Department of Energy and Economic Diversification

GOVERNMENT OF WESTERN AUSTRALIA

Energy Policy WA

Minutes

Meeting Title:	Essential System Services Framework Review Working Group (ESSFRWG)
Date:	24 July 2025
Time:	10:00am – 11.31am
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	
Dimitri Lorenzo	Bluewaters Power	
Julian Fairhall	Economic Regulation Authority	
Jenny Laidlaw	EPWA	
Shelley Worthington	EPWA	
Noel Schubert	Expert Consumer Panel	
Christian Schaefer	GHD	
Jesse Singh	GHD	
Dennis Stanley	GHD	
Max Collins	Neoen	
Mark McPartland	Nomad Energy Pty Ltd	
Sumeet Kaur	Shell Energy	
Graeme Ross	Simcoa	
Charlie Caruso	Smart Energy Council	
Bobby Ditric	Summit Southern Cross Power	
Brad Huppatz	Synergy	
Rhiannon Bedola	Synergy	
Dev Tayal	Tesla	
Peter Huxtable	Water Corporation	
Mark McKinnon	Western Power	

Thomas Friberg	Zenith Energy	
Apologies		
James Eastcott	Clean Energy Council	
Lekshmi Jaya Mohan	BP Australia	
Mark Lee	GridBeyond	

1. WELCOME

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

2. INTRODUCTIONS AND ATTENDANCE

The Chair noted the attendance and apologies as above. She noted that this was likely to be the last meeting of the ESSFRWG.

3. ESSENTIAL SYSTEM SERVICES FRAMEWORK REVIEW

Mr Schaefer opened the discussion by noting that:

- the economic analysis aimed to establish the relationship between technical parameters and costs; and
- a cost benefit assessment of providing higher and lower quantities for different Frequency Co-optimised Essential System Services (FCESS), was conducted to identify the benefits of changing parameters.

Mr Schaefer presented slide 7- 9 (Sensitivity Analysis) noting that:

- establishing the relationship between the technical parameters and costs was challenging due to the changes in the market over the 12-month period of the review;
- significant reduction in all FCESS costs were driven by the ESM Rules changes implemented in November 2024; and
- the interdependencies between Contingency Reserve Raise (CRR) and Rate of Change of Frequency (RoCoF) made meaningful assessment difficult.

Mr Schaefer presented slide 10 (Case Studies for Economic Assessment) noting that:

- the outcomes of the technical assessment (as provided at the 26 March ESSFRWG meeting) indicated six key findings and of those, three warranted further investigations.

Mr Schaefer presented slide 11 (Approach to the Economic and Cost/Benefit Analysis) noting that:

- the analysis was undertaken on a small set of Dispatch Intervals with days chosen to allow for comparison of changed conditions; and
- the analysis was not intended to quantify the entire cost or benefits but provide an indication of how material the changes could be to determine if there was value in further investigation.

Mr Schaefer presented slide 13 (Case Study 1 - Changing the RoCoF Safe Limit) noting that:

- the RoCoF Safe Limit:
    - is a major input into the Dynamic Frequency Control Model (DFCM) to provide Contingency Reserve Raise (CRR) Offsets that are used in the Wholesale Electricity

Market (WEM) Dispatch Engine (WEMDE) to determine the total quantities of CRR required;
    - it provides the quantification of the performance factors to be applied to a particular generator to determine its ability to arrest frequency decline;
    - it is set conservatively in the WEM in comparison to other jurisdictions;
- the DFCM accounts for all possible permutations of system conditions that may exist. In scenarios where no secure or safe solution can be calculated by the DFCM, AEMO must intervene to secure the system; and
- between the 20 November 2024 to the 19 April 2025, AEMO made 90 manual interventions.

Mr Wilson presented slide 14 (Changing the RoCoF Safe Limit - More contributions from all generators at lower inertia). He noted that the stylized diagram showed potential frequency trace after a contingency event, with the two green dotted lines showing potential RoCoFs, and that:

- where a facility with a particular speed factor could not respond fast enough to keep the system within the RoCoF Safe Limit, even if theoretically it might be maintained above the frequency nadir, that facility has a performance factor of zero because it cannot contribute to keeping the system secure;
- in allowing the RoCoF Safe Limit to be higher there will be facilities which can respond at lower inertia levels and this would allow AEMO to find safe dispatch outcomes at lower inertia levels.

