MINUTES - DRAFT

MEETING:	Control Room Operations Working Group (CROWG)
DATE:	Friday, 19 November 2021
TIME:	09:30am – 12:30pm
LOCATION:	Via Teleconference / Microsoft Teams MS Teams Meeting
TELECONFERENCE DETAILS:	Microsoft Teams meeting **Join on your computer or mobile app** Click here to join the meeting **Join with a video conferencing device** aemo-au@m.webex.com Video Conference ID: 135 943 639 1 Alternate VTC instructions **Or call in (audio only)** +61 2 8318 0090,,713651413# Australia, Sydney Phone Conference ID: 713 651 413# Find a local number | Reset PIN Learn More | Meeting options

ATTENDEES:

Name	Company / Department
Mario Rositano	AEMO (Chair)
Malcolm McNicol	AEMO
Ellise Harmer	AEMO
Darren Spoor	AEMO
Bashar Derbas	AEMO
Caroline Ferris	AEMO
Daniel Lavis	AEMO
Callan Masters	AEMO
Ken Harper	AEMO
Matthew Wikman	AEMO
Declan Gilmour	AEMO
Wim Van Schie	AEMO
Ben Blake	AEMO
Brian Nelson	AEMO
Clydie Cox	AGL
Paul Clark	AGL
Christopher Migocki	Ausgrid
Phil Gay	Ausnet
Simon Bolt	Delta Electricity
Matthew Hanson	Delta Electricity
Doug Deans	ElectraNet
Rod Joyce	Endeavour Energy
Jason Causer	Endeavour Energy
Vijay Kumar	Energy Australia
Russell Gordon	Energy QLD
Simon Ahrens	Engie
S Burge	Intergen
Mike Griffiths	Origin Energy
Robert McCann	Powerwater
James Lugg	Powerwater
Vernon Lee	Powerwater
Ali Walsh	SA Power Networks (leave)
Matt	Steinhardt
Colin Sharp	TasNetworks
Geoff Cook	TransGrid
GUESTS	
Stephanie Easton	Iberdrola Australia
Chitresh (Resh) Mukherjee	acciona
Koldo Basterra Rípodas	Acciona
Piers Walls	Acciona

Nathan Everitt	BayWa r.e. Australia
Derek Dymond	BayWa r.e. Australia
Adrian Pang	cwp renewables
Tony Saker	Goldwind
Jacky Han	Fulcrum3D
Ross Greenham	Lindendale SF, Site Manager
Hal Jorgensen	Neoen
Steve Frimston	Shell Energy Australia
Victor Depoorter Ruelle	Proaanalytics
Sam Gard	Res-group
Thomas Jeffery	Res-group
Warwick Batstone	RWE
Samuel Hayes	RWE
Trevor Lim	Total Eren

APOLOGIES:

Name	Company / Department
Lenard Bayne	AEMO
Paul Elliott	AEMO (leave)
Raj Ippiliapiah	AEMO
Mark Pollock	AEMO
Petar Pantic	AEMO
Adam Budzynski	AGL
Brenton Medlin	AGL
Garry Paterson	AGL
Grant Matherson	AGL
Alan Jenkinson	AGL Loy Yang
Stephan Laucht	AGL Macquarie
Paul McNamara	AGL Macquarie (Bayswater)
James Mortimer	APA
Rob Krueger	APA
Kylie McClafferty	Ausgrid
Joo Wee	Ausgrid
Joo Ean Prasad	Ausgrid
Martin Cavanagh	Ausnet
Matthew Sands	CleanCo QLD
Greg Dale	CS Energy
Ian Swift	CS Energy
M Greenaway	CS Energy
Anthony Ham	CS Energy
Henry Rich	Delta Electricity
Colin Taylor	ElectraNet

