
# Transend service target performance incentive scheme

## Proposed amendments to apply for the 2014–19 regulatory control period

**23 August 2012**

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# 1 Summary

Transend has reviewed the current service target performance incentive scheme (STPIS) with consideration of the Australian Energy Regulator's (AER) objectives for the STPIS, customer and stakeholder expectations, and the application of the scheme over the current regulatory control period. On balance, Transend considers that the STPIS has been effective and that the objectives of the scheme have generally been met.

Transend proposes to amend the STPIS to include the market impact component of the scheme, provided it remains an asymmetrical bonus only scheme. The adoption of the market impact component would allow the removal of the critical and non-critical transmission line circuit availability sub-parameters to avoid duplication, with a consolidated transmission line circuit availability sub-parameter being retained. The proposed amendments to the STPIS are outlined in Appendix A.

Transend has concerns with regard to the extent that the average outage duration parameter is consistent with the objectives of the STPIS, but accepts that the parameter is likely to remain part of the scheme. Transend considers that the zero weighting that is assigned to this parameter under the current STPIS should be retained for the next regulatory control period.

Transend notes that the AER is reviewing the current STPIS to determine whether the scheme should be amended.[1] Transend supports the ongoing review and improvement of the STPIS, and will continue to work closely with the AER on the further development of the STPIS.

# 2 Rules requirements

The STPIS requires Transend to propose any amendments to the scheme at least 22 months prior to the commencement of the next regulatory control period.[2] In Transend's case, proposed amendments to the current scheme must be submitted to the AER by 31 August 2012.

Clause 2.3 (e) of the STPIS states the following with regard to the addition, or variation of parameters under the scheme:

*(e) A proposal by a TNSP to amend this scheme to add or vary a parameter or vary the definition of an existing parameter must:*

*(1) demonstrate how the proposed amendment is consistent with the objectives in clause 1.4 of this scheme*

*(2) provide information and quantitative data on its performance history of at least the most recent three to five years as measured by its proposed parameter, and*

*(3) where this performance history information is not available, provide an appropriate benchmark or methodology to set values for the proposed parameter.*

Clause 1.4 of the STPIS states that the AER's objectives for the scheme are that it:

*(a) contributes to the achievement of the National Electricity Objective*

[1] AER Issues Paper – Electricity transmission - Service Target Performance Incentive Scheme, October 2011, p2
[2] AER, Final – Electricity transmission network service providers, Service target performance incentive scheme, March 2011, Clause 2.3(d) p4

*(b) is consistent with the principles in clause 6A.7.4(b) of the NER*

*(c) promotes transparency in:*

*(1) the information provided by a TNSP to the AER, and*

*(2) the decisions made by the AER*

*(d) assists in the setting of efficient capital and operating expenditure allowances in its transmission determinations by balancing the incentive to reduce actual expenditure with the need to maintain and improve reliability for customers and reduce the market impact of transmission congestion.*

The National Electricity Objective is:

*'to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to –*

*a. price, quality, safety, reliability, and security of supply of electricity; and*

*b. the reliability, safety and security of the national electricity system.*'

Section 6A.7.4 (b) of the National Electricity Rules (NER) states:

*(b) The principles are that the service target performance incentive scheme should:*

*1) provide incentives for each Transmission Network Service Provider to:*

*i. provide greater reliability of the transmission system that is owned, controlled or operated by it at all times when Transmission Network Users place greatest value on the reliability of the transmission system; and*

*ii. improve and maintain the reliability of those elements of the transmission system that are most important to determining spot prices;*

Details of how the proposed amendments to the STPIS are consistent with the objectives of the scheme are presented in Section 3.

Market impact performance data for the period 2008 to 2012 is provided in Appendix B.

# 3 Market impact component

In 2007, the AER commenced the development of a market impact component for inclusion in the STPIS. The AER introduced the market impact component of the STPIS in March 2008. In its final decision of the STPIS in 2008, the AER stated that,

*'The scheme promotes the national electricity objective and principles set out in the NER by encouraging TNSPs to consider how customers value their actions and how their operational decisions may affect market outcomes. TNSPs are encouraged to improve the availability, security and ultimately reliability of the transmission system at the times most valued by transmission network users.'*[3]

[3] AER, Final decision– Electricity transmission network service providers, Service target performance incentive scheme (incorporating incentives based on the market impact of transmission congestion), March 2008, p4

In the October 2011 STPIS issues paper the AER considered that,

*'The market impact component provides an incentive to TNSPs to improve the availability of the transmission system at times and on those elements of the network that are most important to determining spot prices.* '[4]

Transend agrees with the AER that the market impact component of the STPIS supports the objectives of the scheme. Transend considers that the inclusion of the market impact component in Transend's STPIS for the 2014–19 regulatory control period is consistent with the AER's objectives for the scheme because it will:

- promote the efficient operation and use of the Tasmanian transmission network with respect to the price of electricity as required by the national electricity objective;
- incentivise Transend to provide greater reliability of the transmission system at times when Transmission Network Users place greatest value on the reliability of the transmission system consistent with the requirements of Section 6A.7.4 (b) of the NER; and
- incentivise Transend to improve and maintain the reliability of those elements of the transmission system that are most important to determining spot prices consistent with the requirements of Section 6A.7.4 (b) of the NER.