Mr Wilson noted that this means that AEMO does not have to intervene as frequently because the fleet configuration means that system secure outcomes can still be achieved.

- Mr Carlberg asked whether this considered Primary Frequency Response.

Mr Wilson replied for very fast response facilities with a reference factor of two there was some consideration, but as the RoCoF is governed by system inertia, for many facilities including the reasonably fast responding facilities, the amount they can contribute over the first 500 milliseconds is very small.

Mr Wilson noted that:

- the table does not include higher inertia but the numbers end up looking very similar;
- at higher inertia levels there is no change to performance factors for facilities as RoCoF Safe Limit does not end up being the binding issue, but the downward range is extended;
- increasing the RoCoF Safe Limit provides AEMO more capability to operate the system at lower inertia levels, assuming that sufficient CRR can be procured.

Mr Wilson presented slide 15 (Changing the RoCoF Safe Limit – Impact on CRR Offset). He noted that the tables show more extreme scenarios in which higher largest credible contingencies and lower inertias become theoretically feasible. He added that, while some are beyond the realm of feasibility, this demonstrates, for the less extreme scenarios, far more options for secure economic dispatch.

Mr Schaefer presented slide 16 (Changing the RoCoF Safe Limit – Conclusions). He noted that with a higher RoCoF Safe Limit applied:

- there was a reduction in the number of Dispatch Intervals requiring AEMO intervention; and
- this indicated a substantial reduction in RoCoF Safe Limit breaches, which translated into a reduction in Energy Uplift Payments by about $96,000 that would otherwise be made.

- Mrs Bedola raised concern with thermal generation accessing the documentation required to confirm their ride through capability and asked if consideration was given to the risks to equipment.

Mr Wilson advised that the risk to equipment was considered in the recommendation to move to a higher RoCoF Safe Limit and noted other power systems had higher limits. Mr Wilson noted that he would seek advice from the AEMO engineering team and advise of any issues raised with specific facilities.

Action: AEMO to consult internally with its engineering team and advise of any potential concern with increasing the RoCoF Safe Limit for individual facilities.

The Chair noted that other markets generally had a higher RoCoF Safe Limit than the WEM. She noted that an overview of the jurisdictional review had been covered in previous ESSFRWG meetings and would be included in the Consultation Paper.

In response to a question from Mr Carlberg, Mr Gillespie noted that the cost recovery limit would be 0.25 Hz above the RoCoF Safe Limit, and therefore 1 Hz per second.

- Mr Carlberg asked whether CRR costs were expected to change and whether the change to the RoCoF Safe Limit would limit the size of the largest contingency the system could handle.

The Chair noted that there would be no immediate change to the cost of CRR but that for lower inertia levels in the system AEMO may need to constrain a generator to reduce the largest contingency.

Mr Wilson agreed and noted that the higher RoCoF Safe Limit would result in the need for far less frequent intervention by AEMO.

- Mr Huppatz requested an extended consultation period to allow opportunity to consult with Original Equipment Manufacturers (OEM) noting that obtaining documentation for older plant is quite challenging. He considered that simulated tests did not replicate actual full stress events. These events could cause significant damage to plant and potential failure of units, particularly those with high inertia because of the stress placed upon them with the rapid rates of change.

The Chair advised that what was been presented today would be in the Consultation Paper.

The Chair asked ESSFRWG to advise offline what would be a reasonable period for consultation.

Action: ESSFRWG members to advise the Chair what length of consultation was required to consult internally and with OEMs on an increase to the RoCoF Safe Limit.

- Mr Carlberg noted that this could constrain less emissions intensive and lower cost energy until Clean Energy Link North was built. He asked if it were possible to quantify the level of curtailment and the market impact of that.

- Mrs Bedola and Mr Ditric supported Mr Carlberg's comment.

In response to Mr Carlberg, Mr Wilson replied that would be hypothetical as it would be dependent on dispatch conditions but that AEMO should be able to provide some kind of indication.

Action: AEMO to model the incidence of reducing the largest contingency to quantify the level of curtailment with a higher RoCoF Safe Limit and any market impact.

- Mrs Bedola sought to clarify whether the issue was AEMO interventions, or cost or a combination, noting the costs did not appear that unreasonable.

