REVIEW OF ELECTRICITY STANDARDS OF SERVICE FOR THE NORTHERN TERRITORY

ISSUES PAPER

May 2010

Level 9, 38 Cavenagh Street DARWIN NT 0800
Postal Address GPO Box 915 DARWIN NT 0801
Email: utilities.commission@nt.gov.au
Website: www.utilicom.nt.gov.au

Table of Contents

Confidentiality

In the interests of transparency and to promote informed discussion, the Commission will make submissions publicly available. However, if a person making a submission does not want their submission to be public, that person should claim confidentiality in respect of the document (or any part of the document). Claims for confidentiality should be clearly noted on the front page of the submission and the relevant sections of the submission should be marked as confidential, so that the remainder of the document can be made publicly available. In addition, a copy of the submission suitable for publication (i.e. with any confidential material removed) should also be provided.

Public access to submissions

Subject to the above, submissions will be made available for public inspection at the office of the Commission and on its website (www.utilicom.nt.gov.au).

To facilitate publication on the Commission's website, submissions should be made electronically by disk or email. However, if this is not possible, submissions can be made in writing.

Inquiries

Any questions regarding this report should be directed in the first instance to the Executive Officer, Utilities Commission at any of the following:

Utilities Commission
GPO Box 915
DARWIN NT 0801

Telephone: 08 8999 5480
Fax: 08 8999 6262

Email: utilities.commission@nt.gov.au

CHAPTER 1

Overview

Introduction

1.1 The Commission has terms of reference from the Treasurer to review and report on the adequacy of current standards of service established by the Electricity Standards of Service Code. The objective is to provide options to ensure electricity generation, network and retail standards of service are appropriate in the Territory.

1.2 The Commission is to advise on the indicators and reasonable benchmarks for minimum standards of service in the Territory, and develop options for setting, monitoring and enforcing minimum standards of service.

Standards of service

1.3 Standards of service are a common feature of the electricity supply industry, with governments and industry regulators defining and monitoring average or minimum service performance of certain of the operating activities of electricity generators, network service providers and retailers.

1.4 The key factor in establishing standards of service arrangements is identifying what represents acceptable levels for service performance, which involves understanding customer preferences, and customers' willingness to pay more or less for improved or reduced levels of service. A further factor in determining acceptable levels of service performance is the cost of providing and maintaining reliability relating to local circumstances, such as prevailing weather, number and location of customers, size of the network and other local conditions. The variation in local circumstances means that standards of service differ between jurisdictions, and between regions within jurisdictions.

Northern Territory experience

1.5 Service performance in the Territory has been monitored by the Commission since January 2006, with the introduction of the Electricity Standards of Service Code (ESS Code).

1.6 The performance reporting framework and the minimum standards currently apply to the Power and Water Corporation (PWC) generation, networks and retail business units. Requiring performance reporting by the contestable generation and retail sectors was to provide additional transparency and accountability to the performance of PWC Generation and PWC Retail due to the absence of competition in these sectors.

1.7 PWC reports annually on reliability, quality and customer service performance for electricity generation, networks and retail activities in the Darwin, Katherine, Alice Springs and Tennant Creek regions.

1.8 The service performance of PWC has come under greater community scrutiny in recent years due to a series of major outages affecting a large number of customers, including the series of outages in the Casuarina zone substation service area in September and October 2008, and the Darwin-Katherine system black incident on 30 January 2010. These events have raised broad questions about the condition of electricity assets, expectations for the potential future levels of service performance, and the capital and maintenance investment required to achieve desired levels of service performance.

1.9 PWC is undertaking an extensive capital and maintenance program to avoid further deterioration in current levels of generation and network service performance, and meet future growth. However, there has been no recent consideration or debate about the standards of electricity services that Territorians should reasonably expect, or are willing to pay for.

Reliability performance achieved since 1999-2000

1.10 On average, customers in Tennant Creek, Katherine and Alice Springs have generally experienced an improvement in reliability between 1999-00 and 2008-09. In particular, reliability in Tennant Creek has noticeably improved since 1999-00, and now appears to be on a par with the other regions in the Territory. In contrast, customers in Darwin have experienced an average decline in reliability.

1.11 The trend in network and generation reliability performance in the Territory has not been considered in a comprehensive fashion to identify reasons for the gradual increase in duration and frequency of power outages. Nor has there been a comprehensive assessment of the future performance of generation and network assets and reliability.

Design of standards of service arrangements

1.12 Standards of service arrangements apply in each part of the electricity supply chain. However, there are differences in the indicators of performance, methods of setting service targets and monitoring and reporting on performance.

1.13 A reliability standard applies to generators in the national electricity market (NEM) to establish the minimum acceptable level of bulk electricity supply delivered to customers in a region measured against the total demand of consumers in that region. The standard is a measure of the expected amount of energy at risk of not being delivered to customers due to a lack of available capacity, and was set at 0.002 per cent unserved energy (USE) in 1998, and remains at that level now.

1.14 Standards of service most commonly apply to network service providers, and are a key consideration of regulators in undertaking network price regulation and identifying the optimum balance between price and service levels – a trade-off known as the regulatory bargain.

1.15 The Commission notes that the Australian Energy Market Commission has recommended that the Ministerial Council on Energy initiate a review to develop a

nationally consistent approach to determining service targets for distribution network service providers. The Commission considers that such a review would inform the development of effective standards of service arrangements in the Territory.

1.16 Electricity retailers have been required to report on aspects of service performance in most Australian jurisdictions, with the main objective of providing information to household customers on the affordability and accessibility of electricity services, and customer satisfaction with the quality of service.

1.17 Indicators of service performance used in Australia typically include:

- reliability of supply, which identifies the ability of generators and network service providers to maintain the availability of the service in question, typically being measured by how often and for how long customers go without the service during a given period;
- quality of supply, which identifies the specification of supply by generators and network service providers, and involves measures such as voltage levels, frequency and harmonic content; and
- customer service, which identifies how the distribution network service providers and retailers interact with individual customers.

1.18 Although subject to different regulators and regulatory approaches, the process for setting the service targets to be achieved network service providers elsewhere in Australia is a well understood part of the network regulation process. Similarly, the process for setting service targets to be achieved by retailers is dealt with through customer protection regimes, and guaranteed service level schemes.

1.19 However, there appears to be a gap in the Territory's regulatory framework for determining the service targets to be achieved by generators, and the generation sector. In particular, there is no independent or transparent process for determining the generation reliability standard. Given the greater propensity for generation related outages to affect customers in the Territory than in the NEM, there appears to be a case for examining what represents a reasonable generation reliability standard.