During the development of the market impact component of the scheme, Transend was advised by the AER that,

*'In the interim, the AER intends to review the parameters applying to each TNSP before their respective revenue determinations. These reviews will ensure that each TNSP is encouraged to improve reliability at the times valued by users and on those elements of the network most important to determining spot prices.*

*This will be achieved by applying (where appropriate) peak period and critical circuit availability sub-parameters to each TNSP.* '[5]

With the AER's agreement, Transend subsequently split the transmission line circuit availability sub-parameter into transmission line circuit availability (critical) and transmission line circuit availability (non-critical) sub-parameters. This approach was used as an alternative to the market impact component because of the limited market performance data available at that time.[6]

Since 2008, Transend has developed the tools and systems required to assess the market impact of transmission system outages. Transend will have five years of data on which to develop performance target when the revenue proposal for the 2014–19 regulatory control period is submitted in May 2013. Performance data since 2008 is provided in Appendix B.

Transend notes the AER's concern over the market influence of the dominant generator in the Tasmanian region. As the AER advised in its submission to the Tasmanian Electricity Supply Expert Panel review[7], the price of energy in the spot market in Tasmania is heavily influenced by the bidding behaviour of the dominant generator, Hydro Tasmania. In its May 2012 edition of the 'AER Energy Update' the AER further acknowledged the influence of Hydro Tasmania's bidding behaviour on spot prices in the Tasmanian region, with the following statement:

[4] AER Issues Paper – Electricity transmission - Service Target Performance Incentive Scheme, October 2011, p3
[5] AER, Final decision – Electricity transmission network service providers – Service Target Performance Incentive Scheme, August 2001, p4
[6] AER, Final decision– Electricity transmission network service providers, Service target performance incentive scheme (incorporating incentives based on the market impact of transmission congestion), March 2008, p6
[7] AER Submission, Independent Review of the Tasmanian Electricity Sector, Response to Electricity Supply Industry Expert Panel's Issues Paper 15 August 2011

*'Between January and early March 2012, Tasmanian spot prices during the low demand period in the early morning hours were typically around $50 per MWh (and later in March, around $70 per MWh). These prices were considerably higher than in other regions and resulted from a change in Hydro Tasmania's bidding strategy. As the state's dominant generator, Hydro Tasmania can influence prices by withdrawing low-priced generation capacity from the market."*[8]

The Tasmanian Government has developed a reform package for the Tasmanian electricity industry. A key feature of the reform is the independent regulation of the wholesale market in Tasmania.[9] It is unclear what impact, if any, this will have on the Tasmanian spot market.

It is Transend's view that for the forthcoming regulatory control period the market impact component of the STPIS should operate as an asymmetric bonus only scheme, providing Transend with the opportunity to receive a maximum revenue increment of up to 2 per cent of its maximum allowable revenue, as currently defined in the STPIS.[10] This reflects that the scheme is untested in Tasmania, and that the extent to which Transend is able to influence the outcome under the scheme is also untested. Introducing the market impact component as a bonus only scheme, at least for the first regulatory period in which it is applied, would also be consistent with the approach taken in all other regions.

# 4 Transmission line circuit availability sub-parameters

As noted, the transmission line circuit availability (critical) and transmission line circuit availability (non-critical) sub-parameters were developed as an alternative to the market impact component of the STPIS. With the addition of the proposed market impact component, Transend proposes that from July 2014 onwards Transend's scheme reverts to measuring a consolidated transmission line circuit availability sub-parameter, with no critical and non-critical sub-parameters.

It is Transend's view that the inclusion of the market impact component within the STPIS provides a more sophisticated and targeted market-based incentive than that achieved by splitting transmission line circuit availability into critical and non-critical sub-parameters (where 'criticality' is defined in a way that attempts to simulate market impact).

# 5 Average outage duration parameter

The average outage duration parameter included in Transend's current STPIS comprises transmission line circuit and transformer circuit sub-parameters. A zero weighting has been assigned to this parameter.

The stated purpose of the Average Outage Duration parameter is to *'...minimise the average length of all unplanned outages to the benefit of system users.'*[11] As part of the 2009–14 revenue reset, Transend and its consultant Sinclair Knight Merz provided justification for not including the average outage duration measure in the STPIS, outlining how the parameter would not add value to customers. Transend's reasons for not including this parameter in the STPIS were:

[8] AER, AER Energy Update May 2012, p8
[9] Tasmania Government, Energy for the Future, Reforming Tasmania's electricity industry, May 2012, p6
[10] AER, Final – Electricity transmission network service providers, Service target performance incentive scheme, March 2011, Clause 4.3 p11
[11] AER, Final decision – Electricity Transmission Network Service providers, Service Target Performance Incentive Scheme, March 2011, Clause 3.1.1.3 p8

- any unplanned transmission circuit outages that result in a loss of supply (LOS) greater than 0.1 system minute are captured under the LOS event parameter;
- there is already an incentive to minimise the impact of unplanned transmission circuit outages through other mechanisms (customer connection agreements, connection point performance reporting to the Office of the Tasmanian Energy Regulator etc);
- performance under this parameter is heavily influenced by the configuration and technical capability of the transmission network;
- the duration of planned outages may be extended by events outside Transend's control;
- the historical performance for this parameter has been relatively volatile (particularly with consideration of the configuration of Transend's transmission network) and it would be difficult to influence Transend's performance under the scheme.

