

MINUTES

MEETING:	NATIONAL ENERGY MARKET OPERATIONS COMMITTEE NEMOC
DATE:	Friday, 9 December 2022
TIME:	1000am – 12.00pm
LOCATION:	10:00AM – 12.00PM (Sydney / Melbourne Time)
TELECONFERENCE DETAILS:	Microsoft Teams By phone: +61 2 8318 0090 , 557699114#

ATTENDEES:

NAME	COMPANY DEPARTMENT	NAME	COMPANY DEPARTMENT
Tjaart Van der Walt	AEMO (<i>Chair</i>)	Christiaan Zuur	CEC
Danielle Freke	AEMO (<i>Secretariat</i>)	Laurent Francisci	CEC/Neoen
Michael Gatt	AEMO	Gary Adkins	ElectraNet
Teresa Smit	AEMO	Glenn Springall	ENA (DNSP Rep) /Energy QLD
Tim Lloyd	AusNet Services	Verity Watson	ENA
Ben Skinner	AEC	Emma Rogers	Powerlink
Naresh David	AEC/Energy Australia	Jennifer Hughes	TransGrid

GUESTS:

NAME	COMPANY DEPARTMENT	NAME	COMPANY DEPARTMENT
Alexis Bowman	AEMO	Sujeewa Rajapakse	AEMO
Mark Gordon	AEMO	Darren Spoor	AEMO
Luke Robinson	AEMO	Dalibor Balicevic	AEMO
Harmohan Singh	AEMO		

APOLOGIES:

NAME	COMPANY DEPARTMENT	NAME	COMPANY DEPARTMENT
Ken Harper	AEMO	Ross Burridge	TasNetworks
Callan Masters	AEMO	Kasia Kulbacka	TransGrid
Leanna Tedesco	AEMO	Gary Edwards	Powerlink

1 WELCOME

Tjaart welcomed members to the meeting and noted the apologies.

2 AEMO/TNSP DISCUSSION AROUND RECENT SA AND TAS INCIDENTS

- Discussion was around failure of lines and structures and causes for the failures (such as age or environmental conditions) and anecdotal evidence suggests these failures are occurring more frequently, however data would need to confirm this.
- Overview and learnings discussion (including the management of minimum system load) around the recent South Australian and Tasmanian reviewable operating incidents. Two published reports about these incidents were circulated to members: (1) Preliminary Report – Trip of South East – Tailm Bend 275 kV lines on 12 November 2022 and (2) Preliminary Report – Trip of Liapootah – Palmerston 220 kV lines on 14 October 2022. See links: [preliminary-](#)

[report--trip-of-south-east-tailem-bend.pdf \(aemo.com.au\)](#) and [preliminary-report-trip-of-liapootah-palmerston-lines.pdf \(aemo.com.au\)](#).

- Jennifer suggested it would be worthwhile to have a 'lunch and learn session' about DPV with this group and DNSPs. The group agreed.

ACTION – Jennifer to set up a 'lunch and learn' session with DNSPs, TNSPs and AEMO.

3 CEC AND AEC JOIN THE MEETING

- Michael shared with members for information, a report on load models and DPV which informs both Operational and Planning decisions in the NEM/WEM – [psse-models-for-load-and-distributed-pv-in-the-nem.pdf \(aemo.com.au\)](#) and an AEMO media release about AEMO's Engineering Roadmap to 100% Renewables report, providing an overview of the engineering challenges and actions needed to operate Australia's National Electricity Market (NEM) solely on renewable generation – [AEMO | AEMO unleashes 'roadmap' to 100% renewables](#).
- Ben, Christiaan and Naresh questioned the splitting of the meeting and felt they and their members are interested in the learnings from reviewable operating incidents. Tjaart explained that certain things only related to AEMO and TNSPs so this AEMO/TNSPs only discussion will occur as a separate meeting to NEMOC. It was agreed by all members to change the meeting format to how it was prior to this meeting so that all members hear about the reviewable operating incidents.

ACTION – Secretariat – Change meeting format to how it was before this meeting ie no split meeting – one whole meeting with all members included.

4 PREVIOUS MINUTES AND ACTIONS REGISTER

- Previous meeting minutes (16 September 2022) were accepted with no changes made.
- Actions Register was reviewed and actions amended accordingly.
- Tim raised the point again from the last meeting that there should be an agenda item discussion around 'Prioritisation of Work with the Sub-Groups'. He felt it would be good to get a full view of the subgroups 'to do list' and how they have prioritised them, and how much time they are spending on each. He said it was incumbent on NEMOC to ensure that the sub-groups are focused on the right things and have the resources to deliver in the necessary time.

