

MINUTES

MEETING: Control Room Operations Working Group (CROWG)
DATE: Wednesday, 21 July 2021
TIME: 09.30am – 12.30pm
LOCATION: MS Teams Meeting
TELECONFERENCE DETAILS:

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[+61 2 8318 0090](tel:+61283180090) Australia, Sydney (Toll)

Conference ID: 884 698 85#

ATTENDEES:

Name	Initials	Company / Department
Mario Rositano (Chair)	AB	AEMO
Alexis Bowman	ALB	AEMO
Daniel Lavis	DL	AEMO
Darren Spoor	DS	AEMO
Ken Harper	KH	AEMO
Mario Rositano (Chair)	MR	AEMO
Mark Gordon	MGO	AEMO
Petar Pantic	PP	AEMO
Adam Budzynski	ABU	AGL
Garry Paterson	GP	AGL
Kerri Slatter	KS	AGL
Melissa Mason	MM	AGL
Paul Clark	PC	AGL
Christopher Migocki	CM	Ausgrid
Graeme Bowey	GB	Ausnet
Colin Taylor	CT	ElectraNet
Doug Deans	DDE	ElectraNet
Duane Brooks	DBR	ElectraNet
Jason Causer	JC	Endeavour Energy
Neil Grigg	NG	Energy Australia (Yallourn)
David Gray	DG	Energy QLD
Matt Donaldson	MD	Essential Energy
Mike Griffiths	MGI	Origin Energy
Leanne Maurice	LM	Powerlink
Matthew Corney	MC	Powerlink
Ed Sellwood	ES	Powerlink (2 nd half of meeting)
Bill Clark	BC	Stanwell
Brad Shipanski	BSH	Stanwell
Colin Sharp	CS	TasNetworks
Darrell Blackford	DBL	Territory Generation (NT GOC)
Bradley Shipp	BSP	TransGrid

GUESTS:

Name		Company / Department
Chitresh (Resh) Mukherjee	CM	Acciona
Piers Wall	PW	Acciona
Rajesh Arora	RA	AECOM
Dylan Reynolds	DR	AGL
Derek Dymond	DDY	BayWa r.e. Australia
Nathan Everitt	NEV	BayWa r.e. Australia
Adrian Pang	AP	CWP Renewables
Jose Fortes	JF	CWP Renewables
James Ley	JL	Energy Australia
Stephen Challis	SC	ESCO Pacific
Colin Bonner	CB	Fulcrum3D
Daniel Murphy	DM	Fulcrum3D
Jacky Han	JHA	Fulcrum3D
Jo Hume	JHU	Fulcrum3D
Tony Saker	TS	Goldwind
Harley Mackenzie	HM	HARD Software
Paul Vickers	PV	HARD Software
Stephanie Easton	SE	Iberdrola Australia
Andreas Molnar	AM	Indra
German Burbano	GB	Indra
Jarryd Doran	JDO	LGI Limited
Matthew Tap	MTA	LGI Limited
Daryl Smith	DS	Meridian Energy
Hal Jorgensen	HJ	Neoen
James Fuller	JF	Overwatch Energy
James Tetlow	JTE	Overwatch Energy
Jonathon Dyson	JDY	Overwatch Energy
Victor Depoorter Ruelle	VDR	Proanalytics
Jeffery Thomas	JTH	Res-group
Peter Veljkovic	PV	RWE Renewables Australia
Ron Logan	RL	Shell Energy Australia
Steve Frimston	SF	Shell Energy Australia
Nick Engerer	NEN	Solcast

APOLOGIES:

Name		Company / Department
Bashar Derbas	BD	AEMO
Caroline Ferris	CFE	AEMO
Elise Harmer	EH	AEMO
Lenard Bayne	LB	AEMO
Mark Pollock	MPO	AEMO

Name		Company / Department
Raj Ippiliapiah	RI	AEMO
Brenton Medlin	BM	AGL
Grant Matherson	GMA	AGL
Alan Jenkinson	AJ	AGL Loy Yang
Paul McNamara	PMC	AGL Macquarie (Bayswater)
James Mortimer	JM	APA
Joo Ean Prasad	JEP	Ausgrid
Joo Wee	JW	Ausgrid
Kylie McClafferty	KMC	Ausgrid
Martin Cavanagh	MC	Ausnet
Matthew Sands	MS	CleanCo QLD
Anthony Ham	AH	CS Energy
Greg Dale	GD	CS Energy
Ian Swift	IS	CS Energy
M Greenaway	MGR	CS Energy
Henry Rich	HR	Delta Electricity
Simon Bolt	SB	Delta Electricity
Tim Gray	TG	ElectraNet
Ken Wilby	KW	Endeavour Energy
Robert Armstrong	RA	Endeavour Energy
David Molla	DM	Energy Australia
Brett Harrington	BH	Energy Australia (ECOGEN)
Craig Flanigan	CFL	Energy Australia (ECOGEN)
Gayle McAllister	GMC	Energy Australia (Yallourn)
Nikki Barbi	NB	Energy QLD
Russell Gordon	RG	Energy QLD
Simon Ahrens	SA	Engie
ESCO Pacific	ESCO	ESCO Pacific
Peter Kirkpatrick	PK	Essential Energy
Matthew Turner	MTU	EVO Energy
Wahid Ibrahim	WI	EVO Energy
Aaron Lai	ALA	Fulcrum3D
James Sherrin	JS	Hydro Tas
S Burge	SB	Intergen
David Elkington	DE	Loy Yang B
Brett Wills	BW	Origin Energy
Chad Thompson	CT	Origin Energy
Robert Chapman	RC	Origin Energy
Steve Saunders	SS	Powerlink
Duncan Griffin	DG	Powerwater
Ian Ferguson	IF	Powerwater
Vernon Lee	VL	Powerwater

