CONGESTION INFORMATION RESOURCE GUIDELINES

Published: **July 2018**

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

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VERSION RELEASE HISTORY

Version	Effective Date	Summary of Changes
7		Updated for 2018 consultation and new template. Added section on Planned Network outages
6	15 October 2015	Updated for 2015 consultation and latest AEMO template. Comprehensive review by AEMO legal.
5	25 Jun 2014	Full document review. Updated for 2014 consultation, changed Interconnector Quarterly performance report section, updated Planned Electricity Network Outages to match current practice
4	25 Jun 2013	Updated for 2013 consultation, updated URLs, updated list of CIR items, removed minimum information section
3	27 Jun 2012	Converted to new AEMO template. Updated for 2012 consultation. Updated URLs for new AEMO website. Included updated CIR items list in Appendix 1
2	27 Jun 2011	Updated for 2011 consultation. Included revised disclaimer, revisions to match AEMO style guide.
1.2	6 Jul 2010	Added AEMO disclaimer
1.1	30 Apr 2010	Added heat map section to Appendix, minor corrections
1	28 Apr 2010	Included extra fields for NOS, added NOS 24 hour summary
Interim	28 Oct 2009	Original document for the Interim CIR

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1. INTRODUCTION

1.1 Purpose and Scope

These are the Congestion Information Resource Guidelines (**Guidelines**) made under clause 3.7A(k) of the National Electricity Rules (**NER**).

In accordance with this clause, the Guidelines describe the:

(1) Information categories and their source to be contained in the *congestion information resource* (**CIR**).

(2) Scope and type of information to be provided by *Transmission Network Service Providers* (TNSPs) in accordance with clause 3.7A(n) & (o) of the NER.

(3) Processes to be implemented by AEMO to obtain the information from TNSPs in accordance with clause 3.7A(n) & (o) of the NER.

(4) Determination of the intervals for updating and *publishing* the CIR.

(5) Processes for providing *Registered Participants* with information under clause 3.7A(g) of the NER.

These Guidelines have effect only for the purposes set out in the NER. The NER and the National Electricity Law (**NEL**) prevail over these Guidelines to the extent of any inconsistency.

1.2 Definitions and Interpretation

1.2.1 Interpretation

The following principles of interpretation apply to these Guidelines. Unless otherwise expressly indicated, these Guidelines are subject to the principles of interpretation set out in Schedule 2 of the NEL.

1.3 Related Documents

Reference	Title	Location

2. CONGESTION INFORMATION RESOURCE

Following the conclusion of the Australian Energy Market Commission (AEMC) review "Arrangements for Managing Risks Associated with Transmission Network Congestion" in 2009, AEMO is required under the NER to establish and maintain a CIR, which will consolidate and enhance existing sources of information relevant to the understanding and management of transmission *network* congestion risk.

2.1 Objective

Clause 3.7A(a) lists the objective of CIR:

> (a) The objective of the *congestion information resource* is to provide information in a cost effective manner to *Registered Participants* to enable them to understand patterns of *network* congestion and make projections of *market* outcomes in the presence of *network* congestion (the *congestion information resource objective*).

2.2 NER Obligation

AEMO is required to *publish* the CIR in accordance with clause 3.7A(b) of the NER:

> (b) To implement the *congestion information resource objective*, *AEMO* must develop and *publish*, in accordance with this rule 3.7A, an information resource comprising:
>
> (1) Information on *planned network events* that are likely to materially affect *network constraints* in relation to a *transmission system*;
>
> (2) Historical data on *mis-pricing* at *transmission network* nodes in the *national electricity market*; and
>
> (3) Any other information that *AEMO*, in its reasonable opinion, considers relevant to implement the *congestion information resource objective*,
>
> which is to be known as the *congestion information resource.*

Further, clause 3.7A(c) provides a benchmark:

> (c) The *congestion information resource* must contain at least the same level of detail as is required to be included in the interim congestion information resource *published* under clause 11.30.2.

2.3 Location

The CIR is available on AEMO's website at: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Congestion-information.

