

MINUTES

MEETING: NEMOC
DATE: Thursday, 11 April 2019
TIME: 9:30AM – 3:30PM
LOCATION: ElectraNet
55- East Terrace
Adelaide SA 5000

MEETING 15

ATTENDEES:

NAME	COMPANY / DEPARTMENT
Christian Schaefer	AEMO (Chair)
Kylie Carns	AEMO (Secretariat)
Teresa Smit (Proxy)	AEMO
Kate Summers	Clean Energy Council (CEC)
Verity Watson	Energy Networks Australia (ENA)
Mike Paine	TasNetworks
Gary Edwards	Powerlink
Ben Skinner	AEC
Naresh David	AEC
Lillian Patterson	CEC
Andrew Kingsmill	TransGrid

PRESENTERS:

NAME	COMPANY / DEPARTMENT
Daniel Lavis	AEMO
James Lindley	AEMO
Sujeewa Rajapakse	AEMO
Babak Badrzadeh	AEMO
Darren Spoor	AEMO

APOLOGIES:

NAME	COMPANY / DEPARTMENT
Dean Sharafi	AEMO
Blake Harvey	ENA
Tim Lloyd	AusNet Services

1. Welcome and introduction

- Chair welcomed and introduced members to meeting

2. Minutes of Previous Meeting and Actions

- Meeting minutes were accepted.
- Actions were discussed and to be updated to reflect changes discussed. Any further changes to be noted to secretariat.

ACTION: 15.2.1 AEMO to provide the next meeting an organisation chart diagram of the NEMOC working group structure, a compilation of all their TOR and current members.

3. NSP Memo- Map Publication

- Letters have been sent from AEMO to TNSPs, advising them of updates to the generation and connection maps. AEMO are requesting assistance from NSPs get aggregated enquiries information to inform industry where there is an over subscription in interest compared to capacity. In future, MLFs will also be placed on the maps, and the interactive map on the AEMO website.
- This information will be used to assist developers to steer them in the right direction.
- CSchaefer noted that there is a rule change underway to help share enquiries information that will help to avoid pitfalls and for NSPs to manage their risks
- It is AEMO's intent to provide regular updates.
- It was noted that sanity checking is still needed for proponents wanting to connect.
- BSkinner stated it was a great initiative from AEMO.
- MPaine noted that anything that will lead to investment outcomes is a positive initiative. The issues currently seen are about generators not wanting to speak to each other. Collectively generators can unbundle this information.

ACTION: 15 .3 .1 AEMO to update committee at next meeting on Generation Map

4. Inertia Modelling Tool Presentation

- Teresa Smit presented on the Inertia Modelling Tool used in WA.
- Western Australia has a high demand of DER coming in. Questions were raised about what is the maximum generation you can put on the system. Studies were completed to see what inertia limits were needed to be placed on the system.
- Inertia monitoring is about estimating what is on line and being aware of it. The tool shows controllers when they need to be concerned (noting at this stage there is no need to raise concern other than talking about what is going on. Danger periods have reached high thus far)
- KSummers noted that this gives us all the information to proceed further, though also noted that protection engineers need to have input and it needs to be completed with guidance.

5. Summer Recap for 2018/19

- Mike Davidson of AEMO presented on the Summer 18/19 period.
- Records have been broken throughout this summer with January being the hottest on official record (BOM predicted burst of heat at the beginning of the summer)
- Summer is officially titled from November through to March
- It is now getting harder to provide graphs focusing in the future. More often, AEMO is noticing short term forecasting is required, but there is no relevant history to base the forecasting on.

ACTION: 15.5.1 Andrew Watkins to present at next NEMOC meeting in June and for it to include reflection on the 18/19 summer and summer 19/20 predictions.

- Of all the states the Victorian forecasting Victorian demand remains the most challenging. Weather conditions, particularly cool changes and sea breezes have a

significant impact on Melbourne CBD, specifically in summer. Because of the difficulty in forecasting Victoria Operational Forecasting monitor this forecast very closely and impose a manually derived forecast. Analysis shows that these interventions have improved the forecast accuracy over the last summer.

