Audit of Transend Service Standards Performance Reporting

PERFORMANCE RESULTS FOR 2009

- Final
- 29 March 2010

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1. Executive Summary

Sinclair Knight Merz (SKM) was engaged by the Australian Energy Regulator (AER) to conduct an audit of the year 2009 service performance report of Transend Networks (Transend).

During the 2009 calendar year Transend's service was to be measured against two separate performance target schemes being:

- Jan – June: the AER service standards established in the AER Determination for 2004-2008/09.
- July – Dec: the AER Service Target Performance Incentive Scheme (STPIS)[1].

The audit reviewed the performance results submitted by Transend, in particular:

- Transend's internal incident reporting procedure;
- Transend's performance data capture and analysis process;
- the accuracy of the calculations of the final performance;
- any exclusions to ensure compliance with the revenue cap decision, the AER service standards guidelines, and the STPIS; and
- any refinements or additions to the recording system used to measure performance.

As a result of audit activities undertaken, SKM has formed an opinion that:

- the performance reporting by Transend was free from material errors and in accordance with the requirements of the AER service standards guidelines;
- the recording system used by Transend to capture the relevant details for outages is accurate and reliable;
- the application of exclusions was in accordance with defined exclusions and historical calculation of performance.

For the period January to June 2009, SKM recommends that:

- Transend's calculation of its S-factor be accepted as free from material errors;
- the outages categorised as *Generator Request* be accepted within the definition of exclusions of transmission line availability;

[1] AER "Electricity transmission network service Providers Service target performance incentive Scheme" FINAL, March 2008.

- the events within the *Generator Shared* category are outages caused by an event on a third party installation, and should be accepted as exclusions as these particular types of outages reflect sound maintenance practices that the PI Scheme is seeking to encourage, subject to continued additional verification in future audits that Transend maintenance activities have not extended the outage beyond that required by the Generator in question; and
- based on the acceptance of the proposed exclusions being consistent with standard performance measures in the AER Transend Determination, the bonus recommended under the AER PI Scheme is **0.87625%** of the revenue calculated for the corresponding period.

Table 1 provides a summary of the performance measures and SKM's assessment of Transend's service performance results for the period January to June 2009.

Table 1 SKM Assessment of Transend's Jan – Jun 2009 service performance

S	Performance Measure	SKM assessment of S-Factor result
S1	Transmission circuit availability	0.25000%
S2	Transformer availability	0.02625%
S3	Frequency of loss of supply events (> 0.1 system minutes)	0.20000%
S4	Frequency of loss of supply events (> 2.0 system minutes)	0.40000%
Total S-Factor		**0.87625%**
Revenue calculated for Period		$ 70,504,533
Performance Bonus (penalty)		$ 617,796

For the period July to December 2009, SKM recommends that:

- Transend's calculation of its S-factor be accepted as free from material errors;
- the proposed exclusion for extended outages within Transmission Circuit Availability related to the extreme weather event on September 27th 2009 be accepted as a force majeure event;
- the outages categorised as *Generator Request* be accepted within the definition of exclusions of transmission line availability;
- the events within the *Generator Shared* category are outages caused by an event on a third party installation, and should be accepted as exclusions as these particular types of outages reflect sound maintenance practices that the PI Scheme is seeking to encourage, subject to continued additional verification in future audits that Transend maintenance activities have not extended the outage beyond that required by the Generator in question; and

- based on the acceptance of the proposed exclusions being consistent with the AER's STPIS, the bonus recommended under the AER PI Scheme is **0.108%** of the revenue calculated for the corresponding period.

Table 2 provides a summary of the performance measures and SKM's assessment of Transend's service performance results for the period July to December 2009.

- **Table 2 SKM Assessment of Transend's July – Dec 2009 service performance**

S	Performance Measure	SKM assessment of S-Factor result
S1	Transmission circuit availability (critical)	0.200%
S2	Transmission circuit availability (non-critical) availability	0.058%
S3	Transformer availability	0.000%
S4	Frequency of loss of supply events (> 0.1 system minutes)	0.200%
S5	Frequency of loss of supply events (> 1.0 system minutes)	-0.350%
S6	Average outage duration - transmission lines (no revenue attached)	0.000%
S7	Average outage duration - transformers (no revenue attached)	0.000%
Total S-Factor		**0.108%**
Revenue calculated for Period		$ 88,600,000
Performance Bonus (penalty)		$ 95,688

2. Introduction

Sinclair Knight Merz (SKM) was engaged by the Australian Energy Regulator (AER) to conduct an audit of the year 2009 service performance report of Transend Networks (Transend).

During the 2009 calendar year, Transend's service performance was to be measured against two separate target schemes being:

- Jan – June: the AER service standards established in the AER Determination for 2004-2008/09.
- July – Dec: the AER Service Target Performance Incentive Scheme (STPIS)[2].

The audit reviewed the performance results submitted by Transend, in particular:

- Transend's internal incident reporting procedure;
- Transend's performance data capture and analysis process;
- the accuracy of the calculations of the final performance;
- any exclusions to ensure compliance with the revenue cap decision, the AER service standards guidelines, and the STPIS; and
- any refinements or additions to the recording system used to measure performance.

SKM met with Transend staff in Hobart on Wednesday 17th and Thursday 18th February 2010, with a representative from the AER attending the first day's session, to undertake the Transend data systems. The review sought to establish the integrity of the in terms of retrieving performance data from the PROMS[3] and RIMSys[4] databases, and to investigate specific events that Transend had proposed for exclusion.

As a result of audit activities undertaken, SKM has formed an opinion that:

- the performance reporting by Transend was free from material errors and in accordance with the requirements of the AER service standards guidelines;
- the recording system used by Transend to capture the relevant details for outages is accurate and reliable;

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[2] AER "Electricity transmission network service Providers Service target performance incentive Scheme" FINAL, March 2008.

[3] Plant Restriction and Outage Management System

4 Reliability Incident Management System

- the application of exclusions was in accordance with defined exclusions and historical calculation of performance.

2.1. Transend embracing the STPIS objectives

During their time at Transend's Offices for the STPIS Audit, SKM noted that internal Transend newsletters included details of the organisation's current service performance levels against the AER STPIS targets[5].

SKM considers that this reinforces Transend's ongoing commitment to monitoring and reporting their performance internally, on a regular basis, in order to encourage high levels of service performance, in line with the primary objectives of the STPIS.

[5]Transend Internal Company Newsletter: "Current News: Volume 11, Issue 6, pg2".

3. Applicable Performance Scheme and Targets

During the 2009 calendar year Transend was measured according to two separate performance incentive schemes;

- Between 1st January and 30th June 2009, the AER service standards established in the AER Determination for 2004-2008/09.
- Between 1st July and 31st December 2009, the AER Service Target Performance Incentive Scheme (STPIS)[6].

Table 3 below identifies the performance measures to which Transend were held accountable under each of the two schemes.

- **Table 3 Transend's Previous And Current Performance Schemes under the AER**

Performance Measure		Previous Performance Scheme	Current STPIS
		Valid up until 30 June 2009	Valid from 1 July 2009 to 30 June 2014
Circuit availability %	Transmission Lines	Transmission circuit availability	Transmission circuit availability (critical)
			Transmission circuit availability (non-critical)
	Transformers	Transformer circuit availability	Transformer circuit availability
Loss of Supply Event Frequency (no.)		>0.1 System minutes	>0.1 System minutes
		>2.0 System minutes	>1.0 System minutes
Average Outage Duration (mins)			Transmission Lines
			Transformers

[6] AER "Electricity transmission network service providers Service target performance incentive Scheme" FINAL, March 2008.

4. Incident Reporting Procedure

During the performance review sessions, the Transend incident reporting procedure was discussed, with a full explanation of the responsibilities for reporting provided to the SKM team.

SKM was provided a copy of the Transend's formal internal document:

"Incident Registration, Investigation and Reporting Standard, TNM-GS-809-0408, Issue 2.0, April 2009".

The objective of the Standard is clarified within the document, which states:

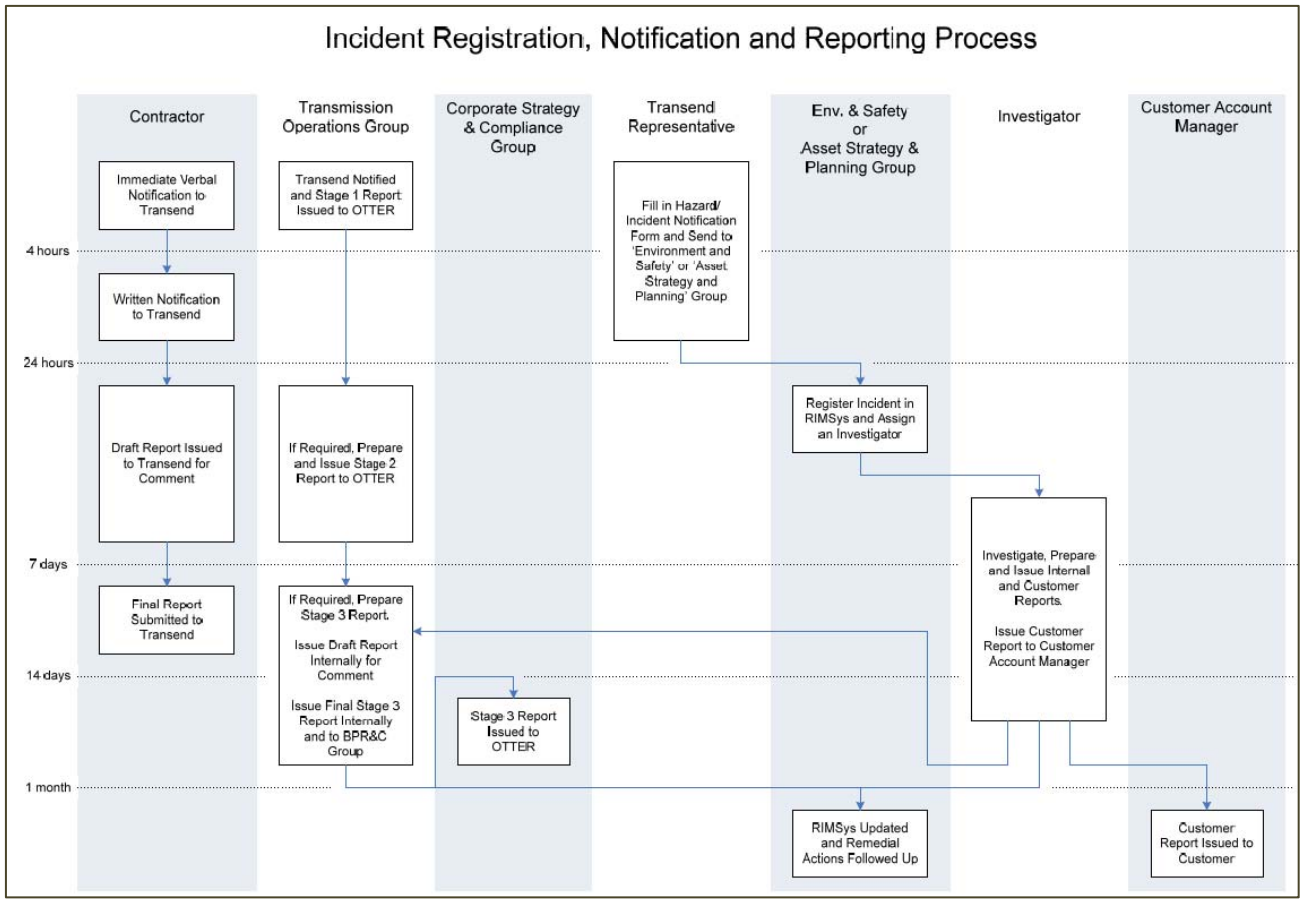
"It is intended that this standard provide Transend employees with a description of the requirements to be met in registering, investigating and reporting incidents. ....