Name		Company / Department
Sam Gard	SG	Res-group
Michael Edmonds	ME	SA Power Networks
Michael Paine	MPA	Snowy Hydro
Brad Perry	BP	Stanwell
Elizabeth Beavis	EB	Stanwell
Darrell Backford	DB	Territory Generation
Trevor Lim	TL	Total Eren

1. Welcome and Introduction

1.1. Roll Call was taken via MS Teams

- Welcome to all participants
- Apologies accepted from various members who were unable to attend.

1.2. Purpose and objectives of today's CROWG meeting

Main purpose and objectives for today are to:

- Continue discussions on some of the topics that were raised in the last meetings and to provide updates on where some of the work stands.
- Introduce and explore new topics
- Apologies accepted from various members who were unable to attend.
- Discuss the 'Guest Membership' arrangement for semi-scheduled and non-scheduled participants, as agreed at the last meeting.
- share ideas and experiences and matters that relate to our work in the control rooms. Share opinions, insights, etc.
- Improve control room operations and relations in the NEM as per the TOR

1.3. Introduce any new members/guests

Welcome to new members and guest members of the CROWG:

- Read through new members/guests from AEMO, as well as other new guests to the CROWG.

2. Minutes/ Actions

2.1. Previous meeting minutes

Previous minutes were accepted by Phil Gay from AusNet

2.2. Updates to actions register made

Refer to actions register for details. Items 13 and 14 were actioned and are now closed. Work will continue for Item 15 (Item 10 is also associated with Item 15). No further comments from the group.

3. Electricity Industry Terminology and Phraseology

3.1. Latest Update

Following on from the last CROWG meeting in April, a sub-group from within the CROWG was formed to create the System Restart Terminology and Phraseology spreadsheet.

- The document was forwarded to all CROWG Members for comment.
- The next step is to have the document endorsed by the CROWG and then the wider industry.

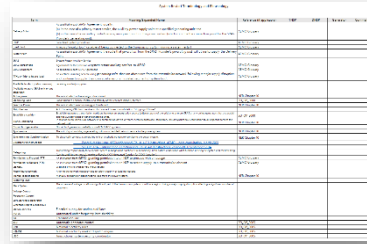
Action: Mario will send the document to the CROWG for endorsement.

- A mechanism to keep document up to date is required. Mario will lead this initiative and send out information to the CROWG when available.

Action: Mario to send the CROWG information relating to the document currency mechanism.

Action: Alexis to send to participants a copy of the System Restart Terminology and Phraseology Spreadsheet, with the meeting minutes.

Click the following image to open the spreadsheet:



[Terminology and Phraseology Spreadsheet](#)

How can this document feed into controller competency framework? -

- DL – (AEMO) - From RTO Training spoke about the OTWG and phase 1 of developing a framework and are concentrating on a suite of knowledge-based modules to assist with training PSO's as the first phase of an NTF. More information will be provided to the CROWG, as the framework is developed.

3.2. Question for Semi & Non-Scheduled (SNS) participants

- Would a standard set of operational terminology and phrases be of use?
- Has there been issues previously from SNS side?
- What would they like to see on this front?
 - ABU – AGL – Keen to see as there is a gap, especially in the mining industry, stretched across 4 states – this would be a huge step for us and extremely valuable. We would heavily leverage of anything that is developed. We have scheduled and semi scheduled in our control room, so I am keen about this.
 - TS – Has not seen the details as this is my first meeting – very important for us, developing our CR and operations capability and it would be great to get the industry
 - Darren Spoor – Objective is to manage safety in everyday practices
- **Action:** Mario will get the time critical things out for everyone, so the CROWG can start that body of work.
- **Action:** Mario to set up another EITP subgroup meeting and try to get some of the Semi & Non-Scheduled participants involved as well.

4. Control Room of the Future

4.1. Development of new technologies and approaches for enhanced real-time visibility and analysis in power system operator control rooms

This is a topic and discussion that was prompted by Michael Gatt during an SMS Training session earlier in the year, based on a forum he attends - The Global Power System Transformation Consortium (G-PST).

- As a group, we need to think and discuss what our roles and how we work may look like in the future.
- EPRI (Electric Power Research Institute) is currently doing a lot of work this space and have published a draft report.
- MR sent a link via the chat window for a video about the work Tennet is doing in this area. "The Control Room of Future". A European based company primarily covering the Netherlands and Germany grids. (21 minutes)
- It is to generate discussion on the topic.
 - <https://www.epri.com/research/products/000000003002019525>
 - <https://www.youtube.com/watch?v=e2gyZ0vsOxU>
 - <https://www.tennet.eu/our-key-tasks/innovations/control-room-of-the-future/>

4.2. Participant Comments about the video

- MR – (AEMO) - Their 10-year timeline is ambitious. I know how long it took to get a review up back in 2007 for a control room review and getting some progress there. Their system has many similarities. Interconnectors, semi-scheduled plant, demand.

