AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Monthly Constraint Report

April 2021

A report for the National Electricity Market

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.

DISCLAIMER

This document or the information in it may be subsequently updated or amended. This document does not constitute legal or business advice, and should not be relied on as a substitute for obtaining detailed advice about the National Electricity Law, the National Electricity Rules, or any other applicable laws, procedures or policies. AEMO has made every effort to ensure the quality of the information in this document but cannot guarantee its accuracy or completeness.

Accordingly, to the maximum extent permitted by law, AEMO and its officers, employees and consultants involved in the preparation of this document:

- make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and
- are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.

Contents

Tables

Figures

1. Introduction

This report details constraint equation performance and transmission congestion related issues for April 2021. 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)	Change Date
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.	2386 (198.83)	26/03/2020
T_MRWF_FOS	Limit Musselroe wind farm due to upper limit on Tasmanian generator events. Limit is 153 MW (effective 144 MW at the connection point at Derby)	2276 (189.66)	1/01/2020
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	1564 (130.33)	22/04/2021
N^^N_NIL_2	Out=Nil , limit Darlington Point to Wagga line (63) line flow to avoid voltage collapse at Darlington Point 132kV post contingency trip of line 63, Feedback	1162 (96.83)	31/03/2021
V^^N_MSUT_1	Out = Murray to Upper Tumut (65), avoid voltage collapse around Murray for loss of all APD potlines	936 (78.0)	3/03/2021
Q_STR_MEWF_ZERO	Limit 0MW to Mt Emerald Wind farm for system strength requirement	921 (76.75)	12/01/2021
Q_STR_SMSF_ZERO	Limit 0MW to Sun Metals Solar farm for system strength requirement	921 (76.75)	12/01/2021
Q_STR_HASF_ZERO	Limit 0MW to Haughton Solar farm for system strength requirement	921 (76.75)	12/01/2021

Constraint Equation ID (System Normal Bold)	Description	#DIs (Hours)	Change Date
N^^N_NIL_3	Out= Nil, limit power flow on line X5 from Balranald to Darlington Point (X5) to avoid voltage collapse for contingency trip of Bendigo-Kerang 220kV line in NW Victoria	780 (65.0)	31/03/2021
V_S_NIL_ROCOF	Out = NIL, limit VIC to SA Heywood interconnection flow to prevent Rate of Change of Frequency exceeding 2 Hz/sec in SA immediately following loss of Heywood interconnector. [NOTE: Switches based on ON/OFF status of Dalry Battery in Load Mode)]	755 (62.91)	9/10/2020

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	Change Date
N^^N_NIL_2	Out=Nil , limit Darlington Point to Wagga line (63) line flow to avoid voltage collapse at Darlington Point 132kV post contingency trip of line 63, Feedback	967,803	31/03/2021
Q_STR_MEWF_ZERO	Limit 0MW to Mt Emerald Wind farm for system strength requirement	871,322	12/01/2021
T_MRWF_FOS	Limit Musselroe wind farm due to upper limit on Tasmanian generator events. Limit is 153 MW (effective 144 MW at the connection point at Derby)	619,638	1/01/2020
N>>N-NIL_94T	Out= Nil, avoid O/L Molong to Orange North (94T) on trip of Nil, Feedback	619,526	30/03/2021
S-SNWWF_0	Discretionary upper limit for Snowtown WF generation of 0 MW	604,393	7/08/2018
Q>NIL_EMCM_6056	Out= NIL, avoid thermal overload on Emerald to Comet (6056) 66 kV Feeder	478,833	16/04/2021
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	470,422	22/04/2021
Q_STR_HASF_ZERO	Limit 0MW to Haughton Solar farm for system strength requirement	464,144	12/01/2021
V_YATPSF_FLT_25	Limit Yatpool solar farm upper limit to 25 MW to manage post contingent voltage oscillation	435,384	14/10/2020
V_MURRAWRWF_FLT_90	Limit Murra Warra Wind Farm upper limit to 90 MW to manage system stability on the next contingency due to voltage oscillation	430,234	2/09/2019