- In regard to long term forecasting, AEMO don't tend to look too far back due to market changes, but on average their forecasting performance has held up and doesn't change much- It seems to stay constant.
- BSkinner questioned if there was forecasting around the AWEFS/ASEFS over this past summer. MDavidson noted that planning does happen and analysis included ASEFS. Systems were brought that showed increased ability for cloud prediction, which is a huge bonus for forward planning of ASEFS/AWEFS.
- Forecasting includes sensitivity to relative humidity for all regions and not just Queensland.
- Feedback received from the Summer Review stakeholder sessions was that it was too Government centric and not industry related. Noted it should include load shedding etc.
- There will be a tender for forecasting accuracy systems for ASEFS and AWEFS.
- BSkinner questioned if there were incident reports for the load shedding days. MDavidson noted a report in being finalised and will be published soon.
- CSchaefer noted that the hardest element to deal with forecasting are the cool changes and sea breezes.

ACTION 15.5.2 MDavidson to provide an update at next meeting on further information to be extracted from these reports such as impact on accuracy for Solar PV rooftop, embedded generation, dispatch and operations security, (weather changes/increased uptake across the NEM and the impact on system inertia.)

6. System Strength

- CSchaefer presented on System Strength
- Systems Strength is a localised concept reflecting the stiffness of network voltages in response to small and large disturbances. It effects the stability and dynamics of generating systems control systems and the ability of the power system to remain stable under normal conditions and return to steady-state conditions following a disturbance.
- Victoria is starting to have multiple issues so further investigations will commence in due course.
- AKingsmill suggested that the Regulator should be engaged in the topic and possible involved at the next NEMOC meeting. BSkinner noted that AEMC/AER would be only beneficial in the planning space and it would be better to take issues through to planning before the AER/AEMC.
- KSummers noted that there are differences in how we operate the powers system compared to what is happening with the setting of the control systems. Power system control philosophy is being replaced by a market philosophy. A suitable hierarchy of control needs to be re-established, so that correct local control occurs in response to the system without market interference. Having a clear understanding of the local response will enable you to plan for the future. You can't run a power system without the ability to retune and reset control systems.
- AKingsmill stated that the more schemes they get, the higher the risk of maloperation and different philosophies that the operators manage. When the power system was planned 40 years ago, there were certain assumptions and levels of tolerance that there was margin in

it. Operation is now at micro-second levels, so we are inherently removing a lot of the margins and when it comes to operating the systems, issues could possibly arise.

- NEMOC agreed that there are issues that need to be changed in operations to optimise the systems in its current state.
- KSummers stated that fundamental practises in chapter 4 are not currently highlighted. Such as primary control systems should respond to stabilise voltage and stabilise frequency. The market has allowed these controls to be undermined.
- KSummers suggested this be taken to the Power Systems Security Working Group for contemplation that there is a philosophical control issue.
- CSchaefer suggested that the PSSWG look at the real time management of systems strength issues and problems and how is this captured in chapter 4.
- AKingsmill suggested a “stocktake” with the risks on where we are now. The PSSWG and the OPWG should work together on producing a concise report on the state of current systems, then the NEMOC can review and determine whether we are able to engage the AEMC or not.
- RKorte stated that there are several working groups that are not operational based but planning based. It is a good idea to review the current groups and see if they should still be under the NEMOC banner.

ACTION: 15.6.1 PSSWG/ OPWG- to report on what are the gaps in the system and the operational impact of System Strength issues and to report to NEMOC at next meeting.

ACTION 15.6.2- The OPWG and the Executive Planning Committee (EPC) to review how they interact and how they assist each other and report back to NEMOC.

7. Use of EHV Line Switching

- Gary Edwards presented a paper on switching of extra high voltage (EHV) line for voltage control.
- Powerlink have suggested that where a transmission line is switched out of service for voltage control, that AEMO publish a market notice highlighting that all potential means of reactive support (ie. Cap/reactors/generators) were already considered and ruled out.
- Switching out a transmission line should be considered as last resort. Consequently, a line should only be removed after all available reactive controls were employed and studies confirmed that reliability of the transmission system will not be adversely impacted.
- BSkinner stated that we shouldn't apply the rule of thumb approach and each individual option should be looked at for the potential impact, dispatch and maintenance damage. There could be options on taking a few lines out. Concerns raised are the same concerns that the AER would raise. BSkinner questioned whether AEMO have the power to apply the TNSP. CSchaefer noted that as far as system strength is concerned, line switching would occur through direction of AEMO. AEMO wouldn't tell the TNSP how to plan their network but will advise the best ways to operate it.
- CSchaefer noted that line switching in the LaTrobe Valley is a great example of issues that can arise from a line switching scenario i.e. switch out too many lines and it becomes and issues of resilience and possibly security. This highlights that there needs to be a voltage control strategy. AEMO are still operating the grid on power control and some measures should be considered within reason. With the introduction of a five-minute settlement the control room operates with five-minute intervals and it will be hard to manage if they have

to then look at line switching scenarios while balancing dispatch. Also, how far do you go with line switching before it becomes a stability issue?