Average and minimum standards of service

1.20 Measurement of service performance generally includes consideration of the average (system wide) standard of a service and the minimum standard of a service. An average standard identifies performance which customers (on average) do not value an increase in service performance greater than the incremental cost of providing that level of performance. A minimum standard identifies performance below which the service is unacceptable.

1.21 Minimum standards are generally defined for the purposes of guaranteed service level schemes, where payments to customers are made if they experience poor service performance. Minimum standards may also apply to the performance of specific network feeders or classes of feeders, or specific services to customers (e.g. connection services). Average standards are used to determine the average network or system performance that should be achieved over time, and the associated capital and maintenance expenditure.

Options for setting standards of service targets

1.22 The service performance targets set through the ESS Code for the Territory are based on service performance in 1999-00, except for some services where accurate data on performance was not available, and the target was based on performance in an alternative later year. The Territory's service performance targets are notionally targets for minimum rather than average performance.

1.23 The Commission has identified the following approaches to setting service performance targets:

- targets based on a multiple year rolling average;
- targets based on benchmarks; and
- targets to improve service performance.

Customer preferences and willingness to pay

1.24 The reliability and quality of electricity supply is important to the Territory community and economy. The increased reliance on electrical devices means households and business place greater value on electricity reliability and quality, and frequent or extended power outages are considered inconvenient, and can be costly.

1.25 The level of reliability and quality of electricity supply is determined by system planning and design and operating practices, which in turn influence capital and maintenance expenditure decisions, and the price of electricity for customers. As such, defining a standard of service requires a trade off between desired service performance and the cost borne by customers

1.26 Methods of identifying the appropriate balance between an acceptable level of service performance over time and cost include an economic assessment of the value of customer reliability or by undertaking customer preference surveys.

1.27 The task of measuring willingness to pay is difficult, as there are very few opportunities to observe customers' responses to changes in prices and service standards in industries where there is little or no competition. Further, willingness to pay relates to elusive factors such as perception and expectations of services

1.28 Explicit recognition and assessment of customer preferences has not been a factor in determining standards of service and electricity infrastructure investment priorities in the Territory. However, engagement with customers to determine their satisfaction with existing levels of service, and willingness to pay for a higher or lower level of service is the only effective way of determining customer preferences.

1.29 An advantage of consultation is that customers would develop a greater awareness of the price and reliability trade off, and an improved understanding of the supply conditions in the Territory. Consultation is also important because customer preferences differ significantly between communities, and accurate estimates of customer preferences in the Territory would probably be unreliable if inferred from preferences expressed in a different region or jurisdiction.

1.30 The Commission's preliminary view is that improved understanding of customer preferences in the Territory would assist in setting standards of service that reflect customer expectations and their willingness to pay.

Other design considerations

1.31 The Commission also has a particular interest in:

- whether, and how, events beyond the reasonable control of service providers should be excluded for the purposes of determining service targets and reporting service performance;
- how planned and unplanned outages should be treated when determining service targets and reporting service performance;
- how service performance data should be segmented; and
- the availability and quality of service performance data.

1.32 An index of issues and questions the Commission is seeking comment on from stakeholders is provided at Appendix A.

1.33 A summary of preliminary proposals for standards of service arrangements in the Territory is provided at Appendix B.

CHAPTER 2

Introduction

Background

2.1 The electricity supply industry in the Northern Territory is regulated through the *Electricity Reform Act*, *Electricity Networks (Third Party Access) Act*, *Utilities Commission Act* and associated legislation. This statutory framework was introduced on 1 April 2000.

2.2 The statutory framework is primarily focused on regulating the activities of electricity industry participants and customers in the Darwin-Katherine, Alice Springs and Tennant Creek power systems – referred to as the market systems. Key elements of the statutory framework are:

- third party access to the Darwin-Katherine, Alice Springs and Tennant Creek electricity networks;
- staged introduction of retail contestability, with all customers to become contestable from 1 April 2010; and
- an independent economic regulator, the Utilities Commission, to regulate monopoly electricity services, licence market participants and enforce regulatory standards for market conduct and service performance.

2.3 The Power and Water Corporation (PWC) is the main industry participant in the market systems, generating the majority of electricity, operating the network and supplying retail services to all customers. PWC also provides water supply and sewerage services to customers throughout the Territory.

2.4 PWC is a vertically integrated electricity service provider, with generation, network and retail business units operating as separate businesses.[1] The commercial relationship and transactions between each unit is subject to oversight and regulation by the Commission.[2] PWC is owned by the Territory Government, and is also subject to oversight by a shareholding Minister through the *Government Owned Corporations Act*.

2.5 In the three market systems, PWC is currently the sole electricity retailer, supplying electricity to 74 365 customers at 30 June 2009.[3] PWC is also the main electricity generator, with almost 91 per cent of generation capacity. There are four other firms

[1] This paper refers to the separate business units as PWC Retail, PWC Networks and PWC Generation.

[2] Regulatory instruments include the licensing framework and the Northern Territory Electricity Ring-Fencing Code.

[3] Power and Water Corporation, September 2009, 2008-09 Annual Report, page 23.

generating electricity for the Darwin-Katherine and Alice Springs systems. However, these businesses generate electricity under contract for PWC rather than selling directly to an electricity retailer, and PWC provides the fuel used for electricity generation.[4]

2.6 PWC operates the Darwin-Katherine, Alice Springs and Tennant Creek networks, and is responsible for system control.[5] The networks are not interconnected, and are separated by long distances. The networks comprise 730 kilometres (km) of high voltage transmission lines and 7 378 km of low voltage distribution lines.[6]

2.7 Electricity supply in regional and remote centres of the Territory is mainly managed by the Territory Government and a service provider through a contract for service model. These systems include: the 72 communities and about 600 outstations where essential services are provided through the Territory Government Indigenous Essential Services program; three mining townships (i.e. Nhulunbuy, Alyangula and Jabiru), where electricity is supplied by the associated mining firm; and eight remote townships (e.g. Elliott, Yulara and Ti-Tree).

Electricity standards of service

2.8 Standards of service allow firms and customers to establish a point of difference in the reliability, quality and price of otherwise similar products available in a market. However, governments can intervene to define and regulate minimum and average standards of service where there is potential for customers or the economy to be disadvantaged by poor service performance.

2.9 In the case of the electricity industry in Australia, governments or industry regulators have defined certain standards of service for reliability and quality of supply, and customer service levels, that should be achieved by electricity transmission and distribution network service providers (TNSP and DNSP), and by the electricity generation and retail sectors.

2.10 The most common features of standards of service frameworks in place in Australia are:[7]

- monitoring or information disclosure requirements, with firms required to publish information about service performance against a number of reliability, quality and customer service performance measures or benchmarks;
- definition of minimum service standards, with minimum standards of performance mandated in legislation;

[4] These generators are located at Pine Creek (between Darwin and Katherine), Shoal Bay (at the Darwin City Council dump) and Brewer Estate (in Alice Springs).

