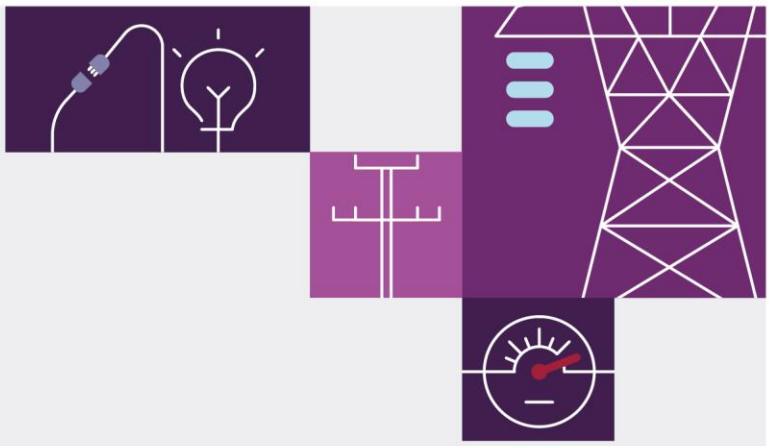
AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Monthly Constraint Report

November 2024

A report for the National Electricity Market on Constraint results.



Important notice

Purpose

This publication has been prepared by AEMO to provide information about constraint equation performance and related issues, as at the date of publication.

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1 Introduction

This report details constraint equation performance and transmission congestion related issues for November 2024. Included are investigations of violating constraint equations, usage of the constraint automation and performance of Pre-dispatch constraint equations. Transmission and generation changes are also detailed along with the number of constraint equation changes.

2 Constraint Equation Performance

2.1 Top 10 binding constraint equations

A constraint equation is binding when the power system flows managed by it have reached the applicable thermal or stability limit or the constraint equation is setting a Frequency Control Ancillary Service (FCAS) requirement. Normally there is one constraint equation setting the FCAS requirement for each of the eight services at any time. This leads to many more hours of binding for FCAS constraint equations - as such these have been excluded from the following table.

Table 1 Top 10 binding network constraint equations

Constraint Equation ID (System Normal Bold)	Description	#DIs (Hours)	Limit Type
Q_STR_7C0K_HASF_2	No limit to Haughton Solar Farm if Stan>=2+Stan+Cal>=3+Glad>=2+ (Stan+Cal+Glad) >=7, NQLD>250&270(AVG),Ross_FN>100&120(AVG),Haughton Syncon is ON, Zero otherwise.	3195 (266.25)	System Strength
N>NIL_94T	Out= Nil, avoid O/L Molong to Orange North (94T) on trip of Nil, Feedback	2563 (213.58)	Thermal
V^^V_BDBU_KGTS	Out = Bundey to Buronga (6F) 330kV line, avoid voltage collapse for loss of Horsham - Murra Warra - Kiamal 220kV line. Murraylink VFRB disabled. Swamp if Murraylink VFRB enabled.	2221 (185.08)	Voltage Stability
S>NIL_MHNW1_MHNW2	Out= Nil, avoid O/L Monash-North West Bend #2 132kV on trip of Monash-North West Bend #1 132kV line, Feedback	1727 (143.91)	Thermal
N>NIL_9R6_991	Out= Nil, avoid O/L Wagga North to Wagga (9R6) 132kV line on trip of Wagga North to Murrumburrah (991) 132kV line, Feedback	1433 (119.41)	Thermal
N>>BDBU_970_051	Out = Bundey to Buronga (6F) 330kV line, avoid O/L Burrinjuck to Yass (970) on trip of Wagga to Lower Tumut (051) line, Feedback	1258 (104.83)	Thermal
N>NIL_969	Out= Nil, avoid O/L Gunnedah to Tamworth (969) on trip of Nil, Feedback. Metering is used as specified in OM520 [Note: swamped with 96M or 9UJ or 9UH is O/S]	1239 (103.25)	Thermal
NRM_NSW1_VIC1	Negative Residue Management constraint for NSW to VIC flow	1078 (89.83)	Negative Residue
S-NIL_WTPT_SC+INV_2	Out=NIL, limit output of Wattle Pt WF based on Wattle Pt statcom status & the number of Dalrymble battery inverters I/S (Note: constraint is swamped when the number of Dalrymple battery inverters is >= 10)	1076 (89.66)	Other
N>NIL_9R4_99A	Out= Nil, avoid O/L Finley to Mulwala 132kV line (9R4) on trip of Finley to Uranquinty (99A) line, Feedback	1001 (83.41)	Thermal

2.2 Top 10 binding impact constraint equations

Binding constraint equations affect electricity market pricing. The binding impact is used to distinguish the severity of different binding constraint equations.

The binding impact of a constraint is derived by summarising the marginal value for each dispatch interval (DI) from the marginal constraint cost (MCC) re-run[1] over the period considered. The marginal value is a mathematical term for the binding impact arising from relaxing the RHS of a binding constraint by one MW. As the market clears each DI, the binding impact is measured in $/MW/DI.

The binding impact in $/MW/DI is a relative comparison and a helpful way to analyse congestion issues. It can be converted to $/MWh by dividing the binding impact by 12 (as there are 12 DIs per hour). This value of congestion is still only a proxy (and always an upper bound) of the value per MW of congestion over the period calculated; any change to the limits (RHS) may cause other constraints to bind almost immediately after.