- DDE – (Electranet) – Very aspirational as far as where their maturity model is looking to go. A good presentation and a structure we could leverage from.
- MR – (AEMO) - Dashboards for SA are heavily relied on due to the complexity of the system.

MR – (AEMO) - Another notion is computer or artificial intelligence in the control room. How do members feel about having that in the control room?

- DDE – (Electranet) – Interesting with AI or automation and having the operators be a supervisor of that, with the ability to overrule it rather than the other way around. An obvious extension of where things could go, but there is a big change in management processes to get there.
- MR – (AEMO) - From my point and an operators' point of view, you lose a bit of feel for the system when you allow the automated systems to come in and when things don't go right, you are starting to deal with seldomly used processes. These complex processes start introducing these risks into what we do in the control room. I am not sure if anyone else feels the same way?
- ABU – (AGL) - See advantages having worked with Rio Tinto, there is some touch, feel and intuition that will always be required, from an automation perspective, but certainly the advantage of this is to take away the noise, the easy items that can and should be automated and just observed by an operator, whereas time critical systems, health critical systems should remain in the hands of someone appropriately trained and authorised to do so. The pathway needs to be in parallel to what we currently do.
- DG – (Energy QLD) - I have a slightly different view. The automation will be required with the level of complexity of the system, especially with DER and the ability to have to suddenly move loads and batteries around to get the system operating in a safe manner.
- JD – (Overwatch) - There is still a need for intervention at times – skilled people who know the system and the market. It is already here and happening. There are several companies who are spending millions of dollars on this and many tens of organisations already in the NEM.
- MD – (Essential) - Western Power are running an interim generator access automated system on behalf of AEMO Perth - they are the TNSP and DNSP – constraining all the renewable plant that is coming online. Not ideal for the proponents. It works and constantly applies constraint equations that are constantly updated for outages. So, the access to generators is controlled via an automated system there.
- SE – (Iberdrola) – For us automating our supervisory layout and bidding is a priority on our 5-year technology road map and a critical part of it. One of the key focuses we have regarding AI vs automation – solving complex optimisations in a real time manner and do complex supervising of a growing suite of technology platforms, our operators need to understand how the automated systems work. Fix all the problems along the way. Operators must learn the technology and the workflow steps and try and troubleshoot and make them better along the way. Operators need to know about the automated systems that are helping us with our decision making as well.
- AP – (CWP) – some experience in Automisation helped. Something operators should have as part of their training programs.
- MR – (AEMO) - Early warning or look ahead systems. We have an hour ahead Marketnet system that can do that in a CA capacity. Systems that still need to be developed – stages 4 and 5. Anyone developing these already? – No response
- MR – (AEMO) - Operators as supervisors. What do we think? Lose feel for the system to a degree. Handling complex, but seldomly done processes is a risk.
- Simulator used for training AND testing systems
- Big take out for MR was that there were 45 risks, 17 main ones. Congestion (constraints) the top one – the number of renewables that are coming into the system.
- Data, Software, Hardware aspects purely IT related.
- Decision support – interesting. Stage 3 is still basic. What would that look like?
- The discussion continued about R&D Projects Q1 2021 – we are up to our armpits on these topics already! That is really being actively looked at and a constant development that we will be using.

5. Semi and Non-Scheduled Presentations and Q&A

5.1. Presentations

- Ellise Harmer – Extreme Weather Events in Australia – moved to next meeting, as Ellise Harmer was not able to attend this meeting – COVID test in SA.

5.2. Operational Contacts

- **Importance of maintaining current operational contacts for power system security (voltage/dispatch/security). Feedback on process for updating contact details via Support Hub**

Darren Spoor lead the discussion for this topic.

- For the past year, Darren has been part of the Generator Connection Registrations Process – one aspect is ensuring that the Operational contacts meet the NEM Generator Connection Guidelines requirements.
- AEMO are looking for two points of independent contact, and not mobile phones.
- In some circumstances, we may make an assessment of the risk in relation to system security:
 - If there is mobile reception in the location of the NSP; and
 - If we don't believe system security will be impacted by delays in communication,
- Then we may accept mobile telephony, but by and large, that is not the case.
- Once a generator is registered in the power system – there is an ongoing obligation to comply with the various clauses of the NER – the most notable being 4.9.2 subclause D.
- All participants online must be available 24/7, receive a verbal instruction and act on it immediately.
- If participants have any questions about the points of contact for new information and new updated communication details, they are to contact the AEMO support hub.
 - A request will be raised
 - A ticket/request number is then assigned
 - The ticket can be tracked, and confirmation will be provided, as to when the changes are made.
- This is the process for all participants, as opposed to coming to Operations directly.

AEMO Information and Support Hub
Support.hub@aemo.com.au
1300 236 600; or
Complete an enquiry form on the AEMO
website: <https://aemo.com.au/en/contact-us>

Questions regarding this discussion?

