

MINUTES

MEETING: National Electricity Market Operations Committee (NEMOC) #20
DATE: Friday, 11 December 2020
TIME: 10:00AM – 1:30PM (Sydney/Melbourne Time)

ATTENDEES:

NAME	COMPANY
Ken Harper <i>(Chair)</i>	AEMO
Lenard Bayne <i>(Secretariat)</i>	AEMO
Michael Gatt	AEMO
Teresa Smit	AEMO
Daniel Lavis <i>(Proxy)</i>	AEMO
Wai-kin Wong	AGL/Clean Energy Council
Tim Lloyd	AusNet Services
Ben Skinner	Australian Energy Council
Lillian Patterson	Clean Energy Council
Simon Emms	ElectraNet
Naresh David	Energy Australia/Australian Energy Council
Verity Watson	Energy Networks Australia
Glenn Springall	Energy Queensland/DNSP Rep for ENA
Randall Jones <i>(Proxy)</i>	Powerlink QLD
Mike Paine	TasNetworks
Andrew Power	TransGrid

GUESTS:

NAME	COMPANY
Alistair Wells <i>(Item 3.1)</i>	AEMO
Babak Badrzadeh <i>(Item 6.3)</i>	AEMO
Chris Davies <i>(Item 3.2)</i>	AEMO
Chris Stewart <i>(Item 5.3)</i>	AEMO
Daniel Lavis <i>(Item 6.4)</i>	AEMO
Darren Spoor <i>(Item 6.1)</i>	AEMO
Luke Robinson <i>(Item 5.1)</i>	AEMO
Mark Hancock <i>(Item 5.2)</i>	AEMO
Sujeewa Rajapakse <i>(Item 6.2)</i>	AEMO
Tim Daly <i>(Item 3.3)</i>	AEMO

APOLOGIES:

NAME	COMPANY
Alastair Andrews	Powerlink QLD

Gary Edwards	Powerlink QLD
Michael Gatt	AEMO
Tjaart Van Der Walt	AEMO

1. Welcome

Ken Harper welcomed members and noted those apologies. In addition, Ken Harper introduced Glenn Springall to the meeting as the new representative for Energy Queensland/DNSP Rep for ENA.

Ken Harper added that outage coordination is currently a great focus for AEMO currently, with a lot of challenges, with some being particularly challenging now. AEMO are working through these outages with the relevant TNSP's. Some issues emerging are related to minimum and maximum demand, system strength and PV shake off. AEMO is currently reviewing the April 2021 forward outages, which are mostly associated with generation and transmission within the April 2021 period. Ken Harper added that it would be helpful that those expected outages during the April 2021 and the rest of the year, be placed into Network Outage Scheduler (NOS) ASAP, if they're not already.

2. Previous meeting minutes and actions

Previous meeting minutes were accepted with no changes made. NEMOC members approved 21 September 2020 meeting minutes to be published on [AEMO's website](#). Actions were updated accordingly, and amendments made.

3. Presentations

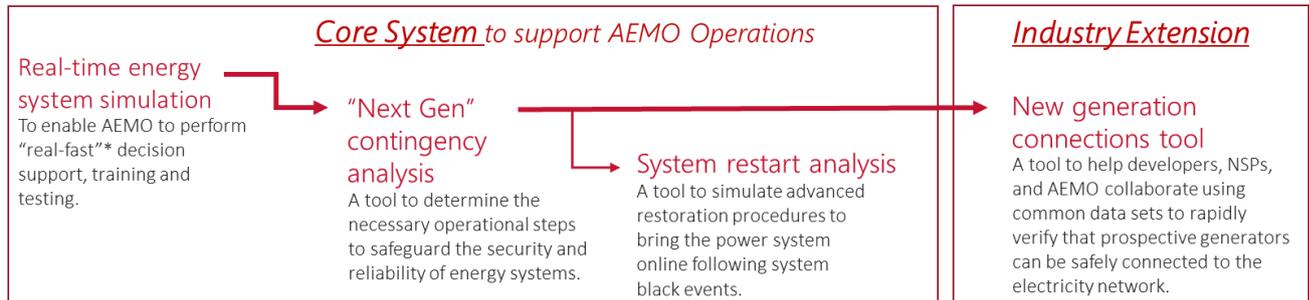
3.1. AEMO Realtime Simulator & Connections Tool

Alistair Wells provided a presentation on AEMO's Realtime Simulator & Connections tool and was considered read. Previous presentations were presented to NEMOC in September 2019. It was noted that a feasibility study was conducted by BCG in September 2019 which concluded that there was a need for a single source of truth.

Alistair Wells advised that there were two focus areas that would be of immediate benefit and were considered highest priority. These priorities are outlined below.

1. Real Time Simulator Tool (Foundational)
2. Connections.

Alistair Wells provided a brief overview of the project scope with key areas outlined below.