In addition, the parameter may not be consistent with the objectives of the STPIS because it does not take into account the trade-off between the cost to customers of providing the levels of service to meet the defined targets in comparison to the benefits received by customers.

Transend and its consultant Sinclair Knight Merz identified that while there may be some value in measuring and reporting on this parameter, it possibly would not provide its intended incentive as a primary driver of performance improvement. The AER agreed with Transend's concerns about the average outage duration parameter, concluding that, *'The AER considered that this parameter should not affect Transend's financial incentive because its performance results are highly volatile and vary significantly from year to year.'*[12] The average outage duration parameter was subsequently included in the STPIS, but with a zero weighting. Transend proposes to retain the average outage duration parameter, and associated sub-parameters, but with a zero weighting for the reasons outlined above.

[12] AER, Final decision – Electricity transmission network service providers, Service Target Performance Incentive Scheme (incorporating incentives based on the market impact of transmission congestion), March 2008, p6

# Appendix A: Service target performance incentive scheme – proposed amendments

## Part 4—Transend

**Parameter 1 Transmission circuit availability**

| | |
|---|---|
| Sub-parameters | transmission line circuit availability ~~(critical circuits)~~<br>~~transmission line circuit availability (non-critical circuits~~)<br>transformer circuit availability |
| Unit of measure | percentage of total possible hours available |
| Source of data | Transend performance reporting system |
| Definition/formula: | $\left(\frac{\text{No. hours per annum circuits are available}}{\text{Total possible no. of defined circuit hours}}\right)\times 100$<br>definition: the actual circuit hours available divided by the total possible defined circuit hours available<br>~~critical circuits are those lines which are in areas under direct AEMO oversight (except radial portions on the *transmission system*)~~<br>~~non-critical circuits are lines in areas under indirect AEMO oversight and the radial portions of the *transmission system* that are under direct AEMO oversight~~ |
| Inclusions | 'circuits' includes overhead lines, underground cables, and power transformers<br>circuit outages from all causes include planned, forced and emergency events, including extreme events |
| Exclusions | outages on assets that are not providing *prescribed transmission services*<br>dedicated connection assets that supply a customer who has negotiated a higher (or lower) level of service required by the NER, where that customer has agreed to the cost (or discount) for that higher (or lower) level of service<br>circuit outages caused by a fault or other event on a third party system—e.g. intertrip signal, generator outage (including coincident outages), customer installation (including a customer request), or by direction of fire services or AEMO<br>*Force majeure events*<br>NOTE: under section 3.5 of the AER's Information Guidelines, the TNSP must provide a list to the AER each year of the events that the TNSP considers should be excluded from performance results, including reasons and how the event meets the relevant exclusion definition |

| **Parameter 2** | **Loss of supply event frequency** |
|---|---|
| Sub-parameter | frequency of events where loss of supply exceeds x system minutes<br>frequency of events where loss of supply exceeds y system minutes |
| Unit of measure | number of events per annum |
| Source of data | Transend performance reporting system |
| Definition/formula | number of events greater than x system minutes per annum<br>number of events greater than y system minutes per annum<br>system minutes are calculated for each supply interruption by the 'load integration method' using the following formula:<br>$\frac{\Sigma (\text{MWh unsupplied} \times 60)}{\text{MW peak demand}}$<br>where:<br>MWh unsupplied is the energy not supplied as determined by using NEM metering and substation load data. This data is used to estimate the profile of the load over the period of the interruption by reference to historical load data<br>period of the interruption starts when a loss of supply occurs and ends when Transend offers supply restoration to the customer<br>MW peak demand means the maximum amount of aggregated electricity demand recorded at entry points to the Transend transmission network and interconnector connection points during the financial year in which the event occurs or at any time previously<br>the performance parameter applies to exit points only<br>interruptions affecting multiple connection points at exactly the same time are aggregated (i.e. system minutes are calculated by events rather than connection point interruptions)<br>x = 0 .1 y = 1 .0 |
| Inclusions | all unplanned outages exceeding the specified impact (that is, x system minutes and y system minutes)<br>unplanned outages on all parts of the regulated transmission system<br>extreme events |
| Exclusions | outages on assets that are not providing *prescribed transmission services*<br>dedicated connection assets that supply a customer that has negotiated a higher (or lower) level of service required by the NER, |

