TransGrid

Performance Against

AER Service Standards

2005

3rd February 2006

Service Standards Performance Incentive Scheme Implementation for TransGrid

1. Purpose

In its Draft Revenue Cap Decision 2004/05 – 2008/09 for TransGrid dated 28th April 2004, The Australian Competition and Consumer Commission (ACCC), now the AER, established a Performance Incentive scheme intended to provide TransGrid with additional incentive to maintain and improve service quality. TransGrid's Performance Incentive scheme is based on a number of service standard measures which are common to all TNSPs.

The performance targets established by ACCC have been based on data of TransGrid's historical performance. Consequently, the measurement of TransGrid's performance under the performance incentive scheme has been conducted using the same criteria incorporated in the historical data from which the targets were derived.

This document sets out the performance measures implemented by TransGrid consistent with the above principle, its guidelines for measuring those performance measures, and the performance measure results for the calendar year 2005 with incentive scheme bonus/penalties calculated from those results.

2. Performance Measures

2.1 Measure 1 - Transmission Circuit Availability

Formula for Measure:

$$\% \text{ Availability} = 1 - \frac{\text{sum(number of transmission circuit outage hours)}}{\text{Total possible circuit hours available}}$$

Circuits include regulated overhead lines and underground transmission cables (each with a designated TransGrid transmission segment identification number).

Number of transmission circuit outage hours means in relation to each circuit, the number of hours during each reporting period in which that circuit was unavailable to provide transmission services.

Total possible circuit hours available is the number of circuits multiplied by 8760 hours.

2.1.1 Inclusions

Subject to the exclusions specified below, outages on transmission circuits in the *regulated* TransGrid transmission system from all causes including planned, forced and emergency outages.

2.1.2 Exclusions

• Transient interruptions less than one (1) minute

• Unregulated transmission assets.

• Any outages caused by a 3rd party such as intertrip signals, generator outage, customer installation, customer request or NEMMCO direction.

• switching to control voltages and fault levels within required limits, both as directed by NEMMCO and where NEMMCO does not have direct oversight of the network (in both cases only where the element is available for immediate energisation if required).

• The opening of only one end of a transmission circuit (e.g. where the transmission circuit remains energised and available to carry power with immediate manual or automatic return to service).

• Force majeure events (including multiple structure failures)

2.2 Measure 2 - Transformer Availability

Formula for Measure:

$$\% \text{ Availability} = 1 - \frac{\text{sum(number of transformer outage hours)}}{\text{Total possible transformer hours available}}$$

Transformers include regulated transformers counted in 3-phase units (each with a designated TransGrid transformer identification number).

Number of transformer outage hours means in relation to each transformer, the number of hours during each reporting period in which that transformer was unavailable to provide transmission services.

Total possible transformer hours available is the number of transformers multiplied by 8760 hours.

2.2.1 Inclusions

Subject to the exclusions specified below, outages on all transformers in the *regulated* TransGrid transmission system from all causes including planned, forced and emergency outages.

2.2.2 Exclusions

• Transient interruptions less than one (1) minute

• Unregulated transmission assets.

• Auxiliary transformers

• Static Var Compensator transformers (which are counted as part of the SVC).

• Any outages caused by a 3rd party such as intertrip signals, generator outage, customer installation, customer request or NEMMCO direction.

• switching to control fault levels within required limits, both as directed by NEMMCO and where NEMMCO does not have direct oversight of the network (in both cases only where the element is available for immediate energisation if required).

• The opening of only one or both sides of a transformer for operational purposes, such as to control losses, fault levels, incompatibility of tap changes etc but where the transformer remains available to carry power on immediate manual or automatic return to service.

• The period where a transformer is made available for service, but not switched in, at the end of each day of a multi-day planned outage.

• Force majeure events.

2.3 Measure 3 – Reactive Plant Availability

Formula for Measure:

$$\% \text{ Availability} = 1 - \frac{\text{sum(number of reactive plant outage hours)}}{\text{Total possible reactive plant hours available}}$$

Reactive plant include regulated capacitor banks, reactors, synchronous condensers, static Var compensators (each with a designated TransGrid plant identification number).