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)	Change Date
F_T+NIL_MG_RECL_R6	Out = Nil, Raise 6 sec requirement for a Tasmania Reclassified Woolnorth Generation Event (both largest MW output and inertia), Basslink unable to transfer FCAS	14 (1.16)	2/12/2016
V_BANSF_22INV	Limit Bannerton Solar Farm upper limit to 0 MW if number of inverter available exceed 22. Constraint swamp out if number of inverter available not exceed 22. This is to manage voltage oscillation. DS only	14 (1.16)	11/08/2020
T^T_LIPM_1	Out = Liapootah to Waddamana to Palmerston 220 kV line, avoid voltage instability or violations for loss of the other Liapootah to Waddamana to Palmerston line	11 (0.91)	5/07/2017
N_FINLYSF_FLT_30	Limit Finley solar farm upper limit to 30 MW to manage post contingent voltage oscillation	10 (0.83)	23/11/2020
V_GANNSF_12INV	Limit Gannawarra Solar Farm upper limit to 0 MW if number of inverter available exceed 12. Constraint swamp out if number of inverter available not exceed 12. This is to manage voltage oscillation. DS only	10 (0.83)	11/08/2020
NRM_QLD1_NSW1	Negative Residue Management constraint for QLD to NSW flow	9 (0.75)	23/09/2020
T:T_LIPM_1	Out = Liapootah to Palmerston 220kV line, avoid transient instability for fault and trip of remaining Liapootah to Palmerston line (flow to South)	9 (0.75)	21/08/2013
N_BROKENH1_0INV	Constraint to violate if Broken Hill Solar Farm inverter availability greater than zero. Constraint swamp out otherwise. DS only	9 (0.75)	22/12/2020
V_KARSF_12INV	Limit Karadoc Solar Farm upper limit to 0 MW if number of inverter available exceed 12. Constraint swamp out otherwise. This is to manage voltage oscillation. DS only	9 (0.75)	11/08/2020
V_WEMENSF_21INV	Limit Wemen Solar Farm upper limit to 0 MW if number of inverter available exceed 21. Constraint swamp out if number of inverter available not exceed 21. This is to manage voltage oscillation. DS only	9 (0.75)	11/08/2020

2.3.1 Reasons for constraint equation violations

Table 4 Reasons for constraint equation violations

Constraint Equation ID (System Normal Bold)	Description
F_T+NIL_MG_RECL_R6	Constraint equation violated for 14 non-consecutive DIs on 10/04/2021, 11/04/2021, 13/04/2021 and 14/04/2021 with max violation 26.78 MW occurring on 11/04/2021 at 0825 hrs. Constraint equation violation occurred due to Tasmania raise 6-second service availability being less than the requirement.
V_BANSF_22INV	Constraint equation violated for 14 consecutive DIs on 21/04/2021 from 0605 hrs to 0710 hrs with violation degree 0.001 MW. Constraint equation violated due to Bannerton Solar Farm exceeding its inverter limit.

Constraint Equation ID (System Normal Bold)	Description
T^T_LIPM_1	Constraint equation violated for 11 non-consecutive DIs on 19/04/2021 with max violation 35.59 MW occurring at 1110 hrs. Constraint equation violated due to Gordon Unit 1 tripping.
N_FINLYSF_FLT_30	Constraint equation violated for 10 non-consecutive DIs on 07/04/2021, 08/04/2021 and 20/04/2021 with max violation of 54.33 MW occurring on 08/04/2021 at 1520 hrs. Constraint equation violation occurred due to Finley solar Farm non-conforming.
V_GANNSF_12INV	Constraint equation violated for 10 consecutive DIs on 21/04/2021 from 0640 hrs to 0725 hrs with violation degree of 0.001 MW. Constraint equation violated due to Gannawarra Solar Farm exceeding its inverter limit.
NRM_QLD1_NSW1	Constraint equation violated for 9 non-consecutive DIs on 10/04/2021 with max violation of 129.19 MW occurring at 1715 hrs. Constraint equation violation occurred due to competing requirements with the export limit which was set by F_Q++LDTW_R5.
T:T_LIPM_1	Constraint equation violated for 9 consecutive DIs on 19/04/2021 from 1045 hrs to 1125 hrs with max violation 81.96 MW occurring at 1120 hrs. Constraint equation violated due to Gordon Unit 1 tripping.
N_BROKENH1_0INV	Constraint equation violated for 9 non-consecutive DIs on 21/04/2021 with violation degree of 0.001 MW. Constraint equation violation occurred due to Broken Hill Solar Farm exceeding its inverter limit.
V_KARSF_12INV	Constraint equation violated for 9 consecutive DIs on 21/04/2021 from 0650 to 0730 hrs with violation degree 0.001 MW. Constraint equation violated due to Karadoc Solar Farm exceeding its inverter limit.
V_WEMENSF_21INV	Constraint equation violated for 9 consecutive DIs on 21/04/2021 from 0720 hrs to 0800 hrs with violation degree of 0.001 MW. Constraint equation violation occurred due to Wemen Solar Farm exceeding its inverter limit.