Table 2 Top 10 binding impact network constraint equations

Constraint Equation ID (System Normal Bold)	Description	∑ Marginal Values	Limit Type
N>NIL_94T	Out= Nil, avoid O/L Molong to Orange North (94T) on trip of Nil, Feedback	4,398,630	Thermal
N>>BDBU_970_051	Out = Bundey to Buronga (6F) 330kV line, avoid O/L Burrinjuck to Yass (970) on trip of Wagga to Lower Tumut (051) line, Feedback	2,647,365	Thermal
V^^V_BDBU_KGTS	Out = Bundey to Buronga (6F) 330kV line, avoid voltage collapse for loss of Horsham - Murra Warra - Kiamal 220kV line. Murraylink VFRB disabled. Swamp if Murraylink VFRB enabled.	1,623,460	Voltage Stability
N>NIL_969	Out= Nil, avoid O/L Gunnedah to Tamworth (969) on trip of Nil, Feedback. Metering is used as specified in OM520 [Note: swamped with 96M or 9UJ or 9UH is O/S]	1,258,269	Thermal
S>NIL_MHNW1_MHNW2	Out= Nil, avoid O/L Monash-North West Bend #2 132kV on trip of Monash-North West Bend #1 132kV line, Feedback	1,061,489	Thermal
N>NIL_9R6_991	Out= Nil, avoid O/L Wagga North to Wagga (9R6) 132kV line on trip of Wagga North to Murrumburrah (991) 132kV line, Feedback	1,054,305	Thermal
N::N_MNYS_2	Out = Marulan-Yass (5), stability limit (Snowy-NSW) for loss of a 330kV line between Yass and Bannaby/Marulan (3H, 3J, 3L, 3P, 4 or 61)	1,033,203	Transient Stability
S-NIL_WTPT_SC+INV_2	Out=NIL, limit output of Wattle Pt WF based on Wattle Pt statcom status & the number of Dalrymple battery inverters I/S (Note: constraint is swamped when the number of Dalrymple battery inverters is >= 10)	1,009,028	Other
NRM_NSW1_VIC1	Negative Residue Management constraint for NSW to VIC flow	774,842	Negative Residue
N>NIL_94K_1	Out= Nil, avoid O/L Suntop Tee to Wellington (94K/1) on trip of Nil, Feedback	693,053	Thermal

[1] The MCC re-run relaxes any violating constraint equations and constraint equations with a marginal value equal to the constraint equation's violation penalty factor (CVP) x market price cap (MPC). The calculation caps the marginal value in each DI at the MPC value valid on that date. MPC is increased annually on 1st July.

2.3 Top 10 violating constraint equations

A constraint equation is violating when NEMDE is unable to dispatch the entities on the left-hand side (LHS) so the summated LHS value is less than or equal to, or greater than or equal to, the right-hand side (RHS) value (depending on the mathematical operator selected for the constraint equation). The following table includes the FCAS constraint equations. Reasons for the violations are covered in 2.3.1.

Table 3 Top 10 violating constraint equations

Constraint Equation ID (System Normal Bold)	Description	#DIs (Hours)	Limit Type
Q_STR_KBWF_N-2	Out = Nil, Loss of 858 and 857 declared credible. No limit to Kaban WF if Stan>=2+Stan+Cal>=3+Glad>=2+ (Stan+Cal+Glad) >=7, Kar>= 2,NQLD>350&370(AVG),Ross_FN>150&170(AVG) and Feeder 8905 IS, Zero otherwise.	18 (1.5)	System Strength
N>NIL_9R5_9R6_N	Out= NIL, avoid O/L Wagga330 to Wagga North (9R5) 132kV line on trip of Wagga132 to Wagga North (9R6) 132kV line, Feedback	14 (1.16)	Thermal
N>NIL_999	Out= Nil, avoid O/L Bango999 to Cowra (999) on trip of Nil, Feedback	9 (0.75)	Thermal
Q_STR_7C0K_HASF_2	No limit to Haughton Solar Farm if Stan>=2+Stan+Cal>=3+Glad>=2+ (Stan+Cal+Glad) >=7, NQLD>250&270(AVG),Ross_FN>100&120(AVG),Haughton Syncon is ON, Zero otherwise.	9 (0.75)	System Strength
N_WALGRV1_LE_ZERO_E	Direction to zero gen for Wallgrove BESS for Dispatch and Predispatch and NOT PASA	8 (0.66)	Other
N_WTAHB1_LE_ZERO_E	Direction to zero gen for Wallgrove BESS for Dispatch and Predispatch and NOT PASA	7 (0.58)	Other
F_T+NIL_MG_R6	Out = Nil, Raise 6 sec requirement for a Tasmania Synchronous Generation Event (both largest MW output and inertia), Basslink unable to transfer FCAS	6 (0.5)	FCAS
N_NEWENSF1+2_100-INV	New England Solar inverter limit of 100. Constraint to violate if New England Solar inverter availability greater than 100. Swamp out otherwise. DS only	6 (0.5)	System Strength
V_BANSF_0INV	Bannerton Solar Farm inverter limit of zero. Constraint to violate if Bannerton Solar Farm inverter availability greater than zero. Swamp out otherwise. DS only	6 (0.5)	System Strength
N>NIL_9R6_9R5_N	Out= NIL, avoid O/L Wagga132 to Wagga North (9R6) 132kV line on trip of Wagga330 to Wagga North (9R5) 132kV line, Feedback	5 (0.41)	Thermal