Number of reactive plant outage hours means in relation to each item of reactive plant, the number of hours during each reporting period in which that plant was unavailable to provide network services.

Total possible reactive plant hours available is the number of reactive plant multiplied by 8760 hours.

2.3.1 Inclusions

Subject to the exclusions specified below, outages on all reactive plant in the *regulated* TransGrid system from all causes including planned, forced and emergency outages.

2.3.2 Exclusions

• Transient interruptions less than one (1) minute

• Unregulated transmission assets.

• Capacitors banks and reactors operating at less than 66kV.

• Any outages caused by a 3rd party such as intertrip signals, generator outage, customer installation, customer request or NEMMCO direction.

• Reactive plant switched out by System Operations, or left out after repairs that make it available for service, for operational purposes.

• Force majeure events.

2.4 Measures 4 and 5 - Reliability

Definition for measures:

Measure 4: Number of events per annum greater than 0.05 *system minutes*.
Measure 5: Number of events per annum greater than 0.40 *system minute*.

System minutes are calculated for each supply interruption by using the following formula:

$$\frac{\text{(Total MWh unsupplied x 60)}}{\text{MW peak demand}}$$

where:

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.

Period of the Interruption starts when a loss of supply occurs or when System Operations directs a customer to reduce load and ends when TransGrid offers full supply restoration to the customer or the customer regains supply via back-feed through its own system.

In cases where restoration or loss of supply is multi-staged, the total MWh Unsupplied is the cumulative sum of MWh unsupplied calculated over the various stages until supply is fully restored.

MW peak demand means the maximum amount of aggregated electricity demand recorded at entry points to the TransGrid transmission network and interconnector connection points during the calendar year in which the event occurs, based on NEMMCO's Historical Demand process.

2.4.1 Inclusions

Subject to the exclusions specified below, all unplanned losses of supply to customers on all parts of the *regulated* transmission system.

2.4.2 Exclusions

• Transient interruptions less than one (1) minute

• Unregulated transmission assets.

• Any outages caused by a 3rd party such as intertrip signals, generator outage, customer installation, customer request or NEMMCO direction or automatic underfrequency load shedding (UFLS).

• Planned outages.

• Where TransGrid protection operates correctly due to a fault on a customer's or a 3rd party system.

• Pumping station supply interruptions (such as Barnard River, Burrawang, Bendeela, Kangaroo Valley and Jindabyne). These interruptions were excluded from historical data used for target setting as there being no effective loss of supply due to their ability to obtain the pumping load at a later time after restoration of supply.

• where a customer's own control/protection system trips their plant during a transient voltage fluctuation or other quality of supply event, whether caused by TransGrid or otherwise.

• Force majeure events.

Notes

The following points further clarify the implementation of the Reliability performance measure:

• The > 0.05 system minutes measure is, as defined, only for events >0.05 up to and equal to 0.4 system minutes. An interruption >0.40 system minute does not register as a >0.05 system minute event.

• Interruptions affecting multiple connection points at exactly the same time and caused by the same event are aggregated (i.e. system minutes are calculated on the basis of events rather than connection point interruptions).

• TransGrid has not included in its historical performance for these measures any ENS events where the customer's own control system (including under-voltage system) caused the trip of the customer's plant during a supply fluctuation on TransGrid's network.

▪ Where the return of supply is abnormally or unreasonably delayed by a second party and outside the control of TransGrid, TransGrid reserves the right to adjust the restoration time to a normal or reasonable period.

▪ Where multiple and unrelated events overlap in time and in their impact on the supply of electricity, the energy not supplied shall be reasonably allocated between the events; the "system normal" arrangement of TransGrid and its customer may be taken into account in determining the allocation.