| | |
|---|---|
| | where that customer has agreed to the cost (or discount) for that higher (or lower) level of service |
| | circuit outages caused by a fault of other even on a third party system—e.g. intertrip signal, generator outage (including coincident outages), customer installation (including a customer request), or by direction of fire services or AEMO |
| | planned outages |
| | *Force majeure events* |
| | NOTE: under section 3.5 of the AER's Information Guidelines, the TNSP must provide a list to the AER each year of the events that the TNSP considers should be excluded from performance results, including reasons and how the event meets the relevant exclusion definition |

| **Parameter 3** | **Average outage duration** |
|---|---|
| Sub-parameters | transmission line circuits<br>transformer circuits |
| Unit of measure | minutes |
| Source of data | Transend performance reporting system |
| Definition/formula | $\frac{\text{Aggregate minutes of all unplanned outages}}{\text{Number of events}}$<br>the cumulative summation of the outage duration time for the period, divided by the number of outage events during the period<br>where: outage duration time starts when a loss of supply occurs and ends when Transend offers supply restoration to the customer |
| Inclusions | where notification to affected customers is less than 24 hours (except where AEMO reschedules the outage after notification has been provided.) |
| Exclusions | successful reclose events (less than one minute duration)<br>outages on assets that are not providing *prescribed transmission services*<br>dedicated connection assets that supply a customer who has negotiated a higher (or lower) level of service required by the NER, where that customer has agreed to the cost (or discount) for that higher (or lower) level of service<br>circuit outages caused by a fault or other event on a third party system e.g. intertrip signal, generator outage (including coincident outage), fire services direction, customer installation (including a customer request), or by direction by fire services or AEMO<br>planned outages<br>*force majeure events*<br>for all outages the duration is capped at seven days<br>NOTE: under section 3.5 of the AER's Information Guidelines, the TNSP must provide a list to the AER each year of the events that the TNSP considers should be excluded from performance results, including reasons and how the event<br>meets the relevant exclusion definition |

# Appendix B: Market impact performance data

The following is a raw count of dispatch intervals that satisfy the market component reporting criteria. Transend is yet to conclude detailed analysis of the intervals that would be removed from the historic data set, based on exclusions permitted under the scheme. This more detailed analysis will form part of the information supporting Transend's revenue proposal, should the market impact component be included in Transend's approved STPIS.