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)
F_MAIN++NIL_MG_R6	T-V-MNSP1 Export	Out = Nil, Raise 6 sec requirement for a Mainland Generation Event, Basslink able transfer FCAS	1877 (156.42)	342.4 (446.01)
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	1526 (127.17)	156.26 (183.56)
F_Q++LDTW_L6	NSW1-QLD1 Import	Out = Liddell to Tamworth (84) line, Qld Lower 6 sec Requirement	1117 (93.08)	-383.41 (-703.43)
F_Q++LDTW_L6	N-Q-MNSP1 Import	Out = Liddell to Tamworth (84) line, Qld Lower 6 sec Requirement	1058 (88.17)	-43.77 (-85.7)
V^^N_MSUT_1	VIC1-NSW1 Export	Out = Murray to Upper Tumut (65), avoid voltage collapse around Murray for loss of all APD potlines	909 (75.75)	530.07 (803.16)

Constraint Equation ID (System Normal Bold)	Interconnector	Description	#DIs (Hours)	Average Limit (Max)
F_MAIN++NIL_MG_R5	T-V-MNSP1 Export	Out = Nil, Raise 5 min requirement for a Mainland Generation Event, Basslink able transfer FCAS	835 (69.58)	383.99 (446.0)
N^^N_NIL_2	V-S-MNSP1 Import	Out=Nil , limit Darlington Point to Wagga line (63) line flow to avoid voltage collapse at Darlington Point 132kV post contingency trip of line 63, Feedback	815 (67.92)	125.58 (-3.88)
F_MAIN++APD_TL_L60	T-V-MNSP1 Import	Out = Nil, Lower 60 sec 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	779 (64.92)	-199.04 (-446.0)
V_S_NIL_ROCOF	V-SA Export	Out = NIL, limit VIC to SA Heywood interconnection flow to prevent Rate of Change of Frequency exceeding 2 Hz/sec in SA immediately following loss of Heywood interconnector. [NOTE: Switches based on ON/OFF status of Dalry Battery in Load Mode)]	755 (62.92)	412.73 (575.03)
N^^N_NIL_3	VIC1-NSW1 Export	Out= Nil, limit power flow on line X5 from Balranald to Darlington Point (X5) to avoid voltage collapse for contingency trip of Bendigo-Kerang 220kV line in NW Victoria	749 (62.42)	351.04 (876.24)

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 6 Non-Real-Time Constraint Automation usage

Constraint Set ID	Date Time	Description
CA_BRIS_4F8E5761	19/04/2021 07:05 to 19/04/2021 07:10	This constraint automation was created to manage thermal overload of Tungatinah-NewNorfolk #3 110kV with prior outage Liapootah-Palmerston-Waddamana #1 220kV and Tungatinah-NewNorfolk - Meadowbank #2 110kV for a trip of Liapootah-Palmerston-Waddamana #2 220kV when flow is south.
	19/04/2021 08:05 to 19/04/2021 08:20	Outage of Tungatinah-NewNorfolk-Meadowbank #2 110kV was originally scheduled to begin at 19/04/2021 at 0700 hrs. It was then rescheduled to begin at 0800 hrs. AEMO and TasNetworks agreed that the concurrent outage combination should not go ahead and the Tungatinah-NewNorfolk-Meadowbank #2 110kV outage was withdrawn.
CA_BRIS_4F7EC46C	06/04/2021 20:35 to 06/04/2021 21:20	Constraint automation was used to prevent the overload of Bouldercombe - Stanwell (848) 275kV line during the outage of Bouldercombe - Stanwell (849) 275kV line on a trip of Calvale - Wurdong (871) 275kV line. However, the constraint equation produced by Constraint automation did not work correctly. During the outage, Powerlink and AEMO agreed to a 10-minute re-rating of the 848 line and a contingency plan to resolve the issue.