[5] The System Controller is located in the PWC networks business unit, and is responsible for monitoring and controlling the operation of the power system to ensure the system operates reliably, safely and securely in accordance with the System Control Technical Code.

[6] Power and Water Corporation, September 2009, 2008-09 Annual Report, page 23.

[7] Energy Networks Association, March 2007, Service Standard Regulatory Policy & National Reliability Reporting Framework, page 8.

- guaranteed service level (GSL) schemes, with payments made to customers when service performance is outside a defined threshold (e.g. worse than a minimum standard);
- financial incentive schemes, with financial incentives established through a price regulation framework to encourage defined performance outcomes; and
- contractual service standards, whereby firms agree with a customer through the contract negotiation process to achieve a particular service level.

2.11 The key factor in establishing standards of service arrangements is identifying what represents acceptable levels for service performance, which involves understanding customer preferences, and customers' willingness to pay more or less for improved or reduced levels of service.[8] A further factor in determining acceptable levels of service performance is the local circumstances, such as prevailing weather, number and location of customers, size of the network and other local conditions. The variation in local circumstances means that standards of service differ between jurisdictions, and between regions within jurisdictions.

2.12 Standards of service frameworks most commonly apply to DNSPs and TNSPs. As natural monopolies DNSPs and TNSPs have less incentive to strive to provide improved, or different, levels of service as customers generally cannot move to an alternative provider. Consequently, the standards of service achieved by DNSPs and TNSPs are a key consideration of regulators in undertaking network price regulation, and identifying the optimum balance between price and service levels.

2.13 Additionally, the performance of the equipment a firm uses to provide a good or service can influence standards of service. For example, the safe, secure and reliable operation of a power system requires that electricity generators design and operate their equipment so as to meet specified technical and performance parameters. As such, the technical and service performance of generators is regulated and managed to avoid the adverse reliability (e.g. outages) or quality (e.g. power surges) outcomes for customers that could result from operating outside these parameters.

2.14 Finally, electricity retailers have been required to report on aspects of service performance in most Australian jurisdictions, with the main objective of providing information to household customers on the affordability and accessibility of electricity services, and customer satisfaction with the quality of service. A focus of examining retailers' standards of service, and the monitoring of retail service performance, is to bring transparency and accountability to how retailers are treating their customers, and particularly vulnerable customers.[9]

[8] Ibid, pages 7-8.

[9] For example, refer Essential Services Commission of Victoria, December 2009, Energy Retailers Comparative Performance Report – Customer Service 2008-09.

Indicators of service performance

2.15 Indicators of service performance used in Australia typically include:

- reliability of supply, which identifies the ability of a service provider to maintain the availability of the service in question, typically being measured by how often and for how long customers go without the service during a given period;
- quality of supply, which identifies the specification of supply, and involves measures such as voltage levels, frequency and harmonic content; and
- customer service, which identifies how the service provider interacts with individual customers.[10]

2.16 Commonly used indicators of reliability and quality of supply, and customer service are presented below.

Reliability of supply

2.17 Reliability measures are system wide measures derived from the duration and number of power outages experienced, and the number of customers affected. There are four main measures used in Australia:[11]

- system average interruption duration index (SAIDI) – is the average number of minutes that a customer is without supply each year. SAIDI is calculated as the sum of the duration of each sustained customer interruption (in minutes), divided by the total number of customers. SAIDI excludes momentary interruptions (one minute or less);
- system average interruption frequency index (SAIFI) – is the average number of times a customer's supply is interrupted each year. SAIFI is calculated as the sum of each sustained customer interruption, divided by the divided by the total number of customers. SAIFI excludes momentary interruptions (one minute or less);
- customer average interruption duration index (CAIDI) – is the average duration of each interruption. CAIDI is calculated as the sum of the duration of each sustained customer interruption (in minutes) divided by the total number of sustained customer interruptions (SAIDI divided by SAIFI). CAIDI excludes momentary interruptions (one minute or less); and
- momentary average interruption frequency index (MAIFI) – the average number of momentary interruptions (one minute or less) per customer per year. MAIFI is calculated as the total number of customer interruptions of one minute or less, divided by the total number of customers.

2.18 Supply interruptions can be planned or unplanned. For example, a planned power outage would occur when a DNSP de-energises a substation or feeder to undertake

[10] Utilities Commission, August 2004, *Developing a Standards-of-Service Framework*, page 1.

[11] Refer Utilities Regulators Forum, March 2002, National Regulatory Reporting for Electricity Distribution and Retailing Businesses Discussion Paper, page 6, table 1.

routine maintenance, and an unplanned outage would occur when there is an equipment failure.

2.19 Jurisdictions can adopt different approaches to including planned and unplanned outages when measuring and reporting on reliability performance, for example by excluding planned interruptions or excluding unplanned interruptions caused by infrequent and catastrophic natural events like cyclones

Quality of supply

2.20 Quality of supply refers to the electrical specification of supply, and is measured by such indicators as voltage levels, frequency and harmonic content. Poor quality of supply shows up as dimming, flickering or overly bright lights, or motors speeding up and slowing down (e.g. ceiling fans), and damage to electrical appliances. Quality of supply is a concern where customers use voltage sensitive electrical appliances and equipment (e.g. computers and electronically controlled systems).

2.21 Quality of supply is difficult to measure. Although the quality of supply is the subject of fairly detailed regulation specified in various Australian Standards, there are no commonly used indicators for monitoring and reporting the response to, and prevention of quality problems. A common approach to monitoring quality is to rely on customer feedback, or complaints, about voltage problems.

Customer service

2.22 Retailers and DNSPs provide services directly to customers, whether through billing for energy consumed or through responsibility for connections or distribution reliability. Most jurisdictions monitor standards of customer service to bring transparency and accountability to the level of service performance. A particular focus of monitoring of customer service is the treatment of vulnerable customers.

2.23 Indicators of customer service by retailers and DNSPs commonly monitored in Australia include:

- call centre responsiveness, with reporting of the time taken for customer telephone calls to be answered, the length of time the callers have to wait, and use of automated interactive services;
- whether a DNSP keeps appointments made with customers;
- the number of connections, disconnections and reconnections, focusing on customers disconnected due to non-payment of bills, and reconnections in the same name;
- the time taken by a DNSP to repair a faulty street light once notified;
- advice of planned interruptions – adequate planning, assessment of impact of planned interruptions on customers, and communication to customers; and
- the number and type of customer complaints.