2.4 Contents

The following sections outline the content provided as part of the CIR along with some related references. AEMO's website provides further information for each item.

2.4.1 Policies and Processes

A number of process and policy documents describe aspects of *network* constraints and congestion:

- Constraint Naming Guidelines.
- Constraint Formulation Guidelines.
- Constraint Implementation Guidelines.

- Schedule of Constraint Violation Penalty Factors.
- Confidence Levels, Offsets, and Operating Margins Policy Document.
- Over-Constrained Dispatch Rerun Process.
- Constraint Frequently Asked Questions.
- Factors Contributing to Differences between Dispatch and Pre-dispatch Outcomes.
- Limits Advice Guidelines.

2.4.2 Education Material

Details of AEMO workshops and other educational material to assist with the understanding of the NEM, including *network* congestion.

2.4.3 Network Status and Capability

A number of *publications* describe the real-time status of *networks* and their general capability:

- Transmission Line Diagrams.
- Transmission Equipment Ratings (**TER**).
- Interconnector Capabilities.
- Network Outage Scheduler (**NOS**).
- Market Information Planned Electricity Network Outages.
- Plain English Constraint Equation Converter.
- Market Management System (MMS) Files.
- Limit Advice.

2.4.4 Statistics and incident reports

The CIR contains continuous reporting streams that provide stakeholders with information on constraints and resulting *network* congestion that are updated regularly. The CIR is also a portal to resources providing details on particular incidents.

- Annual Constraint Report
- Monthly Constraint Report.
- Weekly Constraint Library Changes Report.
- Power System Operating Incident Reports.
- Pricing Event Reports.

2.4.5 Related resources

The CIR also provides a portal to a number of related resources that set out upcoming changes to the *network* and congestion management, and therefore may affect *network* congestion in future years. These resources can include:

- Annual Planning Reports by TNSPs.
- TNSP Network Augmentations.

2.4.6 Interconnector Performance

Clause 3.13.3(p) of the NER introduces the requirement for AEMO to publish, for each day of the preceding quarter for all interconnectors, details of:

- Interconnector transfer capability.
- The discrepancy between interconnector transfer capability and the capacity of the relevant interconnector in the absence of outages on the relevant interconnector only.

AEMO satisfies this requirement by publishing:

- A report on nominal interconnector capabilities updated as needed (see interconnector capabilities report above).
- A dispatch interconnector solution via the Market Management System (MMS) data model.
- A table in the monthly constraint report detailing the top binding interconnector limit setters.
- A list of constraint equations that set the interconnector limits, published along with the Annual NEM constraint report.

2.4.7 Mis-pricing

Clause 3.7A(b)(2) of the NER set out an obligation for AEMO to provide historical data on *mis-pricing* at *transmission network* nodes. To meet this requirement, AEMO *publishes* mis-pricing data at the transmission network nodes in the dispatch_local_price table in the MMS data model.

2.5 Publishing and Updating the Congestion Information Resource

Each document that makes up the CIR is updated at different times. Further details can be found in the *timetable*[1].

2.6 Confidentiality

Clause 3.7A(j) of the NER states that AEMO must not *publish confidential information* as part of the CIR.

[1] See: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Dispatch-information

3. INFORMATION TO BE PROVIDED BY TRANSMISSION NETWORK SERVICE PROVIDERS

3.1 Scope of the Obligation

The information required to be provided by TNSPs is stated in clause 3.7A(n), (o) and (p):

(n) In addition to the obligations imposed on *Transmission Network Service Providers* by rule 3.7, *Transmission Network Service Providers* must provide *AEMO* with the information specified in the *congestion information resource guidelines* as information that is to be provided by them:

(1) in a form which clearly identifies *confidential information*; and

(2) in accordance with the *congestion information resource guidelines.*

(o) If there has been a material change to the information provided by a *Transmission Network Service Provider* under paragraph (n), the *Transmission Network Service Provider* must provide *AEMO* with the revised information as soon as practicable.