- KH - (AEMO) – A couple of points to add:
 - Challenges, after commissioning the need to update contact numbers. This is generally done well, but patchy on some occasions, where people have moved through that commissioning process to operations and provided those updated details.
 - The other area is that it is not just important that the people answer when called from the Control Room, but that they action the instruction within 30 minutes. Particularly in relation to some voltage control challenges we have faced on a couple of occasions. Some people do not answer the phone, but some of the people who do answer were not able to follow through with the voltage control instructions within the timing we needed. That is something we have seen sporadically and in the last two weeks, there was an incident relating to this issue.
- DS – (AEMO) – Putting this into contact, in terms of Real Time Operations:
 - If AEMO can contact the participant, however they are not able to act on the instruction, it then becomes a discussion between that participant and the AER.
 - We must all be aware of our obligations and the implications of failure to achieve those.
 - Collectively we are trying to make sure the system remains secure.
 - If participants have specific concerns about this topic, they can reach out to Darren, however if there are contact numbers that need to be changed, that is carried out by the Support Hub.
- NAE – (BayWa) – raised a query about mobiles not being desired:
 - With the current global situation, a lot of people working from home and not based in offices. Calls are diverted to mobiles.
 - Is there recognition that changes may need to be made on that front?
- DS – (AEMO) – This should be addressed at registration process time:

- The baseline is a control room that is responsible for managing the participants assets, with two dedicated PSTN connections.
- Any lesser standard, including using mobiles, may be accepted, following discussions during the registration process.
- However, participants must have the ability to comply with 4.9.2 subclause D.
- Previously, it has often been difficult to make timely contact with technicians via mobile phones.
- If there is a number that redirects to mobile phones until the call is answered, that is a possible solution that can work.
- AP - (CWP Renewables) – Are there different lists that sit with AEMO?
 - When we contact the Support Hub to change a contact for the control room, do we need to specify it is for LTO?
 - We have had instances where the AEMO Settlements team contacted my Control Room. But also, the LTO contacted someone in Settlements for something in Real Time.
- DS – (AEMO) – Yes. The Support Hub will process the information participants provide and make sure the multiple databases across the organisation are updated.
 - If participants provide contact numbers for a control room and a training desk and an offline manager, RTO will need access to the control room and the training desk, but the other numbers may need to be relayed to other points of contact within the organisation.
 - The Support Hub can process and manage that.
 - However, if participants contact RTO directly via email, we will do our best to update that data.
 - If this method is chosen, there is no guarantee if or when the data will be updated.
 - If a request is placed via the Support Hub, it is a guarantee that the updated contact details will be added to the places that they are supposed to be.
- BSP – (TransGrid) – The primary contact mobile numbers we have for semi scheduled units are often wrong numbers or not being answered and invariably we cannot contact them. We try to contact semi scheduled units on weekends to advise that they are off their targets, but we cannot contact them.
- DS – (AEMO) – Happy to speak about it off-line with participants, but if this appears to be an ongoing thing, we can always escalate this issue through a non-conformance process if required.
- PG – (AusNet) – We have a similar issue to Brad when we sometimes try to contact renewables or semi-scheduled units for outages. Most contacts use mobile phones, with there being only a couple of contacts who have provided PSTN numbers. If post project, are they being audited at all?
- DS – (AEMO) – From an AEMO perspective, we are going through an audit of all our points of contact in our databases. All participants will receive a test call in the coming months. The objective is to ensure that we have the correct point of contact and allow us to comply with the various clauses of the NER during a crisis. However, if you are an NSP and you have concerns about the ability to contact specific units, the best approach would be to have a collaborative and collective conversation with the participant concerned, possibly with Darren’s support. Over past few months several participants have proactively enhanced their control room facilities. Commendations to Goldwind. They have worked with AEMO very proactively and are demonstrating the type of spirit that we want to see in the power system. Taking it further and seeking derogation up front, is not the way to go. Trying to educate participants on where we require them to be, based on system security obligations, is the best strategy.
- BSP – (TransGrid) – Can a comment be added to the minutes about what is the requirement for AEMO for this?
- **Action:** Alexis to add link or entire document for the NEM Generator Connection Guidelines.

Click the following image to open the guide:



[NEM Generator Registration Guide](#)

- SE – (Iberdrola) – A recommendation from our side – we have 24/7 phone lines and we also have instances, particularly during snap lockdowns, where we must use mobile phones. The biggest issue with contact number is that some roles are changing with different generator roles – For assets where we have done a contact number update, years later we still have calls coming through to the wrong numbers. To date all those calls have been picked up, but We need a mapping of the roles and responsibilities in our organisations – both on an ongoing basis and assets that were registered ten years ago, almost a two-way information flow that we can get confirmation that AEMO have the correct contact numbers for us and those roles, it is quite clear what is expected. One thing that was useful in the terminology file we were previously discussing, the scripts, in terms of what the control room expect to be communicating with different participants. Those types of scripts and what role in our organisation they expect to give that communication to, is very useful. Helps us to make sure that we are giving the right numbers to each of those roles, and they know how to quickly action any type of direction that comes through.
- DS – (AEMO) – Those sorts of queries can be directed to the Support Hub. They can provide the database points of contact AEMO has for your organisation and they can also update any details as required. The numbers provided are kept in confidence, as are the control room numbers. They are not publicly available.
- As for points of contact in your organisation, AEMO looks at it in two ways. Security contacts and trading contacts. If it is a Dispatch related verbal instruction AEMO will call the number for your trading desk, if you have one. If it is a security related matter, AEMO will call the control room contact, if you have provided us with one. Two distinct points of contact. Stephanie – to contact the support hub with her questions.
- HJ – (Neoen) – Perhaps we can come up with some sort of template , whereby if an organisation wants to update their contacts, they can click a link or fill out a form, so that AEMO have a standardised form, which may make it easier for AEMO.
- DS – (AEMO) – That is a great suggestion Hal and AEMO is currently working behind the scenes to get an IT project started internally that would give us greater internal visibility of all contacts and the ability for participants to modify their own contact details.
- MR – (AEMO) – If something happens in an emergency and contact details need to change, there is always the control room as the first port of call. So, we have that contact if something does come up. We place that in our handover as part of our processes, particularly on weekends and in business hours we can get those details updated.
- JF – (Overwatch) – I appreciate that it is aspirational to get to a stage where we could log in and see what our AEMO contact details are – it would be great to break it into stages – us to jump in to see what the current details AEMO have could be the first stage, with the idea being that in the future there would be more automated processes for updating.
- SE – (Iberdrola) – With the NBN, these days it is getting harder to have a PSTN connection. Is this something that is being considered by AEMO, as whether this is a standard that wants to be held going forward? Not to advocate mobile phones, I understand the need to use multiple technologies, but with the Internet becoming more prevalent and pointing to single points of failure, is there much consideration going on in that space at the moment?
- DS – (AEMO) – There is. However, this will be addressed during Item 6 on the agenda.

