Alex Gillespie	Australian Energy Market Operator (AEMO)	
Christopher Wilson	AEMO	
Oscar Carlberg	Alinta Energy	
Andrew Scarfone	AGL	
Lekshmi Jaya Mohan	BP Australia	
Dimitri Lorenzo	Bluewaters Power	
James Eastcott	Clean Energy Council	
Julian Fairhall	Economic Regulation Authority (ERA)	
Bronwyn Gunn	EPWA	
Shelley Worthington	EPWA	
Noel Schubert	Expert Consumer Panel	
Ali Kharrazi	GHD	
Christian Schaefer	GHD	
Jesse Singh	GHD	
Dennis Stanley	GHD	
Mark Lee	GridBeyond	
Max Collins	Neoen	
Mark McPartland	Nomad Energy Pty Ltd	
Daniel Randazzo	Shell Energy	
Graeme Ross	Simoca	
Bobby Ditric	Summit Southern Cross Power	
Brad Huppatz	Synergy	
Rhiannon Bedola	Synergy	Left at 4.30pm

Dev Tayal	Tesla	
Peter Huxtable	Water Corporation	
Mark McKinnon	Western Power	
Reece Tonkin	Woodside	

No Apologies

1. WELCOME

The Chair opened the meeting with an Acknowledgement of Country and asked members to note the Competition and Consumer Law obligations.

2. INTRDUCTIONS AND ATTENDANCE

The Chair noted the attendance as above, inviting new members to introduce themselves.

3. ESSENTIAL SYSTEM SERVICES FRAMEWORK REVIEW

The Chair opened the discussion noting that:

- the Essential System Services (ESS) Framework Review (Review) is to consider whether the ESS requirements are in line with best practice;
- the new Western Australian State Electricity Objective is now in effect and this Review must give consideration to it.

Mr Kharrazi presented slide 6 (jurisdictional comparison)

Mr Kharrazi presented slide 7 (quantifying frequency Regulation requirements), noting that:

  - o determining frequency requirements via a power system model would be difficult due to the variability of demand; and
  - o while the ESS Quantities Wholesale Electricity Market (WEM) Procedure provides some insight, due to the limited documentation, it is difficult to tell how the Regulation Baseline Model (RBM) is working.

- Mr Fairhall questioned what was determined through heuristics vs. statistical analysis, noting that the numbers looked similar to the old market where quantities were set on a heuristic basis. The mechanics of portfolio bidding in the old market meant that there was limited visibility of actual use of load following services. He added that 20:30 is late for sundown and a different window may be more appropriate.

Mr Schaefer noted that the approach to setting the standard quantities at the new market commencement appeared to be simplistic/heuristic, and that allowance is provided for an operator to procure more based on system conditions and their operational experience (potentially leading to variation between operators). He noted that, based on usage, the quantities appear reasonable.

- Mr Huppatz agreed with Mr Fairhall and noted that any analysis should only be from new WEM commencement.

Mr Kharrazi presented slide 8 (measuring effectiveness and improving Regulation services), noting that:

- the dark blue is the actual Regulation Raise service dispatched by the WEM Dispatch Engine (WEMDE), which has not been outside the requirement since the 20 November 2024 Rule Changes.
- frequency performance has been compliant with the Frequency Operating Standards (FOS), but further examination was required to confirm whether the Regulation requirement was set appropriately.

- Mr Wilson clarified that, when over dispatch occurred, it was due to the price being $0 (and a degenerate solution in WEMDE) and as such it was at no cost to the market.
- Mr Carlberg sought to clarify if the RBM model was still under development and, if so, whether the requirements would change once it's implemented or if there would still be operator discretion.

The Chair clarified that the RBM model is currently operational, not under development.

- Mr Wilson added that further detail is provided in later slides.
- Mrs Bedola asked whether the interconnectors in the National Electricity Market (NEM) act as a safety net, thereby lowering the requirements from what they might otherwise be given the size of the market.

Mr Schaefer noted that this is due to requirements for mandatory frequency response and a higher number of generators running at a level that gives them the headroom to provide this response.