- KSummers noted that once you take out a line, you change your system normal. Constraints are based on the systems normal, so changing this will then impact constraints.
- BSkinner suggested using this as a planning tool eg. Is the planner allowed to consider two lines?

8. Working Group Updates

8.1. OPWG- Sujeewa Rajapakse

- The last OPWG meeting convened on 26 March 2019.
- Work has been completed on the OPWG discussion paper on voltage control in the NEM under light load conditions.
ACTION: 15.8.1.1 OPWG to present a draft to the NEMOC at the next meeting
- TNSP and AEMO agreed that the 'Reflections on summer network outages planning guideline' worked well in outage planning process. There were some outages that needed to be accommodated in Victoria for generation connection. Both AEMO and TNSP's agreed that updates will be accommodated and the guideline will be used going forward for the 19/20 Summer.
- The Transmission failure project was presented to the OPWG by AEMO (Glenn Gillin) – phase 1 (of 2) has been completed
 - Faulty protection 49% incident report
 - Failure of equipment 24%
 - Human Error – 24%
- The new NOS functions/improvements will be available mid 2019 which will give more flexibility on the use of NOS
 - forced outages are currently hard to identify, but with the new improvements these will be able to be flagged in the system.
 - AEMO will be able to add records on line outs and add constraint
 - UFLS is progressing well
- Next meeting mid June 2019

8.2. PSSWG- Darren Spoor

- At last meeting they discussed on impact of fires in particular the Tasmanian, particularly the impact of smoke
- Discussions focused on the power system security on the need to have constraints on the systems
- Discussions on the rapid development of protection schemes- Requested that NEMOC approve a subgroup to development guidelines on protection schemes.
- Load shedding – discussion on process/procedure- intent to have finalised by 15 May meeting. The objective is to cover:
 - The legal requirement by the AER on provide guidance load shedding control schemes
 - Definition of what load shedding is
 - Attempts to define a document that the TNSP has produced on load shedding plans
 - NER has responsibility to AEMO- TNSP are responsible – manual load shedding

- Intent to focus on communications – monthly check on satellite phone systems. Tests to date are questionable under bad weather conditions. Tests are being held between AEMO and TNSP control rooms. An update will be given at the next NEMOC meeting.
- Discussion around potential overlaps between the SPSWG Terms of Reference and the outline of the Communications working group were noted
ACTION: 15.8.2.1 KSummer to call Darren Spoor to discuss working group TOR's further
ACTION: 15.8.2.2. CS to follow up how the working groups can work together regarding the communications issues.

8.3. FCWG- James Lindley

- No meeting since late December, however AEMO has had numerous discussions with generators to work with industry to establish Primary Frequency Control arrangement by quarter three 2019. AEMO have spoken to most major participants in one on one conversations and have had a positive response.
- Creating set of rules that we are looking to implement soon. These were intended to be completed by end of April but have had to extend timeline due to feedback from industry. Due to dealing with parties that have differing views about what the way forward is, it will be difficult to do in an expedited manner.
- The increase in FCAS design have had additional items that they have taken into account- AEMO have increased regulation FCAS in NEM and results show that we have met 99% requirements so now AEMO are making assessment on next step increase.
- Undertaking additional reviews:
 - PSC review of AEMO's AGC system in frequency control. Currently re-engaging consultant to review again due to changes in the performance. Digsilent were asked to review their report from 2017 to see if there are any additional findings due to decline in frequency control.
 - Engaging US consultant to perform assessment on frequency control in particular to international practise and control
- Investigating regional requirements of frequency control services. Analysis should be available shortly. Additional to the rule change
- Reviewing obligations on frequency control providers in the market – MAS has requirement on frequency control services end that they should end when Frequency has reached 49.9Hz-50.1 band. Asymmetric design to the current FCAS services. AEMO have reached out to providers of contingency services and will be working together over the next few months to ensure that the requirement is clear.
- JLindley noted that they are looking at the need for the working group to continue. Due to the complex frequency control agenda, the best way forward is to communicate with participants with one on one meetings.