Northern Territory experience

2.24 Service performance in the Territory has been monitored by the Commission since January 2006, with the introduction of the Electricity Standards of Service Code (ESS Code).

2.25 The performance reporting framework, and the minimum standards currently apply to PWC Generation, PWC Networks and PWC Retail. Requiring performance reporting by the contestable generation and retail sectors was to provide additional transparency and accountability to the performance of PWC Generation and PWC Retail due to the absence of competition in these sectors.

2.26 The service performance of PWC has come under greater community scrutiny in recent years due to a series of major outages affecting a large number of customers. The outages in September and October 2008 in the Casuarina zone substation service area caused extensive community disruption, with the most significant event causing more than 11 000 customers to lose power for up to 14 hours. More recently, the Darwin-Katherine system black incident on 30 January 2010 caused all customers (more than 58 000 customers) in the Darwin-Katherine region to lose power for up to 10 hours.

2.27 The Casuarina outages raised significant concerns about the reliability of the Territory's electricity networks, and power system. A comprehensive review of the incident and substation maintenance by Mervyn Davies (the Davies Enquiry), a former senior executive of Energy Australia and a member of the Board of Western Power, exposed deficiencies in network maintenance practices and asset management by PWC.[12]

2.28 Although the Davies Enquiry only looked at the adequacy and reliability of substations, the findings indicated that the problems of inadequate maintenance effort, record keeping and asset management systems could be systemic throughout PWC. This raised broader questions about the condition of electricity assets, expectations for the potential future levels of service performance, and the capital and maintenance investment required to achieve desired levels of service performance.

2.29 The prospects for future electricity service performance in the Territory is recognised in the PWC 2010-11 Statement of Corporate Intent, where PWC states that:

The electricity…systems are under significant and increasing pressure. Essential work will require greater funding than had been previously planned and approved... to mitigate the risk of major equipment failure through an increase in spending on asset refurbishment and renewal.

This increased infrastructure investment is a consequence of past under-investment. Additionally, ongoing investigations have found that the previous estimates of the residual life of many assets may have been optimistic and that additional urgent refurbishment or replacement of key assets is needed.

[12] Mervyn Davies, February 2009, Independent Enquiry into Casuarina Zone Substation Events and Substation Maintenance Across Darwin Final Report.

The development of generation capacity is planned to meet projected demand with timing for new plant primarily based on the n-2 criterion, and focuses in particular on power system reliability, fuel supply reliability, plant efficiency and incremental capacity increases. Because of increasing reliability issues with generation assets, a revised Generation capital investment strategy was developed and approved in February 2010.

2.30 Extensive capital and maintenance expenditure is being undertaken to avoid further deterioration in current levels of generation and network service performance, and meet future growth. However, there has been no recent consideration or debate about the standards of electricity services that Territorians should reasonably expect, or are willing to pay for.

Purpose of this Review

2.31 The Commission is required to review and report on the adequacy of current standards of service established by the ESS Code, relative to other jurisdictions and in recognition of the service delivery environment in the Territory. The objective is to provide options to ensure electricity generation, network and retail standards of service are appropriate in the Territory.

Summary of terms of reference and scope of review

2.32 The terms of reference ask the Commission to report on the adequacy and effectiveness of the ESS Code and advise on the indicators and reasonable benchmarks for minimum standards of service in the Territory, and develop options for setting, monitoring and enforcing minimum standards of service.

2.33 In undertaking the review, the Commission will take into account:

- the objectives of the ESS Code;
- standards of service and standards of service arrangements in other jurisdictions;
- environmental and market characteristics of the Territory that may have a bearing on standards of service; and.
- all relevant economic and policy developments, including economic conditions, customer preferences, willingness and capacity to pay for a certain standard of service, environmental standards, current service performance and the cost of meeting higher service performance.

2.34 The Commission considers that consideration of standards of service arrangements includes consideration of any minimum and average standards of service that apply to service providers.

2.35 The Commission's approach to this review and the consultation process is set out in table 2.1 below.

Table 2.1: Review Timetable

Date	Action
28 May 2010	Release of Issues Paper.
25 June 2010	Submissions on Issues Paper due.
13 August 2010	Release of Draft Report.
10 September 2010	Submission on Draft Report due.
29 October 2010	Final Report submitted to the Treasurer.

2.36 The Commission is conducting a separate Review of Options for Implementation of a Customer Service Incentive Scheme for Electricity Customers, which is examining possible incentive arrangements for service providers to improve service performance and to avoid very poor service performance.

Structure of this paper

2.37 This document is structured as follows:

- Chapter 2 provides background information on the Territory electricity industry, features of standards of service frameworks, and the Territory experience;
- Chapter 3 examines service performance in the Territory to date;
- Chapter 4 examines standards of service arrangements in other jurisdictions and the Territory; and
- Chapter 5 considers some of the considerations for implementation of standards of service arrangements in the Territory.

CHAPTER 3

Service performance in the Territory

Service performance from 1999-00 to 2008-09

3.1 This section provides an overview of service performance from 1999-00 to 2008-09, focusing on the average duration (SAIDI) and frequency (SAIFI) of electricity generation and network related outages in the Darwin, Katherine, Alice Springs and Tennant Creek regions.

3.2 The standard of electricity services in the Territory is affected by a number of factors, such as the radial design of the network, the location and capacity of generation, the condition of electricity assets, weather and the high incidence of storm activity, rapid vegetation growth in the Top End, and fruit bats roosting on power lines.

3.3 The average service performance received by Ergon Energy (a DNSP servicing the areas of Queensland outside of Brisbane) customers from 2002-003 to 2008-09 is provided as a point of comparison between service performance in the Territory and elsewhere in Australia.

3.4 Ergon and PWC share similar challenges in providing electricity services, including similar weather and seasonal patterns, and a widely dispersed customer base. Ergon has 766 453 customers and 146 339 kilometres of power lines, compared to PWC with 74 097 customers and 7 311 km of power lines.[13] Although the two businesses differ in scale, the equipment, practices and activities associated with supplying electricity are fundamentally similar. Moreover, Ergon has a customer density of 5.2 customers/km, compared to PWC with 9.2 customers/km. All other things being equal, the task facing Ergon is more difficult relative to that faced by PWC due to the lower customer density.

Network reliability performance

3.5 SAIDI and SAIFI are the commonly used indicators of reliability performance in Australia. The network SAIDI and SAIFI data presented in the charts below is based on adjusted data to identify the underlying reliability performance over time.

3.6 Adjusted data excludes the effect of severe or unusual performance. For example, the ESS Code allows PWC to report adjusted network reliability data to exclude the effect of severe interruptions to supply using the "2.5 beta method", an objective statistical methodology for identifying outlier performance.[14]

[13] Australian Energy Regulator, State of the Energy Market 2009, page 165.