Mr Kharrazi presented Slide 9 (procuring Contingency Reserve Raise (CRR) and explained that the Dynamic Frequency Control Model (DFCM) is a single-frequency model that simulates frequency using a combination of real time inputs and generic empirically derived parameters.

- Mr Schubert suggested that the mandatory droop response of online generators could automatically assist to recover frequency in contingency events and therefore reduce the quantity of CRR that needs to be procured.

Mr Schaefer replied that generators in the WEM do not typically have significant headroom and, as such, mandatory droop response does not provide a significant benefit in comparison to the NEM or other systems.

- Mr Schubert noted that the capability that exist in the WEM could be optimised and asked whether batteries have a mandatory droop response of 4% and, if so, whether that response could be adjusted .

Mr Kharrazi and Mr Schaefer noted that all energy producing Facilities are required to provide a 4% mandatory droop response, subject to energy availability, meaning that intermittent generators may not always be able to provide a raise service unless a headroom is preserved. They noted that operators in other markets are considering the benefits of requiring headroom to be preserved, and this could be considered for the WEM.

- Mr Schubert noted that:
  - it is common for utility scale renewables to be turned down in the middle of the day because the prices go negative, which would provide the opportunity for the headroom;
  - AS4777 requires behind-the-meter Distributed Energy Resources to respond to frequency changes.
- Mr Lorenzo asked how windfarms would be compensated for reserving that headroom.

Mr Kharrazi and Mr Wilson noted that no wind farms have applied to be accredited for Contingency Services. If they can meet the technical standards, they can provide Contingency Services and be paid for these like any other facility.

- Mr Schubert considered that this was because Facilities are expected to be accredited in advance and be available all the time, limiting the pool of resources.
- Mr Wilson responded that Facilities aren't required to offer their accredited Frequency Co-optimised ESS (FCESS) at all times.

The Chair clarified that there are exceptions for this for RoCoF.

- Mrs Bedola asked if the DFCM should capture the mandatory droop response and behind-the-meter response.

Mr Schaefer responded that this would be complex as the DFCM is an offline model that takes inputs ahead of time and creates lookup tables and quantities that specify CRR requirements. He added that the amount of mandatory primary frequency response available depends on dispatch and would be quite dynamic.

The Chair noted that, while this may be complex, it is a valid question.

- Mr Wilson stated his understanding that it was a design principle of the new market that those Facilities providing a service would need to offer to provide that service and be dispatched through the co-optimised process. If AEMO was to rely on a mandatory response, there would be no contingency services market.

The Chair clarified that what was being asked was whether assumptions can be made about the mandatory primary frequency response that is available when setting the ESS requirements.

- Mr Wilson responded that assumptions are made about the frequency response of PV with AS4777 compliant inverters, but that this is complex for registered Facilities due to the dependencies with dispatch.

The Chair stated that proper consideration of whether the primary frequency response can be accounted for in the DFCM needs to be considered further.

Action: EPWA, AEMO and GHD to consider the likely size of the contribution from mandatory frequency response and the complexity of accounting for it in the DFCM.

- Mr Schubert added that he would also like to understand whether the primary frequency droop response can be optimised (from the current 4% requirement) to get more contribution from generators who can provide it at no cost or little cost.

The Chair noted that it was her understanding that in the NEM compensation was provided and generators must be compensated for costs incurred.

- Mr Carlberg commented that in the NEM response is incentivised through the frequency performance payments mechanism.

The Chari added that the Cost Allocation Review (CAR) examined how Regulation requirements were set, organised and compensated for in the NEM. The CAR working group agreed to wait and look at how well the new mechanism performed over the next few years in the NEM to be able to better determine whether it may be appropriate for the WEM.

Mr Schaefer added that the frequency performance payments mechanism is for Regulation and would not address the CRR matter currently under discussion.

Mr Kharrazi presented slide 10 (DFCM process to determine CRR). He noted that:

- the DFCM looks to ensure that the RoCoF safe limit is maintained in every scenario, then looks at how much contingency service enablement is required to keep frequency within the frequency deadband; and
- the output – the CRR Offset - is the difference between the amount of contingency service enablement required compared to the size of the largest credible contingency.