ACTION – Secretariat – Add as a regular meeting agenda item – Prioritisation of work streams for different working groups. This item will be listed before the working groups give their updates.

- Tim raised the point that anyone who has actions against them should be at present at the meeting.

ACTION – Secretariat – Invite those people who have actions against them to the meeting.

5 WORKING GROUP UPDATES

5.1 NEM EMERGENCY COMMUNICATIONS WORKING GROUP (NEMEC WG) DARREN SPOOR

Callan Masters normally chairs this group but Callan asked Darren to step in to give the update.

i. LONG-HAUL COMMUNICATIONS OPTIONS

- The NEMEC has now completed a review of the following options to cover the long-distance communications requirements in the NEM. Satellite phones and Starlink had been previously excluded from the communications roadmap, but finalised a consideration of the OTN and HF options at this meeting.
 - Satellite Phones
 - Starlink
 - Hardening of Operational Telephone Networks (OTN)
 - HF Radio

ii. WICEN HF TESTING

- WICEN NSW provided a test report on the HF option using 50-100W equipment on the 40m and 80m amateur radio bands. It was concluded from these tests that this combination of power and frequency allocation could:

- Deliver an approximate 96% availability.
- Allow users to talk directly between SA, TAS, VIC, QLD and NSW.
- Allow remote sites in Brisbane to communicate with other test participants.
- WICEN also shared the following observations based on their considerable experience with HF communications, stating the following:
 - Calls directly between Brisbane and Hobart were achievable.
 - Use of multiple frequency allocations would improve communications reliability.
 - Digital voice encryption can be used without impacting call latency.
- Following a comparison of the costs associated with the OTN and HF options, the NEMEC concluded that HF would be required to manage the long-haul communications options. The preferred HF radio solution should be tested further to confirm its reliability across all NEM regions, but it was agreed that a 400W HF radio system should be installed in Brisbane control room and Tasmania. This test system would enable communications between AEMO and TasNetworks over a six-month period.

iii. RECOMMENDATION

- Installation of two 400W HF radio systems (indicative total of \$250,000), with funding being sought from the Commonwealth.
- The proposed HF option would use 400W equipment with digital signal processing and selected commercial frequency bands.

iv. MEMBER QUESTIONS AND DISCUSSION

- Tjaart asked who do we envisage using the system? TNSPs and AEMO? TNSPs, DNSPs and AEMO? TNSPs, Generators, AEMO and DNSPs?
 - The draft road map considers that in the context of emergency communications, the biggest need is to communicate between AEMO and the TNSPs. Short-haul communication could be relayed through TNSPs to local generators and DNSPs. So at this stage based on conversations in the working group, the primary use of this system will be TNSPs to AEMO communication.
 - NEMEC has short-haul communication as an upcoming agenda item, which will address the issue – when communications fail during emergencies.
- Tim asked does the \$250,000 include the required equipment that would be needed at the TNSPs?
 - No, that's solely for the HF relays and thereafter would be a link from the relay back to the TNSP. Each specific TNSP will be different but the relay is likely to be another radio link. It's hard to say how much this will cost as it depends where the control room is located.
- Ben asked was there only going to be connectivity in Brisbane and in Hobart or was that a test for a broader network to come in the future?
 - It's a test for a broader network. The NEMEC feel it's inappropriate to recommend a wholesale roll out across the NEM and the consensus view is that if we have reliable comms between Brisbane and Hobart, which is already a troublesome link, then that is a really good indicator that we can expand.
- Ben asked and the \$250,000 is just for those two, is it?
 - Correct.

5.2 POWER SYSTEM SECURITY WORKING GROUP UPDATE (PSSWG)

DARREN SPOOR

Darren provided an overview of the recent PSSWG meeting.

i. GENERATOR RECLASSIFICATION CRITERIA

- The PSSWG has engaged the support of representatives from the Energy Council to assist in developing a new section on generator reclassification requirements in SO_OP_3715. Initial comments have been received, but the review of these has been deferred until the next meeting.

ii. NETWORK RECLASSIFICATION CRITERIA

- There is a new Fire Danger rating system that has been standardised across the nation, which includes four levels, instead of six for some regions. The associated bushfire reclassification weighting assessments have been reviewed to align with this standard.

iii. INDISTINCT EVENT RECLASSIFICATION FRAMEWORK

- The PSSWG has finalised a draft list of indistinct risks and associated triggers for inclusion in SO_OP_3715. These will be amalgamated with the existing reclassification criteria in the form of documented appendices to the Power System Security Guidelines.