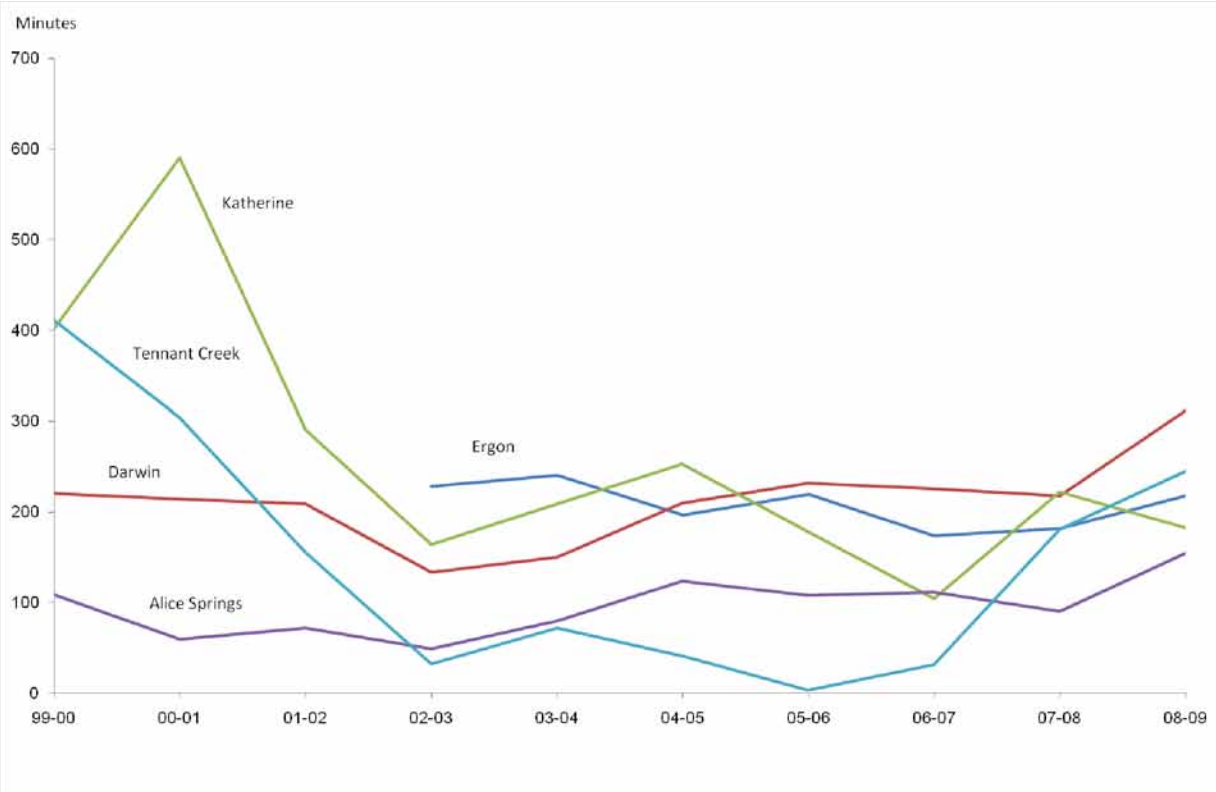
[14] For a description of the 2.5 beta method, refer to the Institute of Electrical and Electronic Engineers, Working Group on System Design, January 2003, Classification of Major Event Days.

3.7 The equivalent reporting arrangements in Queensland allow Ergon to exclude interruptions where at least 5 per cent of customers in the area are affected by storm, flooding or other natural disaster,[15] or from 2005-06, to exclude the effect of severe interruptions to supply using the 2.5 beta method.[16]

3.8 Network SAIDI performance in the Territory is mixed, with a downward trend in the average duration of outages in Katherine and Tennant Creek since 1999-00, but an upward trend in the average duration of outages in Darwin and Alice Springs. Overall the SAIDI data indicates that a majority of electricity customers in the Territory were, on average, experiencing longer power outages in 2008-09 than in 1999-00.

3.9 Ergon SAIDI performance is generally similar to that experienced in Darwin, but is more stable over time compared to the performance in the Territory, with Territory customers experiencing greater variation in the average duration of outages overt time.

Chart 3.1: Electricity networks SAIDI (adjusted) 1999-00 to 2008-09[17]



3.10 The trend in network SAIFI performance in the Territory is similar to SAIDI performance, with a downward trend in the average frequency of outages in Katherine and Tennant Creek, but an upward trend in Alice Springs and Darwin. Ergon SAIFI

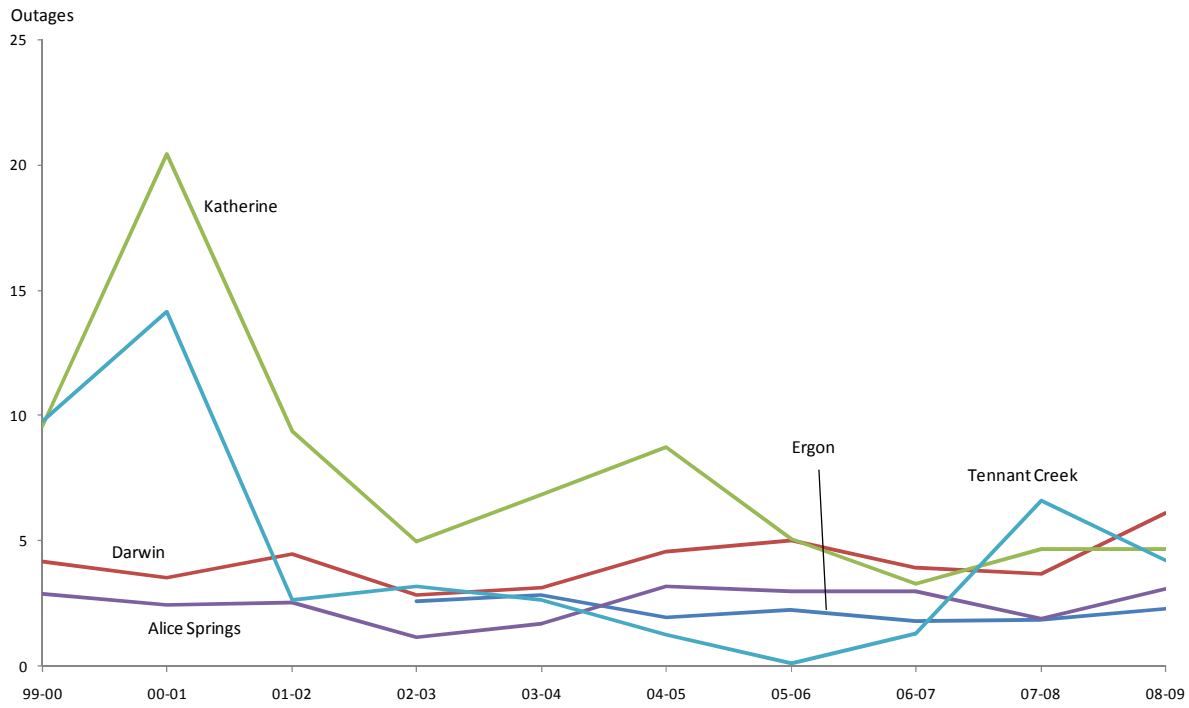
[15] Queensland Competition Authority, October 2001, Electricity Distribution: Service Quality Reporting Guidelines v1.1, section 2.2.