Mr Kharrazi presented Slide 11 (DFCM inputs and outputs), noting that:

- RoCoF is set at 0.65 Hz/s, i.e. larger than the RoCoF safe limit, as this is only for under-frequency, not over-frequency, events.
- the look-up table presented on the right is for DPV of 10MW; and
- if the Contingency Raise Offset is negative, it means the Contingency Raise requirement should be higher than the size of the largest contingency. If it is positive, then there is enough inertia in the system for the requirement to be lower than the size of the largest contingency.

Mr Kharrazi presented slide 12 (CRR Requirement formulas), noting that the amount of Contingency Reserve a Facility can provide in real time is adjusted by its performance factor – if it is slower than the reference scenario, its ability to provide services will be adjusted by a proportional amount.

Mr Kharrazi presented slide 13 (CRR Requirement – visualisation).

Mr Kharrazi present slide 15 (CRR Dispatch total), noting that the procurement of CRR has been higher than the requirement and that this is due to low performance factors, meaning that higher quantities needed to be dispatched. He added that the bottom of the chart indicates the instances when there have not been enough offers in the system to meet the CRR requirement.

Mr Kharrazi returned to slide 14 (jurisdictional comparison), noting that:

  - the different load relief percentage in the WEM of 2% compared to 0.5% in the NEM, which is reflective of the higher penetration of induction machines at loads in the WEM.
  - in both Ireland and New Zealand interconnectors play a significant part in Frequency Control, affecting both CRR and Regulation services because their presence increases the largest credible supply contingency.

- With regard to the calculation of the performance factors of Facilities (slide 12), Mr Huppatz noted that he understood that the calculation is per Facility, but sought to clarify whether the speed factor/tau that is calculated overstate/over procure CRR services when the average system Speed Factors is between 0.2 and Tau, which could overstate the requirement.
- Mr Wilson clarified that the intent of the DFCM is that the Performance Factors can be added together to reflect a reasonable level of response from all Facilities. He noted that AEMO could investigate if that method of modelling would mean that AEMO was over or under conservative in certain circumstances.

Mr Wilson presented Slide 16 (Contingency Reserve Lower (CRL) Requirement), noting that

  - Load contingency is not co-optimised. AEMO has a finite list of things known to be the largest load contingencies, as listed on the slide.
  - as a priority, AEMO is currently working to co-optimise the size of the largest credible load contingency. With larger batteries coming online, AEMO needs to be able to efficiently dispatch batteries' withdrawal while having other Facilities cover them for CRL (in a way that is economic).
  - AEMO accounts for rooftop PV reducing output.

- Mr Collins asked what would happen in the event when the largest battery loss was offering CRL.

Mr Wilson advised that, at present, that was a risk that AEMO was having to account for this manually (on the occasions where it presents an issue) and clarified that, if a Facility presents the largest load contingency (i.e. a battery charging) it could not be dispatched (or paid) for any CRL.

- Mrs Bedola asked what the plan was to address this moving forward.

Mr Wilson responded that it would be fully Co-optimised within WEMDE as was done for CRR. The WEM rules to implement this have been gazetted but have not yet commenced and AEMO will publish a new Dispatch Engine Formulation WEM procedure for consultation in the coming months with the new equations.

Mr Kharrazi presented Slide 18 and 19 (Process of calculating minimum RoCoF Control Requirement).

Mr Kharrazi presented Slide 20 (WEMDE endogenous RoCoF Control Requirement) noting that the inertia, as calculated in slide 19, is an input to WEMDE which then endogenously calculates the amount of RoCoF Control Service that is required in accordance with the equations presented.

Mr Kharrazi presented Slide 21 (Determining the RoCoF Control Requirement) and noted that this was only the RoCoF Control Requirement that was considered by WEMDE and that the jurisdictional comparison table indicates that the RoCoF Safe Limit in the WEM is quite conservative in comparison to other jurisdictions.