2.5 Measure 6 - Average Outage Restoration Time

Definition/Formula

$$\text{Measure} = \frac{\text{Aggregate minutes duration of all unplanned plant outages}}{\text{Number of unplanned plant outage events}}$$

The summation of the unplanned outage duration times for the reporting period, divided by the number of unplanned plant outage events during the period, where:

Outage duration time for an item of plant starts when an outage occurs and ends when TransGrid either returns the item to service or the item is repaired, switching instructions are completed and the item is ready for energisation.

2.5.1 Inclusions

Subject to the exclusions specified below, unplanned outages on all TransGrid *regulated* transmission circuits, transformers and reactive plant.

2.5.2 Exclusions

• Transient interruptions less than one (1) minute

• Unregulated transmission assets.

• Any outages due to a 3rd party such as intertrip signals, generator outage, customer installation, customer request or NEMMCO direction.

• Planned outages.

• Outages for capacitor banks and reactors operating at < 66kV

• The portion of outage duration longer than 7 days (168 hours.) That is, each individual outage is capped at 7 days.

• Force majeure events.

3. Reporting Performance Incentive Scheme Outcomes

The AER Service Standards Guidelines require TransGrid to report its annual Service Standards Incentive Scheme performance to the AER within two months after the end of the calendar year reporting period.

This report will provide the following:

- The targets set and achieved performance for each performance measure
- The S Factor and resulting bonus/penalty for each performance measure, as calculated from the pro-formas provided by AER in January 2006.
  - i) without exclusions
  - ii) with exclusions

With the exception of any Force Majeure related events, TransGrid has eliminated from its statistics, as a standard operating procedure, all outages routinely excluded as covered by sections 2.1.2, 2.2.2, 2.3.2, 2.4.2 and 2.5.2 above.

In addition, in its letter of 14th May 2005 with its final decision on TransGrid's 2004 Performance Report Against Service Standards, ACCC determined that an extended outage by an SVC at Kemps Creek substation could not be excluded for the reasons submitted by TransGrid, and that it should be capped at 14 days. As this outage, and the exceptional circumstances that led ACCC to cap the outage at 14 days, has continued throughout 2005, TransGrid submits that the original 14 day cap for 2004 should remain in force with no further outage value allocated against the 2005 performance.

4. Exclusions

TransGrid proposes to exclude the following events for the purposes of calculating the performance bonus/penalty under its performance incentive scheme, in accordance with the criteria set out in Section 2 above.

4.1 Measure affected = Transmission Line Availability

4.1.1 Emergency and planned Outages on No.41 330kV cable (Sydney South – Beaconsfield West) from June to October 2005, totalling 1,285.3 hours.

During sewer connections by a third party for a residential development adjoining the cable route, open trench excavations passed beneath the cable. During this work, a water main burst washing away the soil beneath the cable, causing significant sag in the cable. Subsequent sewer pipe works caused further subsidence. TransGrid then prudently took the cable out of service as an emergency outage until the extent of the damage and the disposition of the problem could be satisfactorily addressed.

As part of the remedial work, TransGrid took a further planned outage to inject grout to stabilise the ground beneath the cable.

These outages are excluded as described in 2.1.2 "Any outages caused by a third party…" and/or also "force majeure event".

4.1.2 Emergency Outage 0-2005-E0008 on 30th September 2005, on 330kV line No. 21 Munmorah to Sydney North tee Tuggerah. A member of the public overcame anti-climbing barriers to climb a 330kV steel tower and was at risk of injury by electric shock. The NSW Police Force directed TransGrid to de-energise the line until the man was returned to safety. Exclusion is sought for this outage under 'force majeure'.

While the outage duration was 3.78 hours, this impacted on three separately counted segments of 21 line, giving a total of 11.34 hours.

4.2 Measure affected = Reliability (Loss of Supply Event Frequency)

4.2.1 Outage 2-2005-F0164 on 25th July 2005, a local municipal council's road works contractor's excavating sub-contractor dug up and damaged TransGrid's Depot 11kV cable which crossed a public road from its 132kV substation. Every precaution had been taken to inform the contractor of the precise location of the cable concerned.