2.3.1 Reasons for constraint equation violations

Table 4 Reasons for constraint equation violations

Constraint Equation ID (System Normal Bold)	Description
Q_STR_KBWF_N-2	Constraint equation violated for: • 9 consecutive DIs from 29/11/2024 1520 hrs to 29/11/2024 1600 hrs • 6 consecutive DIs from 30/11/2024 0100 hrs to 30/11/2024 0125 hrs • 3 consecutive DIs on 30/11/2024 1400 hrs, 30/11/2024 1405 hrs, and 30/11/2024 1410 hrs With a violation degree of 0.001 MW. Constraint equation violated due to Kaban Wind Farm exceeding its MVAr limit.
N>NIL_9R5_9R6_N	Constraint equation violated for: • 4 consecutive DIs from 06/11/2024 1750 hrs to 06/11/2024 1805 hrs • 6 consecutive DIs from 25/11/2024 1740 hrs to 25/11/2024 1805 hrs • 3 consecutive DIs on 26/11/2024 1750 hrs, 26/11/2024 1755 hrs, and 26/11/2024 1800 hrs • And 1 additional DI on 26/11/2024 1740 hrs With a maximum violation degree of 12.736 MW occurring on 25/11/2024 1800 hrs. Constraint equation violated due to Uranquinty Units 1-4 being limited by its ROC down rate.
N>NIL_999	Constraint equation violated for: • 4 consecutive DIs from 06/11/2024 1750 hrs to 06/11/2024 1805 hrs • 4 consecutive DIs from 26/11/2024 1750 hrs to 26/11/2024 1805 hrs • And 1 additional DI on 26/11/2024 1740 hrs With a maximum violation degree of 22.193 MW occurring on 06/11/2024 1755 hrs. Constraint equation violated due to Uranquinty Unit 1 and Unit 2 being limited by its ROC down rate.
Q_STR_7C0K_HASF_2	Constraint equation violated for 2 consecutive DIs on 14/11/2024 0620 hrs and 14/11/2024 0625 hrs, and 7 consecutive DIs from 21/11/2024 0620 hrs to 21/11/2024 0650 hrs with a violation degree of 0.001 MW. Constraint equation violated due to Haughton Solar Farm exceeding its MVAr limit.
N_WALGRV1_LE_ZERO_E	Constraint equation violated for 2 consecutive DIs on 27/11/2024 1510 hrs and 27/11/2024 1515 hrs, and 6 consecutive DIs from 27/11/2024 1605 hrs to 27/11/2024 1630 hrs with a maximum violation degree of 42.0 MW occurring on 27/11/2024 1605 hrs. Constraint equation violated during market intervention period. Wallgrove BESS was directed to discharge at maximum rate.
N_WTAHB1_LE_ZERO_E	Constraint equation violated for 6 consecutive DIs from 27/11/2024 1605 hrs to 27/11/2024 1630 hrs and 1 additional DI on 27/11/2024 1510 hrs with a maximum violation degree of 50.0 MW occurring on 27/11/2024 1605 hrs. Constraint equation violated during market intervention period. Waratah BESS was directed to discharge at maximum rate.
F_T+NIL_MG_R6	Constraint equation violated for 6 non-consecutive DIs from 01/11/2024 1400 hrs to 25/11/2024 1030 hrs with a maximum violation degree of 18.114 MW occurring on 13/11/2024 0525 hrs. Constraint equation violated due to the Tasmanian raise 6 second service availability being less than the requirement.
N_NEWENSF1+2_100-INV	Constraint equation violated for 6 consecutive DIs from 11/11/2024 0510 hrs to 11/11/2024 0535 hrs with a violation degree of 0.001 MW. Constraint equation violated due to New England Solar Farm inverter availability exceeding its limit.
V_BANSF_0INV	Constraint equation violated for 4 consecutive DIs from 26/11/2024 0535 hrs to 26/11/2024 0550 hrs, and 2 consecutive DIs on 26/11/2024 1750 hrs and 26/11/2024 1755 hrs with a violation degree of 0.001 MW. Constraint violated due to Bannerton Solar Farm inverter availability exceeding its limit.
N>NIL_9R6_9R5_N	Constraint equation violated for 5 consecutive DIs from 25/11/2024 1745 hrs to 25/11/2024 1805 hrs with a maximum violation degree of 10.213 MW occurring on 25/11/2024 1800 hrs. Constraint violated due to Uranquinty Units 1-4 being limited by its ROC down rate.

2.4 Top 10 binding interconnector limit setters

Binding constraint equations can set the interconnector limits for each of the interconnectors on the constraint equation left-hand side (LHS). Table 5 lists the top (by binding hours) interconnector limit setters for all the interconnectors in the NEM and for each direction on that interconnector.