In response to Mrs Bedola's comment the Chair noted that:

- the issue of the increased costs in the WEM was now raised on a daily basis;
- concerns about cost and the impact on the economy and customers more generally should always be considered;
- 308 Dispatch Intervals with AEMO issuing directions occurred in one week; and
- manual interventions should be avoided because they can distort the market.

- Mr Lorenzo considered curtailment of low-cost energy would also include low-cost gas plant.

The Chair noted that:

- savings amounted to $103,000 and was for directions during a one-week period only.
- there was no cost associated with the change unless there were unintended consequences;
- the analysis clearly shows the benefits to reducing the number of directions is twofold - avoided manual directions by the AEMO control room and avoided cost.

- Mrs Bedola believed that prior to the AEMO manual directions the costs were ~$2M+/week. She noted that the number of AEMO directions was due to the current lack of a RoCoF market.

Mr Wilson reiterated that the $103,000 saving was over a one-week period. While this was a week in which directions were probably higher than average, those savings were indicative of overall cost saving.

- Mrs Bedola requested clarification on AEMO's plans to properly "stress test" this in the WEM.

Mr Wilson noted that the engineering judgement was that a RoCoF Safe Limit of 0.75 Hz per second would be secure and would not lead to system wide failure, and that this is the number that AEMO is confident running the system against.

- Mr Schubert noted that, as a consumer representative, the case seemed clear and provided his support, adding that there was no apparent evidence from other jurisdictions that this would be detrimental to the WEM.
- Mr Carlberg noted that there could be cost involved with the curtailment of low-cost energy. He asked if AEMO was comfortable with the change and whether it would be possible to bypass the OEM reviews, noting that at market start it was assumed that all generators were capable of riding through 0.5 Hz per second and could the same assumption be made for 0.75 Hz per second.
- Mrs Bedola advised that, given the likely risk to Synergy's equipment, she was not comfortable with the recommendation and would rather undertake internal reports and analysis.

In response to a question from Mr Fairhall, the Chair noted that AEMO had committed to modelling the incidence of curtailing low emissions generation.

Mr Schaefer presented slide 18 (Case Study 2 – Mandatory Primary Frequency Control) noting that:

- a lot of generators do not decommit during the middle of the day or remain at low output;
- Electric Storage Resources, available and online, are often not providing CRR; and
- the case study therefore looked to quantify what headroom would actually have available in some Dispatch Intervals.

Mr Schaefer explained that the green line on the graph indicates dispatched CRR and the blue line - the headroom that appears available. He noted that:

- even adjusted for performance factors there was still substantial headroom available;
- mandatory primary frequency response (MPFR) has a positive impact on system behaviour;
- comparatively, the National Electricity Market (NEM) had significantly improved the need for Regulation services because of the introduction of narrowband MPFR; and
- New Zealand does not procure much Regulation due to the significant amount of frequency responsive generation available.

Mr Schaefer noted that the range of Dispatch Intervals under review, included daytime where there was substantial PV online, night time and both high and low demand days. He explained the boundaries on slide 19.

- Mr Schubert noted that it was his understanding that a battery can switch from charging to discharging very quickly and could be supplying power very quickly. He noted that smaller systems can do it within cycles.

Mr Schaefer agreed but noted that system security also need to be taken into consideration as the reversal of power at such a rapid rate will cause a massive change in reactive power. He provided the example of the Hornsdale Power Reserve responding so quickly that it made protection systems trip as it was thought that an islanding event was underway in 2016.

The Chair clarified that the aim of the case study was to determine whether it was worth AEMO undertaking further investigation into the impact of adjusting their processes to account for what is provided through the mandatory droop, when setting the requirements for Regulation, not accounting for what is already a requirement under the Generator Performance Standards.

Mr Schaefer agreed noting that:

- if there was a frequency disturbance then all online generators with headroom or footroom must respond, not only those contracted for Contingency Reserve Raise or Lower;
- this is not considered in the DFCM when AEMO calculates the offset required for the largest credible supply contingency;
- the impact that MPRF is having is evidenced by the quality of normal system operation; and
- this case study went one step further to determine the impact of including it in the equation.