8.4. PSMWG: Babak Badrzadeh

- Last PSMWG meeting was held 12 February 2019 in Hobart
- The next meeting July will be their annual meeting including updates from their delegated task forces
- Discussions from their last meeting included:
 - Mudpack –discussing with AEMO/ TNSP to determine level of engineering for signal models and licenses that are needed to negotiate with software vendor- focusing on this work as they complete existing task force

- Future taskforce in August 2019. Requirements include:
 - Publish systems strength requirements and inertia
 - Planning of 5 year timeframes
 - Further analysis of regions other than SA that could have shortfall
 - Methodology has been given to a taskforce for completion at the end of year
 - Look into options to improve systems strength and synchronous condensers – grid forming inverters – moving towards potential systems security condensers
 - Investigate what services are needed to operate system securely
- GEdwards questioned the operational aspects vs future planning and what is the operational focus or planning?
 - BBadrzadeh noted it was initially set as the Network Providers full responsibility. AEMO is already discussing with Powerlink and planning of day to day running of systems. Concerns are the short time frame to NSPs. The concern was the timeframe available for make assessment is appropriate to look into aspects of what is required to respond to generators.
- CSchaefer questioned the coordinating of synchronous condensers activities such as ElectraNet’s previous work and how do planning functions fit into an operational space. BBadrzadeh noted:
 - There is a Joint Cigre/C4 Working Group. AEMO has requested leading a synchronous condenser taskforce that would leverage on a international working group through CIGRE.
 - Looking at running a system on asynchronous condensers.
 - ElectraNet have two members in taskforce and with AEMO have proposed a performance standards template.
 - In regard to the operations space, the PSMWG are clear it is not looking at 5-10 year time frame. The have agreed to exclude market implications – this working group is not the right forum for discussions on options.
 - PSCAD Taskforce-
 - This is not a legal requirement so therefore there no specific date lines, but they have not budgeted for NEMOC review, but instead have suggested that the review comes from the right technical people in the organisations. If NEMOC need to review requirements, it will delay publication by 2-4 week.

ACTION 15.8.4.1: Executive summary of taskforce is required by next NEMOC and to include key findings

ACTION 15.8.4.2. All participants on all modelling taskforces to be supplied to NEMOC Secretariat.

9. TOR Operations Training Working Group

- Daniel Lavis joined the meeting to discuss the Terms of Reference for the Operations Training Group.
- TOR’s have been endorsed from all of the five NEM TNSPs

- Concerns around costs and ideals around operator competency. This working group will be used as a forum to achieve better training for operators.
- KSummers recommended field training for operators to get practical training.
- BSkinner noted that generators were not really interested in being involved in the actual operator training, but were open for opportunities to be involved in future shared sessions etc.

ACTION 15.9.1 DLavis to provide a timeline for the next 6, 12 and 18 months and present at next meeting.

10. Other Business

- GEdwards suggested that the chair of each working group attend a NEMOC meeting to discuss forward planning. Further discussion will be needed on this.

ACTION: 15.10.1 Forward planning is needed for all workgroups- Gantt chart to be provided by head of each working group with timelines on current and future work.

- It was noted that after discussions, that the EJPC and NEMOC should meet to align work commitment with working groups.

ACTION: 15.10.2 Meeting to be set up in June with NEMOC working groups and EJPC to streamline work

- BSkinner raised a query regarding the Newport terminal and a direction incident that occurred in September 2018. Due to a light load, AEMO initiated an ancillary service arrangement and directed Newport to maintain power. BSkinner noted that he was under the impressions that this is how the market is supposed to work after an event, so why was this not achievable in the South Australian issue?
 - RKorte noted that AEMO was seeking further system strength gap, so ElectraNet sourced how to address this. They looked at sourcing contracts with existing generators to operate when required but didn't go ahead since the pricing was going to cost customers much more that it was for AEMO to continue to direct. It was not in the interest of customers to go down that route and proposed that AEMO continue direction while ElectraNet put in place a synchronous condenser solution. There is an economic assessment that was published regarding this.

National Electricity Market Operations Committee Forward Plan

	Location	Hosting Organisation
Friday 21 June 2019	Brisbane	Powerlink QLD
Thursday 5 September 2019	TBA	TBA
Thursday 5 December 2019	TBA	TBA