....The focus of this standard is the reporting of incidents by Transend and Contractor personnel where Transend's employees, assets or continuity of supply are placed at risk. Where appropriate, contractors working on property or assets owned or managed by Transend will be required to cooperate with any investigation managed by Transend."

Figure 1 below, which has also been extracted from the Transend internal procedure document, clearly illustrates Transend's incident reporting timeline, and the flow of responsibility.

Although the procedure also describes the flow of information toward the development of an official incident report for the Office of the Tasmanian Energy Regulator (OTTER), SKM deemed its inclusion in this report to be useful, as it provides an illustration of all the steps followed toward the development of internal incident reports which are used as supporting evidence in exclusions under the AER's STPIS.

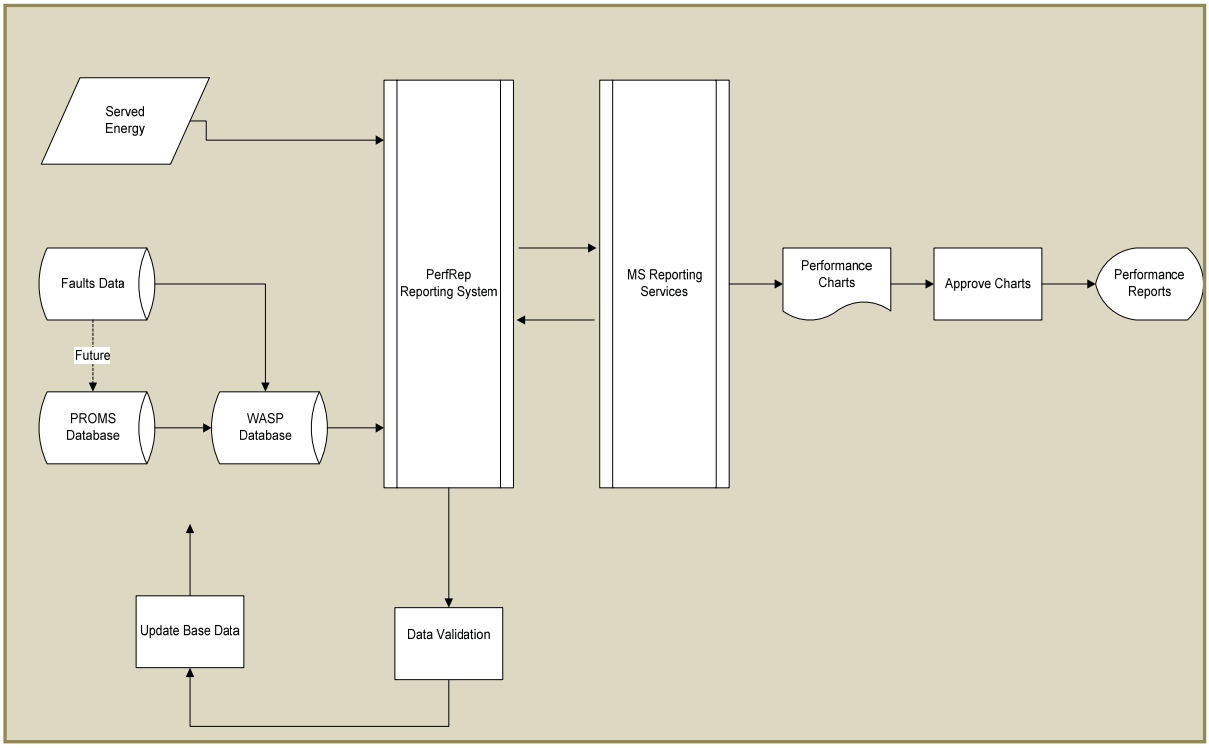
Figure 1 Transend Incident Registration, Notification and Reporting Process



5. Data Recording System

During the STPIS Audit meetings, the Transend Performance reporting team described their internal data reporting system with the aid of a diagram referenced as Transend's performance reporting process. The diagram was requested for inclusion in this report and is shown in Figure 2.

- **Figure 2 Transend's Performance Reporting Process**



Source : Transend internal document ref: TNM-GS-810-0285, Issue 4.0, May 2006.

The performance reporting process uses as its primary data source, records of all planned and unplanned outages (which are recorded in the PROMS database, and all fault initiated outages (recorded in the Reliability RIMSys fault database.

Relevant information related to assets (such as attributes, criticality and plant ratings) affected by either planned or fault outages is retrieved from the WASP asset management system.

Transend have documented the procedure for the extraction, analysis and sorting of data and the processing of results for the production of monthly transmission system performance reports in an internal procedure document entitled: *"Transmission Network Performance Reporting*

Procedure"[7]. The document was reviewed by SKM and was deemed to correspond to the account of the process as described in the STPIS Audit session.

5.1. Outage Details

For each planned or unplanned outage or operation on the transmission system, and incidence where personnel are working in or near apparatus inclusive of a substation, a works order is initiated through PROMS. This work order documents the known details of any outage and the nature of work required. The PROMS record is the record by which network security, scheduling, resourcing and other isolation related events are initiated and logged against. No planned or unplanned network switching can occur without a PROMS request having first been initiated, researched, approved and scheduled.

All faults that occur on the transmission system that cause the operation of a protection device are recorded on the fault database. These records are initiated by the shift network operators and are generated in the early stages of investigating the cause of the fault by field service groups.

The PROMS and Fault databases represent all of the databases used to capture transmission system operations and activities. Both of these databases are maintained by the network operations group, who control, monitor and operate the transmission system for Transend. From a review of randomly selected outages, SKM is satisfied that they represent an accurate record of all outage events on the system.

5.2. Processing of Outage Data

Extraction of the raw data events is manually conducted on a monthly basis. Extraction of information consists of a download of all events for the month from each system into the Performance Reporting v2.0 (PerfRep) system. The raw data is then filtered to remove non-network element outage causing events. This represents a significant culling of records.

The remaining records are then individually reviewed to ensure credibility of element outage and restoration times.

5.3. Categorisation and Exclusions

The events are further manually reviewed to determine if the initiating event qualifies the outage for inclusion or exclusion in the performance reporting scheme.

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[7] Transend Reference TNM-GS-810-0285, Issue 4.0, May 2006.

SKM noted that Transend has developed an internally approved document[8] which defines the measures to be used when reporting for the AER on performance, and defines the performance incentive scheme. The performance measures contained in this document detail assets and events that should each be considered either an inclusion or exclusion for the determination of performance result.

5.4. Further Processing of Outage Data and Validation

Transend have developed an in house package "PerfRep" that analyses the raw data downloaded from the PROMS and fault databases and also analyses the events for performance qualifying events.

This algorithm performs validation checks on outage data and allows treatment of exceptions. SKM considered this a useful check mechanism for verifying the primary source of data.

The outage lists provided to SKM and the AER for the 12 month review period included the full details of the outage events, including cross references to both asset management and outage management systems.

5.5. Calculation of Performance Measure Results

The performance measure results are calculated using the AER performance incentive model that contains S-factor equations defined in the Transend revenue cap decision (2004-2008/9), for the Jan – June 2009 performance reporting period, and the STPIS templates provided by the AER for the July to December 2009 reporting period. The results are displayed on graphs (refer Appendix A) illustrating the S-factors proposed by Transend and recommended for acceptance by SKM.

5.6. Data Recording System improvements

During the 2009 audit, SKM were made aware that the Critical / Non-Critical transmission line categorisation had been added to the WASP asset management system as a separate field for data sorting purposes. SKM suggests this inclusion minimises the risk of incorrect or inaccurate incident reporting through human error.

[8] Transend, *AER Service Standards - Terms and Measures TNM-GS-809-0099 Issue 1.0*, February 2005

5.7. Classification of Outages

The classification of outage types is done on the basis of timeframes as follows:

Planned	Planned outages are based on a request for outage, and are typically maintenance or construction work. Planned work is considered to be outages with a minimum of 90 days notice.
Unplanned	Unplanned work may be either maintenance or construction work, but where the notice of the outage is less than 90 days.
Forced	Forced outages are attended as resources become available. These are typically short notice outages.
Fault	Fault or emergency outages require immediate attention

5.8. AER Performance Excel spreadsheet

SKM reviewed the accuracy of data recorded on the Excel spreadsheets for a number of events throughout the year. Specifically, SKM reviewed the accuracy of outage commencement and restoration times against actual circuit breaker operation times and transmission line and transformer current flows as recorded on the Transend system event log. The input to this log is the actual time stamped element operation time load flows taken directly from the SCADA system. This is a real time system, and SKM considers its accuracy to be excellent and best electricity industry practice.

5.9. System Audit Findings

SKM remains satisfied that the recording and data processing systems that have been put in place by Transend accurately log and calculate performance. The reporting enhancements put in place during 2009 have removed the possibility of manual error in the categorization of critical and non-critical circuits. The allocation of exclusions is in accordance with Transend's interpretation of the prescribed list of exclusions.