[16] Queensland Competition Authority, August 2005, Electricity Distribution: Service Quality Reporting Guidelines v2, section 2.2.

[17] Utilities Commission, Annual Service Performance reports and 2008-09 Power System Review, and Queensland Competition Authority, distributors' quarterly service performance reports made under the QCA Electricity Distribution Service Quality Guidelines, refer www.qca.org.au.

performance is similar to that experienced in Alice Springs, and is again more stable over time compared to the performance in the Territory.

Chart 3.2: Electricity networks SAIFI (adjusted) 1999-00 to 2008-09[18]



Generation reliability performance

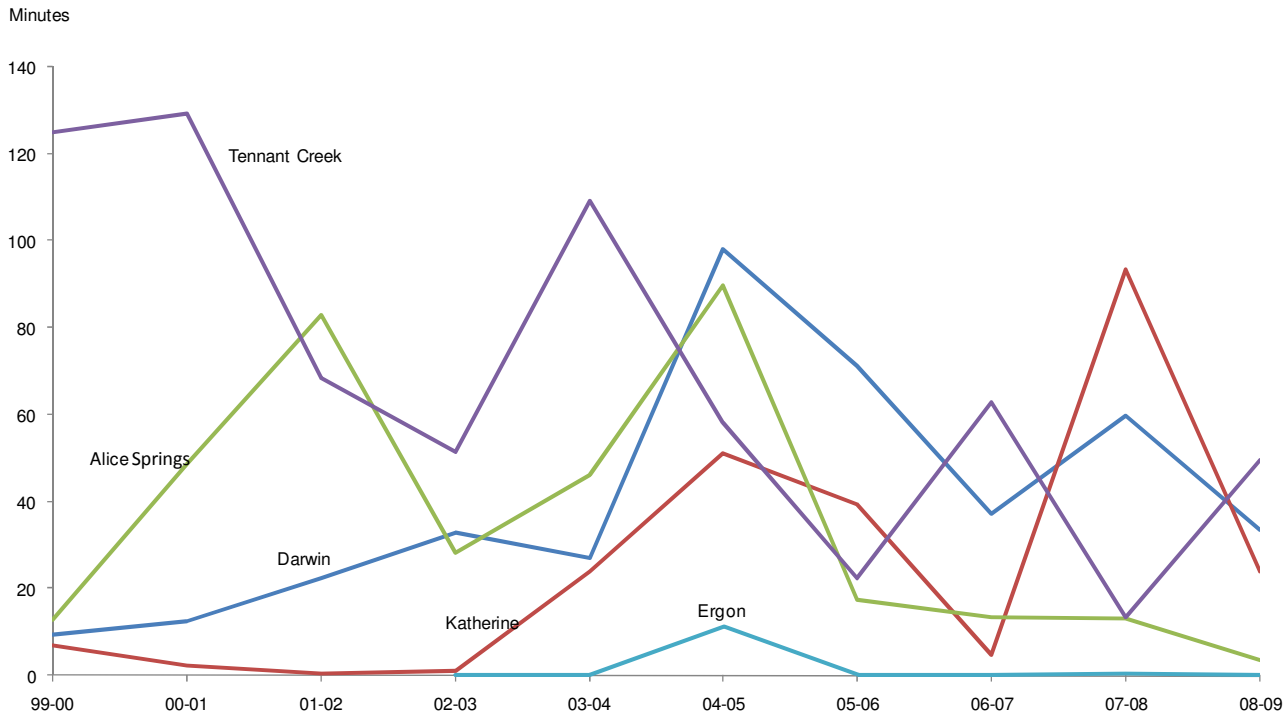
3.11 Generation reliability in the Territory is currently measured using SAIDI and SAIFI. Service performance reporting arrangements for Queensland DNSPs include reporting of generation related SAIDI and SAIFI data. Generation SAIDI and SAIFI data is not adjusted.

3.12 There is significant variation in annual generation SAIDI across the four regions in the Territory. There is an overall downward trend in generation SAIDI performance in Tennant Creek and Alice Springs, but an upward trend in performance in Darwin and Katherine.

3.13 Average generation SAIDI performance in Darwin between 2006-07 and 2008-09 was 43.5 minutes off supply per customer, which accounted for about 15 per cent of the average minutes off supply experienced annually by each customer, based on the sum of generation SAIDI and adjusted network SAIDI. In contrast, Ergon customers experienced generation related outages once between 2002-03 and 2008-09, with an average of 11.4 minutes off supply per customer in 2004-05 only. The better generation SAIDI performance experienced by Ergon customers can probably be attributed to a greater availability of generation capacity and reserve capacity.

[18] Ibid.

Chart 3.3: Electricity generation SAIDI (adjusted) 1999-00 to 2008-09[19]