(p) Information contained in the *congestion information resource* which has been provided by, or has been derived from information provided by, a *Transmission Network Service Provider* under this rule 3.7A:

(1) must represent the *Transmission Network Service Provider's* current intentions and best estimates regarding *planned network events* at the time the information is made available;

(2) does not bind the *Transmission Network Service Provider* to comply with an advised *outage* program; and

(3) may be subject to change due to unforeseen circumstances outside the control of the *Transmission Network Service Provider*.

3.2 Types of Information Required by AEMO

3.2.1 Network Outage Scheduler (NOS)

TNSPs are required to submit their current intentions and best estimates regarding *planned network events* which must comply with the requirements of clause 3.7A(p)(1) of the NER.

TNSPs meet this obligation by entering information about their *network outages* into NOS. This includes information about all primary assets (any assets that carries high voltage), and any outages of secondary systems (protection systems, ancillary plants, etc.) that is forecast to constrain the *dispatch* process.

Bookings for *outages* can be made up to two years in advance or at short notice in response to an emergency. TNSPs enter the following *outage* information into NOS:

- The equipment affected by the *outage*.
- The planned start and end time of the *outage*.
- Whether it relates to primary or secondary assets.
- Any notes associated with the *outage*.

AEMO assesses the *outage* bookings and enters the following information into NOS:

- Any *constraint* equations invoked associated with the *outage*.
- The assessment status of the *outage*.
- Any further notes associated with the *outage*.

Further information is available on AEMO's website: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Network-Data/Network-Outage-Schedule

3.2.2 Planned Network Outages

TNSPs are required to submit the current intentions on network outages that materially affect transfer capabilities for the next 13 months. For outages closer to current time the requirements are covered in section 3.2.1.

TNSPs meet this obligation by entering this information into NOS (see 3.2.1) for outages that have historically caused binding constraint equations or for outages that are forecast to cause binding constraint equations (due to network changes, new/future generators or generators retiring).

AEMO publishes historical binding constraint information:

- In the dispatch constraint solution table via the Market Management System (MMS) data model. This contains all the constraint result data, binding constraint equations can be filtered by searching for constraint equations with a non-zero value in the marginal value field.
- The annual NEM constraint report includes a summary of the binding constraint equations for a calendar year, categorised by system normal, outage and region.

3.2.3 Transmission Equipment Ratings

TNSPs are required to advise AEMO of the rating of their *transmission lines* and other equipment under clause S5.1.12 of the NER.

Network Service Providers (NSPs) provide information about their equipment, including rating application levels, application rules, and rating values.

This information can be provided as static data for use under specified conditions, telemetered dynamic real-time data for use in *dispatch* timeframe, or be hand-dressed manually in AEMO's EMS in urgent circumstances.

3.3 Confidentiality

Clause 3.7A(n)(1) of the NER requires TNSPs to provide information to AEMO in a form that clearly identifies *confidential information*, so that AEMO can comply with its obligation not to *publish confidential information* as part of the CIR.

3.4 Updates to Information

Material changes to any of the information provided to AEMO by TNSPs must be updated by the TNSPs as soon as practicable (see clause 3.7A(o) of the NER).

4. FURTHER DEVELOPMENT OF THE CONGESTION INFORMATION RESOURCE

AEMO continues to develop the CIR to match stakeholder needs in line with clause 3.7A(d) of the NER. To manage this process, AEMO:

- Includes CIR development as an agenda item for NEM Wholesale Consultative Forum (**NEMWCF**) meetings at least once a year, where proposals for change, viability, and priorities are discussed.
- Conducts formal stakeholder consultation as needed, but in any event, at least every three years, to determine how the CIR should be changed.

In order to meet the cost effective element of the *congestion information resource objective,* AEMO undertakes a cost-benefit analysis of proposals to change the CIR. This is managed using a release planning strategy similar to that used for AEMO's market systems. Under this approach:

- All acceptable proposals are ranked in terms of relative benefit based on certain criteria. This ranking is developed during the consultation process.
- Resources and costs required to implement each proposal are identified. This includes both development costs, ongoing operational costs, and resources required by TNSPs, where appropriate.
- The proposals are grouped into annual releases according to the ranking and resources available for each release.