5.3. Q & A

Discussions during the Q & A session included:

- How closely they monitor NOS, Market systems, Market notices?
- Are they up to speed with the contingency plans that affect them?
- What are the issues that semi and non-scheduled participants have with AEMO, TNSP's, DNSP's generators, etc.
- What's the process for getting SCADA fixed?

MR – (AEMO) - At this stage I'd like to open the floor to all members who would like to ask a question of our semi and non-scheduled participants about Control Room Related issues.

- BS – (TransGrid) – Some technical issues with a lot of the renewables – We get a target for example. They hit the target, fall away from the target and then they seem to reset their target –

they can't be contacted, and it is too hard to get them back into line. It is taking up to 30 minutes, should we wait the 30 minutes all the time?

- DS – (AEMO) - If there is an imminent security risk, contact AEMO CR, we need to address the security risk within 30 mins – Brad can call DS on his mobile any time about this to discuss the issue if it happens again.
- MR – (AEMO) - When there's curtailment applied to a wind or solar farm due to an outage, it's best if they set a local limit, rather than relying on constraints to target them. Reason being, I've had generators leave their limits at a level above the outage limit. When their output drops below the outage limit due to cloud cover, the semi-dispatch level comes off. The sun or the wind picks up again and then for a DI they can generate above the outage limit before the semi-dispatch cap kicks back in and they get targeted to the outage level or below. I would stress to them that they can't just rely on the constraint to hold them back, they need to set a local limit. Finley SF has been a problem in this regard if you need an example.
- HJ – (Neoen) – This is something we have been discussing. If we set a local limit, sometimes the constraint does not kick in, because it does not need to. From a curtailment point of view, we want to know when we are being constrained and when we are not. Something we have been thinking about is to put local limits above that, but that is not ideal. We would like AEMO to manage it with constraints, but sometimes it does not work the best.
- JF – (Overwatch) – Totally agree with Hal. A real risk is if an outage finishes early, the operator is not aware, and the local limit does not get lifted. That can go unnoticed for long periods of time resulting in significant loss of generation.
- NAE – (BayWa) – Completely agree and we have been working out the best system to deal with that as well. The other side of it, where we don't know that we could be going higher is a big problem on our side.
- BS – (TransGrid) – An example of this was on the weekend where we had three different solar farms that are going 50 MW above what their limit should be. The next thing we know is that there are core voltage issues because there is too much load in the system.
- DS – (AEMO) – I am aware of these locations and, most of the issues you are seeing are at stations where the MW ramp up limit is different from the MW ramp down limit. In the context of reviewing this for the semi-scheduled participants online, if your ramping up rate is different to your ramping down rate, this is a conversation to have with the TNSP or AEMO about. There is no obligation for the two levels to match, however they are indicative of potential problems.
- SE – (Iberdrola) – We see both. We have seen it in NSW, but also instances at one or two of our windfarms, where the AEMO dispatch cap stops applying because the expected production is not going to need the constraints applied, but the expected production is materially wrong, so you get that large ramping oscillation. I do not have a quick solution, but there does need to be an upper MW limitation on the asset for that period. It does not seem that the semi-dispatch cap logic is perfect in that scenario. A bad forecast can lead to power system issues. An ongoing issue that will continue to happen, with the logic that is applied for semi-dispatch caps. There is a limitation to the logic that is used there.
- AP – (CWP Renewables) – If there was better communication between the generator side and NSP, then we can apply local limits for the outage. If when it is finished, we get the notification and take it off. Would that solve both problems?
- BS – (TransGrid) – The problem becomes that communication with the solar farms or wind farms in a timely manner. I may have to contact up to 12 places for one outage. This is why we would rather rely on NEMDE targets, to reduce the need to make so many phone calls.
- AP – (CWP Renewables) – The problem with NEMDE is that the dispatch cap only applies on the solar farm or wind farm when the forecast for generation is above what we allow to. The forecast sometimes does not work as well as we want it to. From the generator side, I have no control over that. Not trying to shift responsibility and am very willing to help keep the grid stable. It just seems like some manual control also needs to happen.
- DS – (AEMO) – Is it possible to use a manual dispatch target, notified in the flyer when these outages are booked? Would that benefit in this case?
- BS – (TransGrid) – It probably would, as long as we know that the target is going to be met. What if it is not always met?
- SE – (Iberdrola) – Is it the case that there are dynamic limits applied to these assets throughout the outages that you are thinking of, or is there ultimately an upper limit that needs to be applied?

