5 SERVICE STANDARDS AND SYSTEM SECURITY

5.1 Introduction

Regulators have frequently commented on the need to regulate both the standard of service provided by monopolies and their revenue. For example, the Commission has noted that without service standards, revenue regulation may encourage transmission network service providers to lower service standards to reduce costs and increase profits.[1] These concerns can be addressed by introducing a performance incentive scheme that provides financial incentives to improve performance.

It should be recognised, however, that regulated companies have tended to maintain or improve standards of service without financial incentives to improve performance. Transend is no exception, having on average improved its performance over the current regulatory period. This demonstrates the company's ongoing commitment to improving its performance. The expenditure projections outlined in this submission are designed to further improve performance.

Transend supports the formal application of a performance incentive scheme. Such a scheme, with its financial penalties or rewards for poor or good performance, will ensure a sharp focus on service delivery.

The Commission has developed a framework for measuring TNSPs' service performance and rewarding improvements. This chapter examines the issues that surround measuring performance, and proposes a scheme that is consistent with the Commission's framework. In particular, the service measures adopted are those suggested by SKM in their report[2] to the Commission on service standards.

An important element of the Commission's performance incentive framework is that 1% of each TNSP's revenue should be placed at risk. Transend notes that this level of risk exposure is material for transmission businesses that have traditionally been regarded as low risk and low return. A 1% change in revenue would probably affect profitability by more than 10%.

In this context it is important that the target performance levels are set appropriately. A particular concern is that the problems associated with an unexpected fall in performance should not be exacerbated by the consequences of substantial reductions in revenue.

This chapter covers:

- measuring service performance
- Transend's current regulatory obligations
- Transend's proposed performance incentive scheme
- future system security criteria.

5.2 Measuring service performance

The principal objective of measuring service performance is to provide a comprehensive assessment of the underlying 'health' of the transmission system. Measuring performance is an important aid to Transend in meeting its regulatory and contractual obligations with regard to service.

Performance measures can also provide an early indication of a decline in the health of the transmission system. In such circumstances, Transend's renewal and maintenance strategies could be fine-tuned to address any emerging issues.

[1] *ACCC*, Queensland Transmission Network Revenue Cap 2002-2006/7, *November 2001, p. 84*

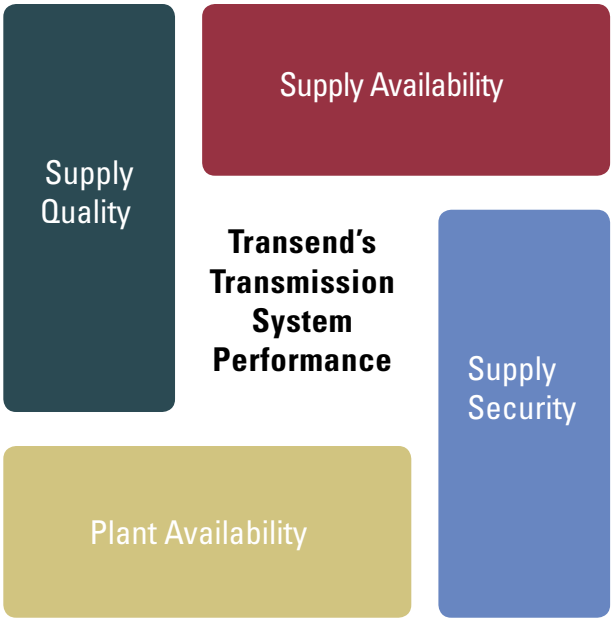
[2] *SKM*, Transmission Network Service Providers Service Standards, *November 2002, pp. 44-45*

Notwithstanding the benefits of measuring performance, the practicalities are complicated because performance has a number of dimensions. In particular, there are four interrelated elements:

- supply availability
- supply quality
- plant availability
- supply security.

These are shown in Figure 5.1.

Figure 5.1: Four elements of transmission system performance



Each element is briefly discussed in turn.

5.2.1 Supply availability

Supply availability measures the impact on Transend's customers of the unavailability of transmission supply.[3] Impact on customers is measured over the period of supply interruption. Interruptions to the supply may either be planned or unplanned. Planned interruptions (those that have more than 24 hours notice) are not included.

Supply availability can be measured in a number of ways. One measure is the amount of 'unserved energy' as a result of transmission outages. Unserved energy is the amount of energy that customers do not receive when supply is interrupted as a result of an outage.