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| F_T_FARC2_R6 | Out=Farrell-Reece 2 220kV line. R6 <= 0MW | 2 | | | | |
| F_T_PMPO_TWO_110_R6 | Out=Both Palmerston-Poatina 110kV lines. R6 <= 0MW | | | | 168 | |
| F_T++CSGO_TG_R6 | Out = one Chapel St to Gordon line, Tasmania Raise 6 sec requirement for loss of the remaining Chapel St to Gordon line, Basslink able to transfer FCAS | | | 2 | 8 | |
| F_T++CSGO_TG_R60 | Out = one Chapel St to Gordon line, Tasmania Raise 60 sec requirement for loss of the remaining Chapel St to Gordon line, Basslink able to transfer FCAS | | | | 1 | |
| F_T++FASH1_2C_TG_R6 | Out = either Farrell to Sheffield (1 or 2) line with John Butters, Tribute & Reece 1,2 supplying Sheffield, Tasmania Raise 6 sec requirement for loss of the remaining Farrell to Sheffield line, Basslink able to transfer FCAS | | | | 20 | |
| F_T++FASH1_2D_TG_R6 | Out =either Farrell to Sheffield (1 or 2) line with Bastyan, John Butters, Tribute & Reece 2 supplying Sheffield, Tasmania Raise 6 sec requirement for loss of the remaining Farrell to Sheffield line, Basslink able to transfer FCAS | | | 5 | | |
| F_T++FASH1_B_TG_R6 | Out = Farrell to Sheffield No.1 or 2 line with Bastyan + Reece 1 & 2 + Tribute supplying Sheffield, Tasmania Raise 6 sec requirement for loss of the remaining Farrell to Sheffield line, Basslink able to transfer FCAS | | | 7 | 1 | |
| F_T++GO_A752_TG_R5 | Out= Gordon CB A752, Tasmania Raise 5 min requirement, Basslink able to transfer FCAS | | | | 2 | |
| F_T++GO_A752_TG_R6 | Out= Gordon CB A752, Tasmania Raise 6 sec requirement, Basslink able to transfer FCAS | | | | 24 | |
| F_T++GO_A752_TG_R60 | Out= Gordon CB A752, Tasmania Raise 60 sec requirement, Basslink able to transfer FCAS | | | | 4 | |
| F_T++GO_C752_TG_R5 | Out= Gordon CB C752, Tasmania Raise 5 min requirement, Basslink able to transfer FCAS | | | | 2 | |
| F_T++GO_C752_TG_R6 | Out= Gordon CB C752, Tasmania Raise 6 sec requirement, Basslink able to transfer FCAS | | | | 3 | |
| F_T+FASH1_2C_RREG | Out = Farrell to Sheffield No.1 or 2 line; John Butters, Tribute and Reece 1, 2 unavailable for raise FCAS | | | | 1 | |
| F_T+FASH1_2C_TG_R6 | Out = either Farrell to Sheffield (1 or 2) line with John Butters, Tribute & Reece 1,2 supplying Sheffield, Tasmania Raise 6 sec requirement for loss of the remaining Farrell to Sheffield line, Basslink unable to transfer FCAS | | | 8 | 12 | |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| F_T+FASH1_B_RREG | Out = Farrell to Sheffield No.1 or 2 line, Bastyan, Reece 1 & 2 and Tribute Raise Regulation Requirement = 0, Note Farrell 220kV bus configured as per OAN 180 | | | | 1 | |
| F_T+FASH1_B_TG_R6 | Out = Farrell to Sheffield No.1 or 2 line with Bastyan + Reece 1 & 2 + Tribute supplying Sheffield, Tasmania Raise 6 sec requirement for loss of the remaining Farrell to Sheffield line, Basslink unable to transfer FCAS | | | 2 | 7 | |
| F_T+FASH1_B_TG_R60 | Out = Farrell to Sheffield No.1 or 2 line with Bastyan + Reece 1 & 2 + Tribute supplying Sheffield, Tasmania Raise 60 sec requirement for loss of the remaining Farrell to Sheffield line, Basslink unable to transfer FCAS | | | 1 | | |
| F_T+GO_A752_TG_R6 | Out= Gordon CB A752, Tasmania Raise 6 sec requirement, Basslink unable to transfer FCAS | | | | 5 | |
| F_T+GO_C752_TG_R6 | Out= Gordon CB C752, Tasmania Raise 6 sec requirement, Basslink unable to transfer FCAS | | | | 5 | |
| F_T+GO_C752_TG_R60 | Out= Gordon CB C752, Tasmania Raise 60 sec requirement, Basslink unable to transfer FCAS | | | | 1 | |
| F_T+T_CSGO_R5 | Out = one Chapel St to Gordon line, Gordon Raise 5 min Requirement = 0 | 17 | | | | |
| F_T+T_CSGO_R6 | Out = one Chapel St to Gordon line, Gordon Raise 6 second Requirement = 0 | 26 | | 13 | | |
| F_T+T_CSGO_R60 | Out = one Chapel St to Gordon line, Gordon Raise 60 second Requirement = 0 | 17 | | | | |
| F_T+T_CSGO_RREG | Out = one Chapel St to Gordon line, Gordon Raise Regulation Requirement = 0 | 17 | | 1 | | |
| 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) | 111 | 4 | 111 | | |
| T^T_CSGO_1_DS | Out = one Chapel St to Gordon 220 kV line, avoid voltage instability or violations for loss of the other Chapel St to Gordon line, Dispatch only, swamped when SSSPS enabled | | | 1 | | |
| T^T_CSGO_2_DS | Out = one Chapel St to Gordon 220 kV line, avoid voltage instability or violations for loss of Chapel St to Cluny Tee to Liapootah line, Dispatch only | | 5 | 1 | | |
| T_FABA | Out=Farrell-Bastyan 220KV line. Energy <= 0MW | | | 1 | | |
| T_FAJB | Out=Farrell-John Butters 220KV line. Energy <= 0MW | | | 2 | | 12 |