Those targets are not coming through in a uniformed way. They are quite dynamic. There could be an overarching upper limit that realistically is expected for the outage, but there are still going to be variabilities that sometimes turn up as others turn down. So, is it something that can be applied in a fixed fashion within the control systems for the outage, or is it expected to be dynamic?

- BS – (TransGrid) – It would be an upper limit because based on the requirements that we have for our outages, it states that they should not have any more generated than 'x'.
- SE – (Iberdrola) – Maybe participants have an obligation to put an upper limit in place, as well as use the NEMDE target. We would be open if our limits advice said we did have to set an upper limit for the outage duration. We need notification if the start/end time for the outage changes.
- BS – (TransGrid) – An upper limit set by you for the duration of the outage would work, because that is our requirement and we are happy, if you are under target.
- NAE – (BayWa) – A general notice to everyone when the outage is finished could be beneficial down the track.
- MR – (AEMO) – Do you have access to the NOS? If Brad completes his NOS entry, does that get fielded out to you, which may save Brad from having to make so many calls?
- NAE – (BayWa) – So is the NOS record updated as soon as an outage is finished? Do I need to check every 30 minutes to see if it is finished?
- GB – (Ausnet) – If you have direct access to NOS, you can keep it open to see updates as they come in. If you only access through the MMS, you will only be able to check every 30 minutes.
- SE – (Iberdrola) – For us it is a static file, a get function for us. Even when we have automated it into things, it is not efficient to alert from, in our experience.
- MR – (AEMO) – Does the same go for Market Notices, for example and other market notifications that come out?
- SE – (Iberdrola) – No. For market notices, we have it mapped in an SQL database, so it is very easy to alert from. In NOS we do a CSV RIP, so it is less efficient.
- PG – (Ausnet) – There is always a market notice when the constraint is lifted, so if you are monitoring those, you can see when the constraint has been withdrawn.
- SF – (Shell) – Sometimes though, the market notice might be late. I also have another question. It comes back to the AER. It sounds great to artificially ask the semi schedulers to reduce caps, which is effectively reducing their availability, but from an AER perspective, we need to check if this is in line with the rules, as it's physically available to do more. If the unit is still available, under the rules they still must bid that unit because it is still physically available and the AEMO constraints are what constrains it to zero in NEMDE. So, this would be asking the semi-schedulers to do something that is not in line with the rules of bidding. You cannot ask participants because that is a direction as well.
- BS – (TransGrid) – We do not have dynamic limits. We know that we have a dozen wind and solar farms that we set at a maximum load and we want you to stay under that load. When there are 3 or 4 going over the limit, there is a huge impact on the network. Big issues with loads and volts.

Action: MR will organise another meeting so there can be further discussions for semi and non-scheduled participants.

- KH – (AEMO) – There are two points to raise about issues with constraints binding and not binding. The first is the need to speak with the Operations Planning Working Group (OPWG) about outage coordination and potentially whether it is NOS or improved communications there. That is one theme that I detected should go to the OPWG. The second point is that we should probably have Ben Blake from the AEMO Constraints team involved, as well as someone from Markets. Question for Peter Pantic – For the Intermittent Generator Forum, has that got the right AEMO NEMDE and Constraint people to have a discussion there?
- PP – (AEMO) – There is no one from the Congestion or Markets team involved, but we could invite someone from each of the teams. Ross Gillett would be an example for the markets.

Action: MR to put something together and discuss with Ken (when he returns from leave) to move this issue forward.

- KH – (AEMO) – Failed SCADA and fixing SCADA data in a timely fashion is another area where we have found a few challenges. It has taken many days to correct failed and bad SCADA data. Not sure if there is more we can do in this area, but that is one problem that we have identified.
- MR – (AEMO) – There are some SCADA field people are online – can anyone speak about this? If we have SCADA issues in the Control Room, we will talk to the TNSP, or we will try to talk to the appropriate wind or solar farm to get that sorted. Tony from Goldwind? I believe you have some SCADA experience there as well.
- TS - (Goldwind) – there was a SCADA fail back in Jan and we had to put in a non-conformance report. Something happened on our windfarms where we had a non-conformance. We had to get it resolved over three days. We did not realise that there was a problem until about three days later. The information being received was incorrect and it took a while to resolve. If we can work through how to manage that with AEMO, that would be worthwhile delving into. Exact details about how the windfarm was not able to respond in a timely matter, I will need to find out.
- ABU – (AGL) – In June a device failure – a hard limit applied to semi-scheduled plan. Did not alarm, we only noticed because the output did not deviate. It was a Saturday, but we got people out to fix the situation as best we could and implemented a work around until we got new hardware installed. The other one was quirky – semi-dispatch cap flag – a flag was missing – Infoprod said it was applied in the market system, but it was not being applied in the SCADA system by AEMO. Took about 7-8 days for that flag to be reinstated.
- HJ – (Neoen) – Challenge – trying to consolidate things by getting better answers. Our return time has improved. We get the call about SCADA data issues and our problem is working out where the issue is. We lose that visibility and there is some room for improvement about working out where the issue is occurring, so that it can be fixed in a timely manner.
- MR – (AEMO) – Are there any other questions from the semi or non-scheduled? Any from TNSPs?
- HJ – (Neoen) – Unsure if this is the correct forum, but the elephant in the room is often around our personnel – that is a challenge we have. Having an operator that started when they are 20 and having a wealth of knowledge by the time they are 60, is not the norm anymore. Also, older operators using new technology e.g., SQL. We need to motivate our personnel to collaborate as to how to make control room shift work more appealing e.g., control room layout, exercise programs.
- ABU – (AGL) – We are essentially here and paid, not for what we do, but for what we know. People who have been in the industry for a long time. Recruiting into that environment has been difficult over time and it is sometimes about the environment, location, what the control room looks like, undocumented features – very topical to find people who are willing to take on the role and then training them up.
- SF – (Shell) – A good point that everyone here has experience with rosters. It would be great to discuss about what works and what doesn't.
- KH – (AEMO) – OTWG would be a good forum. We did a study with Monash university on this
- Dan Lavis can provide details. Also, we have split our control rooms and are using the DTS simulators, changed to production, so in effect have four control rooms. Not sure if we could share the layout of the Control Rooms and DTS Rooms. Perhaps Dan Lavis could include that when he discusses the Monash University Study at the next meeting.