* "Real-fast" = approx. 3 times slower than real-time. For example, 1 minute of simulation time will require 3 minutes of processing time.

Alistair Wells provided a brief overview of the stakeholder benefits which are outlined below.

- Connecting parties able to observe the same stability issues that NSPs and AEMO see
 - Open Access concept
 - IP protected behind black boxes, residing on AEMO infrastructure
 - Creates platform for joint problem solving of issues
- Accelerate the connections assessment process
 - Real-time Simulator
 - Runs "real-fast", same level of detail as PSCAD
 - Wider variety of scenarios evaluated; shorter timeframe needed

Alistair Wells provided a status project update with key milestones outlined below.

- Following a 2-stage procurement process, AEMO has selected Opal-RT to supply the core Real-time Simulation (RTS) engine
- Implementation of the RTS commenced 14 September 2020
- Stage C1 represents a Proof of Concept phase to confirm accuracy, saleability, performance and effort to implement Opal-RT platform
- Full platform to be delivered by Opal-RT mid-2021, and configured by AEMO by end 2021
- AEMO has commenced detailed scoping and high-level design of the Connections Tool component

3.2. NEM Power System Design System & Engineering Framework

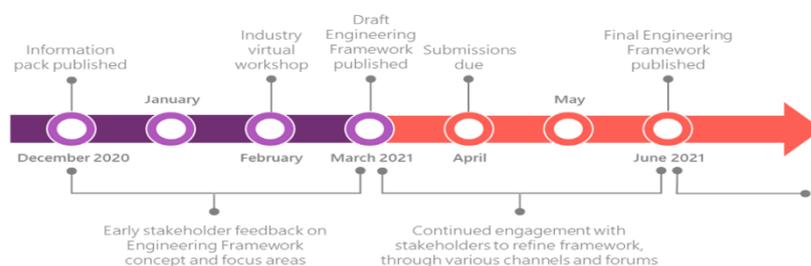
Chris Davies provided a status update on the NEM Power System Design and Engineering framework. The presentation was considered read.

Chris Davies added that a draft Engineering Framework will be published in March 2021 which will capture:

1. Updated focus areas.

2. Principles of prioritisation.
3. Preliminary gap analysis for future work and priority areas.
4. An action-based timeline
5. An indication of how each focus area will be progressed – either via existing industry processes or the development of an action-based timeline within the framework – and notes on work already underway and linkages/ interdependencies with industry processes.

AEMO anticipates publishing the final Engineering Framework in mid-2021. NEMOC members endorsed the below engagement timeline.



3.3. Cyber Security in the Australian Energy Sector

Tim Daly provided a brief overview on Cyber Security in the Australian Energy Sector. The presentation was considered read. Highlights from this presentation are outlined below.

- Reporting obligations for Owners and Operators of systems of national significance and regulated critical infrastructure assets will be required to provide specific asset information to government.
 - To provide Government with greater visibility and understanding of who owns, controls and has access to our most critical assets.
- Positive Security Obligation to build consistent security and risk management uplift across all critical infrastructure sectors.
 - Set and enforce baseline protections for critical infrastructure.
 - Implement sector-specific standards.
 - Strengthen sectoral regulatory oversight.
- Enhanced Cyber Security Obligations to strengthen the resilience of designated Systems of National Significance.
 - Co-develop scenario based 'playbook' setting out response arrangements.
 - Build near real-time threat picture.
 - Build the cyber resilience of Systems of National Significance.
- Government Assistance to disrupt serious cyber security threats – supported by PSO inputs and enhanced situational awareness.

- To ensure owners and operators can receive timely advice and assistance to address and respond to a cyber security attack.

4. Decision

4.1. 2021 NEMOC Meeting Calendar & NEMOC/EJPC Workshop

NEMOC members endorsed the 2021 NEMOC meeting calendar and NEMOC/EJPC workshop.

4.2. Distribution of Working Group Updates

Ken Harper raised a question relating to NEMOC sub-committee working groups. It was suggested that the updates that are provide to the NEMOC be shared amongst each working group to provide greater transparency and avoid unnecessary work overlap. Members endorsed the distribution of working group updates across NEMOC sub committees.

5. Discussion

5.1. Reviewable Incident Report Summary

Luke Robinson provided a summary of the Reviewable Incident Report as per NER 4.8.15. Information was considered read. A total of 30 incidents were presented to members with 15 reports being published on AEMO's website.

5.2. South Australia and Victoria Separation Event – 16 November 2019

Mark Hancock joined the meeting to provide a brief overview of the SA and VIC Separation Event which occurred on 16 November 2019. The incident primarily was due to two 500 kV transmission lines (HYTS-APD-MOPS & HYTS-APD-TRTS) disconnecting simultaneously at 18:06:47 (EST) on 16 November 2019. It was noted that the primary cause was due to a communications equipment failure and was considered as a non-credible contingency event. Mark Hancock added that no similar events had been recorded before or since, at any locations. AEMO published two reports on this event, which are located on AEMO's Website.