Mr Kharrazi presented Slide 23 (WEM Frequency performance), noting that:

- the FOS defines what is the normal operating frequency band of the SWIS;
- the Normal Operating Frequency Band is the healthy frequency of the system;
- the Normal Operating Frequency Excursion Band is the amount of excursion that does not require a response from AEMO;
- Credible Contingency is the frequency band that needs to be maintained in the case of a Credible Contingency Event;
- Island Suppression Frequency Band is when there is a separation in SWIS and different islands are created; and
- Extreme Frequency Tolerance Band is the frequency band that may be reached when there is a non-credible contingency. Load shedding is permitted in this situation.

Mr Kharrazi presented Slide 24 and 25, noting that over a 30-day rolling window SWIS-wide frequency is well within the deadband as required by the FOS.

Mr Kharrazi presented Slide 26 which depicted the utilisation of the Regulation Raise services, noting that:

- green indicates the amount of Regulation Raise requirement that is coming from the RBM;
- magenta is the amount dispatched (sourced from SCADA) and shows that for the most part what is dispatched is very close to the requirement.

Mr Kharrazi presented Slide 27, noting that:

  - CRR Deficits have become a rare occurrence since the 20 November 2024 Rule Change.
  - the chart on the right shows a day when WEMDE did not dispatch enough CRR when compared to the requirement. On this day, when the deficit increased WEMDE did not dispatch the available quantities.
  - at that time, there was around 600MW of CRR offers in the market, but only a 60MW single Facility was dispatched. This could be for a number of reasons, including a performance factor of zero for the Facilities that offered or because of other enablement restrictions in the market (e.g. Facilities that offered were already dispatched for energy).

- Mr Fairhall noted that slower machines have a lower performance factor and, therefore, AEMO needs to schedule more from those machines. He noted that the oversupply of CRR shown in the earlier part of the day was not adjusted for that and should be taken into account when reviewing this.
- Mr Wilson noted that, in this particular example, there was a very peaky day, and a lot of the other Facilities were likely utilised for energy. If AEMO has to be short on a service, CRR will be the one they go short on.

Mr Kharrazi presented slide 28 (contingency services performance) and slide 29 (frequency contingency events).

Mr Kharrazi presented slide 30 (RoCoF shortfalls) and noted that, while CRR deficits were a rare occurrence since 20 November 2024, RoCoF Control Service Shortfalls had increased at the same time.

Mr Kharrazi presented slide 32 (next steps).

Mr Wilson noted that AEMO was currently working on some of the issues mentioned by Mr Kharrazi including:

- an engineering review of the RoCoF Safe Limit, due in the next few months;
- an ongoing project looking at the relationship between the minimum RoCoF Control Requirement and other parameters on the system. He noted that the original process was set at market start based on a statistical approach, and AEMO is looking at whether it can better align what the minimum RoCoF Requirement is in WEMDE and what AEMO's real time tools and systems are providing;
- optimisation of the largest credible load contingency in WEMDE; and
- a review into the provision of synthetic inertia from inverter-based resources, and whether this can be considered and if so what would need to change in the systems, rules and processes to enable that.

In response to a question from Mr Carlberg, Mr Wilson noted that he did not want to pre-empt the review but would be surprised if the RoCoF Safe Limit were to decrease.

- With regard to slide 29, Mr Huppatz asked whether any of the observed contingencies were close to the largest credible contingency in that interval. He noted that keeping frequency above 49.4Hz and RoCoF below 0.25Hz/s for a 300MW trip might appear conservative but would not if the largest credible contingency being covered was 500MW.

Mr Schaefer responded that, with such a low RoCoF, there would likely be quite a bit of inertia in the system potentially requiring lower amounts of CRR services. He considered a larger contingency may have resulted in a steeper drop and he would like to put a simulation together for a simple single mass model to see whether it would have arrested the fall under those conditions.

4. GENERAL BUSINESS

No general business was discussed.

5. NEXT STEPS

The Chair advised that there would be another working group meeting in 4 weeks, recapped the next steps and closed the meeting.

- The meeting closed at 4.45pm.