Name	Company / Department
Duane Brooks	ElectraNet
Tim Gray	ElectraNet
Robert Armstrong	Endeavour Energy
Ken Wilby	Endeavour Energy
David Molla	Energy Australia
Peter Moretti	Energy Australia
Craig Flanigan	Energy Australia (ECOGEN)
Brett Harrington	Energy Australia (ECOGEN)
Gayle McAllister	Energy Australia (Yallourn)
Neil Grigg	Energy Australia (Yallourn)
David Gray	Energy QLD
Nikki Barbi	Energy QLD
Peter Kirkpatrick	Essential Energy
Matt Donaldson	Essential Energy
Wahid Ibrahim	EVO Energy
Matthew Turner	EVO Energy
Warren Wood	EVO Energy
Leylann Hinch	EVO Energy
James Sherrin	Hydro Tas
David Elkington	Loy Yang B
Robert Chapman	Origin Energy
Brett Wills	Origin Energy
Chad Thompson	Origin Energy
Leanne Maurice	Powerlink
Corney Matthew	Powerlink
Steve Saunders	Powerlink
Ed Sellwood	Powerlink
Ian Fergurson	Powerwater
Duncan Griffin	Powerwater
Micheal Edmonds	SA Power Networks (moved to new role)
Michael Paine	Snowy Hydro
Bill Clark	Stanwell
Elizabeth Beavis	Stanwell
Brad Perry	Stanwell
Darrell Blackford	Territory Generation (NT GOC)
Bradley Shipp	TransGrid
GUESTS	
Adam Budzynski	AGL
Jeffery Thomas	Res-group
Peter Veljkovic	RWE Renewables Australia
Paul Vickers	HARD software

Name	Company / Department
Harley Mackenzie	HARD software
Stephen Challis	ESCO Pacific
James Fuller	Overwatch Energy
James Tetlow	Overwatch Energy
Jonathon Dyson	Overwatch Energy
Daryl Smith	Meridian Energy
Jose Fortes	cwp renewables
Jarryd Doran	LGI Limited
Matthew Tap	LGI Limited
Colin Bonner	Fulcrum3D
Jo Hume	Fulcrum3D
Daniel Murphy	Fulcrum3D
Aaron Lai	Fulcrum3D
James Ley	Energy Australia
Ron Logan	Shell Energy Australia
Rajesh Arora	Aecom
Dylan Reynolds	AGL
German Burbano	indra
Andreas Molnar	indra
NIck	Solcast
Chris Baldwin	Meridian Energy
Derek Dymond	BayWa r.e. Australia

1. Welcome and Introduction

1.1. Roll Call was taken.

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 (e.g., issues relating to wind and solar) and provide updates on where work stands.
- Introduce and explore new topics.
- 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 CROWG members, Clydie Cox (AGL) – stepping in for Adam Budzynski, Trevor Lim (Total Eren), Matt Hanson (Shift Mgr Vales Point), Sam Gard (Res-group), Derek Dymond (BayWa r.e. Australia), Shane Burge (Millmerran PS) Callan Masters, a Senior Engineer from our Operations group.

2. Minutes/ Actions

2.1. Previous meeting minutes

Minutes were accepted by Phil Gay.

2.2. Updates to actions register made

Refer to actions register for details. Items 6, 7, and 9 were actioned and are now closed. Items 8, 10, 11, 12 and 13 are in progress. No further comments from the group.

3. Electricity Industry Terminology and Phraseology

Following the last CROWG Meeting in July 2021, an Electricity Industry Terminology and Phraseology (EITP) subgroup meeting was held in late September 2021. Meeting minutes have been circulated to the group.

3.1. System Restart

See attached meeting update (email 27/10/2021), the latest updated version of the System Restart Terminology and Phraseology document, the corresponding email (4/10/2021) and minutes from the September 2021 meeting held by the EITP sub-group for reference.

- The document was used as a reference in the latest system restart training exercise a few weeks ago and it held up well. There were a couple minor things that require updating (mainly references).
- From an approval point of view, the document will be passed to the PSSWG (meeting next in February 2022). Can be published in its own right as a stand-alone document to be referenced and easily updated. References from TOAs may need changing