| T_FAMA | Out=Farrell-Mackintosh 110KV line. Energy <= 0MW | | | | 3 | |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| T_FARC1 | Out=Farrell-Reece 1 220KV line. Energy <= 0MW | 7 | | | 1 | |
| T_FARC2 | Out=Farrell-Reece 2 220KV line. Energy <= 0MW | 2 | 1 | 15 | | |
| T_FASH_1_2_C_WC_RAMP | Ramp down (25 MW per DI) Bastyan and Mackintosh to 110% of West Coast load for an outage of either Farrell to Sheffield line with John Butters, Reece 1,2 and Tribute supplying Sheffield | | 16 | | | |
| T_FATI | Out=Farrell-Tribute 220KV line. Energy <= 0MW | | 1 | 1 | | |
| T_GO13_250 | Out = Gordon CB C752, discretionary 250 MW upper limit on Gordon Unit 1 & 3 combined generation | | | | 3 | |
| T_GO23_250 | Out = Gordon CB A752, discretionary 250 MW upper limit on Gordon Unit 2 & 3 combined generation | | | | 49 | |
| T_GTBB2 | Out=George Town-Bell Bay 2 110KV line Energy <= 0MW | 27 | | | | |
| T_PMPO_FOUR_220 | Out= All four Palmerston-Poatina 220KV lines | | 39 | | | |
| T_PMPO_TWO_110 | Out=Both Palmerston-Poatina 110KV lines | | 37 | | 3 | |
| T_SHCE | Out=Sheffield-Cethana 220KV line. Energy <= 0MW | | 1 | 12 | | |
| T_SHDG | Out=Sheffield-Devils Gate 110KV line. Energy <= 0MW | 5 | | | | |
| T_SHFI | Out=Sheffield-Fisher 220KV line. Energy <= 0MW | | 13 | 7 | | |
| T_SHLT | Out=Sheffield-Lemonthyme 220KV line | 2 | 107 | | | |
| T_SHWI | Out-Sheffield-Wilmot 220KV line | | 2 | | | |
| T_T_FASH1_A_1 | Out = Farrell to Sheffield No.1 line with Bastyan + John Butters + Reece 2 supplying Sheffield, Hampshire link closed, limit Reece 1 + Tribute + Mackintosh <= 110% of West Coast load | 14 | | | | |
| T_T_FASH1_B_1 | Out = Farrell to Sheffield No.2 line, Farrell 220kV bus split John Butters supplying transformers other generators supplying the 220kV line to Sheffield, Hampshire link closed, limit John Butters + Mackintosh <= 110% of West Coast load | | | 79 | | |
| T_T_FASH1_B_2 | Out = Farrell to Sheffield No.1 or 2 line, Farrell 220kV bus split John Butters supplying transformers other generators supplying the 220kV line to Sheffield, Hampshire link closed, limit John Butters + Mackintosh >= 90% of West Coast load | | | 135 | | |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| T_T_FASH2_A_1 | Out = Farrell to Sheffield No.1 or 2 line with Tribute and Reece 1 supplying Sheffield, Hampshire link closed, limit Bastyan + Reece 2 + John Butters + Mackintosh <= 110% of West Coast load | | | | | 29 |
| T_T_FASH2_A_2 | Out = Farrell to Sheffield No.1 or 2 line with Tribute and Reece 1 supplying Sheffield, Hampshire link closed, limit Bastyan + Reece 2 + John Butters + Mackintosh >= 90% of West Coast load | | | | | 5 |
| T_TAMAR_GCS_OUT | Out = Tamar Valley 220 kV CCGT Generation Control Scheme (GCS) - Limit output of Tamar Valley CCGT to 144 MW | | | 388 | 42 | |
| T_X_PMSH+GTSH_1 | Outage = Palmerston to Sheffield 220kV line and one George Town to Sheffield 220kV line, limit West Coast + Sheffield generation <= West Coast + North West load + 10MW, limiting SH-GT line flow to 10 MW | | | | | 3 |
| T>>T_GTSH_220_1 | Out = George Town to Sheffield 220kV line, avoid O/L the Sheffield to Palmerston line for loss of the other George Town to Sheffield line | | 206 | | | |
| T>>T_GTSH_EXP_3H | Out = Sheffield to George Town 220 kV line, avoid O/L Palmerston to Sheffield 220 kV line (flow to Palmerston) on trip of remaining Sheffield to George Town 220 kV line considering NCSPS action, ensure Basslink can compensate NCSPS action to remove overload | | | | | 20 |
| T>>T_PMSH_220_1 | Out = Palmerston to Sheffield 220kV line, avoid O/L George Town to Sheffield No.1 line for loss of a George Town to Sheffield No.2 line | 91 | 47 | | | |
| T>>T_PMSH_EXP_3B | Out = Palmerston to Sheffield 220 kV line, avoid O/L Hadspen to George Town 220 kV line (flow North) for trip of the other Hadspen to George Town 220 kV line considering NCSPS action, ensure Basslink can compensate NCSPS action to remove overload | | | | | 3 |
| T>T_BUSH1_220 | Out = Burnie to Sheffield 220kV line, Hampshire link open, avoid O/L a Sheffield 220/110kV transformer for loss of the other Sheffield 220/110kV transformer | | 9 | | 15 | |
| T>T_BWLF_110_2 | Out = Bridgewater to Lindisfarne 110kV line, avoid O/L Tarraleah to New Norfolk No. 2 110 kV line (flow to South) on trip of Meadowbank to New Norfolk 110 kV line | | | 4 | 151 | |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| T>T_BWLF_110_4 | Out= Bridgewater to Lindisfarne or Bridgewater to Waddamana 110 kV line, avoid O/L New Norfolk to Creek Road 110 kV line (flow to South) on trip of New Norfolk to Chapel St 110 kV line | | | | 83 | |