2.5.1 Further Investigation

CA_BRIS_4F8E5761: AEMO and TasNetworks have agreed that the multiple outage of Liapootah-Palmerston-Waddamana #1 220kV and Tungatinah-NewNorfolk -Meadowbank #2 110kV will not be submitted again.

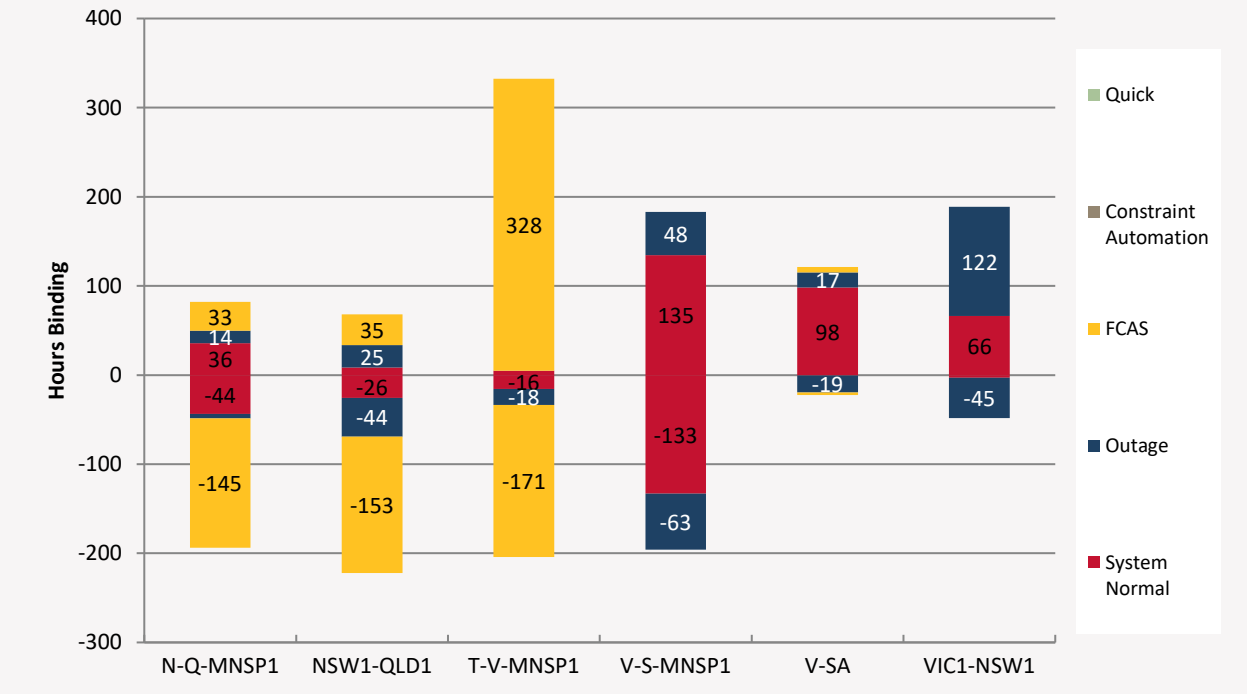
CA_BRIS_4F7EC46C: A constraint equation Q>>BCST_BCST_CLWU has now been created to resolve the overload issue. The reason for the constraint equation produced by Constraint Automation not working correctly has been investigated and was due to an incorrect sign on a line flow on the right-hand side. This has now been fixed in the Constraint Automation application.

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.