- [AEMO Preliminary Report –Non-credible Separation Event South Australia -Victoria 16 November 2019](#)
- [AEMO Final Report –Non-credible Separation Event South Australia -Victoria 16 November 2019](#)

5.3. High Speed Monitoring (HSM) Project Update

Chris Stewart provided a status update on the HSM Project conducted by AEMO. As previously mentioned at the September 2020 NEMOC meeting, the Operations Planning working group will coordinate the program of work with input and guidance by the NEMOC. Updates will be provided via the OPWG moving forward. It was noted that the next steps are to ascertain the Phasor Measurement Units (PMU's) requirements and confirm communication links. The NEMOC Chair asked NEMOC members to direct any questions via the OPWG members or Chris Stewart directly.

6. Working Group Updates

6.1. Power System Security Working Group (PSSWG)

Darren Spoor provided a brief overview from the PSSWG meeting which was held on 6 November 2020. The update was considered read. Darren Spoor advised that the PSSWG continued discussions from the bushfire event in VIC on 10 January 2020, where the Eildon to Mt Beauty lines both tripped when the Dederang to South Morang 330kV lines were also reclassified. The PSSWG members agreed that the power system would be deemed to be in a secure state for future events if the respective control rooms had identified the potential separation. The PSSWG members were content to rely on protection relays to ensure a satisfactory post-contingent operating state.

In addition, the PSSWG members discussed a detailed review of the bushfire event in NSW on 4 January 2020, which resulted in a separation with VIC. It was identified that the previous interpretation of Clause 4.2.2 could have assisted in that event also.

Darren Spoor advised that the PSSWG discussed falling regional minimum MW demand at length in the context of voltage and frequency control. This was followed by a subsequent discussion on rooftop PV ride through capability, and was identified that there may be an option to consider the installation of unloaded three phase motors at selected zone substation busbars.

It was noted, Daniel Work (AEMO) provided a presentation to the PSSWG on the potential use of new satellite radar imagery of electrical assets courtesy of [Capella Space](#), which can be produced with a 50cm resolution through snow, smoke and storms.

6.1.1. Review of Non-Credible Contingencies

Darren Spoor provided a summary of Non-credible contingencies to the NEMOC members. Currently there is a total of seven events being reviewed and reported on by AEMO. In addition, there are a further two events that are yet to be reported on.

6.1.2. Draft HF/UHF Funding Options

Darren Spoor presented a draft high-level design for the implementation of an HF communications system. The NEMOC Chair asked that Darren Spoor circulate the draft report including and executive summary to NEMOC members as part of the December 2020 NEMOC meeting minutes for feedback.

6.2. Operations Planning Working Group (OPWG)

Sujeewa Rajapakse provided a brief overview from the OPWG meeting which was held on 17 November 2020. It was noted that AEMO reported to the OPWG that it had completed building a lumped mass model to model Under-frequency load shedding (UFLS) review for the NEM. This new model includes modelling of battery storages and rooftop PV in SA. The current priority is to allocate UFLS settings for few new loads in SA which may require a review of the SA UFLS design and in addition a review of other regions will follow.

It was noted that works are progressing regarding implementation of over-frequency generator shedding (OFGS) settings. Investigations revealed that older wind farms with older versions of firmware go to pause mode at 51 Hz irrespective of their OFGS settings, which impacts the

overall OFGS scheme. With that said, a review of the agreed performance standard for older wind farms in the NEM are progressing as a high priority. It was noted that the OFGS settings developed by TasNetworks have worked well with no additional work required for this region.

The OPWG discussion paper (final) on Voltage control in the NEM under light load conditions was presented to the Joint NEMOC/EJPC workshop in October 2020. This version included recommended actions with priorities and were categorised as follows:

- Short term actions: actions to commence immediately
- Medium term actions: actions to commence from 12 months to 24 months
- Long term actions: actions to commence from 24 months and in conjunction with network planning activity

The recommended actions were also grouped into the following categories:

- AEMO/TNSP actions
- Actions associated with distribution networks
- Further investigations required

The OPWG is awaiting NEMOC instructions to implement short term actions listed in the document.

It was noted that the 2019/20 Summer Network Outage Planning Guideline was discussed, with all members agreeing to use the same guideline with new network elements included for the next summer period (2020/21). In addition, Leanna Tedesco and Ken Harper (AEMO) provided an update on AEMO's preparations for summer

The OPWG conducted an out of session meeting on 12 November 2020 to discuss network outages that required liaising with generation in adjacent regions and embedded generation. It was noted that the main issue has been communications required to ensure the number of inverters/wind turbines that are in service do not exceed the allowed limits for planned network outages. Ben Blake (AEMO) reported that most of the inverter/turbine limits in QLD, VIC and SA have now reduced with the use of a new models, except for islanding conditions. AEMO is liaising with TransGrid regarding new models used for NSW. AEMO undertook an action to follow up with AEMO's NEM Connections division to avoid where possible this issue again moving forward.