3.2. Emergency and Time Critical Discussion/Workshop

- The EITP group made a start on Time Critical and Emergency Events Terminology and Phraseology spreadsheet (see attached [email] or link in the last minutes). To be used as a guide on shift and during training. Thanks to those of you who have provided feedback and updates to the spreadsheet. All CROWG members encouraged to go through the spreadsheet and add their own interpretations of the terms. Please be sure to reference whose interpretation it is when adding this information to the spreadsheet.
- Callout to assist the EITP - Anyone else who'd like to help with this task, please email Mario. It would be great to have more representation from the intermittent Generators. Tony Saker (representing intermittent generators) agreed to be a part of the group going forward.
- Discussed various participants' interpretation of terminology/phrases in the spreadsheet. Key thing is to capture what everybody means when using these terms. Added comments and amended some definitions:
    - Unplanned Outage – ENSA & EQL – add 'protection-initiated event'
    - Include Intermittent Generators and Renewables – Discussed terminology for how intermittent generators/renewables define/refer to themselves (i.e., intermittent generators, SF, WF, Syncon, batteries, renewables, etc).
    - Short Notice Outage – 4 days prior to dispatch SO_OP_2000. SAPN call this 'forced outage'
    - Non-credible contingency – broader than the actual definition in the glossary of the rules (five or six terms such as multiple generators, multiple elements coming out, etc)
    - High Wind Cut-out – instantaneous overspeed and average wind speed exceeded. High wind de-rating. (CWP renewables)
    - Definitions for Curtailment ,Set-points and distinguish between AGC and SDC. (Tony Saker)
    - Ramp back schemes (Russell Gordon)

Action: Mario to follow up with Adrian Pang about various WF and SF perspectives on phrases (e.g., energy loss factor, what SCADA system is being referred to, etc)

4. Intermittent Generator Related

4.1. Constraints binding update – Ken Harper/Ben Blake/Ross Gillet/Brian Nelson

- The issue was raised by Transgrid initially to kick off discussions centring around intermittent generators coming off their dispatch cap and being free to generate which causes security issues. There were a couple action items raised. Key thing was to get the right people involved from AEMO to discuss the issues with the group.
- Introduced Brian Nelson (markets) and Ben Blake (constraints) to define the status of the issue. Questions were also addressed.
    - BN - Rules are quite specific in this regard. Hole in the design of semi-scheduled. BB - Only seeing issues in a single generator constraint. Issues arise when cloud cover comes over and there's not enough capacity. The

constraint goes on. Slight errors in the forecasting process could be an issue as well. Once it oscillates (switching on and off) it becomes an issue.

- Discussed why, if the clouds come over, and the forecast comes down such that the generator is going to be under the limit, why can't the semi-dispatch cap still remain on and the constraints be set? If the clouds do remain, the generator will remain under the limit and if the clouds don't remain, the generator will go over.
  - The system is behaving the way it is because it's an automated system. A solution for the outage might be to put a limit on the unit. But it won't fix the problem because the semi-dispatch cap will stay on for the whole day. We have a system that is designed in a particular way which is why it is behaving the way it is.
  - Caps are set for intervals, but things can happen in the interval that changes things.
  - System changes may not be literally consistent with the rules. Trying to manage this for participants is going to be a complex thing.
  - Discussed outage upper cap and forecasting fixes. The fixes are limited.
  - False run backs are typically operating for cloud-based generation. They are a flag.
  - Not always outage driven. We will see more of these issues on system normal.
  - Might need to consider a supplementary cap/limit that's built into the process (within the rules or within the industry) recognising that the renewable source can change (but not fast, big jumps). Would be a system change.
  - Some sort of short-term delay or the cap stays on for a couple of DIs after the binding constraint. This could, however, cause some self-forecasting issues. Need to explore all ideas and options at this point.

Action: Intermittent Generator Related Binding Constraint discussion to be continued at a future meeting with the key people. Mario to distribute Petar Pantic's slide pack from a recent forum and organise an additional meeting to address issues raised today. Include Nathan Everitt (BayWa r.e.) in the discussion.

5. Extreme Weather and What's ahead

5.1. Presentation by Ellise Harmer

- Ellise Harmer, Lead in AEMO's Operations Forecasting Team, delivered a presentation on 'Extreme Weather Events in the NEM' delivered recently at ESIG covering high level overview of:
  - Rooftop Solar Growth – growing strongly. NSW might even overtake QLD. Up to 14 GW in the NEM
  - Wind & Solar growing – up to 15GW. Now nearing 30 GW total renewables on the grid.