An alternative measure is the number of 'loss of supply events'. This measure records the number of times that there is a material loss of supply. A loss of supply event is defined as an interruption that leads to a loss of supply of more than 0.1 system minutes. It is also valuable to record the number of events where there is a very significant loss of supply, for example more than 2.0 system minutes. This provides useful information on the make-up of the company's performance on supply availability.

[3] *'Supply availability' is often referred to as 'supply reliability'.*

5.2.2 Supply quality

Transend's customers require a high quality of electricity supply to ensure that their electrical equipment and appliances:

- operate as designed and can be used to full capability
- operate continuously when required, with minimal risk of interruption
- are at minimal risk of damage when connected to Transend's transmission system.

To meet these requirements it is necessary to maintain the supply from the system at an appropriate standard with regard to:

- frequency
- power frequency voltage magnitude
- voltage fluctuations
- harmonic or notching distortion of voltage
- voltage balance.

5.2.3 Plant availability

Plant availability measures the time that plant is in service, or ready for service and fit for purpose. Conversely, it indicates the amount of time that plant is not in service due to planned, forced and fault outages.

As it is a time indicator, plant availability does not measure the impact on customers in terms of loss of supply. The impact on customers is measured by supply availability, discussed in Section 5.2.1.

5.2.4 Supply security

Supply security is a measure of how much 'redundancy' is included in the design of the network. A 'firm' connection point is able to continue supply if a major item of transmission plant is disconnected.

Therefore, for a customer's connection point, a firm connection means that the loss of a single transmission element will not cause a loss of supply (with the possible exception of momentary loss). Connection points that are less secure are known as 'non-firm'.

Customers value a high level of supply security because it provides greater certainty that supply will be maintained in the event of a transmission outage. Most importantly, when customers have paid for a firm connection point, Transend should ensure that this level of security is provided.

From the perspective of network design, it is important to balance the benefits of firm supply security against the additional costs. Notwithstanding this issue of optimal system design, it should be noted that a transmission system that is designed to make a supply more secure will tend also to make it more available. Therefore, it is imperative that performance targets for the availability of supply take account of the design characteristics of each particular transmission system.

Table 5.1 shows Transend's firm and non-firm connection points in 2001-02.

Table 5.1: Transend's firm and non-firm connection points 2001-02

Connection Point	Firm	Non-firm
Generation customers	19	23
Distribution customers	29	21
Directly connected customers	10	8

Table 5.1 shows that a significant number of Transend's connection points are not designed to withstand the loss of a major item of transmission plant without incurring loss of supply. This suggests that Transend will provide lower levels of supply availability compared to other Australian TNSPs that are understood to have fewer non-firm connection points.

It is important to recognise that this lower level of supply availability does not imply that Transend has less effective working practices than other TNSPs. The relative performance of TNSPs in supply availability often reflects differences in the design characteristics of their transmission networks.

Section 5.5 considers whether Transend should adopt enhanced supply security standards in the forthcoming regulatory period.

5.3 Transend's current regulatory obligations

Transend has two reporting requirements:

- to OTTER, in accordance with Transend's transmission licence and the Tasmanian Electricity Code
- to customers, in accordance with connection and network agreements.

This section discusses both requirements before making some concluding observations.

5.3.1 Current reporting requirements to OTTER

Transend is licensed under the *ESI Act 1995* (Tasmania), to operate the transmission system in Tasmania. As a condition of its transmission licence, Transend must develop and maintain a set of Licence Plans, as follows:

- Asset Management Plan
- Vegetation Management Plan
- Service Plan (incorporates Service Standards)
- Compliance Plan.

Clause 3.5 of Transend's transmission licence requires Transend to provide a report to OTTER that includes the details of Transend's actual performance against the standards, indicators and targets in these management plans. Under this monitoring framework, Transend measures its transmission performance against each of the indicators discussed in Section 5.2.

OTTER has recently refined service measures for various entities under the TEC, including Transend. For Transend this has resulted in an expanded set of measures. These revised service measures will be reflected in Transend's future Service Plan.

5.3.2 Performance reporting to Transend's customers

Under the TEC, Transend has connection agreements with its customers: Hydro Tasmania and Bell Bay Power (generators), Aurora (distribution network service provider) and National Grid International (market network service provider). Under these connection agreements Transend is required to report to customers on the performance of its connection points.