8.4.2. Content of reclassification criteria

The *reclassification criteria* are set out in the following appendices to these Guidelines:

- Appendix A – Bushfire threats to double-circuit *transmission lines*;
- Appendix B – Lightning threats to double-circuit *transmission lines*;
- Appendix C – Specific risks relating to *plant operation*;
- Appendix D – Severe wind (including tropical cyclones);
- Appendix E – Geomagnetic *disturbances*;
- Appendix F – Widespread bushfires
- Appendix G – Floods
- Appendix H – Widespread pollutants
- Appendix I – Landslides
- Appendix J – Sudden and large changes to solar generation
- Appendix K – Earthquakes
- Appendix L – Large scale social unrest
- Appendix M – Cyber attacks

iv. LOSS OF TELEMETRY COMMUNICATIONS

- The PSSWG discussed the potential impacts following a loss of voice communications between control centres. The working group reviewed a new draft section within SO_OP_3715 entitled “telemetry system outages covering general principles”. This discussion will be continued in the next meeting.

v. INDUSTRY BEST PRACTICE FOR OPERATIONAL COMMUNICATION

- The PSSWG were previously briefed on the recommendations from the Control Room Operations Working Group (CROWG). The CROWG has finalised their work on defining industry best practice for operational communication and this is being proposed for inclusion in SO_OP_3707. The PSSWG will continue this review at the next meeting.

vi. MEMBER QUESTIONS AND DISCUSSION

- Christiaan asked regarding the indistinct events reclassification, will there be a public consultation on this one or is it subject to a rules consult procedure?
 - 3715 in its own right isn't subject to a rules consultation procedure but we do consult on it. Extensive consultation has happened through the PSSWG and also the control room Operations Working group where we have membership from almost every participant. But just to make sure that we have captured participants who aren't members of those two working groups, we're in the process of putting out some AEMO communication to try to capture any interest elsewhere in the industry. Christiaan said he is looking forward to receiving this AEMO communication and socialise it with his members.

5.3 OPERATIONS PLANNING WORKING GROUP (OPWG)

SUJEEWA RAJAPAKSE

Sujeewa provided an overview of the recent OPWG meeting held 30 November 2022.

i. EXTREME FREQUENCY MANAGEMENT

a. UNDER-FREQUENCY LOAD SHEDDING (UFLS) REVIEW

NEM intact and separation studies as well as their analysis have been completed. The report has been finalised. AEMO Systems Performance presented the observations of intact power system studies as well as SA and QLD separation studies to the OPWG. Based on the experience gained from these studies, AEMO also presented a list of recommendations for future UFLS studies.

b. IMPLEMENTATION OF OVER-FREQUENCY GENERATOR SHEDDING (OFGS) SETTINGS

AEMO has completed the development of the OFGS settings in SA and Western VIC. After review of the OFGS report by ElectraNet and addressing their comments, AEMO finalised the report. AEMO is now liaising with the relevant parties for implementation.

ii. TRANSMISSION EQUIPMENT RATING ADVICE PROCESS

The spreadsheet-based rating advice process being used is cumbersome hence AEMO has commenced a review. This review is intended to address immediate issues as well as to develop requirements for a more efficient long-term process. Improvements to the rating advice process used in the WEM is also in scope.

AEMO has compiled a complete list of pain points in liaison with TNSPs. Identifying options for improvements that suit AEMO and TNSPs has commenced.

iii. EMERGING OPERATIONAL ISSUES

a. OPERATION OF SEMI-SCHEDULED GENERATION

The OPWG documented power system security issues caused by large increases of semi-scheduled generation in dispatch intervals immediately following dispatch intervals with semi-scheduled cap applied. In the OPWG meeting on 30 November 2022, two more options were proposed in addition to the five options identified previously. Relative merits of the two new options are being assessed.

iv. STRATEGIC IMPROVEMENTS TO NETWORK OUTAGE PLANNING PRACTICES (FOCUS: 2023 – 2024)