Table 5 Top 10 binding interconnector limit setters

Constraint Equation ID (System Normal Bold)	Interconnector	Description	#DIs (Hours)	Average Limit (Max)
V^^V_BDBU_KGTS	V-S-MNSP1 Import	Out = Bundey to Buronga (6F) 330kV line, avoid voltage collapse for loss of Horsham - Murra Warra - Kiamal 220kV line. Murraylink VFRB disabled. Swamp if Murraylink VFRB enabled.	1753 (146.08)	121.47 (-155.78)
S>NIL_MHNW1_MHNW2	V-S-MNSP1 Export	Out= Nil, avoid O/L Monash-North West Bend #2 132kV on trip of Monash-North West Bend #1 132kV line, Feedback	1693 (141.08)	162.22 (202.35)
N>>BDBU_970_051	VIC1-NSW1 Export	Out = Bundey to Buronga (6F) 330kV line, avoid O/L Burrinjuck to Yass (970) on trip of Wagga to Lower Tumut (051) line, Feedback	1146 (95.5)	-167.24 (834.46)
NRM_NSW1_VIC1	VIC1-NSW1 Import	Negative Residue Management constraint for NSW to VIC flow	1069 (89.08)	-133.67 (-1630.16)
V_T_NIL_FCSPS	T-V-MNSP1 Import	Basslink limit from Vic to Tas for load enabled for FCSPS	648 (54.0)	-438.99 (-477.88)
N::N_MNYS_2	VIC1-NSW1 Export	Out = Marulan-Yass (5), stability limit (Snowy-NSW) for loss of a 330kV line between Yass and Bannaby/Marulan (3H, 3J, 3L, 3P, 4 or 61)	573 (47.75)	-158.03 (860.04)
V^T_NIL_9	T-V-MNSP1 Import	Limit Basslink import to 350 MW (flow from Vic to Tas) under conditions of sustained low fault levels at George Town 220kV, and one or more 43 MVAr harmonic filters is out of service (Not available, Disconnector/Isolator OPEN). DS ONLY	542 (45.17)	-350.0 (-350.0)
F_MAIN++APD_TL_L5	T-V-MNSP1 Import	Out = Nil, Lower 5 min Service Requirement for a Mainland Network Event-loss of APD potlines due to undervoltage following a fault on MOPS-HYTS-APD 500 kV line, Basslink able to transfer FCAS	466 (38.83)	-408.03 (-478.0)
S>NIL_NWRB2_NWRB1	V-S-MNSP1 Export	Out= NIL, avoid O/L North West Bend-Robertstown #1 132kV line on trip of North West Bend-Robertstown #2 132kV line (this trips MWP1-3 SFs), Feedback	465 (38.75)	153.15 (173.56)
F_T++NIL_ML_L6	T-V-MNSP1 Export	Out = Nil, Lower 6 sec requirement for a Tasmania Load Event, Basslink able to transfer FCAS	457 (38.08)	-75.49 (543.88)

2.5 Constraint Automation Usage

The constraint automation is an application in AEMO's energy management system (EMS) which generates thermal overload constraint equations based on the current or planned state of the power system. It is currently used by on-line staff to create thermal overload constraint equations for power system conditions where there were no existing constraint equations or the existing constraint equations did not operate correctly.

The following section details the reason for each invocation of the non-real time constraint automation constraint sets and the results of AEMO's investigation into each case.

Table 1 – Non-Real-Time Constraint Automation usage

Constraint Set ID	Date Time	Description
CA_SYDS_565BA54D	29/11/2024 11:35 to 29/11/2024 11:35	CA_SYDS_565BA54D was built to manage overloading of Tailem Bend to Mobilong 132 kV Line for loss of Tailem Bend 275/132 kV No. 4 Transformer with prior outage of Tailem Bend 132 kV CB6128.
CA_SYDS_565B8899	29/11/2024 09:45 to 29/11/2024 11:35	CA_SYDS_565B8899 was built to manage overloading of Tailem Bend to Mobilong 132 kV Line for loss of Tailem Bend 275/132 kV No. 4 Transformer with prior outage of Tailem Bend 132 kV CB6128.

2.5.1 Further Investigation

CA_SYDS_565BA54D: Auto constraint was required to increase the operating margin of CA_SYDS_565B8899. Constraint automation was revoked on 29/11/2024 1135 hrs and constraint equation S>>CB6128_TBTX4_TBMO was built to manage future violation issues.