In reporting to its customers on performance, Transend reports on 'firm' and 'non-firm' connection points. Performance reporting to Aurora is split for two more types of connection points:

- direct-connect connection points (major industrial customers)
- distribution system connection points.

It must be noted that the direct-connect connection points comprise seventeen major industrial customers. These make up about 60% of the total load on the system, as measured by energy transported. In the 2001–02 financial year, four of these directly connected major industrial customers accounted for 50% of the total load on the system.

5.3.3 Future considerations

The Commission's framework for service standards will not replace Transend's current reporting requirements to OTTER and its customers. Instead, the introduction of a performance incentive scheme under the auspices of the Commission will require Transend to incur additional reporting requirements and costs.

Transend will continue to work with OTTER and the Commission to ensure that the regulatory arrangements for service performance are as closely aligned as possible.

5.4 Transend's proposed performance incentive scheme

This section considers:

- design principles
- Transend's performance indicators
- Transend's performance targets
- financial impacts of the performance incentive scheme.

5.4.1 Design principles

Transend's view is that the design of the performance incentive scheme should satisfy six principles:

1. *Sound accountability regime*

   A TNSP should be accountable only for outcomes that it can control, or which it is best placed to manage.

2. *Commensurate rewards for new risks and costs*

   Performance measures, standards and incentives should be applied only if the cost and risk issues for the relevant TNSP have been explicitly considered.

3. *Statistical soundness*

   Performance measures must be statistically sound. Many network performance measures show a statistical distribution that is not consistent with using the mean or median values as a simple target for a single year. For these measures, statistical approaches applicable to small populations and rare events must be applied to identify appropriate norms and acceptable variances.

4. *Auditable performance*

   The performance indicators must be selected so that performance can be audited.

5. *Alignment with desired outcomes*

   The performance indicators must align with outcomes that customers and generators value.

6. *Legal context*

   Service standards must mesh coherently with other legal and regulatory requirements applying to Transend.

These principles should apply to each step in designing a performance incentive scheme, namely:

1. Define *performance indicators* that measure the TNSP's performance.
2. Determine *performance targets* for each performance indicator.
3. Establish an *incentive scheme* that attaches financial rewards and penalties to the performance targets.

The remainder of this section applies these three steps to Transend.

5.4.2 Transend's performance indicators

Following extensive consultation with interested parties, the Commission has suggested that the following performance indicators should form the basis of each TNSP's performance incentive scheme[4]:

1. Circuit availability.
2. Loss of supply events frequency index.
3. Average outage duration.
4. Hours constrained (intra-regional).
5. Hours constrained (inter-regional).

Importantly, the Commission has acknowledged that it may not be appropriate to apply all of these performance indicators in this first phase of establishing the performance incentive schemes. In particular, it would be premature to apply performance indicators if data on past performance is not available.

In the light of the Commission's findings, Transend commissioned TransGrid to assess which indicators should be applied to Transend. As a result of TransGrid's analysis, Transend has concluded that:

- *Circuit availability* measures will be of greatest interest to the wholesale generation market, and will increase in importance following NEM entry. Availability targets for transmission lines and transformer circuits should be applied to Transend.
- *Loss of supply event frequency index* measures are of most interest to end-users and electricity retailers. To reflect the characteristics of the Tasmanian customer load, a loss of supply index should be applied with thresholds of 0.1 system minutes and 2.0 system minutes. These proposed thresholds align with the approach suggested by the Commission.

[4] ACCC, Transmission Network Service Provider (TNSP) Service Standards, *November 2002*

- *Restoration times after outages* are of interest to all users, but are secondary to supply and plant availability measures. Past data shows that performance is volatile as a result of a small number of significant events. Therefore, an appropriate target and incentive mechanism cannot be developed.
- *Intra-regional constraint* targets cannot be applied to Transend because of insufficient data on past performance. It is also noted that Transend has limited ability to control performance in relation to this measure.
- *Inter-regional constraint* measures are not applicable to Transend as Basslink is a market network service provider (MNSP). It should be noted that SKM, in their report to the Commission, also concluded that targets for intra- and inter-regional constraints were not appropriate for Transend.[5]

In summary, Transend has concluded that its service incentive scheme should be based solely on measures of supply and plant availability:

- Transmission circuit availability
- Transformer circuit availability
- Loss of supply event frequency index:
  - Number of events in which loss of supply exceeds 0.1 system minutes
  - Number of events in which loss of supply exceeds 2.0 system minutes.