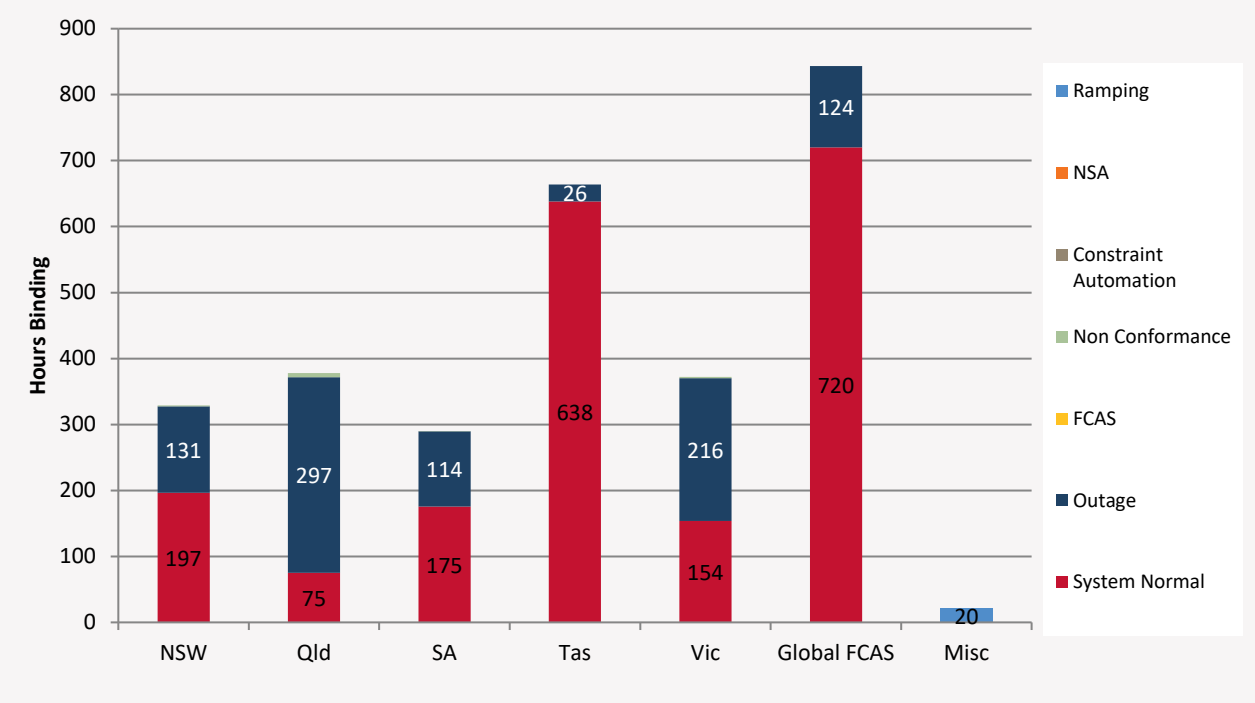
In the following graph the export binding hours are indicated as positive numbers and import with negative values.

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.