| T>T_BWLF_110_6 | Out= Bridgewater to Lindisfarne or Bridgewater to Waddamana 110 kV line, avoid O/L either Tungatinah to Tarraleah 110 kV line (flow to South) on trip of the other Tungatinah to Tarraleah 110 kV line | | | | 75 | |
| T>T_BWWA_110_6 | Out = Bridgewater to Waddamana 110kV line, avoid O/L the Tarraleah to New Norfolk No.2 110 kV (flow to South) line for loss of the Meadowbank to New Norfolk 110 kV line | | | 20 | 5 | |
| T>T_BWWA_110_7B | Out = Bridgewater to Waddamana 110kV line, avoid O/L Tungatinah to Tarraleah No. 2 110 kV line for loss of the Tungatinah to Tarraleah No. 1 110 kV line | | | 10 | 3 | |
| T>T_CSNN_2C | Out = Chapel St to New Norfolk 110kV line, avoid O/L New Norfolk to Creek Road 110kV line for loss of Tungatinah to Lake Echo Tee to Waddamana No.2 line and Waddamana to Bridgewater | | 88 | | | |
| T>T_CSNN_4 | Out = Chapel St to New Norfolk 110kV line, avoid O/L New Norfolk to Creek Road 110kV line for loss of Waddamana to Bridgewater | | 31 | | | |
| T>T_FASH_1_2_A | Out = one Farrell to Sheffield line, Farrell 220 kV bus NOT split, Hampshire link closed, limit West Coast gen to avoid O/L Hampshire to Waratah Tee for trip of remaining Farrell to Sheffield 220 kV line | | | 41 | | |
| T>T_FASH_1_2_C1 | Out=Farrell to Sheffield No.1 or 2 line, Farrell 220kV bus split, Hamp. link closed, Bastyan+Mack supplying transformers other generators supplying 220kV line to Sheffield, limit Bastyan and Mackintosh <= 110% of West Coast load | | 428 | 22 | 7 | 41 |
| T>T_FASH_1_2_C2 | Out=Farrell to Sheffield No.1 or 2 line, Farrell 220kV bus split, Hamp. link closed, Bastyan+Mack supplying transformers other generators supplying 220kV line to Sheffield, limit Bastyan and Mackintosh >= 90% of West Coast load | | 6 | | 1 | |
| T>T_FASH_1_2_D1 | Out=Farrell to Sheffield No.1 or 2 line, Farrell 220kV bus split, Hamp. link closed, Reece 1+ Mackintosh supplying transformers other generators supplying 220kV line to Sheffield, limit Reece 1 and Mackintosh <= 110% of West Coast load | | | 182 | | |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| T>T_GT_HA_220_2 | Out= One George Town to Hadspen 220kV line, avoid overloading either Sheffield to George Town 220 kV line (flow from Sheffield to George Town) for trip of the parallel Sheffield to George Town 220 kV line | | | 48 | | |
| T>T_GT_HA_220_3A | Out = One George Town to Hadspen 220kV line, avoid O/L the Sheffield to Palmerston 220 kV line (flow to North) for loss of remaining Hadspen to George Town 220 kV line | | | 3 | | |
| T>T_GT_HA_220_3B | Out = One George Town to Hadspen 220kV line, avoid O/L the Sheffield to Palmerston 220 kV line (flow to South) for loss of remaining Hadspen to George Town 220 kV line | | | | | 37 |
| T>T_GTHA_5L | Out = Hadspen to George Town 220 kV line, avoid O/L line terminal equipment of Sheffield to George Town No. 1 220 kV line (flow to George Town) for trip of Sheffield to George Town No. 2 220 kV line | | | | | 124 |
| T>T_GTSH_220_1 | Out = One George Town to Sheffield 220kV line, avoid O/L the Sheffield to Palmerston line (flow south) for loss of the remaining George Town to Sheffield line | | 5 | 773 | 17 | |
| T>T_GTSH_2A | Out = Sheffield to George Town 220 kV line, avoid O/L Palmerston to Hadspen 220 kV line (flow North) for trip of other Palmerston to Hadspen 220 kV line considering NCSPS action, ensure sufficient NCSPS generation dispatched | | | | | 2 |
| T>T_GTSH_2C | Out = Sheffield to George Town 220 kV line, avoid O/L Palmerston to Hadspen No. 1 220 kV line (flow North) for trip of remaining Sheffield to George Town 220 kV line considering NCSPS action, ensure sufficient NCSPS generation dispatched | | | | | 13 |
| T>T_GTSH_5K | Out = Sheffield to George Town 220 kV line, avoid O/L line terminal equipment of Palmerston to Sheffield 220 kV line (flow to Palmerston) for trip of remaining Sheffield to George Town 220 kV line | | | | | 2 |
| T>T_GTSH_IMP_4E | Out = Sheffield to George Town 220 kV line, avoid O/L Hadspen to George Town No. 1 220 kV line (flow North) for trip of Hadspen to George Town No. 2 220 kV line with no NCSPS action | | | | | 2 |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| T>T_GTSH_IMP_4K | Out = Sheffield to George Town 220 kV line, avoid O/L Palmerston to Sheffield 220 kV line (flow to Palmerston) for trip of remaining Sheffield to George Town 220 kV line with no NCSPS action | | | | | 124 |