5.4.3 Transend's performance targets

Having established the performance indicators, the next step is to propose performance targets against each one.

It should be noted that a performance target is not intended to be a 'stretch target' that might itself encourage better performance. The targets are intended to ensure that:

- current performance is at least maintained
- the impact of the bonus and penalty scheme is revenue neutral.

It is therefore important that the targets reflect achievable performance without requiring changes to working practices or additional expenditure.

Ideally, a service incentive arrangement should be based on many years of data on past performance. Unfortunately, Transend does not have information on service performance before 1998. This lack of historical data needs to be taken into account in setting performance targets for the forthcoming regulatory period. In particular, it suggests that a more conservative approach should be adopted in setting penalties and bonuses.

Figures 5.2 to 5.5 show details of Transend's performance from June 1998 to June 2002 and proposed performance targets on a financial year basis. Transend is mindful that the Basslink connection and NEM entry will bring changes to the operating environment. Transend therefore proposes that events triggered by Basslink (and other MNSPs) be excluded from Transend's performance incentive scheme.

For each performance measure there is a target range before penalties or incentives apply. This scheme is consistent with the targets proposed by the Commission and provides a challenge to Transend over the forthcoming regulatory period, particularly when the large works program is considered. Figure 5.2 shows the service incentive scheme as follows:

[5] *SKM,* Transmission Network Service Providers Service Standards, *November 2002, pp. 44-45.*

- Red: performance levels where Transend pays penalties.
- Green: performance levels where Transend receives bonuses.
- Yellow: performance levels which do not attract penalties or bonuses.

The penalty and bonus arrangements are capped so that performance that is outside the range of the scheme does not result in further bonus or penalty payments. A full description of the performance incentive scheme is provided in Appendix 4.

It should be noted that the order of 'red, yellow and green' is reversed for Figures 5.4 and 5.5, compared to Figures 5.2 and 5.3. This is because Figures 5.4 and 5.5 show information on loss of supply events, for which a low score is a better performance than a high score. The converse is true for availability measures, shown in Figures 5.2 and 5.3.

Figure 5.2: Past transmission circuit availability percentage and incentive scheme (in percentages)

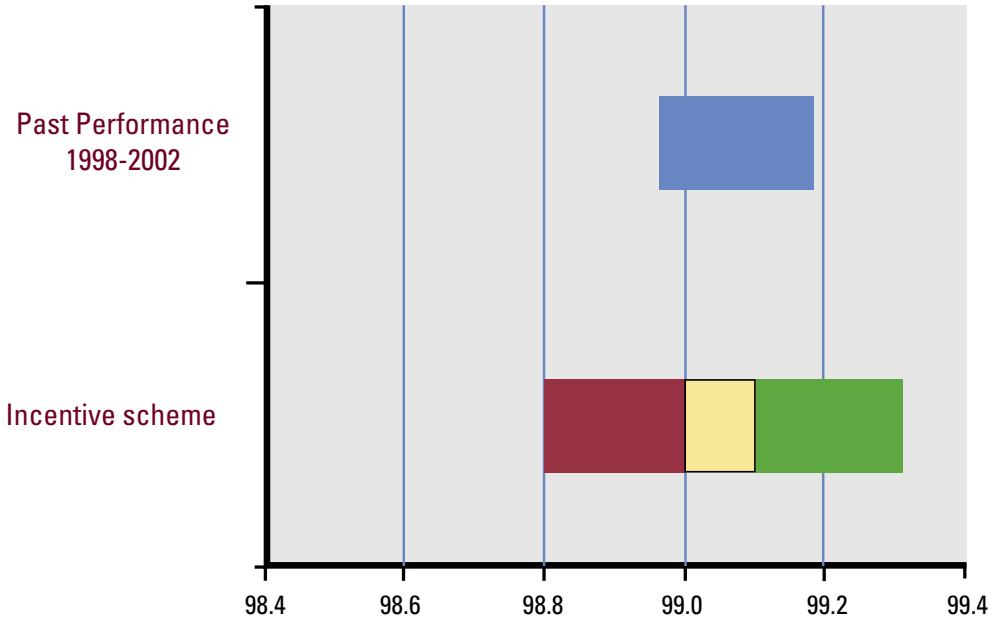


Figure 5.3: Past transformer availability percentage and incentive scheme (in percentages)