- Events:
  - Bushfire Smoke (January 2020). People needing to stay indoors also impacts energy demand. High temp days (40 degrees plus) add to demand. Smoke can be thick enough to hold temperatures down causing deviations in predicted MW.
  - Cool Changes & Thunderstorms – focussed on wind generation from the 31 Jan 2020. Particularly tough day with change coming through, coincident heat, high demand, thunderstorms picking up. In terms of forecasting, the wind generation was impacted in four different ways – high temperature cut out (got above 40 and WF came off ahead of the change), high wind cut out, low temp drop off/low wind cut-out and towers down. Broad forecasts don't necessarily provide the granularity needed for extreme weather events.
  - Thunderstorms 28 October 2021 – three storms in short time frame. Intense rainfall can be a challenge because it becomes really dark and the solar will drop off. Slight swings in the load are also observed. Weather models won't capture this risk. Broad warnings capture storms and the likely time period. Weather models don't capture really high variability. Learnings from this event - considering how the SA Operational and Underlying Demand variability is managed. Looking at POE ranges and how wide the envelope of possibility needs to be over the day in the demand models.
  - Next Steps – Intermittent Gen forum in early-December 2021. Published a handbook for Wind and Solar Generators. Wrapping up and SA Nowcasting Trial. Continued collaboration with various forums and industry contacts. Enhanced management of variability and uncertainty using probabilistic forecasts, ensembles and forecasting as service model.
  - Please contact Ellise Harmer for more information – Ellise.Harmer@aemo.com.au

Action: Mario to distribute copy of Ellise's presentation on 'Extreme Weather Events in the NEM'.

6. Shift Work

6.1. Ways of making shift work more "appealing".

- Current challenges:
  - Location
  - Renumeration
  - Longevity
  - Change associated with doing that work
  - Experience required. People coming in are getting younger and younger and don't have that experience.
  - Isolation/remoteness
  - Progression – difficulties due to lack of vacancies

- Training – doing this adequately and within the required time frame.
- "Pigeon-holed" and then locked in
- Flexibility/Rosters
- Family/work balance
- Health – what can be done to remediate the health effects of working shift work?

6.2. What are organisations doing to combat the challenges of shift work?

- Discussed challenges including rostering (flexibility 8hr vs 12hrs):
  - AW (SAPN) – implementing a new roster set-up after 7 months of work and consultation with controllers. Previously had 1.5 people on shift (50% of the time controllers were on shift solo). Changed so that there are always two people on shift. One short turnaround and a 7-day break in the roster. Recruiting seven new day controllers into the team. Uptake has been positive. Roster pattern looks like:

NC-Shift

	Monday	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday	total	required	Equalisation
Operator 1	12.33	12.33	12.33	-		12.33	12.33	61.65	37.5	
Operator 2	12.33	12.33	-					24.66	37.5	
Operator 3			12.33	12.33	12.33	-		36.99	37.5	
Operator 4	8.17	8.17	8.17	8.17	8.17	FO	FO	40.85	37.5	
Operator 5	8.17	8.17	8.17	8.17	8.17			40.85	37.5	
Operator 6				12.33	12.33	12.33	12.33	49.32	37.5	
Operator 7	-			9.17	9.17			18.34	37.5	
Operator 8	9.17	9.17	9.17					27.51	37.5	
							Total	300.17	300	0.17

		Start time	end time	
12.33	Day	6:40	19:00	
12.33	Night	18:40	7:00	
-	lost day	-	-	
9.17	long day	6:50	16:00	
8.17	float	6:50	15:00	
8.17	Training	6:50	15:00	First float day worked as float for the period

DSC

	Monday	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday	total	required	Equalisation
Operator 1	12.33	12.33	12.33	-		12.33	12.33	61.65	37.5	
Operator 2	12.33	12.33	-					24.66	37.5	
Operator 3			12.33	12.33	12.33	-		36.99	37.5	
Operator 4	8.17	8.17	8.17	8.17	8.17	FO	FO	40.85	37.5	
Operator 5	8.17	8.17	8.17	8.17	8.17			40.85	37.5	
Operator 6	8.17			12.33	12.33	12.33	12.33	57.49	37.5	
Operator 7	-							0	37.5	
							Total	262.49	262.5	-0.01