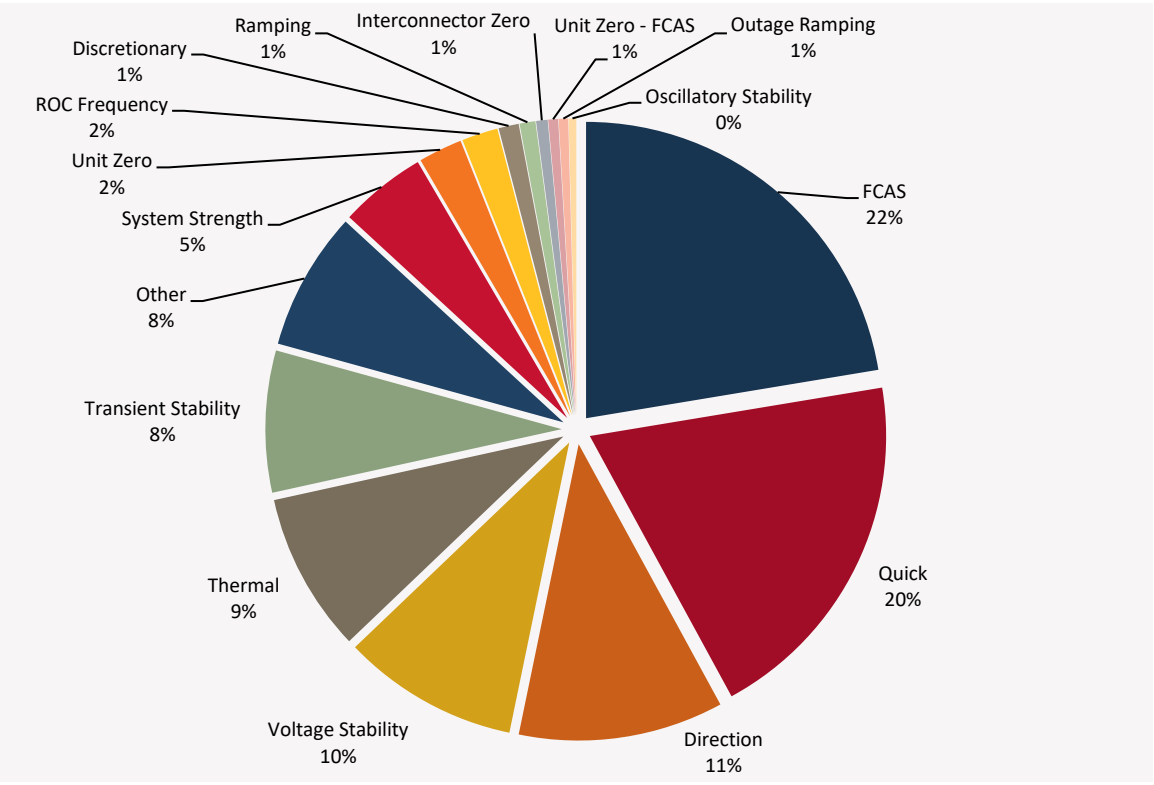
Figure 2 Regional binding dispatch hours



2.7 Binding Constraint Equations by Limit Type

The following pie charts show the percentage of dispatch intervals from for April 2021 that the different types of constraint equations bound.