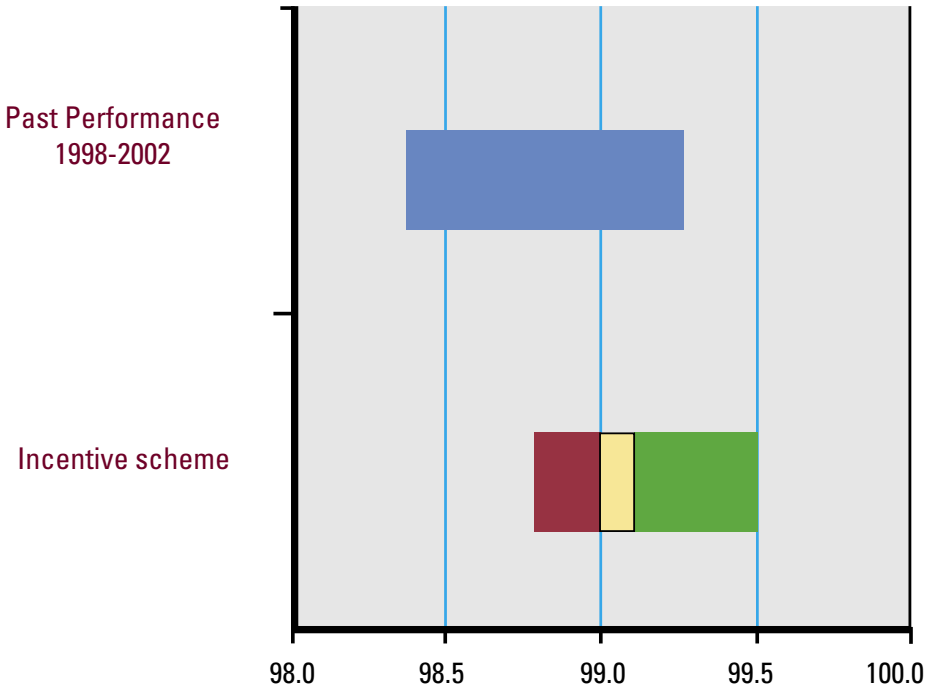


Figure 5.4: Past loss of supply events >0.1 system minutes and incentive scheme

Number of events where loss of supply exceeds 0.1 system minute

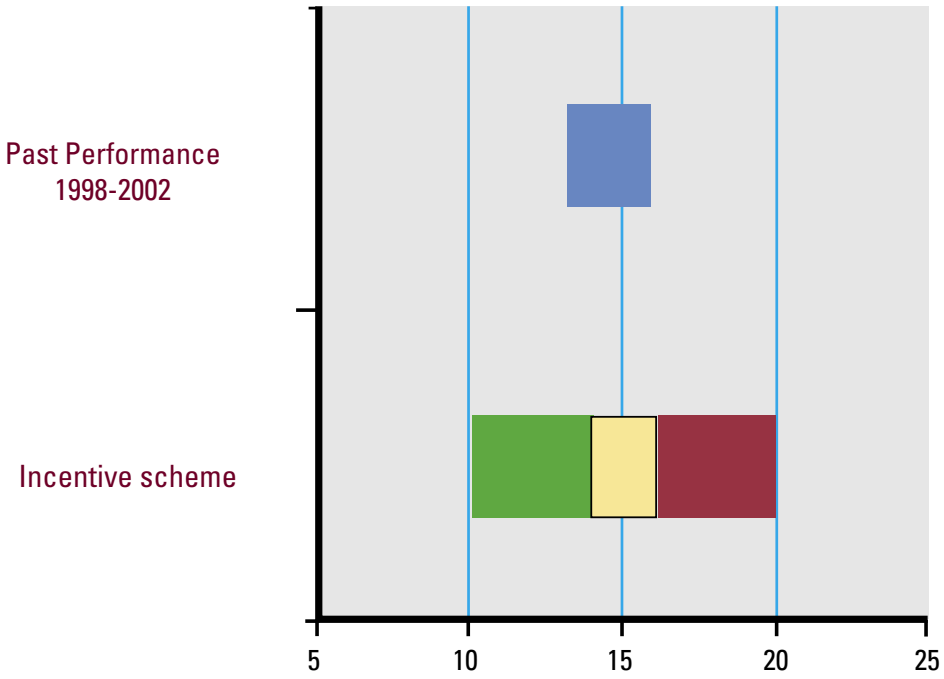
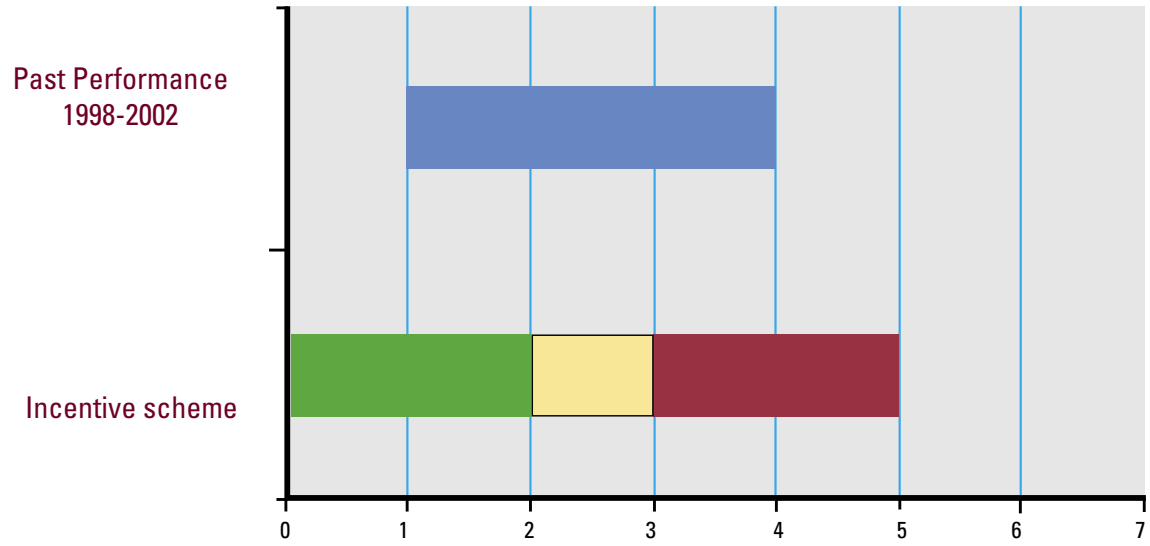


Figure 5.5: Past loss of supply events >2.0 system minutes and incentive scheme

Number of events where loss of supply exceeds 2.0 system minutes



5.4.4 Financial impacts of performance incentive scheme

The performance indicators and targets have been incorporated in a performance incentive scheme that shares risks and rewards between Transend and its customers. The incentive scheme is to operate on a financial year basis.

In Transend's view, customers place more value on supply availability measures than on plant availability measures. It is therefore appropriate to have more weighting on supply availability in the service incentive scheme. Transend has proposed a scheme in which:

- 0.4% of Transend's revenue is at risk against plant availability performance
- 0.6% of Transend's revenue is at risk against the loss of supply event frequency index.

This weighting between plant availability and the loss of supply event frequency index aligns with the Commission's recommendation for Transend.[6]

Transend believes that the proposed service incentive scheme demonstrates the company's commitment to maintaining and improving service standards, and is consistent with the Commission's current guidance on service standards.

In addition, Transend notes that the performance targets are particularly challenging when the extensive future works program is considered. Targets in relation to transformer circuit availability also provide a tough challenge relative to Transend's past performance.

5.5 System security criteria

As noted in Section 5.2, system security criteria determine how a network should be constructed. System security is linked to service performance because a network with more 'redundant' or spare capacity should (other things being equal) be capable of providing a better standard of service to its customers.

[6] *ACCC, Transmission Network Service Provider (TNSP) Service Standards, November 2002*

However, in contrast to the performance incentive scheme, system security criteria are key drivers for network augmentations. They are therefore important drivers for Transend's capital expenditure forecasts: the subject of Chapter 6 of this submission.

Transend's network augmentations are subject to a regulatory test in accordance with Guidelines issued by OTTER pursuant to the TEC.[7] This regulatory test is closely aligned with the NEC, which will apply after Tasmania joins the NEM. The test ensures that network augmentations are justified. A network project satisfies this regulatory test if:

(a) it meets an objectively measurable service standard linked to the technical requirements of Schedule 5.1 of the TEC[8], and the network project minimises the net present value of the cost of meeting those standards

or

(b) in all other cases, it maximises the net present value of the market benefit, taking into account a number of alternative projects, timings and market development scenarios.