Action: DL to provide details about the Monash University study at the next CROWG meeting, as well as the layout of the control rooms and DTS rooms, as they are set up as production control rooms.

- AP – (CWP) - And to stress how important this topic is - there is a significant difference in operator experience between scheduled generators/NSP/AEMO versus those of semi-scheduled generators, and the difference will continue to broaden as more solar and wind farms come on and they inevitably would want to setup their 24/7 team.
- MR – everyone who has questions or information send MR an email

Action: MR to add an item to the agenda for the next CROWG meeting about 'What could make our control rooms more appealing to operators?' - CR layout, rosters, the Monash University study (Dan will provide details for the next CROWG) etc.

- MG – (AEMO) – Would like to table items to discuss with NSPs.

- The first is regarding Oscillations, strength, interactions etc. – one NSP is demanding installation of certain SSR relays for an alarming purpose, without any negotiations. Is that something of interest among NSPs, a direction we as a group see benefit to pursue.
 - To be aware of what is going on for a particular project for a particular region, in the time domain that we cannot otherwise capture, through our usual SCADA tools.
 - There is a lot of work being done on a cognitive and visualisation perspective and I would like to hear from participants, what really works for them in a control room environment and what brings your attention to a particular issue? Is it a sound alarm, is it messaging, a particular visualisation? It could be as simple as a colour. It would be nice to get some feedback.
- MR – (AEMO) – Happy to table those items Mark and get some feedback. It can be tabled and then discussed at the next CROWG meeting.

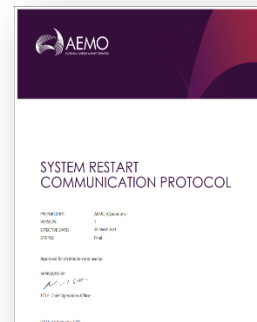
Action: MR to add an item to the agenda for the next CROWG meeting to discuss the three items that Mark Gordon raised: i. Oscillations, strength interactions etc, ii. Awareness of what is going on for a particular project for a particular region in the time domain we cannot otherwise capture, iii. Cognitive and visual perspective of control room setups.

6. Communications

6.1. Update from Darren Spoor on SRAS Communications Protocol status

- DS – (AEMO) - SRAS Communication protocol has been published – Key item of note is Section 4.2 - Availability and Testing of Emergency Communications. Section 4.2 outlines the obligations for any participant that is deemed a restart participant. This may not apply to many of the semi-scheduled units, but if you are a participant in the NEM and participate in system restart, your obligations about primary, backup and emergency communications are provided.
- Please note the section about the Emergency backup links that must also be available between AEMO, NSPs, and SRAS providers. These emergency communications should provide an availability of at least 12hrs standby, with 3hrs talk time. That would be the best standard we have at the moment that provides some governance around that.

Click the following image to open the Communication Protocol:



[System Restart Communication Protocol](#)

6.2. Actions following loss of communications

- Please refer to the following three points:
 - Generators are not to 'shut down', but are expected to follow the last known target
 - Revert to the emergency voice comms links required under the SRAS Comms Protocol
 - (this was a topic of conversation during a recent TISN exercise on space weather)
- SF – (Shell) – Is comms testing going to be formalised?
- DS – (AEMO) – There are formal tests that AEMO conducts, in accordance with this standard, but in essence, it is the responsibility of the participant to conduct testing of their own links.

7. Voltage Control

7.1. Update on AEMO VDS and related issues following on from the last meeting

At the last meeting it was reported how AEMO Operations have conducted a review of VDS and has had a bit of an internal reset.

- Key outcomes from the meeting on 22 March 2021 were:

- Regular meetings to occur every 2 months
- Updates have been made to the VDS User Manual (SO_UM_31).
- Created a VDS Teams Group chat for the control which is incredibly effective.
- General push to tune the system more and chase up on any lingering issues.

There was an action item to have some sort of VDS reboot. A project/working group to sort out some of the issues and provide a forum to obtain feedback and conduct Q&A.