6. Exclusions

The AER reliability incentive scheme contains provision for certain defined events to be excluded from calculated outage figures.

Therefore, each exclusion has been individually examined, and compared with the standard exclusions for each performance measure, and the provisions of Force Majeure.

6.1. Submitted Performance Results for Jan – Jun 2009

Table 4 summarises the submitted Transend performance results for the period January to June 2009, by included and excluded events.

Table 4 Summary Performance over the period With and Without Excluded Events*

S	Performance Parameter	Target	Performance without exclusions			Performance with exclusions			Impact of exclusions
			Result	S-Factor	Final Incentive	Result	S-Factor	Final Incentive	
S1	Transmission circuit availability	99.10%	98.56%	-0.25%	-$ 176,261	99.63%	0.25%	$ 176,261	0.50%
S2	Transformer availability	99.00%	99.17%	0.03%	$ 18,507	99.17%	0.03%	$ 18,507	0.00%
S3	Frequency of loss of supply events (>0.1 system minutes)	8	3	0.20%	$ 141,009	3	0.20%	$ 141,009	0.00%
S4	Frequency of loss of supply events (>2.0 system minutes)	2	0	0.40%	$ 282,018	0	0.40%	$ 282,018	0.00%
	TOTALS			**0.38%**	**$ 265,273**		**0.88%**	**$ 617,796**	**0.50%**

* Rounding off in Final Incentive and Total values shown

As Table 4 indicates the exclusions proposed by Transend would have a net affect on the incentive scheme of **$352,523**.

6.2. Proposed Exclusions for period Jan - June 2009

In the Transend submission to AER, there are several events or categories of events that Transend proposes to exclude from their performance measure calculations.

The events for the period January to June 2009 all fall under the Transmission Circuit and Transformer availability measures (S1 and S2 at that time), with no exclusions being sought under the Loss of Supply measures (either S3 or S4 at that time).

The exclusions all relate to Third Party Outages, being wither Generator Requested, Generator Shared, or Major Industry Requested Outages.

Transend have provided SKM with an Outage Month Query (OMQ) spreadsheet, in Excel format. The OMQ contains significant details of every outage occurring within the network, including *inter alia*, the PROMS reference, Outage start & end times, Elements of the network affected, reason for the outage, categorization of the outage, calculation of system minutes of unserved energy, and a categorization in terms of the STPIS.

6.2.1. Generator Requested and Co-ordinated Outages

The structure of the Tasmanian region provides a unique opportunity for Transend to co-ordinate some of its transmission system maintenance with outages requested by generators for work on their connection assets or generation units.

Currently, the Tasmanian market consists of one principle generator (Hydro Tasmania) and other renewable energy generators, one distribution company (Aurora Energy) and Transend and National Grid Australia (Basslink) as the transmission entities. In planning maintenance activities, Transend has monthly discussions with both Hydro Tasmania and Aurora to investigate any opportunities to co-ordinate an outage so as to minimise the impact on the Tasmanian transmission system. During the audit, Transend demonstrated the procedure for comparing outage requests planned for the upcoming month, and the planning that is done to co-ordinate any work. Table 5 and Table 7 show the breakdown of outages associated with the generating entities during the reporting year 2009.

Generator Request outages are those where a generating entity requests an isolation of a transmission asset to allow work to be done on generation or related assets.

Generator Shared outages are instances where a generator requires a transmission asset to be taken out of service for their own purposes, and Transend uses the opportunity to co-ordinate maintenance on the isolated asset(s).

Table 5 Generator related outages Jan - Jun 2009[9]

Type	Planned		Unplanned		Forced		Fault		Total	
	Events	Mins	Events	Mins	Events	Mins	Events	Mins	Events	Mins
Generator Request										
Critical	2	243	3	433	-	-	-	-	5	676
Non-Critical	12	4,090	16	213,802	-	-	5	95	33	217,892
Subtotal	*14*	*4,333*	*19*	*214,235*	-	-	*5*	*95*	*38*	*218,568*
Generator Shared										
Critical	3	900	-	-	-	-	-	-	3	900
Non-Critical	8	60,210	9	6,055	3	2,528	-	-	20	68,793
Subtotal	*11*	*61,110*	*9*	*6,055*	*3*	*2,528*	-	-	*23*	*69,693*
Total	**25**	**65,443**	**28**	**220,290**	**3**	**2,528**	**5**	**95**	**61**	**288,261**

It is noted that 75.8% of the outage minutes related to generator activity during January to June were requested by a generating entity, whilst 76.4% of the total generator related outage minutes were unplanned.

For the unplanned Generator Request outages, it was found that there were 10 events totalling 202,081 minutes attributable to work at Poatina hydroelectric power station.

[9] The number of events included in Table 5 represents the number of outages reported by Transend with the different categorisation of Planned/Unplanned/Forced/Fault for the period January - June 2009. It was noted that a single PROMS request related to the entire job which occurred on separate days or weeks, was reported as multiple events.

6.3. Submitted Performance Results for period July – Dec 2009

Table 6 summarises the submitted Transend performance results for the period July to December 2009, by included and excluded events.

- **Table 6 Summary Performance over the period With and Without Excluded Events**

S	Performance Parameter	Target	Performance without exclusions			Performance with exclusions			Impact of exclusions
			Result	S-Factor	Final Incentive	Result	S-Factor	Final Incentive	
S1	Transmission circuit availability (critical)	99.13%	99.91%	0.200%	$ 177,200	99.92%	0.200%	$ 177,200	0.000%
S2	Transmission circuit availability (non-critical)	98.97%	97.78%	-0.100%	-$ 88,600	99.26%	0.058%	$ 51,388	0.158%
S3	Transformer availability	99.28%	99.28%	0.000%	$ 0	99.28%	0.000%	$ 0	0.000%
S4	Frequency of loss of supply events (>0.1 system minutes)	8	6	0.133%	$ 118,133	5	0.200%	$ 177,200	0.067%
S5	Frequency of loss of supply events (>1.0 system minutes)	1	3	-0.350%	-$ 310,100	2	-0.350%	-$ 310,100	0.000%
S6*	Average outage duration - transmission lines	326	154	0.000%	$ 0	168	0.000%	$ 0	0.000%
S7*	Average outage duration - transformers	712	414	0.000%	$ 0	414	0.000%	$ 0	0.000%
	TOTALS			**-0.117%**	**-$ 103,367**		**0.108%**	**$ 95,688**	**0.225%**

* No revenue attached

As Table 6 indicates, the exclusions proposed by Transend would have a net affect on the incentive scheme of **$199,055**.

6.4. Proposed Exclusions July – Dec 2009

In the submission to AER, there are a number of events or categories of events that Transend proposes to exclude from their performance measure calculations. These events are:

- Multiple circuit outages during the period July to December 2009 that occurred whilst Hydro Tasmania was undertaking work on its Poatina power station generation and connection assets; and
- Loss of supply event that occurred on 27th September 2009 caused by a force majeure event as a result of severe weather.

Transend provided detailed incident reports, including additional information requested by SKM during the audit, to support the proposal for an exemption for these events.

6.4.1. Severe Weather event in the Burnie Region

Transend have requested the exclusion of a 94cct minutes outage event relating to an incident occurring on the Burnie-Smithton and Burnie-Port Latta 110kV transmission line circuits on the 27th September 2009.

The incident affected the following STPIS measures:

- S2 - Transmission circuit availability (non-critical)
- S4 - Frequency of loss of supply events (> 0.1 system minutes); and
- S5 - Frequency of loss of supply events (> 1.0 system minutes)

The exclusion has been requested by Transend under the premise of "*force majeure.*"

The STPIS provides both a definition of "*force majeure*[10]" and a framework for assessment of individual incidents against a definition of "*force majeure,* " that allows each event to be examined against four (4) specific considerations, being;

- Was the event unforeseeable and its impact extraordinary, uncontrollable and not manageable?
- Does the event occur frequently? If so, how did the impact of the particular event differ?
- Could the TNSP, in practice, have prevented the impact (not necessarily the event itself)?
- Could the TNSP have effectively reduced the impact of the event by adopting better practices?

[10] See Appendix B

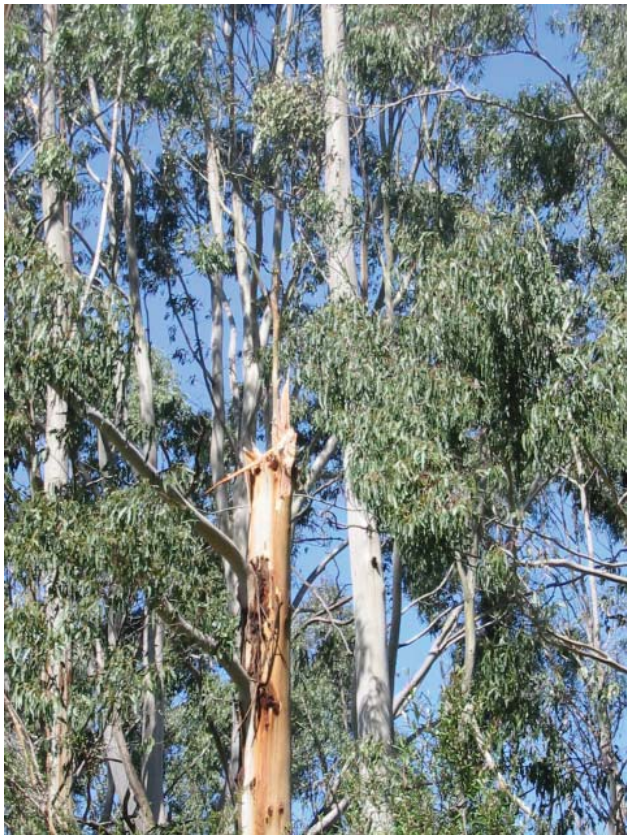
It is understood that the incident is required to pass all four criteria in order to be considered an excluded event under "*force majeure* ".

6.4.1.1. Transend incident report

In response to a request for further information on the incident in question Transend provided the SKM audit team with an internal Incident Investigation referenced as "Incident Report ID: IR 721".