| T>T_HA_GT_220_3B | Out = One Hadspen to George Town 220kV line, avoid O/L the Sheffield to Palmerston 220 kV line (flow to South) for loss of remaining Hadspen to George Town 220 kV line | | | 81 | | |
| T>T_HAPM_220_1 | Out = Hadspen to Palmerston 220kV line, avoid O/L either Sheffield to George Town 220 kV line (flow to George Town) for loss of the parallel circuit | | | | 54 | |
| T>T_LICL_T_CS_9B | Out = Liapootah to Cluny Tee to Chapel St 220kV line, avoid O/L the Palmerston to Waddamana line (flow to South) for loss of the Liapootah to Chapel St line | | 7 | 8 | | |
| T>T_LICS_110_9B | Out = Liapootah to Chapel St line, avoid O/L the Palmerston to Waddamana line (flow to South) for loss of the Liapootah to Cluny Tee to Chapel St 220kV line | 6 | | | | |
| T>T_LIPM_110_2 | Out = Liapootah to Palmerston line, avoid O/L the Palmerston to Waddamana line (flow to South) for loss of the other Liapootah to Palmerston line | 7 | 24 | 4 | 3 | |
| T>T_LIPM_110_2A | Out = Liapootah to Palmerston line, avoid O/L the Palmerston to Waddamana line (flow to North) for loss of the other Liapootah to Palmerston line | | 2 | | 11 | |
| T>T_PM_TX_1C | Outage = Palmerston 220/110kV transformer, limit Tasmanian generation to avoid overloading the Hadspen 220kV/110kV transformer no.1 or no.2 for trip of Hadspen 220kV/110kV transformer no.1 or no.2, feedback equation | 10 | | | | |
| T>T_PMSH_220_1 | Out= Palmerston - Sheffield 220 kV line, avoid O/L either Sheffield to George Town 220 kV line on trip of the parallel circuit | | | 115 | 40 | |
| T>T_PMSH_220_2 | Out = Palmerston to Sheffield 220kV line, avoid O/L Hadspen to George Town No.1 line for loss of the Hadspen to George Town No.2 line | 33 | | 12 | | |
| T>T_PMSH_220_2B | Out = Palmerston to Sheffield 220kV line, avoid O/L George Town to Hadspen No.1 line for loss of the Hadspen to George Town No.2 line | 64 | | | | |
| T>T_PMWA_220_2 | Out = Palmerston to Waddamana 110kV line, avoid O/L the Liapootah to Cluny Tee to Chapel St line for loss of the Chapel St to Liapootah No.2 line | | | 40 | | |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| T>T_TA_B_BUS_1 | Out= Tarraleah 110 kV B Bus, avoid O/L New Norfolk to Tarraleah No. 2 110 kV on trip of Waddamana to Bridgewater 110 kV line | | | 1 | | 93 |
| T>T_TANN1_110_2 | Out = Tarraleah to New Norfolk No.1 110kV line, avoid O/L the Tarraleah to New Norfolk No.2 line (flow to south) for loss of the Meadowbank to New Norfolk line | | 5 | | 79 | |
| T>T_TANN2_110_2 | Out = Tarraleah to New Norfolk No. 2 110 kV line, avoid O/L the Tarraleah to New Norfolk No. 1 110 kV line on trip of Meadowbank to New Norfolk 110 kV line | | | 3 | 34 | |
| T>T_TATU_110_3 | Out = either Tarraleah to Tungatinah 110 kV line, avoid O/L the remaining Tungatinah to Tarraleah 110 kV line (flow to South) on trip of Waddamana to Bridgewater 110 kV line | | | 44 | | |
| T>T_X_NNCS_NNCR_1 | Out= New Norfolk to Chapel St and New Norfolk to Creek Rd 110 kV lines, avoid O/L either Lake Echo Tee to Waddamana 110 kV line section on trip of the parallel line | | | | 115 | |
| T>T_X_TAMB_TANN1_1 | Out= Tarraleah to New Norfolk No. 1 and Tarraleah to Meadowbank 110 kV lines, avoid O/L Tarraleah to New Norfolk No. 2 110 kV line on trip of Waddamana to Bridgewater 110 kV line | | | | | 35 |
| T>T_X_TAMBTANN1_10_1 | Out= Tarraleah to New Norfolk No. 1 and Tarraleah to Meadowbank 110 kV lines, avoid O/L No. 1 Lake Echo Tee to Waddamana 110 kV line section on trip of New Norfolk to Tarraleah No. 2 110 kV line, Lake Echo on No. 1 line | | | | | 2 |
| T>T_X_TU_LE_WA_TWO | Out = Both Tungatinah to Lake Echo Tee to Waddamana 110kV lines, avoid O/L New Norfolk to Creek Rd line for loss of New Norfolk to Chapel St line | | | 19 | | |
| T>T_X_TUWA_TWO_TUTA | Out = Both Tungatinah to Lake Echo Tee to Waddamana 110kV lines, avoid O/L remaining Tungatinah to Tarraleah line for loss of the parallel line | | | 1 | | |
| T>T-X_BWWA_WATU2_2B | Out = Bridgewater to Waddamana 110kV line and Waddamana to Lake Echo to Tungatinah No. 2 line, avoid O/L the Lake Echo to Tungatinah No. 1 line (flow to South) for loss of a Liapootah to Cluny Tee to Chapel St 220 kV line | | | 290 | | |

| | | Number of Binding Intervals | | | | |
|---|---|---|---|---|---|---|
| **Constraint** | **Constraint Description** | **2008** | **2009** | **2010** | **2011** | **2012 (to 30 June)** |
| T>T-X_TUTA | Out= both Tarraleah to Tungatinah 110 kV lines, avoid O/L either Lake Echo Tee to Waddamana 110 kV line section (flow to North) on trip of the parallel line section | | | | | 23 |
| | **Total** | **458** | **1084** | **2513** | **1059** | **570** |