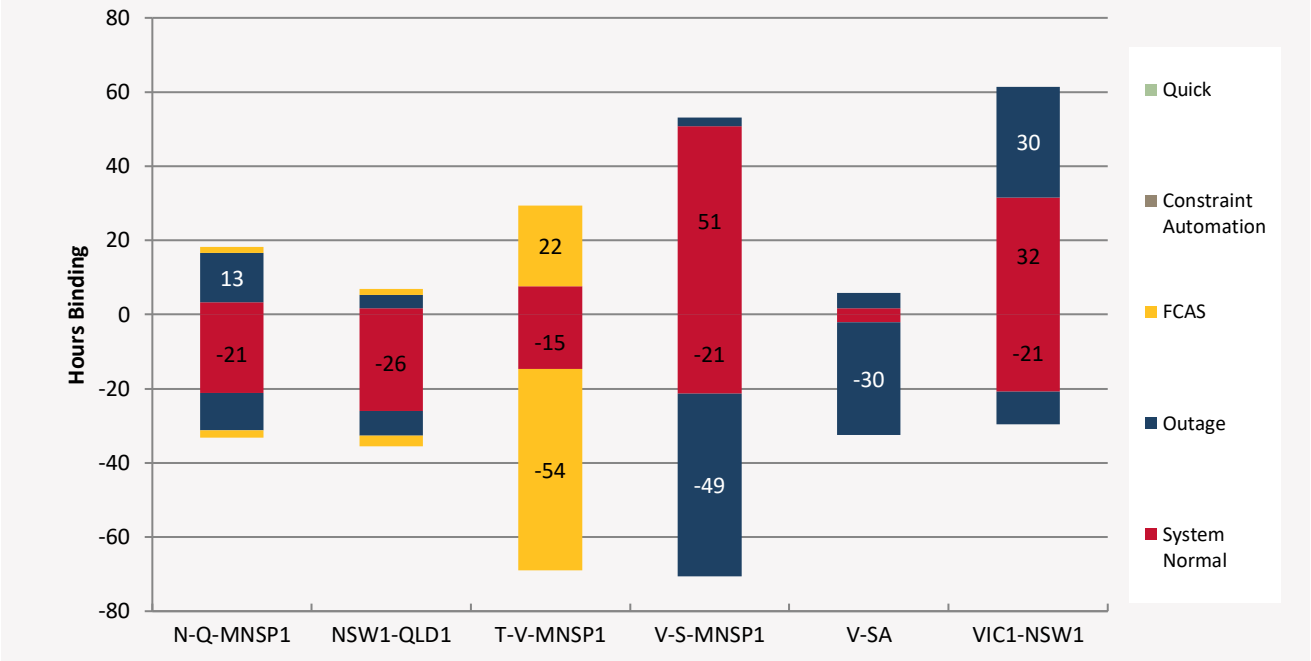
CA_SYDS_565B8899: Auto constraint was invoked to address the outlined scenario. Constraint automation was revoked on 29/11/2024 1135 hrs and constraint equation S>>CB6128_TBTX4_TBMO was built to manage future violation issues.

2.6 Binding Dispatch Hours

This section examines the number of hours of binding constraint equations on each interconnector and by region. The results are further categorized into five types: system normal, outage, FCAS (both outage and system normal), constraint automation and quick constraints.

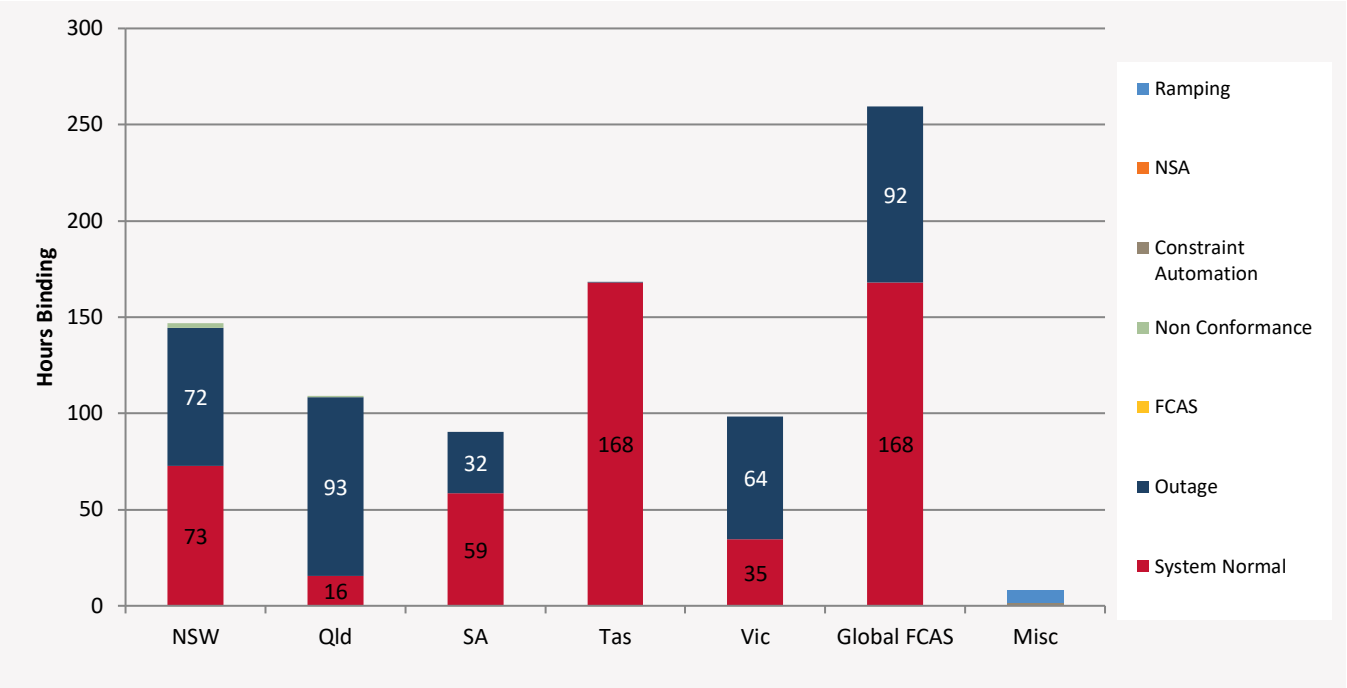
In the following graph the export binding hours are indicated as positive numbers and import with negative values.

Figure 1 Interconnector binding dispatch hours



The regional comparison graph below uses the same categories as in Figure 1 as well as non-conformance, network support agreement and ramping. Constraint equations that cross a region boundary are allocated to the sending end region. Global FCAS covers both global and mainland requirements.