		Start time	end time
12.33	Day	6:40	19:00
12.33	Night	18:40	7:00
-	lost day	-	-
	long day		
8.17	float	6:50	15:00
8.17	Training	6:50	15:00

  - HJ (Neoen) – Good rosters and better rosters help to attract and retain staff. How to handle added issue of splitting control rooms due to Covid-19. How do you justify CR rostering requirements when it comes to increasing personnel – what kind of matrix do you use? (e.g., assets, MWs per controller, controller wellbeing, service, expectation of increased workload as assets age, etc)
  - Health & Wellbeing: provide yoga mats, weights, bicycles in the control room. Noting that controllers can only use the equipment if there are two people on shift. Also need to manage risk of injury/incident. Provide gym membership.
  - DD (ElectraNet) During Covid used permanent teams meeting for comms. Re managing personal risk – moving from a personal alarm device and going to apple watches for raising an alarm in the event of a personal incident/injury. Reasonably good for active and passive (if someone is unconscious), it will call for help.

- PC (AGL/Yallourn PS) – relief ratio particularly during peak holiday periods.
- CC (AGL) – re 12-hour shifts, they can end up being much longer depending on the length of the controller's commute. Some people add 2 or more hours travel time which result in very long days. A decent break between shifts means less annual leave is actually used. Leave balances end up being so high and it becomes difficult to balance and schedule in enough leave (need to have the staff to cover leave/spot on the roster).
- MM (AEMO) – Hours work balance needs to be kept in check and is a struggle for everybody. A lot have young families and are wanting/needing leave at the same time. Leave plans are required if the balance gets too high.
- MG (Origin) – 70/30 balance of shift/leave. Bias towards the shift work.
- AP – a lot of control rooms don't have leave built into the roster. When it is built in, it isn't too well received. Did people WFH during Covid?
    - TNSPs can't work from home. Person would either be at Richmond or Rowville.
- PC (AGL) – when they moved to DD/NN – forward cycle, everyone loved it. We'd never go back. The science and research backs this up in terms of health and bio-rhythmns.

- HJ (Neoen) – include the leave into the roster as a way to keep the leave balances down. Roster that HJ has had the best success with: 5 controllers and holidays built into the roster (see below). Sick leave is covered by overtime.

Roster Model D 5 Day Weekend Rapid Rotation

7 Day, 24 hour Coverage, Using 12 Hour Rotating Shifts
4 to 5 Shifts On and 4 to 12 Days Off per Work Cycle

Controller	Week	M	T	W	T	F	S	S	Roster Hours
A	1	D	D	N	N	-	-	-	48
B	2	-	-	D	D	N	N	N	60
C	3	-	-	-	-	D	D	D	36
D	4	N	N	-	-	-	-	-	24
E	5	-	-	-	-	-	-	-	0
Controllers on D/s		1	1	1	1	1	1	1	33.6
Controllers on N/s		1	1	1	1	1	1	1	

Legend:

D = 12 hour day shift (06:00 –18:00)
N = 12 hour night shift (18:00 – 06:00)
\- = day off

Average hours = 33.6 per week

Features

- 5 Day Weekend Pattern, delivering single 24/7 coverage with built in leave
- 146 rostered shifts per year
- 21 work weekends per annum, A 12 day break every 5 weeks
- 37.5-33.6 = 3.9 hours of annual leave built in per week or 203.5 hours per annum.
- Team leaders owe the company 16 hours per annum

	Positive	Negative
Employee	• No broken weekends and no more than two work weekends in a row. • Weekends Off are 5 day breaks	• Annual leave in short stints (12 days) • Shortest break (4 days) after 3 consecutive N shifts 10x per year
Health & Safety	• Clayton day in each workcycle	• 6 body clock changes every 5 weeks
Business	• Annual leave is built in reducing the planning burden. • Only midweek D shift starts. • Good continuity	• Some relief options

Action: Mario to organise a meeting/regular agenda item to discuss and share information on rosters and best practice.

7. Communications

7.1. Update from Darren Spoor on SRAS Communications Protocol status

The AER have been asking questions about compliance. DS has been asked to talk about when communication protocols are breached. Would like to define guidelines/requirements for Operational Communications and establish the baseline for best practice. Could then take it to consultation.