- On Wednesday, 2 June 2021, a VDS (VAr Dispatch Scheduler) Review meeting was held.
- The purpose and objectives meeting included:
 - Providing an update of the VDS status, any new developments, etc.
 - Providing an opportunity and forum for participants to raise and discuss any VDS related issues with AEMO VDS experts and representatives.
 - Trying to identify issues and find outcomes.
 - Ensuring there is a way forward that benefits and satisfies everyone.
- The meeting was well received - very much a positive session. We had all the “main players” involved. Andrew Illing, Stephen Boroczky, TNSPs etc. There was an in-depth Q & A session and talked about where to go from this point.
- Before we move on, would any members who participated in that meeting like to comment how they thought it all went?
- The VDS reps have put a lot of work into it, made quite a few changes. A bit of time is needed to settle in. Some of the things that can be reported on include:
- There has been some work on QNI and the voltage control there. Coopers Gap, Swanbank E, the Tarong units, and some general adjustments to the C-S eastern corridor.

For NSW/VIC specifics:

- VDS issues with YPS Not being able to receive VDS instructions – resolved
- KGTS and HOTS SVC – soft limits reviewed to prevent high voltages at KGTS. Node Voltage profiling done at KGTS and HOTS whenever they are on manual mode- to maintain volts < 237 kV
- Ausnets preference to have larger caps in service at ROTs, TTS and MLTS - being achieved by reducing cost of 66 kV caps only if 66 volts and below a given threshold. 66 kV caps are switched off first as rooftop PV increases and 66 kV volts increase

Finally, do those that participated/other CROWG members feel they would like to have another meeting with the VDS experts sometime down the track?

- PG - (Ausnet) – It would be good to have another meeting six months down the track, to see how it has settled down, as we are still getting a lot of verbal voltage dispatches in Victoria. Not sure if it is an issue at AEMO’s end, or if it is more convenient to ring up. I found the meeting excellent, and it will take some time to get sorted out and trust it, as we are second guessing it at the moment. There is not a lot of faith in its consistency.
- **Action:** MR to contact the VDS reps to arrange another meeting either in late 2021, or early 2022. Possibly around the beginning of summer.
- LM – (Powerlink) – It would be good to have another meeting, as it is still giving some questionable instructions as of last week, so a review in a couple of months would be well worth it.
- TS – (Goldwind) – Do we have the right representatives? From a Goldwind perspective, we want to get some of our grid connection managers involved in that discussion, but they are not part of that team. If this is going to be a regular agenda item, I could bring in people that have more understanding on the issues with voltage control.
- MR – (AEMO) – The VDS is going to give more instructions to wind and solar as we go along, so it is going to be encompassing the semi scheduled as well, so I will pass that on to the VDS reps.

8. Control Room Technology and Ergonomics

8.1. What are the latest upgrades, ideas, proposals, projects, etc.

8.2. What currently works and what issues have been experienced

- See previous agenda items for information about Control Room Technology and Ergonomics.

9. Alarms

9.1. Update on Alarms work from members following on from the last meeting

- MR – (AEMO) – an update from AEMO’s side is that we have reduced the number of alarms by 66% since the start of the project. We’re still getting 7000 alarms per day (290 per hour), so we’ve still got some work ahead of us but we’re heading in the right direction. It is a slow process as we are relying on IT Grid helping us. A lot more work happening there.
- Alarms that could be the way we have them broken up into 8 categories, break status, voltage limits, comms, IT systems and things that come through that may affect the power systems or market systems. Often, they come through from the TNSPs and we have the same alarms, so we can talk apples with apples. An issue that we struggle during big incidents with the flooding of alarms. We are trying to get to the stage where an alarm is an action item, not just a piece of data. It is actual information that we can use.

10. COVID-19

10.1. Update from members

- MR – (AEMO) – As Ken mentioned earlier, we have split our control rooms in NSW and QLD during COVID. Everyone has learned a lot from the 2020 lockdown. Cleaning services have ceased, and the controllers are cleaning and sanitising the control rooms.
- Control rooms have been split in VIC and SA as well.

11. Rodent Infestation Impact

11.1. Update from members advising of any abnormal conditions arising from the rodent infestation.

- Note that there was a loss of SCADA from Taralga WF on the 5th July “due to mice eating a fibre optic cable”.
- MR – (AEMO) – Seeking comments whether the risk is still present from the rodent infestation?
- BSP – (TransGrid) – We have had several issues, including tripped busbars and transformers, from rodents trying to warm up inside cabinets.
- MR – (AEMO) – From your comments, I am guessing this is not dissipating anytime soon.
- HG – (Neoen) – We have certainly seen this. Fibre optics are definitely a target. We have seen minor electrical targets, but they seem to like the coating of the fibre optics better.
- MR – (AEMO) – Is it ongoing management of the situation, rather than trying to reduce them?

12. Other Business

12.1. Feedback`

- MR – (AEMO) – Please send through your feedback, especially those who have attended for the first time. This has been done as a guest membership for semi and non-scheduled, but if you feel strongly to continue as part of the CROWG, please let us know. I hope the meeting has been worthwhile and I am grateful that we could get the semi and non-scheduled to join the meeting, as we are dealing with each other more and more every day and collectively you are having a huge impact on what we are doing in the control room. Any questions or items for the next agenda please send them through.

12.2. Semi scheduled (one-off) dedicated meeting?

13. Next Meeting...

Meeting Forward Plan

Date	Host	Location
Friday, 19 th November 2021	TBA	TBA

Meeting closed at 12.33pm.