In essence, a network project that satisfies the regulatory test through Route (a) is justified on the basis that it is required to provide system security. The advantage of such criteria is that they provide a high-level assessment of the economics of improving system security, rather than a detailed project-by-project assessment as required by Route (b).

Although the regulatory test contemplates investments being justified on the basis of applying security criteria, no such security criteria have yet been established in Tasmania. Therefore, Transend's augmentations to date have been justified on the basis of the market benefit component [Route (b)] of the regulatory test.

The Tasmanian energy regulator (OTTER) has acknowledged the potential benefit of applying security criteria as part of the regulatory test.[9] OTTER has suggested that 'good industry practice' should be a relevant consideration in appraising investment projects. This is a positive step forward because it recognises that the market benefits test might not always promote projects that may be justified on the basis of 'good industry practice'.

The existence of two potential routes for assessing proposed investments raises important issues in terms of forecasting future development capital expenditure requirements. Specifically, what method should Transend adopt in forecasting its development capital expenditure requirements over the next regulatory period?

In theory, Transend could forecast its development capital expenditure requirements by undertaking a preliminary assessment of whether prospective augmentations were likely to maximise net market benefits. However, such an approach would be data and resource intensive. Transend also recognises that such a relatively complex approach still requires extensive assumptions and judgements.

Therefore, as an alternative approach, Transend used system security criteria that could apply under Route (a) of the regulatory test. Applying these criteria should produce investment decisions similar to those that would be produced if prospective developments were tested in accordance with the market benefits test. This is because the criteria should reflect the underlying costs and benefits to customers of providing a particular level of system security.

[7] *OTTER*, Network Project Assessment: Regulatory Test, *June 2000*

[8] *For the purposes of this discussion 'service standards linked to the technical requirements of Schedule 5.1' amounts to 'system security criteria'.*

[9] *Letter from the Tasmanian Energy Regulator to Transend CEO, 15 October 2002*

However, it should be noted that this approach will not identify augmentations that may be justified on the basis of Tasmanian generators wishing to gain access to the Victorian reference node in the NEM. The uncertainty associated with these projects is discussed in more detail in Chapter 6.

Transend commissioned SKM to develop appropriate system security criteria for the Tasmanian system. In undertaking this exercise, SKM:

- reviewed the National Electricity Code (NEC) and the Tasmanian Electricity Code (TEC) requirements
- reviewed Transend's existing system security and planning criteria
- reviewed the practices in other Australian states and in New Zealand
- considered the specific requirements of the transmission network and Transend's customers
- discussed and confirmed the system security and planning criteria with Transend's Distribution customer
- assessed the impact of the criteria on the existing transmission network
- established the final system security and planning criteria.

In addition, Hydro Tasmania and the System Controller were consulted regarding the appropriate system security criteria, and their views were reflected in SKM's findings.

SKM's final report on the development of system security criteria is included in this submission as Appendix 5. These system security criteria have been developed after discussions with the Reliability and Network Planning Panel (RNPP). The RNPP has expressed interest in adopting system security criteria, but it is not envisaged that formal criteria will be ratified by the RNPP in the near future.

These system security criteria have been reflected in Transend's capital expenditure forecasts, discussed in Chapter 6 of this submission.

5.6 Summary

This chapter has provided detailed information regarding Transend's proposed service standards and security criteria for network planning purposes. In essence, the proposed service standards are intended to provide appropriate incentives for improving the performance of the existing network as well as penalties for any decline in performance. In contrast, the system security criteria provide guidance on how the transmission system should be further developed to meet customer requirements.

In developing service standards and system security criteria it is necessary to adopt a customer perspective by considering what customers want in terms of a better performing transmission system and/or greater security of supply. However, it is not easy to assess customers' preferences on these matters. Transend has therefore sought advice from TransGrid and SKM to ensure that Transend's proposals reflect best practice, and satisfy the current regulatory requirements.

The performance incentive scheme is designed to be revenue neutral. It will provide stronger incentives to deliver better performance without necessarily providing any additional revenue to Transend. Transend believes that the adoption of this proposal will benefit customers.

In relation to the system security criteria, Transend's approach has been focused on providing a sound basis for estimating future capital expenditure requirements. These forecasts are discussed in detail in Chapter 6.