A presentation was provided to the OPWG by Chris Stewart (AEMO) on the development of the roll-out of Phasor Measurement Units (PMU's) and high-speed monitoring system (HSM) program, which has been assigned to the OPWG to coordinate and report back to NEMOC as required.

6.3. Power System Modelling Reference Group (PSMRG)

Babak Badrzadeh provided a brief overview from the PSMRG meeting which was held on 18 November 2020. Babak Badrzadeh advised that the PSMRG have three new members join their reference group, Mark Gordon (AEMO), James Guest (AEMO) & James Lord (TasNetworks) as a PSMRG young engineer member. Babak Badrzadeh encouraged other working groups to include young engineers as part of their membership.

It was noted that the recent System Strength Workshop videos have been uploaded to both the CIGRE and AEMO websites. Attendance for this workshop ranged from 480 – 1300 participants.

The PSMRG discussed AEMO's four-state PSCAD model. It was noted that V1.2 (December 2020) will contain committed generation and V2.0 (February 2021) will be built using the winter minimum snapshot, with AEMO targeting V2.0 to contain DER and composite load models.

Babak Badrzadeh added that the 2021 System Restart Ancillary Services (SRAS) procurement process is underway with data requests sent for SRAS modelling.

6.4. Operations Training Working Group (OTWG)

Daniel Lavis provided a brief overview from the OTWG meeting which was held on 19 November 2020. It was noted that the National Training Framework (NTF) review is progressing with OTWG members agreeing that there is a need to adopt an NTF or a National Training Standards. OTWG members concluded that there are four feasible options for progressing which are outline below.

1. Develop a set of training standards that could be used when organisations develop their own training programs and material, to ensure that all stakeholders adhere to the same guidelines and the level and standard of training across the industry is benchmarked and formalised. Organisations develop their own training methodologies and fulfill their own performance goal requirements, whilst still meeting the industry workforce development needs and training standards. AEMO's role would be the development, maintenance and governance these standards. We would also implement a mechanism that allowing substantiation that standards have been met. A Registered Training Organisation (RTO) would be utilised in this option to assist with developing and maintaining the standards.
2. Develop and implement a pilot program, commencing with Renewables, for one or two Power System Operator Roles. An RTO would consult, develop and deliver the modules and training programs. If successful, this program could be expanded to include additional roles and/ or modules, generators and TNSPs/ DNSPs. This option would be agile and progress in small segments, allowing for adaptation as required.
3. Progress with the NTF proposal, whereby a complete suite of standard modules would be created for the main tasks of power system operators. These modules could be mix-and-matched, delivered as is, or adapted to individual organisations. This option would see training delivered an RTO. Assessments could also be delivered by an RTO, individual organisations, or by AEMO (as a mechanism for regulation, review and reporting). This is the option where we progress as a larger program for power system operators across the industry, not just renewables.
4. Do Nothing and continue with the current training situation.

Daniel Lavis advised that an NTF discussion paper will be prepared and presented at the May 2021 meeting which will outline the current situation, issues and possible options forward. The objective from this meeting is to decide on a way forward.

Daniel Lavis advised that a presentation on Behavioural Training was presented by Transpower’s Technical Training lead, Darshan Shetty. The training was control room specific, which contained Behaviour Competencies for Controllers and Operation Managers. The purpose of this presentation was to highlight the importance of including behavioural training in Power System Operator training programs. Modules demonstrated are outlined below.

- Human Factors in the Control Room
- Communication – General Communication Skills
- Decision making in the Control Room
- Teamwork in the Control Room

Daniel Lavis added that Darshan Shetty from Transpower would be added as a regular participant of the OTWG moving forward.

A presentation was made to the OTWG from Thomson Bridge on Example Training Module which are specific to Renewables. The presentation outlined module objectives relating to comprehension of terminology and concepts used when communicating with AEMO Control Rooms. A major component of this presentation was to demonstrate the INCSYS simulation software, used by Thomson Bridge for Power System Operator training simulations. The software models grid performance could be configured and utilised for various Control Room training modules.

Daniel Lavis advised that each TNSP representative provided an update on their Summer Readiness plans and Covid-19 responses with AEMO providing an overview of the Summer Plan for 2020/21.

The next OTWG meeting will be held in May 2021.

7. Noting

7.1. Summer 2020-21 Readiness Plan (Published 26 November 2020)

8. Other Business

8.1. Next Meeting/Workshop

NEMOC Meeting #23	19 March 2021
NEMOC & EJPC Workshop #3	23 July 2021