- Mr Huppatz noted that FCESS Accreditation suggests 30% of Unit Rating is optimistic for some thermal generation units and, 'Unit Rating' should reflect In-Service Capacity only, for the (Unit Rating - MW Dispatch) term. He noted that not all generators would have the ability to respond in the 3-6 seconds required to address frequency.

Mr Schaefer noted that this case study was only quantifying the impacts if this were to be considered, further monitoring would be required to track how much offset was realistically available.

The Chair summarised that there was in principle agreement from the ESSFRWG, that there may be benefit for AEMO to account (subject to comments raised) for what is available through the MPFR requirements in the rules when AEMO sets the requirement for FCESS.

Mr Schaefer presented slide 22 (MPFR – Potential impact on market outcomes) noting that:

- the lowest value of performance factor adjusted MPFR was used across all 8 Dispatch Intervals and used as an offset to the WEMDE dispatch;
- the outcomes as presented in the slide indicate that consideration of MPFR flows through a number of different areas;
- there is benefit of further investigation on a more granular timescale.

- Noting the increasing load and generation variability, Mr Schubert asked if it would be useful to consider lowering the threshold as there would be more inverter connected resources below 30MW capable of helping, for example community batteries (larger than residential).

- Mr Carlberg noted his support for the initiative and asked if there were any learning from the recent changes in the NEM, with generators there now being paid for their positive contributions and whether it was worth adopting that mechanism.

The Chair noted that this was discussed during the Cost Allocation Review, and it was decided that this would be looked at once it had been implemented and there was some evidence to demonstrate how well it performed.

- In response to Mr Carlberg, Mrs Bedola considered that those costs would also come back to customers because facilities would seek to recover those costs as part of their bids, which then would potentially increase energy prices.

The Chair noted that the point of the change to cost allocation in the NEM was to provide incentives to correct behaviour in the market and therefore reduce costs, and that, at the end of the day, cost are always passed through to consumers.

- Mrs Bedola noted that consideration was required in the analysis of how headroom might change from one Dispatch Interval to the next.

Mr Schaefer agreed and noted that this was the point of the monitoring program.

Mr Schaefer presented slide 23 (Case Study 3 – Synthetic Inertia). He noted that a number of other jurisdictions were also looking into the use of Synthetic Inertia and when considering the number of directions, and the expected growth in grid forming inverters, there may be benefit in considering this in the WEM.

Mr Schaefer presented slide 27 (Synthetic Inertia – breaking down the WEM's lack of inertia). He noted the approach to the case study and that:

- conservatism was applied with 1,200 MW seconds per battery, provided by two batteries; and
- the Dispatch Intervals chosen had a significant number of directions.

He noted the sensitivity with regard to the inertia batteries could provide based on their outputs, but noted that the findings indicate that there would have been reductions to the number of dispatch instructions if that inertia had been considered in the system.

Mr Schaefer presented slide 29 (ESSFRWG feedback on Synthetic Inertia in power systems). He noted that good feedback had been provided in terms of the challenges and the incentivisation that may need to be provided for this to occur as outlined on slide 29.

- Mr Collins noted that the benefits of synthetic inertia had not been costed and considered and that this could be at least equal to the savings of increasing the RoCoF Safe Limit with no decrease in reliability and should be measured as a priority.

The Chair responded that the intent of the case study and consultation was to establish a process for AEMO to be able to procure synthetic inertia, and to come up with a competitive process that actually demonstrates that synthetic inertia is a cheaper addition to the system than, for example, synchronous condensers. She noted that:

- if AEMO foresee an FCESS shortfall it needs to run the Supplementary Essential System Services Mechanism (SESSM) procurement process;
- the SESSM required testing to determine whether it was fit for purpose, or whether the NCESS process was preferred or if another separate process was required; and
- AEMO needs a fit for purpose mechanism to procure inertia as synchronous plant retires.

- Mr Carlberg noted his support and desire to avoid a mechanism that simply pays the last in.

In response to a question from Mr Collins, Mr Schaefer advised that the time period considered was from the 20 November 2024 to 19 April 2025. In this period there were roughly 60 directions from AEMO that would have been avoided if synthetic inertia was an option.

- Mr Colins noted that, as a battery operator in the SWIS, Neoen would welcome the opportunity to reduce the number of AEMO directions.

4. GENERAL BUSINESS

No general business was discussed.