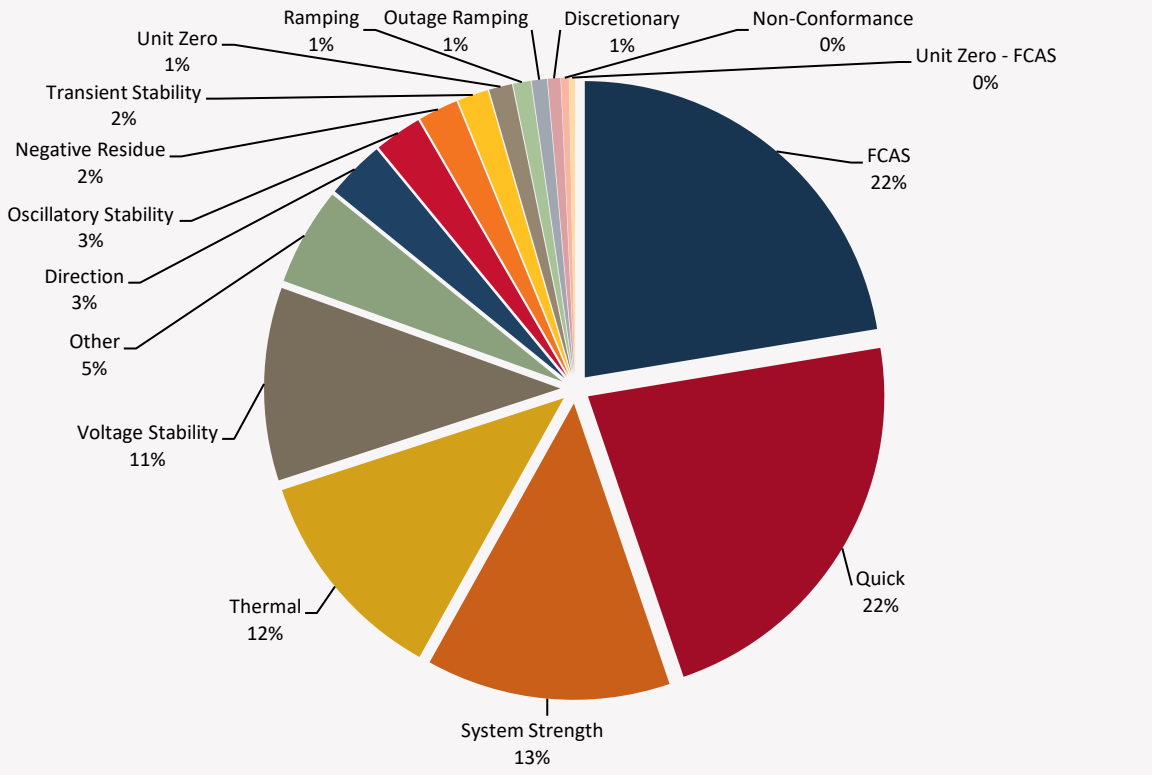
Figure 2 Regional binding dispatch hours



2.7 Binding Constraint Equations by Limit Type

The following pie charts show the percentage of dispatch intervals for November 2024 that the different types of constraint equations bound.