This caused the trip of an 11kV busbar with a loss of distributor load > 0.05 and < 0.4 system minutes. This is excluded as described in 2.4.2: "Any outages caused by a 3rd party… "and/or also force majeure event : "acts and circumstances which is beyond the reasonable control of the party affected…"

4.3 Measure affected = Average Outage Restoration Time

4.3.1 Emergency Outage on No.41 330kV cable (Sydney South – Beaconsfield West) from June to July 2005 for 1,032 hours. (See item 4.1.1 above). As this aligns with the proposed exclusion of the emergency outage, the 7 day capped component of the initial emergency outage for this measure should be excluded.

4.3.2 Emergency Outage 0-2005-E0008 on 30th September 2005, on 330kV line No. 21 Munmorah to Sydney North tee Tuggerah. As this aligns with the proposed exclusion of the emergency outage, the corresponding contributions to the Average Outage Restoration Time should be excluded.

5. Summary of Calculation of 2004 Service Standard Performance Measures

Measure 1 – Transmission Circuit Availability

i) Without exclusions

Average Number of Circuits in year	=	178.0
Sum of all Planned, Forced and Emergency Outages	=	7,717.05 hours
Calculated Availability	=	99.505 %

ii) With exclusions

Average Number of Circuits in year	=	178.0
Sum of all Planned, Forced and Emergency Outages	=	6,420.38 hours
Calculated Availability	=	99.588 %

Measure 2 – Transformer Availability

i) Without exclusions

Average Number of Transformers in Year	=	159.78
Sum of all Planned, Forced and Emergency Outages	=	15,353.81 hours
Calculated Availability	=	98.903 %

ii) With exclusions

Average Number of Transformers in Year	=	159.78
Sum of all Planned, Forced and Emergency Outages	=	15,353.81 hours
Calculated Availability	=	98.903 %

Measure 3 – Reactive Plant Availability

i) Without exclusions

Average Number of Reactive Plant in Year	=	104.0
Sum of all Planned, Forced and Emergency Outages	=	3,327.84 hours
Calculated Availability	=	99.635 %

ii) With exclusions

Average Number of Reactive Plant in Year	=	104.0
Sum of all Planned, Forced and Emergency Outages	=	3,327.84 hours
Calculated Availability	=	99.635 %

(Note: Number of Reactive Plant obtained from:

Capacitor Banks	= 68		
Reactors	= 28		
SVCs	= 6		
Synchronous Condensers	= 2	Total	= 104.0 Reactive Plant)

Measure 4 & 5 – Reliability – Loss of Supply Event Frequency

i) Without exclusions

Number of Loss of Supply Events = 10
Magnitudes in System Minutes: 0.061; 0.021; 0.022; 0.002; 0.008; 0.055; 0.009; 0.041; 0.014; 0.010.
Measure 4 – No. > 0.05 (</= 0.4) system minutes = 2
Measure 5 – No. > 0.4 system minutes = 0

ii) With exclusions

Number of Loss of Supply Events = 9
Magnitudes in System Minutes: 0.061; 0.021; 0.022; 0.002; 0.008; 0.009; 0.041; 0.014; 0.010.
Measure 4 – No. > 0.05 (</= 0.4) system minutes = 1
Measure 5 – No. > 0.4 system minutes = 0

Measure 6 – Average Outage Restoration Time (minutes)

i) Without exclusions

Total Number of Forced and Emergency Outages counted = 101
Total Duration of all Forced and Emergency Outages = 1217.8 (hours)
(individual outages capped at 7 days = 168 hour)
Average Duration per Outage = 12.06 (hours)
= 723.45 (minutes)

ii) With exclusions

Total Number of Forced and Emergency Outages counted = 99
Total Duration of all Forced and Emergency Outages = 1038.7 (hours)
(individual outages capped at 7 days = 168 hour)
Average Duration per Outage = 10.49 (hours)
= 629.38 (minutes)