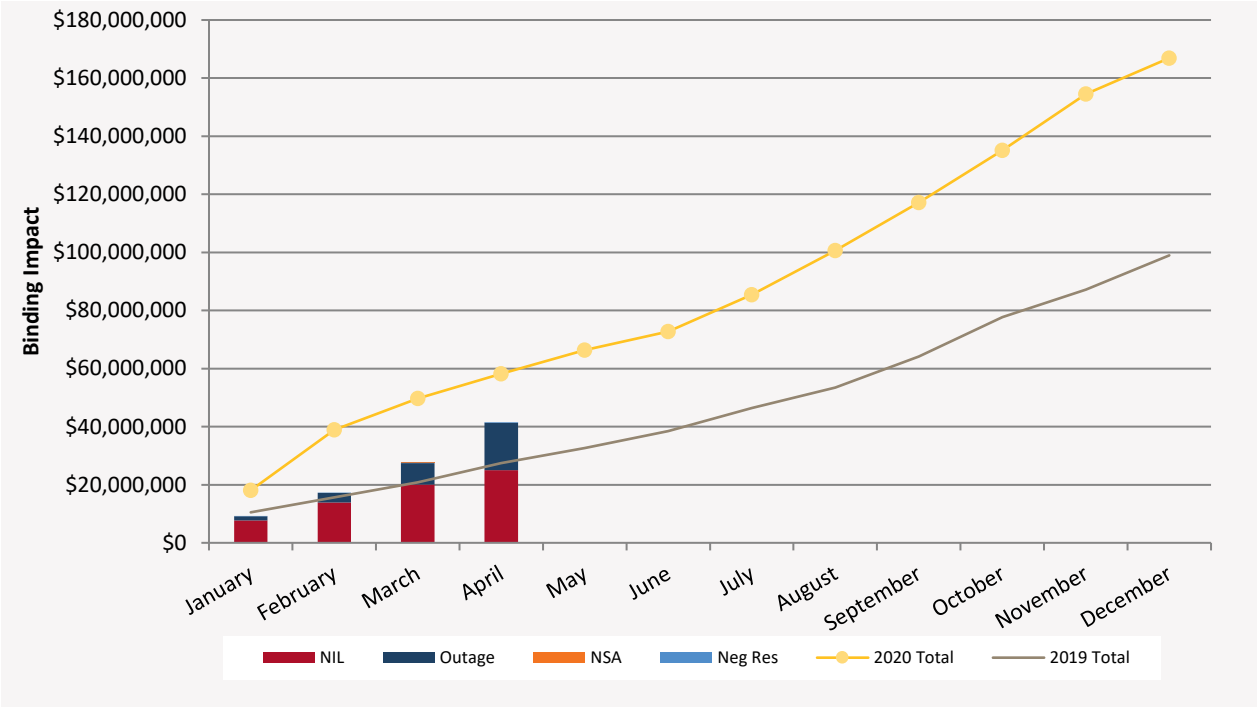
Figure 3 Binding by limit type



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 2.2) 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 7 Top 10 largest Dispatch / Pre-dispatch differences

Constraint Equation ID (System Normal Bold)	Description	#DIs	% + Max Diff	% + Avg Diff
V^SML_BUDP_3	Out = Buronga to Balranald (X3) or Balranald to Darlington Pt (X5) 220 kV line, avoid voltage collapse for loss of Bendigo to Kerang 220kV line	13	15,575% (183.26)	2,112% (96.57)
V::N_HWSM_V1	Out = Hazelwood to South Morang OR Hazelwood to Rowville 500kV line, prevent transient instability for fault and trip of a HWTS-SMTS 500 kV line, VIC accelerates, Yallourn W G1 on 220 kV.	9	3,652% (228.85)	502% (103.66)

Constraint Equation ID (System Normal Bold)	Description	#DIs	% + Max Diff	% + Avg Diff
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.	158	1,667% (9,434)	33.09% (122.5)
S>NIL_HUWT_STBG2	Out = Nil; Limit Snowtown WF generation to avoid Snowtown - Bungama line OL on loss of Hummocks - Waterloo line.[Note: Wattle PT trips when generating >=80 MW when Dalymple Battery (i.e. both Gen and Load component) is I/S]	39	254% (132.26)	51.23% (33.88)
T^T_LIPM_1	Out = Liapootah to Waddamana to Palmerston 220 kV line, avoid voltage instability or violations for loss of the other Liapootah to Waddamana to Palmerston line	29	232% (131.51)	52.85% (63.05)
V::N_HWSM_V2	Out = Hazelwood to South Morang OR Hazelwood to Rowville 500kV line, prevent transient instability for fault and trip of a HWTS-SMTS 500 kV line, VIC accelerates, Yallourn W G1 on 500 kV.	7	221% (248.26)	94.08% (101.92)
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.	596	123.5% (324.26)	13.01% (53.7)
V^^SML_NSWRB_2	Out = NSW Murraylink runback scheme, VIC to SA transfer limit on Murraylink to avoid voltage collapse at Red Cliffs for the loss of either the Darlington Point to Balranald (X5) or Balranald to Buronga (X3) 220kV lines	12	107.29% (260.97)	98.03% (238.04)
N^^V_LTWG_1	Out = Lower Tumut to Wagga 330 kV line, avoid voltage collapse at Darlington Point for loss of the largest Vic generating unit or Basslink	13	105.63% (78.64)	47.75% (41.69)
Q>NIL_MUTE_757	Out= Nil, ECS for managing 757 H4 Mudgeeraba to T174 Terranora 110kV line, Summer and Winter ECS ratings selected by SCADA status.	8	98.33% (99.95)	98.33% (99.95)

2.9.1 Further Investigation

The following constraint equation(s) have been investigated:

V_S_HEYWOOD_UFLS: Investigated and no improvement can be made to the constraint equation at this stage. Changes to the status of the reactive devices between DS/PD contributes to the PD accuracy.

S>NIL_HUWT_STBG2: Investigated and no improvement can be made to the constraint equation at this stage.

T^T_LIPM_1: Investigated and no improvement can be made to the constraint equation at this stage.