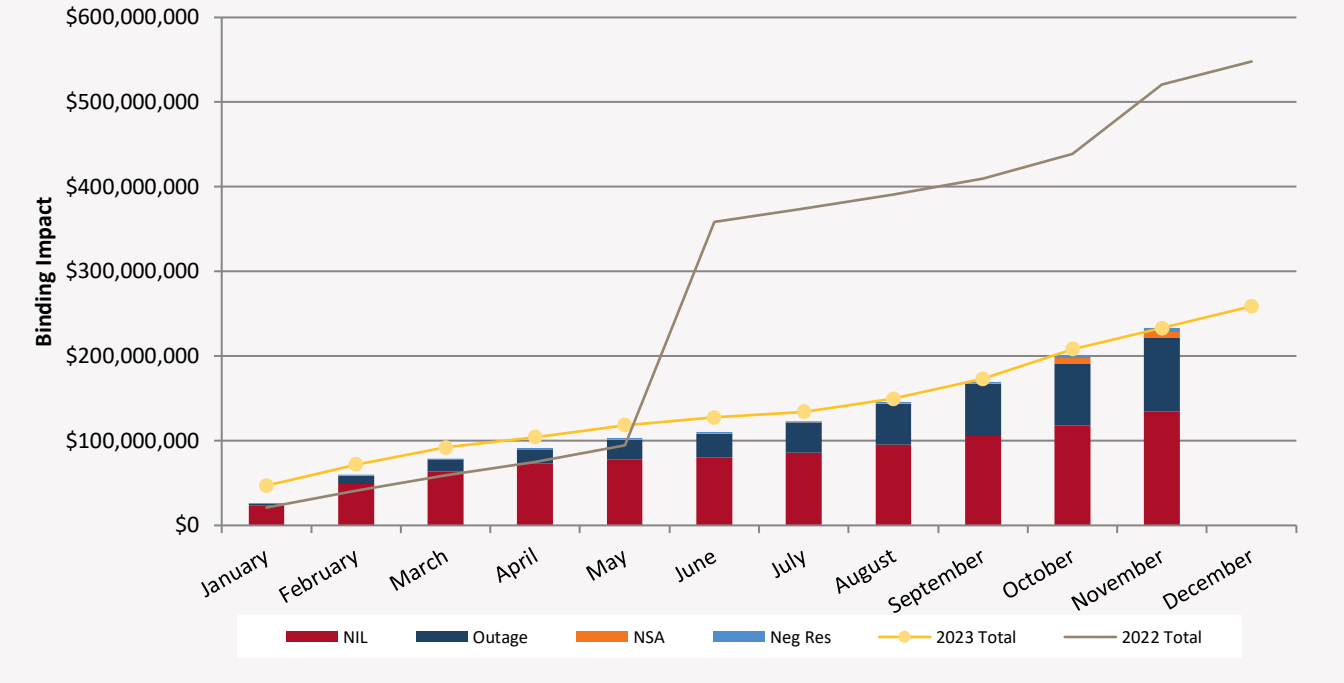
Figure 3 Binding by limit type



2.8 Binding Impact Comparison

The following graph compares the cumulative binding impact (calculated by summating the marginal values from the MCC re-run – the same as in section 0) for each month for the current year (indicated by type as a stacked bar chart) against the cumulative values from the previous two years (the line graphs). The current year is further categorised into system normal (NIL), outage, network support agreement (NSA) and negative residue constraint equation types.

Figure 4 Binding Impact comparison



2.9 Pre-dispatch RHS Accuracy

Pre-dispatch RHS accuracy is measured by the comparing the dispatch RHS value and the pre-dispatch RHS value forecast four hours in the future. The following table shows the pre-dispatch accuracy of the top ten largest differences for binding (in dispatch or pre-dispatch) constraint equations. This excludes FCAS constraint equations, constraint equations that violated in Dispatch, differences larger than ±9500 (this is to exclude constraint equations with swamping logic) and constraint equations that only bound for one or two Dispatch intervals. AEMO investigates constraint equations that have a Dispatch/Pre-dispatch RHS difference greater than 5% and ten absolute difference which have either bound for greater than 25 dispatch intervals or have a greater than $1,000 binding impact. The investigations are detailed in 2.9.1.

Table 6 Top 10 largest Dispatch / Pre-dispatch differences

Constraint Equation ID (System Normal Bold)	Description	#DIs	% + Max Diff	% + Avg Diff
V>>NIL_ARTSTL_ARCW	Out = Nil, avoid O/L Ararat to Stawell 66kV line for loss of the Ararat to Crowlands 220kV line, swamped if BATS-HOTS 66 kV tie opened, or with BGR tie splitting scheme in service, Feedback	11	3,323% (84.46)	534% (59.94)
V_S_HEYWOOD_UFLS	Out= Nil, Limit Heywood flows when SA under frequency load shedding (UFLS) is insufficient (i.e. when UFLS blocks in SA <1000 MW) to manage for double-circuit loss of Heywood IC. Note: Constraint is swamped if UFLS blocks >= 1000 MW.	17	1,675% (9,437)	1,326% (7,761)
N>96L_96R_967_89	Out= Lismore to Tenterfield (96L) or Glen Innes to Tenterfield (96R) 132kV line, avoid O/L Koolkhan to Lismore (967) on trip of Coffs Harbour to Lismore (89),(Noted: Swamped out when 967 O/S)	15	1,543% (73.15)	554% (40.5)
N>NIL_9R5_9R6_N	Out= NIL, avoid O/L Wagga330 to Wagga North (9R5) 132kV line on trip of Wagga132 to Wagga North (9R6) 132kV line, Feedback	10	943% (55.61)	199% (25.73)
N_X_MBTE_3B	Out= all three Directlink cables, Terranora_I/C_import <= Terranora_Load	18	700% (21.)	120.54% (11.02)
I_6F_NS_050	Discretionary limit of 50 MW on Buronga to Bundey (6F) 330 kV Line (NSW to SA)	3	377% (1,350)	218% (806)
V::N_NIL_V2	Out = NIL, prevent transient instability for fault and trip of a HWTS-SMTS 500 kV line, VIC accelerates. Yallourn W G1 on 500kV.	5	289% (348.48)	252% (310.53)
T::T_NIL_1	Out = NIL, prevent transient instability for fault and trip of a Farrell to Sheffield line, Swamp if less than 3 synchronous West Coast units generating or Farrell 220kV bus coupler open or Hampshire 110kV line is closed.	58	250% (341.86)	62.71% (148.41)
N>NIL_94T	Out= Nil, avoid O/L Molong to Orange North (94T) on trip of Nil, Feedback	523	188% (240.05)	22.85% (26.47)

2.9.1 Further Investigation

The following constraint equation(s) have been investigated:

I_6F_NS_050: Investigated and no improvement can be made to the constraint equation at this stage.

V>>NIL_ARTSTL_ARCW: Investigated and no improvement can be made to the constraint equation at this stage.

N>>NIL_BU_TX7_ML_LV: Changes were made to improve performance.

N>>NIL_998: Investigated and no improvement can be made to the constraint equation at this stage.

V^^SML_ARWBBA_1: Investigated and no improvement can be made to the constraint equation at this stage.

V>>ARCW_X3_BEKG: Investigated and no improvement can be made to the constraint equation at this stage.