Some proposals can take several years to implement. If proponents consider this unacceptable, AEMO, in consultation with the NEMWCF, can assess whether the cost to accelerate the work is justified.

GLOSSARY

The words, phrases and abbreviations set out below have the meanings set out opposite them when used in these Guidelines.

Terms defined in the NEL or the NER have the same meanings in these Guidelines unless otherwise specified. Those terms are intended to be identified in these Guidelines by italicising them, but failure to italicise a defined term does not affect its meaning.

Term	Definition
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator Limited
CIR	*congestion information resource*
EMS	AEMO's Energy Management Systems
FCAS	Frequency Control Ancillary Services
MMS	AEMO's Market Management System
NEL	National Electricity Law
NEM	*National Electricity Market*
NEMDE	NEM Dispatch Engine, the market dispatch engine used in the NEM
NEMWCF	National Electricity Market Wholesale Consultative Forum
NER	National Electricity Rules
NOS	*Network* Outage Scheduler, a software application owned by AEMO.
NSCAS	*Network* Support and Control Ancillary Service
NSP	*Network Service Provider*
PASA	*projected assessment of system adequacy*
SCADA	Supervisory Control And Data Acquisition
TER	*Transmission* Equipment Ratings
TNSP	*Transmission Network Service Provider*

APPENDIX A. ITEMS REQUESTED FOR THE CIR

This Appendix details items submitted to AEMO as part of its annual CIR consultations from 2010 to 2014. The current status of each item is indicated.

Items not listed as completed or cancelled are considered for future enhancements of the CIR.

Table 4-1 — Items requested for the CIR

Year	Completed	Requested Item Description	Comments
2010	Oct 2011	NOS Improvements: Recall times/original submit time/time of last change/TNSP.	
2010		AEMO to work with TNSPs to publish outages via NOS instead of planned network outages.	Also submitted in 2011 consultation. AEMO is discussing this issue with the TNSPs. TransGrid and Transend are submitting their *outages* via NOS. 2018 CIR includes changes to require TNSPs to submit their outages via NOS, but reduce the number by only including binding constraints.
2010	Sep 2010	Link CIR to the National Transmission Network Development Plan.	
2010	Feb 2010	Report on performance of *constraint* equations.	Published as the annual Constraint Report in Feb 2010.
2010	Cancelled	Daily report summarising the changes in NOS over past 24 hours established.	AEMO consulted with the DPRG[2] and both agreed to cancel this in favour of providing NOS data via MMS Data Model.
2010	Sep 2010	Link to incident reports from CIR.	
2010	Late 2010	Summated left-hand-side (LHS) of *constraint* equations in *dispatch* and *pre-dispatch*.	
2010	Sep 2010	CIR links to TNSP annual planning reviews.	
2010	Early 2011	Changes to the MMS Web Portal to include the *dispatch* / *pre-dispatch* / PASA *constraint* and *interconnector* results.	
2010		Add a heat map display of mis-pricing.	AEMO is investigating if this information can be implemented in a cost effective manner – such as on the new AEMO Interactive map.
2010	Cancelled	Visual image of *outages*.	Cancelled due to the resourcing and development time required.
2010	Cancelled	Visual image of *constraint* equations.	Cancelled due to the resourcing and development time required.
2011	Feb 2012	Include statistics on *outage* submit times in the Annual Constraints Report (planned, short notices and unplanned *outages*). This is different to the statistics on the Planned Network Outages.	Implemented in the Constraint Report 2011.
2011		Include statistics on Planned Network Outages in the longer timeframe (1/3/6/9 months).	On hold until Planned Network Outages from all TNSPs are in NOS.
2011	Dec 2011	Report on *constraint* performance on a monthly basis.	Monthly Constraint Report released with information on why *constraint* automation was used and information on violating *constraint* equations.
2011	Apr 2011	Include more *network* diagrams in the CIR.	Link provided to National Transmission Network Development Plan diagrams.
2011	Sep 2011	Add information on how *constraint* equations are constructed.	Constraint Implementation Guidelines released.
2011		Link to market impact parameter (MIP) data from *Australian Energy Regulator* (*AER*).	This is *AER* data and is currently not available on its website. When it is available it will be linked.
2011	Oct 2011	NOS improvement: add *outage* change reason.	Combined with other NOS improvements

[2] Dispatch Price and Reference Group – now part of the NEM Wholesale Consultative Forum.