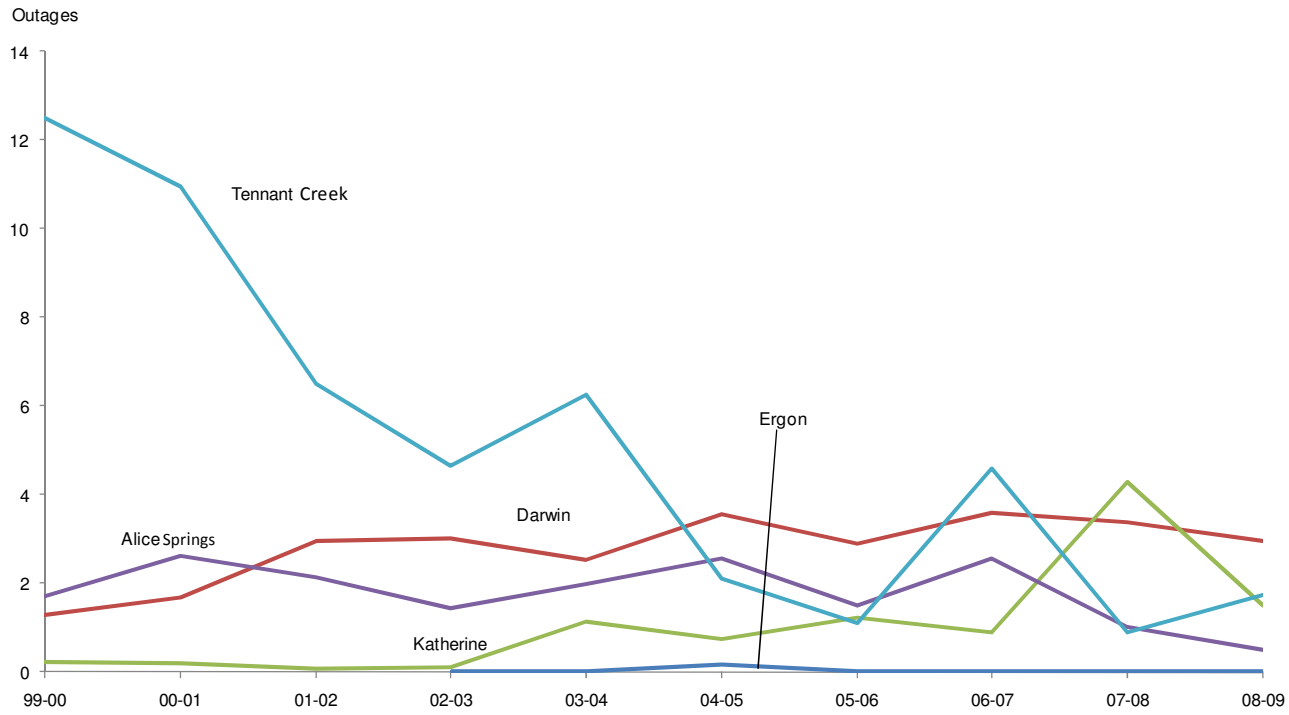
3.14 The trend in generation SAIFI is the same as for generation SAIDI, with a downward trend in the average frequency of outages experienced by each customer in Alice Springs and Tennant Creek, and an upward trend in the average frequency of outages in Darwin and Katherine.

3.15 Average generation SAIFI performance in Darwin between 2006-07 and 2008-09 was 3.3 outages per customer each year. Ergon customers experienced generation related outages in 2004-05 only, with generation SAIFI performance of 0.2 outages for each customer.

Chart 3.4: Electricity generation SAIFI 1999-00 to 2008-09[20]

[19] Ibid.

[20] Ibid.



Comments on reliability performance

3.16 On average, customers in Tennant Creek, Katherine and Alice Springs have generally experienced an improvement in reliability of supply between 1999-00 and 2008-09. In particular, network and generation reliability in Tennant Creek has noticeably improved since 1999-00, and now appears to be on a par with the other regions in the Territory. In contrast, customers in Darwin have experienced an average decline in network and generation reliability. This indicates that the reliability of supply of a majority of electricity customers in the Territory has, on average, worsened since 1999-00.

3.17 The upward trend in network and generation SAIDI and SAIFI performance for the majority of customers in the Territory between 1999-00 and 2008-09 has not been considered in a comprehensive fashion to identify reasons for the gradual increase in duration and frequency of power outages. Nor has there been a comprehensive assessment of the future performance of generation and network assets and reliability.

3.18 An explanation of the worsening trend in reliability performance since 1999-00 is that the serious deficiencies identified by the Davies Enquiry in PWC Network's monitoring and reporting on the condition of network assets, and in maintenance practices were common to other PWC business units. This conclusion is potentially supported by the increased priority given by PWC to network and generation infrastructure investment to mitigate the risk of major equipment failure.[21]

3.19 The PWC response to the Davies Enquiry was a comprehensive program of remedial works and replacement of network assets through the remedial asset management

[21] Power and Water Corporation, April 2010, 2010-11 Statement of Corporate Intent, page 25.

program (RAMP). RAMP has been underway since early 2008, and has involved a significant and ongoing investment in maintenance and remediation of network assets to meet acceptable standards of reliability and safety.

3.20 The 2010-11 SCI advises that a generation capital investment program was approved in February 2010 to allow the urgent refurbishment or replacement of key assets. This program appears to have a similar objective as RAMP, but addressing expected generation related reliability problems.

3.21 PWC is putting significant effort into improving capital planning and asset management practices, and is undertaking an extensive capital and maintenance program to maintain and improve generation and network service performance. However, PWC has not given a clear indication of the amount of investment required to avoid worsening service performance, the target level for service performance or the timeframe for reaching that target.

Reporting of service performance

3.22 Service performance in the Territory has been monitored by the Commission since January 2006. PWC reports annually on reliability, quality and customer service performance for electricity generation, networks and retail activities in the Darwin, Katherine, Alice Springs and Tennant Creek regions.

Electricity standards of service code

3.23 Electricity standards of service are regulated through the ESS Code, which was introduced in December 2005. The objectives of the ESS Code are to:[22]

(a) establish minimum standards of reliability, quality and customer service in the Electricity Supply Industry;

(b) develop, monitor and enforce compliance with and promote improvement in standards and conditions of service and supply by Regulated Electricity Entities in the Electricity Supply Industry; and

(c) require that Regulated Electricity Entities have in place arrangements which regularly report actual service performance against the key service performance indicators in terms of reliability, quality and customer service.

3.24 The ESS Code establishes 46 indicators of performance, and defines a minimum standard for 45 of these indicators. The indicators focus on:

- network and generation reliability, with data on the frequency and duration of outages experienced on average by customers in a year;
- feeder performance, with data on poorly performing urban and rural feeders;
- quality of supply complaints;

[22] Utilities Commission, December 2005, Electricity Standards of Service Code, clause 3.

- the time taken to connect properties to the network;
- the response to telephone calls; and
- customer service complaints, with categories including billing and service levels.

3.25 The Commission uses the annual performance data to prepare a public report on overall performance, and performance against the minimum standards of service. The Commission reported the most recent performance data available, for 2008-09, in the 2008-09 Power System Review. In previous years, performance data has been reported separately.[23] Performance data is available for 1999-00 to 2008-09.

3.26 The ESS Code does note include any incentive or penalty mechanisms, as the Commission took the view when developing the ESS Code that decisions on these matters are best made once reporting mechanisms were effective and the standards adopted were based on accurate performance data.