"Investigations have found that the fault on the Burnie–Smithton 110 kV transmission circuit was caused by extremely strong winds causing the top of a tree located outside Transend's transmission line easement to break off and strike the top and middle conductors (phase A and B) between towers T44–T45 causing the conductors to fall to the ground. Transend's transmission line easement edge is 25m away from the centre of the transmission line. The tree that broke off was located approximately 40m from the centre line of the easement and broke off approximately 25m above ground level (see figure 2). The actual length of the tree top that contacted the conductors was approximately 15-20m".

- **Figure 3 Transend photo of tree in question**



6.4.1.2. BOM report and data

SKM has reviewed weather data available from the Bureau of Meteorology (BOM), with specific attention being paid to data from the Burnie (Round Hill)[11] weather station, being the nearest weather station to the incident, and the Smithton aerodrome[12]weather station, being the nearest BOM site to the incident with full wind measurement and recording capabilities.

The data provided evidence of unusually strong winds in the area during September 2009, with the highest readings occurring on the 27th.

The BOM's monthly climate summary report for Tasmania in September 2009[13] also reflects this *unusual* weather event in stating that:

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[11] Downloadable from: http://www.bom.gov.au/climate/averages/tables/cw_091009.shtml

[12] Downloadable from: http://www.bom.gov.au/climate/averages/tables/cw_091292.shtml

[13] Downloadable from: http://www.bom.gov.au/climate/current/month/tas/archive/200909.summary.shtml

*"A deep low pressure system close to the state on the 27th brought strong to **gale force** southerly winds and caused widespread damage. Two things that may have exacerbated the amount of damage were that the direction was **unusual** for such strong winds, and the wet ground had loosened some tree roots [**emphasis added**]".*

6.4.1.3. Assessment of the evidence surrounding the event

Based on the BOM report and associated data, SKM deemed that, in being labelled "unusual", by the BOM, the particular combination of strength and direction of the wind during this weather event could not reasonably be considered to be a frequent occurrence, that should have been foreseen by the TNSP, and therefore planned for and managed.

In terms of the *manageability of the impacts* of the weather event, SKM deemed that the specific potential for management over such incidents that lay within within Transend's control was the TNSP's control over whether the tree, whose broken portion caused the outage, was allowed to be located in the vicinity of the network asset in the first place.

This was seen to draw an assessment of the incident against the third and forth considerations of "*force majeur*e" within the STPIS, being:

- Could the TNSP, in practice, have prevented the impact (not necessarily the event itself)?
- Could the TNSP have effectively reduced the impact of the event by adopting better practices?

Each of these considerations is now discussed in further detail.

Could the TNSP, in practice, have prevented the impact (not necessarily the event itself)?

SKM reviewed Transend's vegetation management procedures to ascertain whether appropriate easement management practices are in place, and were followed at the location of the event.

Company procedures for Vegetation management are contained in the Transend Easement Management Plan[14] which has been developed in accordance with the TNSP's Environmental Management System (EMS) and the specific statutory requirements of the following Tasmanian and federal statutory Acts:

- Environmental Management and Pollution Control Act 1994;

[14] Transend document number: TNM-SY-808-0033issue 2.0 August 2004

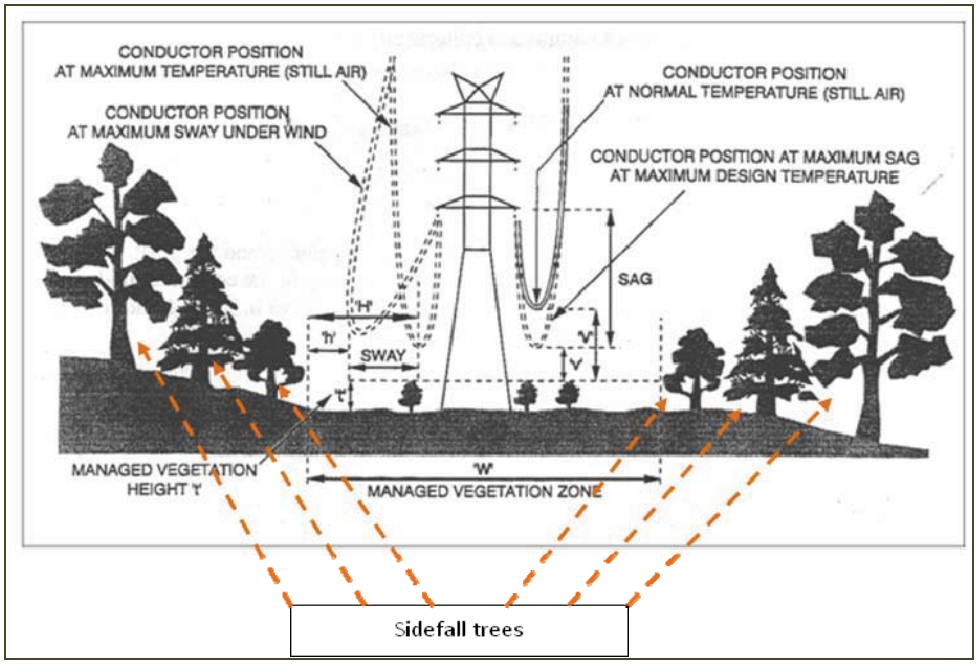
- Threatened Species Protection Act 1994;
- National Parks and Reserves Management Act 2002[15];
- Forest Practices Act 1985; and
- Weeds Management Act 1999.

Transend's vegetation management program was noted to include adequate considerations for:

- Routine inspection of the easements and identification of potential issues;
- Vegetation clearing and herbicide treatment to control regrowth; and
- Random audits of contractor's work to ensure compliance with Transend requirements.

With the Tree identified as the source of the asset damaging material being located approximately 40m from the centre of Transend's 50m wide transmission easement, (ie 15metres outside of the boundary), the tree in question is understood to be situated outside of the TNSP's standard Vegetation Management Zone and would therefore be classified as a sidefall tree, (see Figure 4).

- **Figure 4 Transend's Managed Vegetation Zone**



Source: Transend Easement Management Plan (With SKM identification of Sidefall trees)

[15] This supercedes the previous National Parks and Wildlife Act 1970

SKM questioned Transend regarding what level of responsibility could reasonably be assigned to Transend, in respect to trees situated in the sidefall area striking Transmission infrastructure, such as the tree in question.

Transend confirmed that it has no legal authority to remove off-easement vegetation at will, and is required to negotiate with individual land owners to trim or remove any individual trees that may be considered to represent a potential risk of falling towards and / or onto the transmission line. Transend's ability to manage vegetation outside of easements is also understood to be subject to the stringent stipulations of both the National Parks and Reserves Management Act 2002, and the Forest Practices Act 1985.

In an email response to SKM dated 23/03/2010, Transend wrote;

"Section 10 of the Easement Management Plan is used to identify trees that pose a risk to the transmission system in a side fall situation. Transend is required to negotiate with landowners in order to deal with such trees. The tree involved in the incident of 27 September did not pose a risk under the Easement Management Plan. The tree was in good condition on stable ground with a very low probability of falling. The bulk of the tree is still standing which supports this statement."

In the same email, Transend provided an example of a case where trees having been identified as posing a threat to the system, and the application of Transends policy of removing such trees, as per its Easement Management Plan. Trees located both within and outside Transend's Gordon-Chapel St 220 kV transmission line were identified as posing a risk to the network infrastuture. Having been so identified, negotiations with the relevant landholder, Norske Skog, for their removal were undertaken, with the trees ultimately being removed on 13 and 14 March 2010. Transend also provided supportive evidence of this process by way of a photograph of the removal process

- **Figure 5 Tree removal GO-CS 220kV, 13 & 14 March 2010**

Source: Transend Networks

SKM notes that a similar incident, relating to the issue of Transend's ability to manage sidefall vegetation that has the potential to strike network asset and cause outages, was raised, investigated, and ultimately accepted as *force majeure* during AER's audit of Transend's 2005 performance reporting audit[16].

During the 2005 performance audit, SKM found that "*sidefall vegetation*" management considerations exist in the Transend network (see Figure 4). In Table 10.1 of the Transend Easement Management Plan (see excerpt in Appendix C), the risk assessment of managing vegetation outside of the TNSP's easement considers " *... sidefall trees capable of contacting conductor or structure, which are subject to risk ie. condition of tree* [or] *probability of falling.*"

The photos available within the Transend Incident report (see also Figure 3 of this report), indicates that the tree in question appears to be a healthy tree, that would not normally have been "*controlled"* due to its having a significant probability of falling onto the transmission line. SKM noted that Figure 3 also shows a number of similar trees surrounding the tree in question. It does not appear that any of the neighbouring trees were affected in the manner, or to the extent, of the tree in question. SKM also noted that the pictures indicate that the bulk of the tree in question

[16] SKM report entitled: *Audit of Transend Service Standards Performance Reporting PERFORMANCE RESULTS FOR 2005*, dated 26th March 2006.

appears to be still in place, suggesting that there was no problem regarding how firmly the tree was rooted to the ground at the time of the incident.

After careful review of the TNSP's Easement management Plan, SKM deemed that Transend has constructed its transmission network in accordance with Australian standards and industry guidelines, and has given appropriate consideration for local conditions that historical weather data suggests is likely to be experienced at each of its transmission line locations.

SKM deemed that the vegetation management policy in place within the Transend network adheres to the standard expected of a prudent and efficient network service provider.

SKM further concluded that, based on the evidence presented, Transend's vegetation management policy was followed at the location of the incident.

SKM therefore concluded that, with respect to the third consideration of "*force majeure*" within the STPIS, Transend could not, in practice, have prevented the impact of the event, or the event itself.

Now move to assessing the incident against the fourth consideration of "*force majeure*" events:

Could the TNSP have effectively reduced the impact of the event by adopting better practices?

This section of the report provides an assessment of whether the operating practices in place at Transend contributed to the impact of the event.

As noted in the discussion immediately preceding this section of the report, the tree in question was not considered to pose a risk to the system. Increasing the rigour relating to the criteria for tree removal within Transend's vegetation management policies would doubtless be hampered by both State and federal acts governing the treatment of vegetation in Tasmania.

SKM also considered that the substantial operational costs foreseen to be required in order to ramp-up the criteria for sidefall tree removal in the vegetation management program currently in place within the Transend network, and thereby decrease the likelihood of an event such as the one in question taking place, when compared to the probability of such incidents actually occurring, might not be considered appropriate in terms of considering Transend as a prudent and efficient network Service Provider.