The OPWG commenced discussions on strategies for better future outage management giving consideration to the anticipated high penetration of VRE / DPV and the retirement of synchronous generation. The OPWG focused on:

- Anticipated generation retirements and network augmentations
- Increasing VRE and DPV, MSL
- Cross border issues
- FCAS issues
- System strength issues
- Minimum fault levels
- Suitability of incentive schemes

This discussion will continue in the next OPWG meeting.

v. CRITICAL NETWORK OUTAGES IDENTIFIED IN THE AEMO 2022 SYSTEM STRENGTH REPORT

AEMO presented critical network outages identified in the 2022 System Strength report for which System Strength Service Providers (SSSPs) must make arrangements for system strength services during those outages. Identification of these outages in the System Strength report assists SSSPs recover costs. AEMO encouraged TNSPs (ie SSSPs) to liaise with the AER to seek advice on the approach for cost recovery.

vi. NEXT MEETING

The next OPWG meeting will be held in March 2023.

vii. MEMBER QUESTIONS AND DISCUSSION

- Sujeewa said regarding emerging operational issues and the operation of semi-scheduled generation and the associated issues, in the last NEMOC meeting there was an action for the OPWG to undertake further investigation for the proposed solution, including consultation with generators and potential alternative solutions. This has been actioned as OPWG subsequently had meetings with Ben, Christiaan as well as internal AEMO discussions and it was agreed to work with Mike Davidson and come up with the summary document and then get the final agreement from OPWG and send to NEMOC.

- Sujeewa added that OPWG came up with two other proposals and one is similar to other ones that they had received before. There was a new one that looked promising that involves the use of limit advices to control rate of change of the semi-scheduled generation in question. This option is being assessed with TNSPs at the moment. As soon as that is assessed, OPWG will circulate that final one-page summary to the NEMOC. The final one-page summary will contain all seven proposals/options, OPWG's preferred option, and how this will be socialised to the broader industry and seek their views.

5.4 POWER SYSTEM MODELLING REFERENCE GROUP (PSMRG)

MARK GORDON

Mark provided an overview of yesterday's (8 December 2022) PSMRG meeting.

i. KEY HIGHLIGHTS

- System strength impact assessment guideline was not published on 1st of December 2022 due to concerns regarding quantities and how that may impact the markets. This is currently being discussed with their ELT board as to how they're going to address that.
- PSCAD v5: AEMO released an update of PSCAD v5 in July 2022. All NSPs have started using v5 and are progressing well to fully transition to v5 in the near future. NSPs are also requesting v5 compatible models from new connections.
- Review of Power System Model Guidelines: AEMO presented issues paper and key items for discussion.
- Review of SSAT: AEMO presented review and update of concurrent activities including SSAT development status.
- Presentation by PowerLink: small signal modelling of a PV plant and observed oscillations between an IBR and synchronous machines.

ii. MEMBER QUESTIONS AND DISCUSSION

- Verity asked when is the system strength impact assessment guideline going to be resolved then in light of the fact that the TNSPs and AEMO Victoria had to put in their updated pricing methodology on 30 November 2022 and AER has to approve it by the end of January 2023 so that quantity figure is pretty important?
 - PSMRG were not in a position to provide an answer to this. Verity made the point that TNSPs and AEMO Victoria have the obligation to publish prices that are the starting point for the rest of their current regulatory period on 15 March 2023. Mark was aware of this and it's AEMO non-compliance but couldn't provide further comment. Verity said perhaps she may take it offline with TNSPs and whether they might need a joint letter of non-compliance to the AER.
- Verity asked at what distribution level are we going down to, what's the criteria for a system strength user on the distribution network? I am not clear of which document or how we're defining that as to what the extent of impact on the distributors on passing these charges is?
 - Currently, anything that's subject to Chapter 5, which is 5 megawatts or larger size is subject to performance standards. But for the purpose the rules have made a provision to define a Materiality Threshold for or system strength purpose, this is also something that once the draft system strength impact assessment guideline is published then we will be seeking a consultation on that Materiality Threshold so there is still some work to do on this one.
 - Tim reiterated the point around prioritisation of work streams for different working groups. He said this will allow NEMOC members to get some visibility of when the working groups think they're going to achieve the outcomes that have been set, that they have a very clear objective of what their action is, and when do they think they're going to resolve it and then we can decide whether we're satisfied with that.
- Christiaan asked regarding the system strength impact assessment guideline, was the key issue that you're dealing with is actually the quantity? I had thought it was the locational factor element of the charge. Did I misunderstand that?
 - The locational factor was an issue as to how it was defining the final determination. We believe that issue has now been addressed through an alternative sort of approach how to evaluate system strength locational factor. Yes so the issue is related to system strength quantity and reduction in AFL. We have some challenges that we are working through and I think this is probably something we can cover during the webinar sessions or Q&A session and subject to further feedback from consultative parties once the draft strength impact assessment

guideline is eventually published. NEMOC will be advised when the webinar is on and when the guideline is published.