T::T_NIL_1: Investigated and no improvement can be made to the constraint equation at this stage.

V^^SML_NSWRB_2: Investigated and no improvement can be made to the constraint equation at this stage.

N^^V_LTWG_1: Investigated and no improvement can be made to the constraint equation at this stage.

Q>NIL_MUTE_757: Investigated. Mismatch was due to difference between modeling of Terranora control scheme and line status between DS and PD. 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 for April 2021.

Table 8 Generator and transmission changes

Project	Date	Region	Notes
Mackay GT	1 April 2021	QLD1	Deregistered Generator
Gangarri Solar Farm	13 April 2021	QLD1	New Generator
Adelaide Desalination Plant Battery 7.76 MW - Gen Component	20 April 2021	SA1	New Generator
Adelaide Desalination Plant Battery 7.76 MW - Load Component	20 April 2021	SA1	New Generator
Adelaide Desalination Plant 11 MW PV	20 April 2021	SA1	New Generator
Keilor Terminal Station 100 MVar 200kV Reactor	21 April 2021	VIC1	At Keilor terminal station the 100 MVAr 220 kV reactor was commissioned.

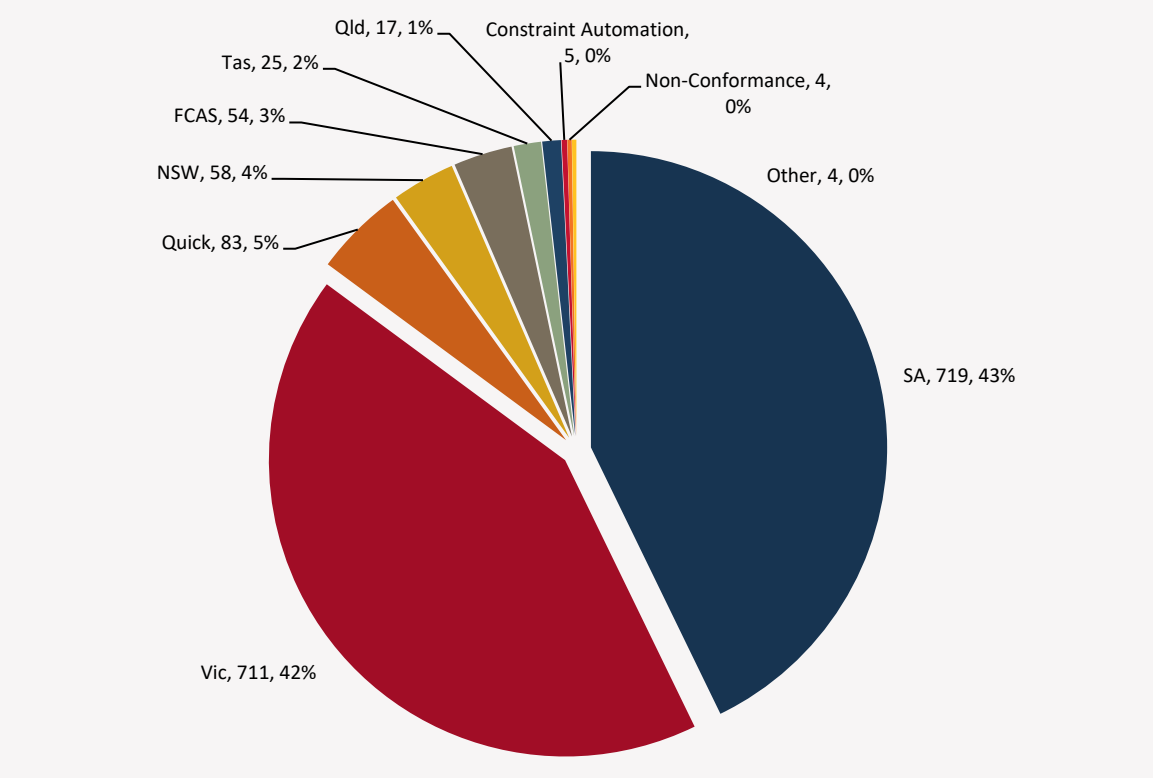
3.1 Constraint Equation Changes

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