SKM concluded that the TNSP could not have effectively reduced the impact of the event by adopting a better vegetation management practice.

SKM also understood that, in this particular incident, Transend's ability to mitigate the impact of the situation was subject to the safe working practices set through its Health and Safety policy, as

well as the safe working practices set through the Health and Safety policies and practices of its contractors, to which the majority of the personnel involved in the initial investigation and restoration efforts were accountable.

After review of the various internal policies and procedures relevant to this incident, SKM deemed that Transend's easement management practices and health and safety policies are in line with Australian Standards and Industry best practice.

SKM therefore concluded that the TNSP could not have effectively reduced the impact of the event by adopting better practices.

6.4.1.4. SKM Conclusion regarding the incident

Having interviewed two Transend staff members involved in the incident investigation, the BOM report for the region affected, as well as Transend's internal documentation regarding Vegetation management, and Health & Safety practices, SKM deemed that the incident satisfies all four considerations of "*force majeure* "as provided within the STPIS.

SKM would therefore recommend that this proposed exclusion be accepted by the AER.

6.4.2. Generator Requested and Co-ordinated Outages

In Section 6.2.1 the potential for co-ordination of outages within the Tasmanian Electricity Network was briefly discussed. Table 7

Generator Request outages are those where a generating entity requests an isolation of a transmission asset to allow work to be done on generation or related assets.

Generator Shared outages are instances where a generator requires a transmission asset to be taken out of service for their own purposes, and Transend uses the opportunity to co-ordinate maintenance on the isolated asset(s).

Table 7 presents the breakdown of outages associated with the generating entities during the period July to December 2009.

Table 7 Generator related outages Jul - Dec 2009[17]

Type	Planned		Unplanned		Forced		Fault		Total	
	Events	Mins	Events	Mins	Events	Mins	Events	Mins	Events	Mins
Generator Request										
Critical	-	-	-	-	-	-	-	-	-	-
Non-Critical	3	997	17	277,422	1	19	1	39	22	278,477
Subtotal	*3*	*997*	*17*	*277,422*	*1*	*19*	*1*	*39*	*22*	*278,477*
Generator Shared										
Critical	3	1,050	-	-	-	-	-	-	3	1,050
Non-Critical	4	13,786	-	-	-	-	-	-	4	13,786
Subtotal	*7*	*14,836*	-	-	-	-	-	-	*7*	*14,836*
Total	**10**	**15,833**	**17**	**277,422**	**1**	**19**	**1**	**39**	**29**	**293,313**

For the July to December period, 94.9% of the generator related outage minutes were requested by a generating entity, whilst 94.6% were unplanned outage minutes.

Continued work at Poatina power station contributed 14 events totalling 277,203 minutes to the unplanned outages.

[17] The number of events included in Table 7 represents the number of outages reported by Transend with the different categorisation of Planned/Unplanned/Forced/Fault for the period July - December 2009. It was noted that a single PROMS request related to the entire job which occurred on separate days or weeks, was reported as multiple events.

7. Force Majeure

In the Service Standards Guidelines published by the AER[18], there are four (4) considerations listed for determining what force majeure events should be "excluded force majeure events". These are:

- Was the event unforeseeable and its impact extraordinary, uncontrollable and not manageable?
- Does the event occur frequently? If so, how did the impact of the particular event differ?
- Could the TNSP, in practice, have prevented the impact (not necessarily the event itself)?
- Could the TNSP have effectively reduced the impact of the event by adopting better practices?

7.1. Definition

The definition used by Transend in the determination of performance under the AER PI Scheme reflects the definition outlined in the AER's STPIS (see Appendix B for details).

7.2. Event

There was one single event during 2009 for which Transend sought exclusion as a force majeure event (refer section 6.4.1).

[18] AER "*Electricity transmission network service Providers Service target performance incentive Scheme FINAL March 2008"* Appendix E

8. Calculation of S-factors

8.1. S-Factors for Period Jan – June 2009

Table 9 shows the results of S-factor calculation for the January – June 2009 AER performance reporting period, as proposed by Transend and recommended by SKM following its audit of the Transend service performance report.

SKM confirmed that the Transend has used the S-factor equations contained in the revenue cap decision and correctly applied the formulas and coefficients to calculate the S-factors in their submission. In addition, SKM has audited and confirmed the results generated from the supporting files detailing the outages included and claimed for exclusion from the performance calculations.

- **Table 8 Performance Results (Jan – June 2009)**

No	Performance Measure	Target	Transend without exclusions	Transend with all proposed exclusions	SKM without exclusions	SKM assessment
1	S1 - Transmission Line Circuit Availability	99.10%	98.56%	99.63%	98.56%	**99.63%**
2	S2 - Transformer Circuit Availability	99.00%	99.17%	99.17%	99.17%	**99.17%**
3	S3 - Loss of Supply Frequency Index (>0.1)	8	3	3	3	**3**
4	S4 - Loss of Supply Frequency Index (>2.0)	2	0	0	0	**0**

- **Table 9 Calculated S-factors (Jan – June 2009)**

No	Performance Measure	Transend without exclusions	Transend with proposed exclusions	SKM without exclusions	SKM assessment
1	S1 - Transmission Line Circuit Availability	-0.25%	0.25%	-0.25%	**0.25%**
2	S2 - Transformer Circuit Availability	0.03%	0.03%	0.03%	**0.03%**
3	S3 - Loss of Supply Frequency Index (>0.1)	0.20%	0.20%	0.20%	**0.20%**
4	S4 - Loss of Supply Frequency Index (>2.0)	0.40%	0.40%	0.40%	**0.40%**
	TOTAL	0.38%	0.88%	0.38%	**0.88%**

The profiles for each of the applicable measures are shown in Appendix A to illustrate the performance in graphical terms. Based on these results, SKM recommends the bonus for Transend should be **0.87625% of their Revenue** of $70,504,533 as calculated for the corresponding period.

8.2. S-Factors for Period July – Dec 2009

Table 9 shows the results of S-factor calculation for the July to December 2009 AER performance reporting period, as proposed by Transend and recommended by SKM following its audit of the Transend service performance report.

- **Table 10 Performance Results (July – Dec 2009)**

No	Performance Measure	Target	Transend without exclusions	Transend with all proposed exclusions	SKM without exclusions	SKM assessment
1	Transmission circuit availability (critical)	99.13%	99.91%	99.92%	99.91%	99.92%
2	Transmission circuit availability (non-critical) availability	98.97%	97.78%	99.26%	97.78%	99.26%
3	Transformer availability	99.28%	99.28%	99.28%	99.28%	99.28%
4	Frequency of loss of supply events (> 0.1 system minutes)	8	6	5	6	5
5	Frequency of loss of supply events (>1.0 system minutes)	1	3	2	3	2
6	Average outage duration - transmission lines (no revenue attached)	326	154	168	154	168
7	Average outage duration - transformers (no revenue attached)	712	414	414	414	414

- **Table 11 Calculated S-factors (July – Dec 2009)**

No	Performance Measure	Transend without exclusions	Transend with proposed exclusions	SKM without exclusions	SKM assessment
1	Transmission circuit availability (critical)	0.200%	0.200%	0.200%	0.200%
2	Transmission circuit availability (non-critical) availability	-0.100%	0.058%	-0.100%	0.058%
3	Transformer availability	0.000%	0.000%	0.000%	0.000%
4	Frequency of loss of supply events (> 0.1 system minutes)	0.133%	0.200%	0.133%	0.200%
5	Frequency of loss of supply events (>1.0 system minutes)	-0.350%	-0.350%	-0.350%	-0.350%
6	Average outage duration - transmission lines (no revenue attached)	0.000%	0.000%	0.000%	0.000%
7	Average outage duration - transformers (no revenue attached)	0.000%	0.000%	0.000%	0.000%
	TOTAL	**-0.117%**	**0.108%**	**-0.117%**	**0.108%**

SKM confirmed that the Transend has used the S-factor equations contained in the STPIS and correctly applied the formulas and coefficients to calculate the S-factors in their submission. In addition, SKM has audited and confirmed the results generated from the supporting files detailing the outages included and claimed for exclusion from the performance calculations.

The profiles for each of the applicable measures are shown in Appendix A to illustrate the performance in graphical terms. Based on these results, SKM recommends the bonus for Transend should be **0.108% of their Revenue** of $88,600,000 as calculated for the corresponding period.

9. Summary of SKM Recommendations

This section of the report provides a summary of SKM's recommendations based on an audit of Transend's Service performance during 2009.

For the period January to June 2009, SKM recommends that:

- Transend's calculation of its S-factor be accepted as free from material errors;
- the outages categorised as *Generator Request* be accepted within the definition of exclusions of transmission line availability;
- the events within the *Generator Shared* category are outages caused by an event on a third party installation, and should be accepted as exclusions as these particular types of outages reflect sound maintenance practices that the PI Scheme is seeking to encourage, subject to continued additional verification in future audits that Transend maintenance activities have not extended the outage beyond that required by the Generator in question; and
- based on the acceptance of the proposed exclusions being consistent with standard performance measures in the AER Transend Determination, the bonus recommended under the AER PI Scheme is **0.87625% of the revenue** calculated for the corresponding period.

Table 12 provides a summary of the performance measures and SKM's assessment of Transend's service performance results for the period January to June 2009.

- **Table 12 SKM Assessment of Transend's Jan – June 2009 service performance**

S	Performance Measure	SKM assessment of S-Factor result
S1	Transmission circuit availability	0.25000%
S2	Transformer availability	0.02625%
S3	Frequency of loss of supply events (> 0.1 system minutes)	0.20000%
S4	Frequency of loss of supply events (> 2.0 system minutes)	0.40000%
Total S-Factor		**0.87625%**
Revenue calculated for Period		$ 70,504,533
Performance Bonus (penalty)		$ 617,796

For the period July to December 2009, SKM recommends that:

- Transend's calculation of its S-factor be accepted as free from material errors;
- the proposed exclusion for extended outages within Transmission Circuit Availability related to the extreme weather event on September 27th 2009 be accepted as a force majeure event;
- the outages categorised as *Generator Request* be accepted within the definition of exclusions of transmission line availability;
- the events within the *Generator Shared* category are outages caused by an event on a third party installation, and should be accepted as exclusions as these particular types of outages reflect sound maintenance practices that the PI Scheme is seeking to encourage, subject to continued additional verification in future audits that Transend maintenance activities have not extended the outage beyond that required by the Generator in question; and
- based on the acceptance of the proposed exclusions being consistent with the AER's STPIS, the bonus recommended under the AER PI Scheme is **0.108% of the revenue** calculated for the corresponding period.