Year	Completed	Requested Item Description	Comments
2011	Cancelled	Include statistics on the performance of *network* ratings in *pre-dispatch*.	
2011	June 2011	Link to *augmentation* information from TNSPs.	
2011	Feb 2012	Updating the existing video to the new format so it is viewable on more devices.	
2011		Additional videos on *constraints*.	Will be addressed in as resources allow. Good suggestions in the CIR 2011 consultation: *constraint* automation examples, dynamic ratings and impacts in *pre-dispatch*, overview of annual report, use of *interconnector* limits in ST/MT PASA, ratings in 5 min *pre-dispatch*, *constraint* equations with all positive factors.
2011	Late 2011	Publish NOS data via the MMS Data Interchange.	This will allow participants to have old copies of the files to compare with and re-download files.
2011	Feb 2012	Publish TER data, which includes information on identifies used on constraint right-hand-side (RHS) used and whether the rating is dynamic.	Existing file on website will remain unchanged.
2011	May 2012	Publish NOS and TER data via the MMS Data Model.	This will allow participants to use this data in the same way as any other *market* data - get historical data and integrate into their own systems.
2012	Late 2012	Review resubmit reasons and work with TNSPs to identify any improvements.	TNSPs to review resubmit reasons and provide more appropriate fields where applicable.
2012	Nov 2012	Discuss with TNSPs what additional information can be provided on reasons for *outages*.	Reason field indicating commissioning or maintenance to be added to NOS data.
2012	Jun 2012	Provide a link to the already *published constraint* equation result data.	
2012 and 2013		Provide in a user-friendly form in the CIR: • Currently invoked *constraint* equation results. • Constraint equations binding now and in pre-dispatch period. • Identification of *generating units/interconnectors* impacted by each binding *constraint* equation. • Identification of which *constraint* equations are the limiting factors on *interconnector* flows.	Updated with Private Generators Group (PGG) request in 2013 CIR. Internal project to review how data is published on the AEMO website – this data is part of that review.
2012	Cancelled	Provide Plain English descriptions outside the web portal.	Unable to be implemented. The plain English descriptions are limited to those on NEMNet due to IT security and this cannot go on the public website.
2012	June 2015	Consolidate Constraint Implementation Guidelines with FCAS constraint Equations and SO_OP_3709.	
2012	Nov 2012	Publish mis-pricing information in near real-time.	
2012	May 2013	Provide dynamic rating values to participants in near real-time.	
2012	Feb 2013	Modify Constraint Report to identify top *market* impact *constraints* by *region*.	Included in the 2012 Constraint Report.
2012	Nov 2012	AEMO Planning team to *publish market* simulations on assessing the use of NSCAS to relieve the 10 most critical *constraint* equations.	*Published* on AEMO's website.
2013		Provide a table of current *outages* along with the *generating units/interconnectors* on the left-hand-side of the invoked *constraint* equations.	
2013	Cancelled	Extended *pre-dispatch* to assist TNSPs managing *outages*.	Project cancelled. Investigating use of the NEMDE Queue with TNSPs.
2013	Nov 2013	Add TNSP identifier to the published NOS data.	
2013	May 2014	Reduce the size of the local price tables to only include those left-hand-side terms that are affected by a *constraint*	

Year	Completed	Requested Item Description	Comments
		equation.	
2013		Add a FCAS requirement table for 5-minute *pre-dispatch*.	
2013	July 2015	Publish the NRM_DI_AMT (used in the calculated of the automated negative residue *constraint* equations) in the MMS Data Model.	Completed in late July 2015.
2018		Changes to the Annual Constraint Report (Outages include 30—90 days)	
2018		New Connections: Information Source Pack	