N>NIL_94T: Investigated and no improvement can be made to the constraint equation at this stage.

N^^Q_DM_TW_SVC_A: Under investigation and will be improved if possible.

N^^V_2+5_1: Investigated and no improvement can be made to the constraint equation at this stage.

N>NIL_BHTX_SF_TTS_HV: Investigated and no improvement can be made to the constraint equation at this stage.

3 Generator / Transmission Changes

One of the main drivers for changes to constraint equations is from power system change, whether this is the addition or removal of plant (either generation or transmission). The following table details changes that occurred in November 2024.

Table 7 Generator and transmission changes

Project	Date	Region	Notes
Chinchilla Bess (Gen Component)	6 November 2024	Qld	Deregistered Generator due to BDU cut-over
Chinchilla Bess (Load Component)	6 November 2024	Qld	Deregistered Generator due to BDU cut-over
Riverina BESS (Gen Component)	6 November 2024	NSW	Deregistered Generator due to BDU cut-over
Riverina BESS (Load Component)	6 November 2024	NSW	Deregistered Generator due to BDU cut-over
Western Downs Battery BDU	14 November 2024	Qld	Existing battery changed to BDU
S2 Halys – H148 Diamondy 8996 275 kV Line	15 November 2024	Qld	Network augmentation commissioned
Wunghnu Solar Farm	19 November 2024	Victoria	New Generator
Tailem Bend 2 Battery BDU	21 November 2024	SA	Existing battery changed to BDU
H3 Belmont No. 2 275 kV 150 MVAr Reactor	21 November 2024	Qld	New Plant
Mokoan Solar Farm	26 November 2024	Victoria	New Generator

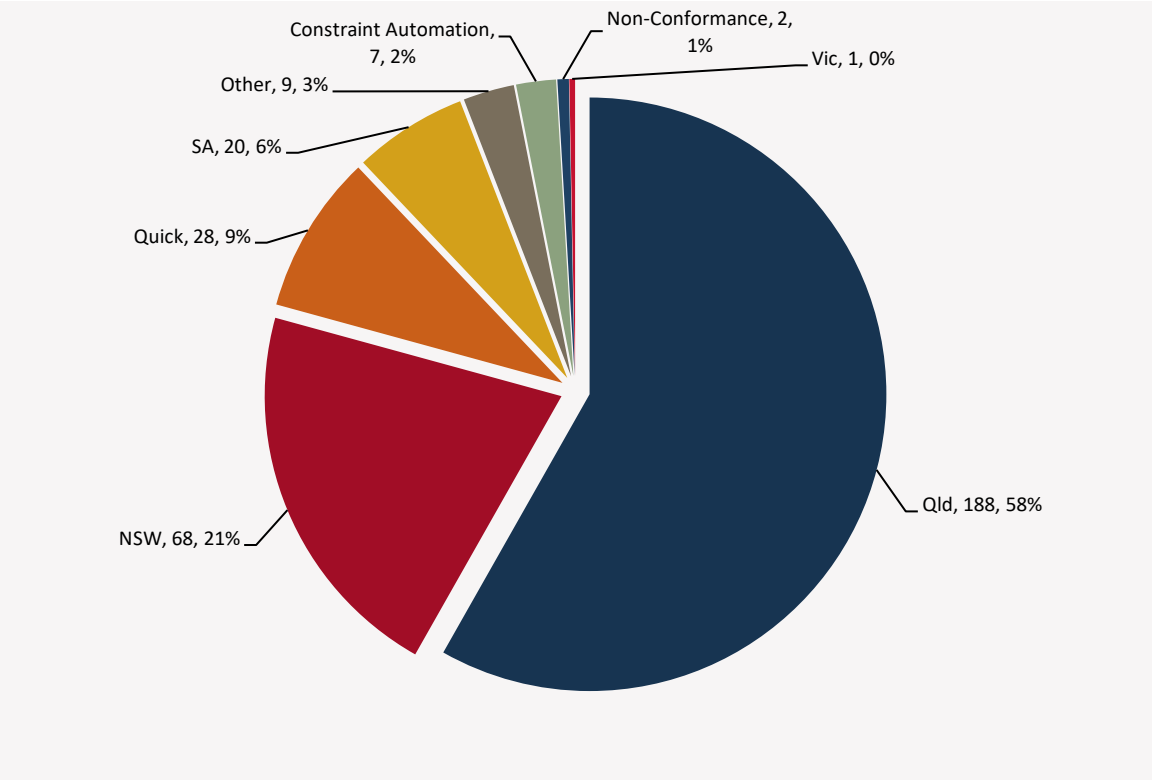
3.1 Constraint Equation Changes

The following pie chart indicates the regional location of constraint equation changes. For details on individual constraint equation changes refer to the Weekly Constraint Library Changes Report[2] or the constraint equations in the MMS Data Model[3].

[2] AEMO. *NEM Weekly Constraint Library Changes Report.* Available at: http://www.nemweb.com.au/REPORTS/CURRENT/Weekly_Constraint_Reports/

[3] AEMO. *MMS Data Model*. Available at: https://www.aemo.com.au/energy-systems/market-it-systems/nem-guides/wholesale-it-systems-software

Figure 5 Constraint equation changes



The following graph compares the constraint equation changes for the current year versus the previous two years. The current year is categorised by region.

Figure 6 Constraint equation changes per month compared to previous two years