Table 13 provides a summary of the performance measures and SKM's assessment of Transend's service performance results for the period January to June 2009.

- **Table 13 SKM Assessment of Transend's July – Dec 2009 service performance**

S	Performance Measure	SKM assessment of S-Factor result
S1	Transmission circuit availability (critical)	0.200%
S2	Transmission circuit availability (non-critical) availability	0.058%
S3	Transformer availability	0.000%
S4	Frequency of loss of supply events (> 0.1 system minutes)	0.200%
S5	Frequency of loss of supply events (> 1.0 system minutes)	-0.350%
S6	Average outage duration - transmission lines (no revenue attached)	0.000%
S7	Average outage duration - transformers (no revenue attached)	0.000%
Total S-Factor		**0.108%**
Revenue calculated for Period		$ 88,600,000
Performance Bonus (penalty)		$ 95,688

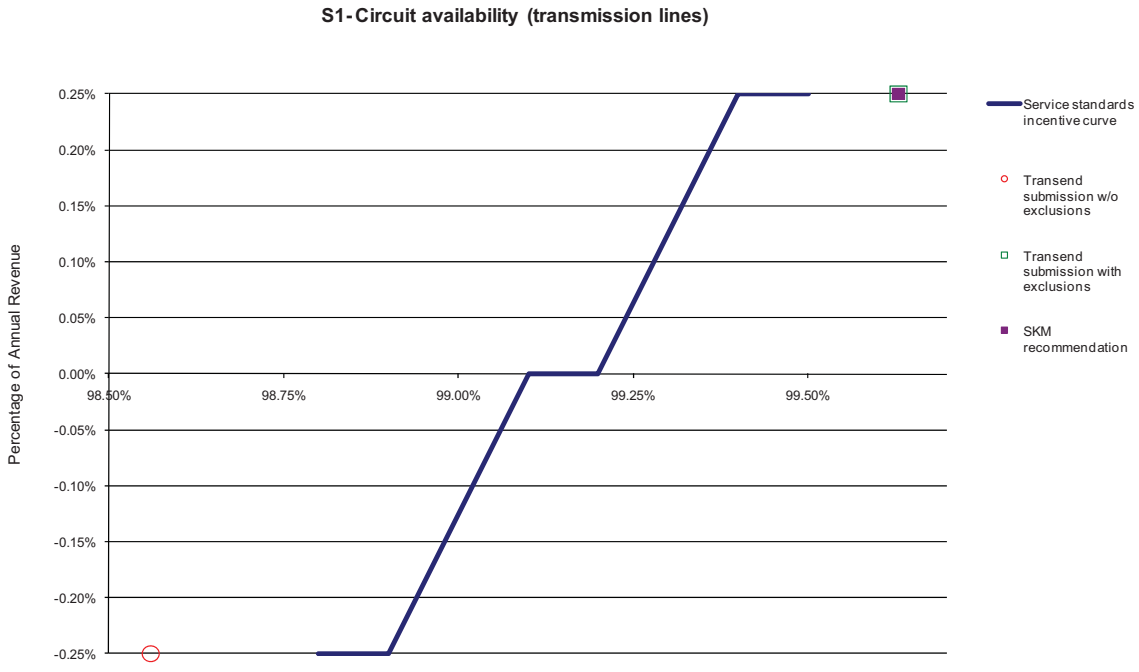
Appendix A Performance Measure Profiles

A.1 Profiles for period Jan – Jun 2009

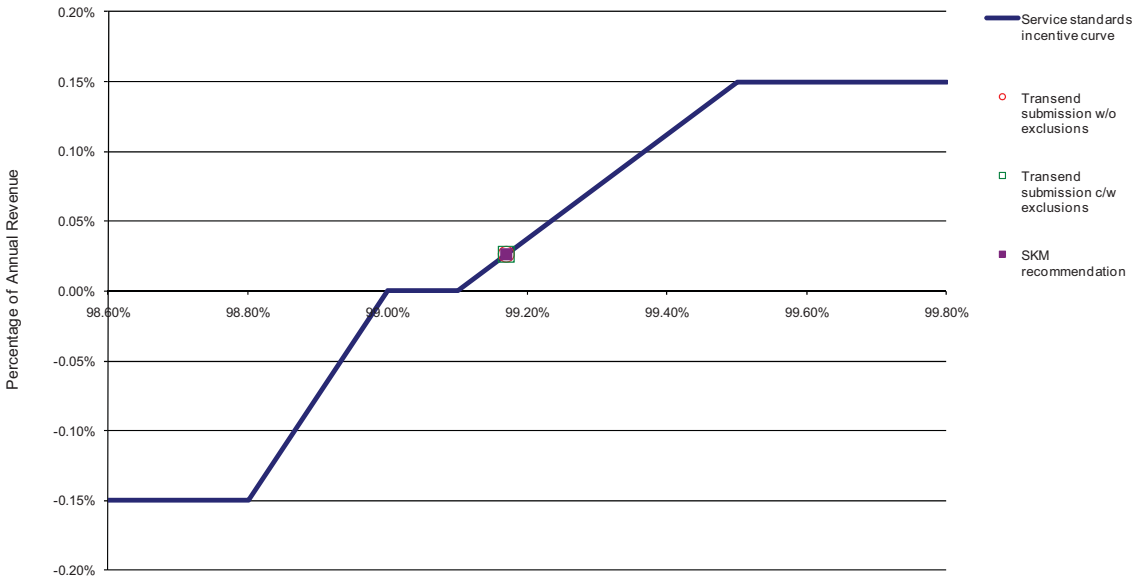
The Performance Measure profiles graphically illustrate the January to June 2009 performance against the targets for Circuit Availability and Loss of Supply Frequency, based on the exclusions sought by Transend and the SKM's recommendation following its review.

The profiles shown are:

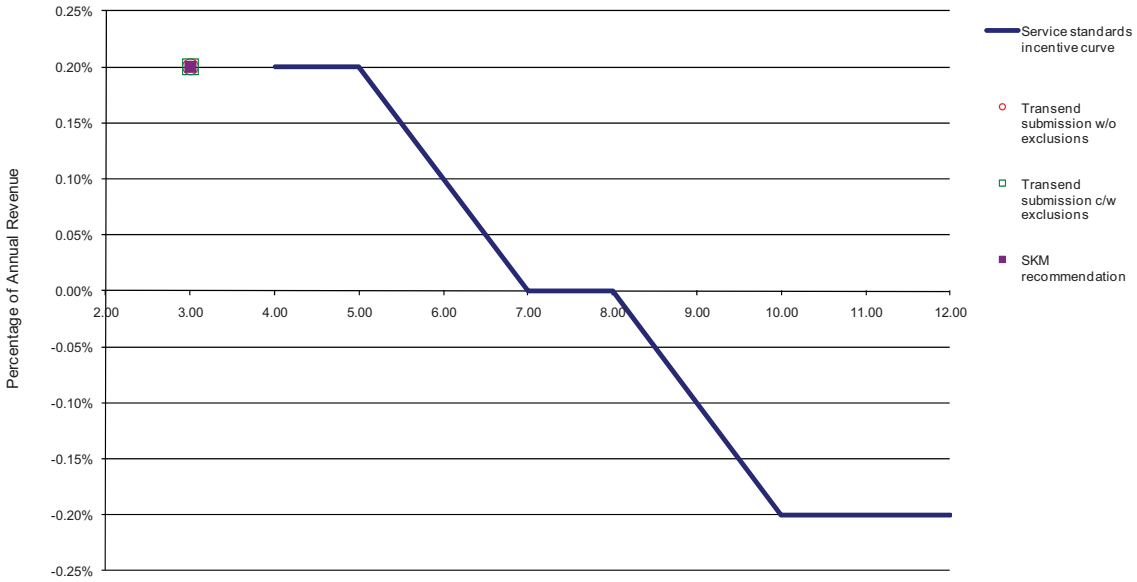
- Measure S1 Transmission Line Circuit Availability (total)
- Measure S2 Transformer Circuit Availability
- Measure S3 Loss Of Supply Frequency Index (>0.1)
- Measure S4 Loss Of Supply Frequency Index (>2.0)

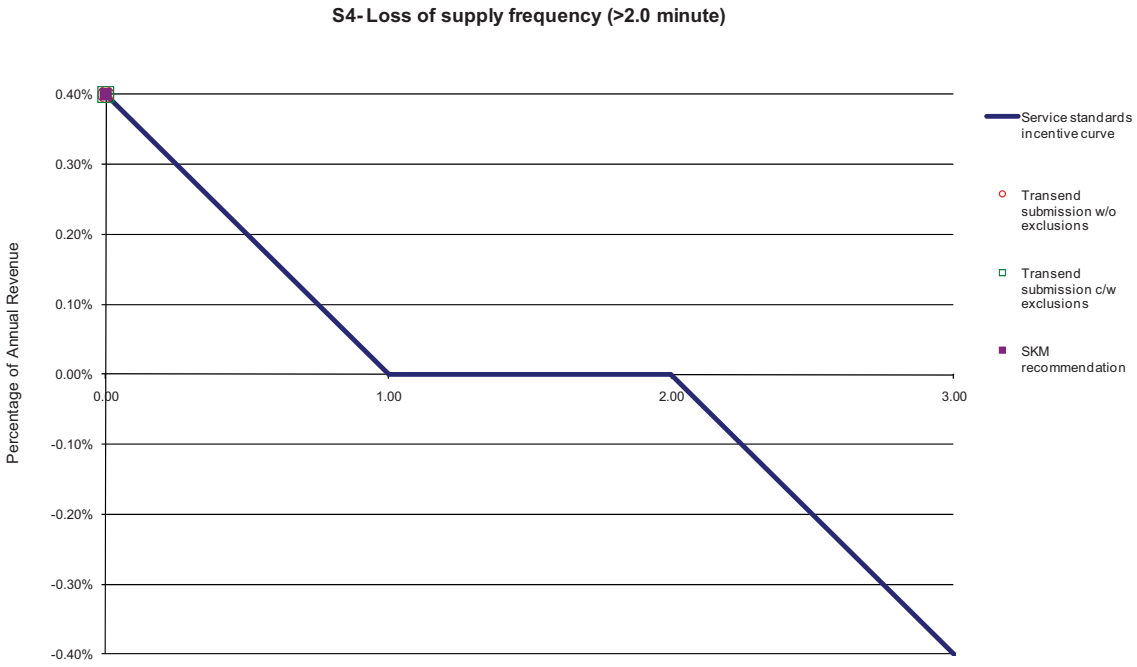


S2- Circuit availability (transformers)



S3- Loss of supply frequency (>0.1 minute)




S4- Loss of supply frequency (>2.0 minute)
Percentage of Annual Revenue
0.40%
0.30%
0.20%
0.10%
0.00%
-0.10%
-0.20%
-0.30%
-0.40%
0.00
1.00
2.00
3.00
Service standards incentive curve
Transend submission w/o exclusions
Transend submission c/w exclusions
SKM recommendation

A.2 Profiles for period July – Dec 2009

The Performance Measure profiles graphically illustrate the July to December 2009 performance against the targets for Circuit Availability and Loss of Supply Frequency, based on the exclusions sought by Transend and the SKM's recommendation following its review.