5.5 OPERATIONS TRAINING WORKING GROUP (OTWG)

ALEXIS BOWMAN

Alexis provided the following update.

i. IRC CONSULTATION FOR THE POWER SYSTEM OPERATOR TRAINING FRAMEWORK

Met with representatives of the IRC in November, as part of ongoing consultation with relevant governing bodies about the Power System Operator Training Framework. Representatives included Erin Knudsen – AIS, Peter Woods – Transport NSW, Barry Heywood – Energy Safe and Sarah Brunton – ETU.

Following extensive industry consultation, the IRC reviewed the initial consultation report and requested further clarification around the purpose and scope of the framework, particularly in relation to current accredited training programs. They also sought clarification around any potential conflicts stemming from recent changes to skills units under the AQF packages.

The IRC representatives provided their endorsement for the framework and appeared comfortable this work does not conflict with accredited courses. We will continue to work closely with the ENA and the IRC and have offered to attend their next gathering to alleviate any concerns and realise the benefits of standardised power system operator training across the country.

ii. RTO ENGAGEMENT PROCESS FOR THE POWER SYSTEM OPERATOR TRAINING FRAMEWORK

As previously outlined, the framework module development and delivery will be undertaken externally. The Expression of Interest phase for RTO engagement concluded on 19 November.

Next steps involve ongoing Steering Committee consultation to progress and finalise engagement of external services. Identification of formal benchmarking measures for PSO training will also commence, following delivery of the modules within the Fundamental level of the framework.

iii. OTWG UPDATE

The next OTWG meeting is planned for February 2023. Focus will include the Power System Operator Training Framework and discussion of AEMO's Engineering Roadmap to 100% Renewables.

The Roadmap to 100% renewables operations has identified the need for a significant uplift in industry training standards to ensure operator capability and sufficient training. The OTWG will be used to inform development and implementation of robust procedures and processes for the range of new operational tools and practices required.

6 GENERAL BUSINESS

- Tjaart gave CEC and AEC members an overview of the recent South Australian and Tasmanian reviewable operating incidents that were discussed at the start of the meeting.
- It was agreed by members to increase the time for the updates from the working groups from 10 minutes to 15 minutes as this will allow for more in-depth questions and feedback.

ACTION – Secretariat – Increase the working group updates from 10 minutes to 15 minutes.

- It was agreed by members to change the meeting format to how it was prior to this meeting so that all members hear about the reviewable operating incidents.

ACTION – Secretariat – Change meeting format to how it was before this meeting ie no split meeting – one whole meeting with all members included.

- Tjaart reminded all members that if they wanted anything specific to be added as an agenda item to let the Secretariat know. Tjaart suggested a deep dive discussion topic as an agenda item and Jennifer suggested to add safety as an agenda item. These were agreed to by all members.

ACTION – Secretariat – Add deep dive discussion and safety as regular agenda items.

i. NEXT MEETINGS

- 1pm – 4pm AEST Thursday 27 April 2023 (Virtual) [*NEMOC & EJPC WORKSHOP 10am – 12pm AEST Thursday 27 April 2023 (Virtual)*]
- 9am – 12pm AEST Friday 23 June 2023 (Virtual)
- 9am – 12pm AEST Wednesday 13 September 2023 (F2F Melbourne) [*NEMOC & EJPC WORKSHOP 12.30pm – 3pm AEST Wednesday 13 April 2023 (F2F Melbourne)*]
- 10am – 1pm AEST Friday 8 December 2023 (Virtual)

7 MEETING CLOSE

- The meeting closed at 12.10pm.

MEETING / WORKSHOP	DATE
NEMOC MEETING No.31	1pm – 4pm AEST Thursday 27 April 2023 (Virtual)
NEMOC & EJPC WORKSHOP No.7	10am – 12pm AEST Thursday 27 April 2023 (Virtual)