Scope of this Guideline could include:

- Use of mobile phones for control room contacts
- Use of call-menu options to reach control room contacts
- Language requirements for control room contacts
- Reliability and quality of voice audio
- Training Requirements (eg: acknowledgement of the agreed Phraseology)
- Expected SLA's:
    - Answer within 30 seconds
    - Respond within 15 min

Discussed whether the CROWG is the right forum for discussing this. The authorities and decision makers are not necessarily in this group. Needs to go through official channels.

Action: Carry over the discussion on Operational Communications to next meeting. Darren to flesh something out for review and comment – obtain input from the CROWG before taking it further via official channels to consultation.

Action: Mario to send out updates on VDS and the TOR for the CROWG (which is being reviewed).

7.2. One on One session with Overwatch

Special thanks to Jonathon Dyson and the crew at Overwatch for a great one on one session. It was well received by the wider AEMO group and a great example of improving relations in the NEM.

Mario has been asked if there are other sessions coming, so if anyone is keen to have a fairly informal session with AEMO on the power system and the challenges you face, please let Mario know.

8. Next Meeting

Meeting Forward Plan

Date	Host	Location
February 2022 (TBA)	TBA	TBA

9. Status of Action Items

Action	What	Who	Due	Status
1.	Mario R to prepare a briefing note to the PSSWG regarding disabling the telephone pre-recorded messaging and beeping when calling control room to control room.	Mario Rositano	November 2019	In progress
2.	Mario R to identify which TNSP's and DNSP's currently have the pre-recorded message in place.	Mario Rositano	November 2019	In progress
3.	Mario R to provide a briefing note to the PSSWG relating to the concerns for communication contact points for wind and solar farms. In addition, seek advice and guidance from the PSSWG.	Mario Rositano	November 2019	In progress
4.	Mario to capture low demand discussion points and forward to PSSWG with a view to further discuss and investigate these issues.	Mario Rositano	July 2020	In Progress
6.	Create an initial list of emergency or time critical events and definitions from AEMO's perspective.	Mario Rositano	December 2020	Completed
7.	Seek endorsement of System Restart Terminology and Phraseology spreadsheet from the CROWG	Mario Rositano	August 2021	Completed
8.	Set up another EITP subgroup meeting and try to get some of the Semi & Non-Scheduled participants involved as well.	Mario Rositano	November 2021	In Progress
9.	Add link or entire document for the NEM Generator Connection Guidelines	Alexis Bowman	July 2021	Completed
10.	Organise another meeting so there can be further discussions for semi and non-scheduled participants	Mario Rositano	November 2021	In Progress

11.	Put something together and discuss with Ken (when he returns from leave) to move this issue of binding constraints forward.	Mario Rositano	November 2021	In Progress
12.	Provide details about the Monash University study at the next CROWG meeting (February 2022), as well as the layout of the control rooms and DTS rooms, as they are set up as production control rooms.	Daniel Lavis	February 2022	In Progress
13.	Contact the VDS reps to arrange another meeting either in late 2021, or early 2022. Possibly around the beginning of summer.	Mario Rositano	November 2021	In Progress
14.	Mario to follow up with Adrian Pang about various WF and SF perspectives on phrases (e.g., energy loss factor, what SCADA system is being referred to, etc)	Mario Rositano		
15.	Intermittent Generator Related Binding Constraint discussion to be continued at a future meeting with the key people. Mario to distribute Petar Pantic's slide pack from a recent forum and organise an additional meeting to address issues raised today. Include Nathan Everitt (BayWa r.e.) in the discussion.	Mario Rositano		
16.	Mario to distribute copy of Ellise's presentation on 'Extreme Weather Events in the NEM'.	Mario Rositano		
17.	Mario to organise a meeting/regular agenda item to discuss and share information on rosters and best practice.	Mario Rositano		
18.	Carry over the discussion on Operational Communications to next meeting. Darren to flesh something out for review and comment – obtain input from the CROWG before taking it further via official channels to consultation.	Mario Rositano		
19.	Mario to send out updates on VDS and the TOR for the CROWG (which is being reviewed).	Mario Rositano		