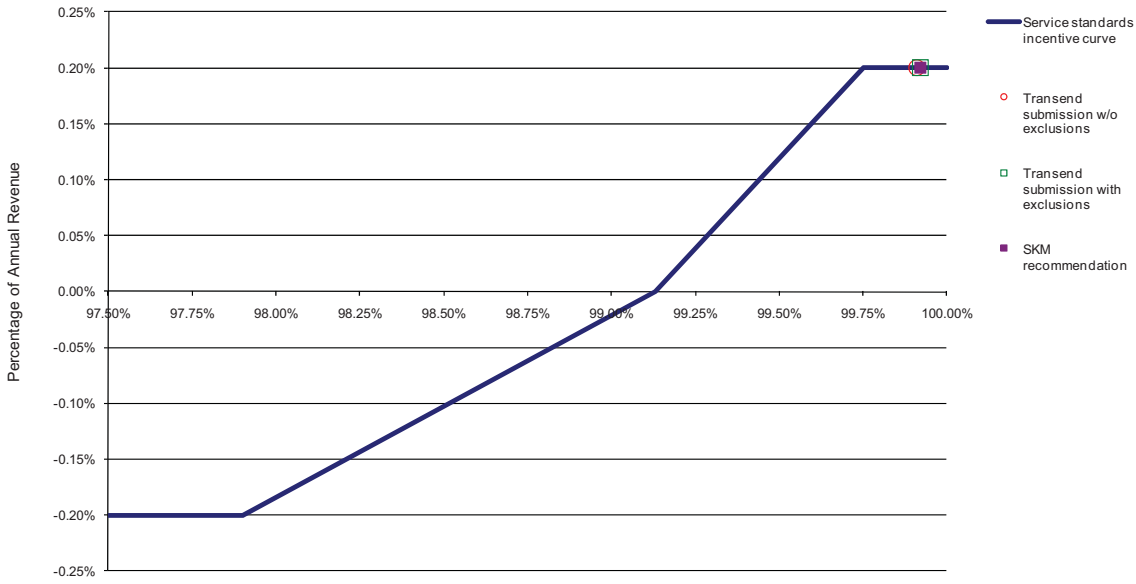
The profiles shown are:

- Measure S1 Transmission Line Circuit Availability (critical circuits)
- Measure S2 Transmission circuit availability (non-critical)
- Measure S3 Transformer Circuit Availability
- Measure S4 Loss Of Supply Frequency Index (>0.1 system minutes)
- Measure S5 Loss Of Supply Frequency Index (>1.0 system minute)
- Measure S6 Average outage duration - transmission lines
- Measure S7 Average outage duration – transformers

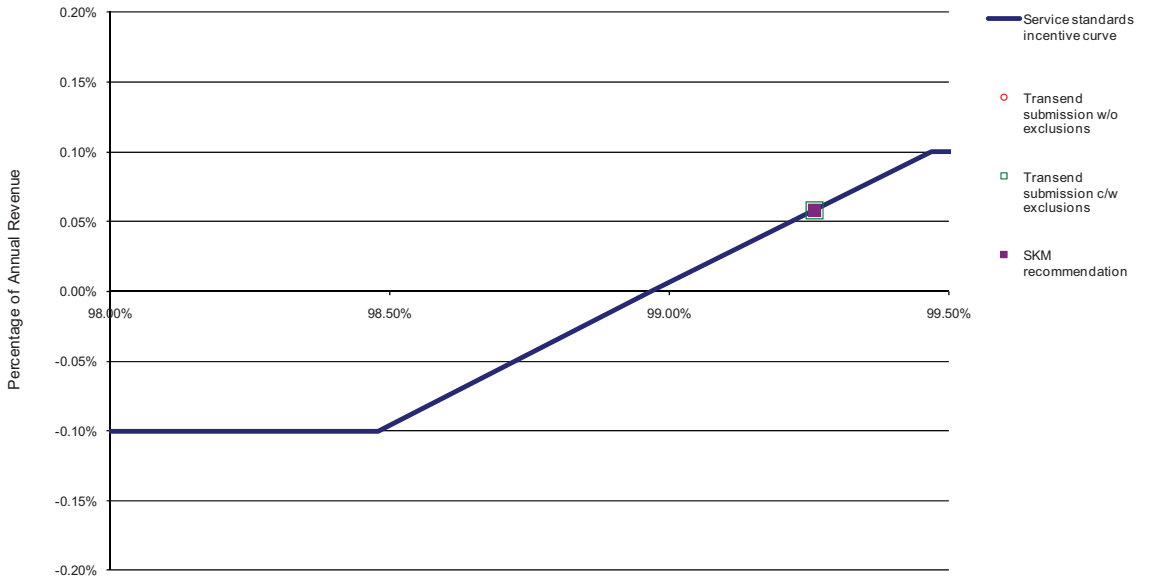
Note:

Measure S6: "Average outage duration - transmission lines", and Measure S7: "Average outage duration – transformers" do not have any revenue incentive attached to them at this stage.

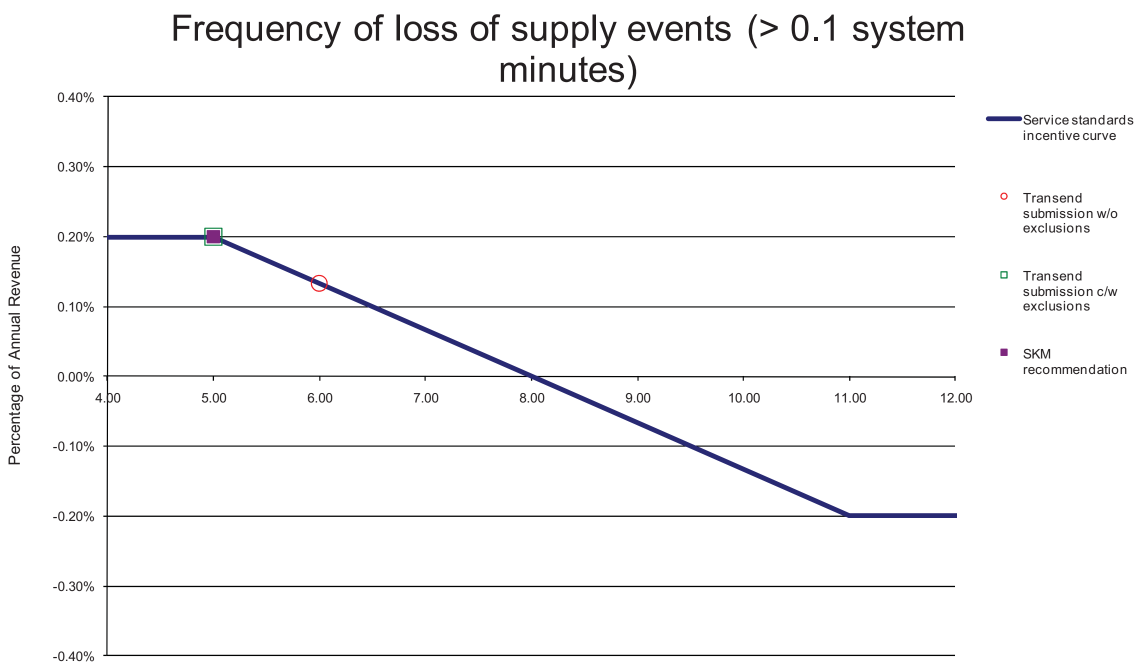
Circuit availability- transmission lines (Critical)



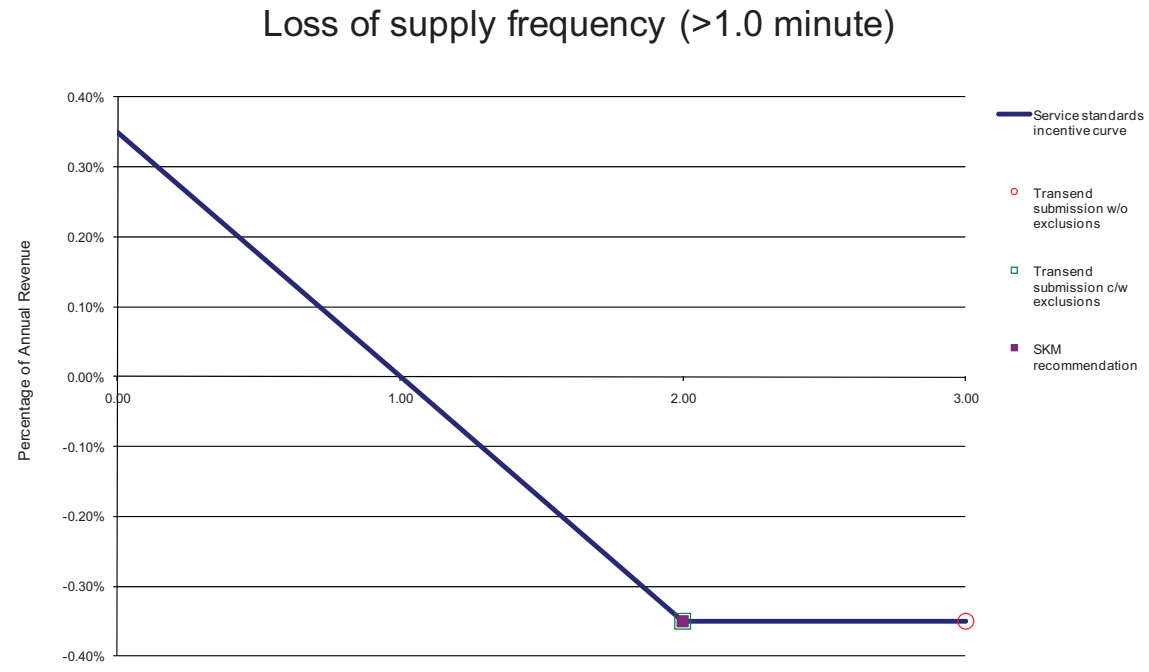
Circuit availability- transmission lines (non-Critical)

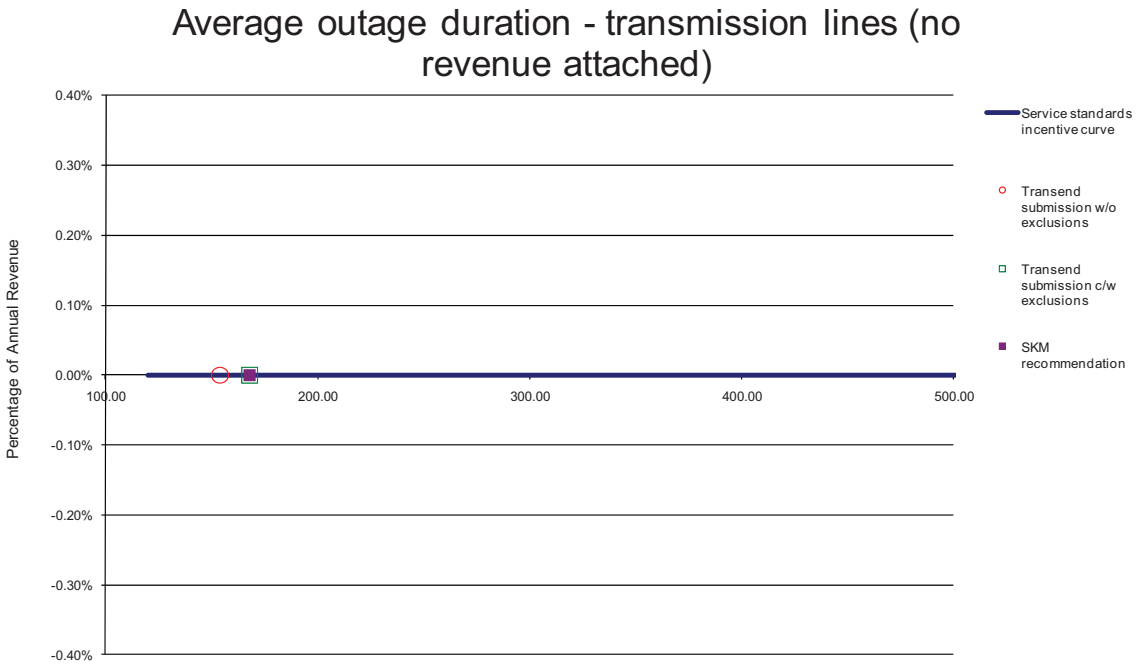


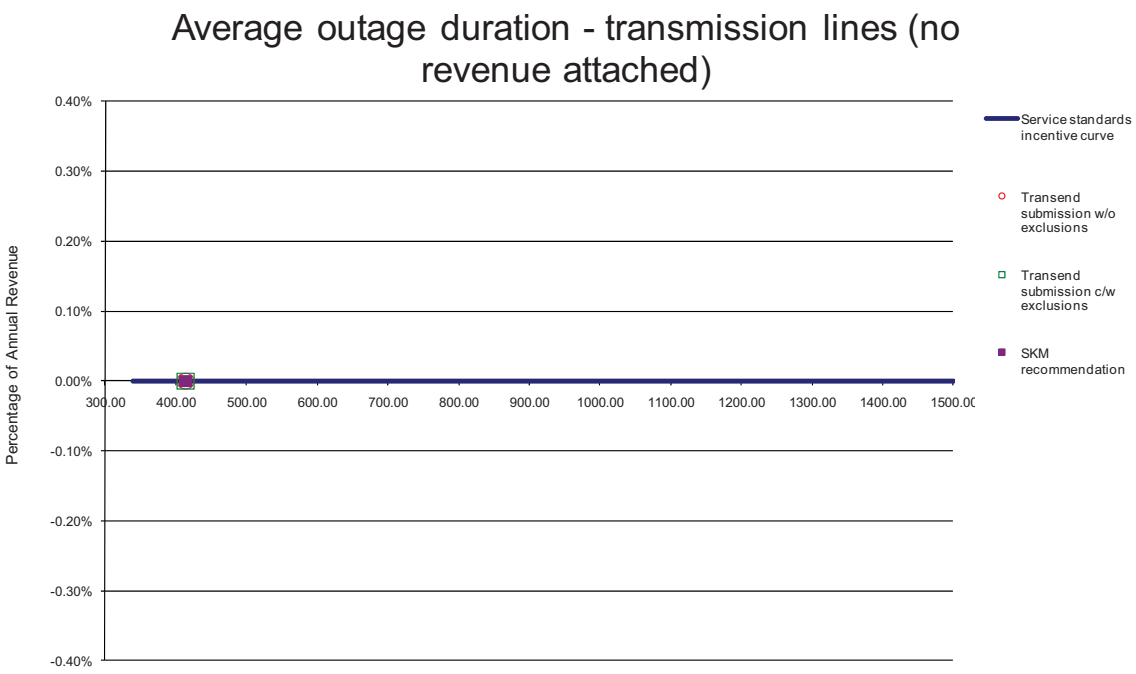
Transformer Availability
0.25%
0.20%
0.15%
0.10%
0.05%
0.00%
-0.05%
-0.10%
-0.15%
-0.20%
-0.25%
98.50%
98.70%
98.90%
99.10%
99.30%
99.50%
99.70%
99.90%
Percentage of Annual Revenue
Service standards incentive curve
Transend submission w/o exclusions
Transend submission c/w exclusions
SKM recommendation



Frequency of loss of supply events (> 0.1 system minutes)
0.40%
0.30%
0.20%
0.10%
0.00%
-0.10%
-0.20%
-0.30%
-0.40%
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00
Percentage of Annual Revenue
Service standards incentive curve
Transend submission w/o exclusions
Transend submission c/w exclusions
SKM recommendation


Loss of supply frequency (>1.0 minute)
Percentage of Annual Revenue
0.40%
0.30%
0.20%
0.10%
0.00%
-0.10%
-0.20%
-0.30%
-0.40%
0.00
1.00
2.00
3.00
Service standards incentive curve
Transend submission w/o exclusions
Transend submission c/w exclusions
SKM recommendation


Average outage duration - transmission lines (no revenue attached)
Percentage of Annual Revenue
0.40%
0.30%
0.20%
0.10%
0.00%
-0.10%
-0.20%
-0.30%
-0.40%
100.00
200.00
300.00
400.00
500.00
Service standards incentive curve
Transend submission w/o exclusions
Transend submission c/w exclusions
SKM recommendation


Average outage duration - transmission lines (no revenue attached)
Percentage of Annual Revenue
0.40%
0.30%
0.20%
0.10%
0.00%
-0.10%
-0.20%
-0.30%
-0.40%
300.00
400.00
500.00
600.00
700.00
800.00
900.00
1000.00
1100.00
1200.00
1300.00
1400.00
1500.00
Service standards incentive curve
Transend submission w/o exclusions
Transend submission c/w exclusions
SKM recommendation

Appendix B Definition of Force Majeure

The following is an extract of the definition of force majeure from the AER's STPIS.

"For the purpose of applying the service target performance incentive scheme, 'force majeure event means any event, act or circumstance or combination of events, acts and circumstances which (despite the observance of good electricity industry practice) is beyond the reasonable control of the party affected by any such event, which may include, without limitation, the following:

- *fire, lightning, explosion, flood, earthquake, storm, cyclone, action of the elements, riots, civil commotion, malicious damage, natural disaster, sabotage, act of a public enemy, act of God, war (declared or undeclared), blockage, revolution, radioactive contamination, toxic or dangerous chemical contamination or force of nature*
- *action or inaction by a court, government agency (including denial, refusal or failure to grant any authorisation, despite timely best endeavour to obtain same)*
- *strikes, lockouts, industrial and/or labour disputes and/or difficulties, work bans, blockades or picketing*
- *acts or omissions (other than a failure to pay money) of a party other than the TNSP which party either is connected to or uses the high voltage grid or is directly connected to or uses a system for the supply of electricity which in turn is connected to the high voltage grid*
- *where those acts or omissions affect the ability of the TNSP to perform its obligations under the service standard by virtue of that direct or indirect connection to or use of the high voltage grid.*

In determining what force majeure events should be excluded the AER will consider the following:

- *was the event unforeseeable and its impact extraordinary, uncontrollable and not manageable?*
- *does the event occur frequently? If so, how did the impact of the particular event differ?*
- *could the TNSP, in practice, have prevented the impact (not necessarily the event itself)?*
- *could the TNSP have effectively reduced the impact of the event by adopting better practices?"*

Appendix C Excerpt from Transend Easement Management Plan

Table 10.1 - Prioritisation Of Vegetation For Management

Priority	Vertical clearance between vegetation and conductor	Horizontal clearance between vegetation and conductor (Span length up to 400m)	Sidefall trees	Other undesirable vegetation
1	0 to 2.5metres (88 & 110kV) 0 to 3.5metres (220kV)	0 to 12 m (88 & 110kV) 0 to 13 m (220kV)	Capable of contacting conductor or structure **subject to risk**, ie. condition of tree, probability of falling, etc.	Manage by assessment of risk: • Gorse • Tea Tree • Broom • Noxious Weeds
2	2.5 to 4.0metres (88 & 110kV) 3.5 to 5.0metres (220kV) **Note:** do not report if not capable of growing up into priority 1 clearance zone.	-	Capable of infringing safety clearances **subject to risk**, ie. condition of tree, probability of falling, etc.	
3	4.0 to 6.0 metres (88 & 110kV) 5.0 to 7.0 metres (220kV) **Note:** do not report if not capable of growing up into priority 1 or 2 clearance zone.	-	-	