3.27 The head of power for the ESS Code is derived from several statutory instruments:

- the *Electricity Reform Act*, s92(1) allowed the Commission to set standards of service and safety for non-contestable electricity customers.
- the *Electricity Networks (Third Party Access) Act*, s.10, and Electricity Networks (Third Party Access) Code, cl.9A and Part 10 require network providers to use reasonable endeavours to provide services of a quality and a standard at equivalent to the greater of the levels prevailing in 1999-00; and
- the *Utilities Commission Act*, s24 gives the Commission the authority to make a code or rule if authorised to do so by the relevant industry regulation or by regulations under the *Utilities Commission Act*.

3.28 The minimum standards of service set through the ESS Code are based on the service performance achieved in 1999-00 (or an alternative standard where accurate data was not available for that year). This approach to setting the standards was prescribed in legislation.[24]

3.29 The levels of the minimum standards were to be reviewed prior to 1 July 2010. However, the Commission decided in June 2009 to continue with the existing minimum standards until 30 June 2011 to permit a comprehensive review of the level of the

[23] Refer Utilities Commission, December 2008, Power and Water's Electricity Service Performance 2007-08, and Power and Water Corporation, October 2008, Standards of Service 2007-08 Key Service Performance Indicators. for 2008-09, the Commission included the report on service performance in the 2008-09 Power System Review.

[24] For example, refer *Electricity Reform Act*, s.92.

standards, and the effectiveness of monitoring and reporting arrangements (that is, this review).[25]

[25] Utilities Commission, June 2009, Approval of Minimum Standards of Service Extension to 30 June 2011.

CHAPTER 4

Design of standards of service arrangements

Purpose of standards of service

4.1 Standards of service are a common feature of the electricity supply industry, with governments and industry regulators defining and monitoring average or minimum service performance of certain of the operating activities of generators, TNSPs, DNSPs and retailers.

4.2 The underlying reason is to provide certainty about the service performance that can be expected by customers from firms participating in an industry with monopoly characteristics. Where a firm or industry has the potential for exercising monopoly power, non market mechanisms, such as the regulation of service performance are needed to ensure that acceptable service performance is maintained.[26]

Best endeavours

4.3 Standards of service for reliability are generally held to be average rather than absolute targets as there are instances where a service provider will not be able to meet a performance threshold. However, over time, the service provider would be expected to achieve a consistent average level of service performance. This is known as a best endeavours approach

4.4 For example, the South Australian regulator has adopted a 'best endeavours' approach when setting standards of service for the local DNSP. Effectively, the DNSP must use best endeavours to achieve targets for reliability and customer service standards, defined as acting in good faith and using all reasonable efforts, skill and resources.[27] The approach does not extend to quality standards, which are considered to be absolute in nature.

4.5 The approach is based on a pragmatic view that a 'must achieve' approach would likely impose significant financial impact on a DNSP, which would eventually be borne by customers. [28]

4.6 The Commission considers that a standards of service framework and standards of service based on a 'best endeavours' approach would recognise

[26] Essential Services Commission of South Australia, November 2008, South Australian Distribution Service Standards 2010-2015 Final Decision, pages 7-8.

[27] Essential Services Commission of South Australia, Electricity Distribution Code, EDC0/07, 1 January 2003 (as last varied in December 2009).

[28] Ibid

4.7 The Commission's preliminary view is to adopt the best endeavours approach when setting average standards of service for reliability and customer service. Average standards of service are meant to represent the level of service achieved over time, and service performance may be worse in some parts of the system or on certain days due to a particular event (e.g. a cyclone).

Question 1.

Do you agree that reliability and customer service performance should be determined based on a 'best endeavours' approach? If not, what other alternative approaches are appropriate?

Electricity generation standards of service

4.8 A reliability standard applies to generators in the national electricity market (NEM) to establish the minimum acceptable level of bulk electricity supply delivered to customers in a region measured against the total demand of consumers in that region. The standard is a measure of the expected amount of energy at risk of not being delivered to customers due to a lack of available capacity, and was set at 0.002 per cent unserved energy (USE) in 1998, and remains at that level now.[29]

4.9 Performance against the NEM reliability standard is currently measured over the long term using a moving average of the actual observed levels of annual USE for the most recent ten financial years. The expectation is that the Australian Energy Market Operator (AEMO) and system participants will operate and plan to achieve an expected USE that is within the reliability standard in each financial year, for each region and for the NEM as a whole.[30] Historically, the NEM has performed well against the reliability standard, suggesting that the commercial disciplines of the NEM are sufficient encouragement for generators to achieve expected standards of reliability and quality.

4.10 Although PWC System Control monitors compliance with defined technical parameters for the design and operation of generators in the Territory, the reliability outcomes achieved are worse than in the NEM. This is probably partly because the small scale of the systems, and the number and location of generation facilities means there is less reserve or redundant capacity than in the NEM. However, reliability outcomes could be influenced by the lack of competition in the generation sector, with PWC Generation operating in a monopoly environment, and facing fewer incentives to provide improved service performance than exist in the NEM or a similar competitive environment.

Electricity networks standards of service

4.11 Standards of service most commonly apply to DNSPs, and are a key consideration of regulators in undertaking network price regulation and identifying the optimum balance between price and service levels – a trade-off known as the regulatory bargain.

[29] Australian Energy Market Commission Reliability Panel, April 2010, Reliability Standard and Reliability Settings Review Final Report, pages 5 and 9.

[30] Ibid, pages 9 and 11.

4.12 The Energy Networks Association (ENA) describes the regulatory bargain as:[31]

The regulatory bargain encompasses an optimisation of the price, service and risk relationship between distribution businesses and customers embodied in a regulatory decision. This optimisation is usually resolved in competitive markets without government or regulatory intervention, however, service standard regulation is generally introduced into mature regulatory regimes for natural monopoly industries to ensure that incentives that drive capital efficiency do not lead to a reduction in service standard performance.

4.13 Similarly, the South Australian regulator has noted that an industry sector or a firm with monopoly characteristics warrants involvement of the regulator in determining the optimal balance between the price and service, and ensuring that acceptable standards of service are maintained in accordance with customer needs and that customers pay a fair price for that level of service.[32]

4.14 As part of the 2009-10 to 2013-14 network price determination process, the Commission considered the possibility of introducing an incentive or penalty mechanism for PWC Networks to support the standards of service framework. However, the Commission concluded that adopting service performance incentives should be deferred until the next regulatory period to give more time to develop confidence in the measurement and monitoring of service performance in the Territory.

4.15 The Commission considered that data constraints presented too many problems to effectively operate a financial scheme involving monetary incentives and penalties for service performance. Nonetheless, the Commission indicated that it was an issue of when rather than if service performance arrangements would be included in the Territory's network price regulation framework.

Electricity retail standards of service

4.16 Electricity retailers have been required to report on aspects of service performance in most Australian jurisdictions, with the main objective of providing information to household customers on the affordability and accessibility of electricity services, and customer satisfaction with the quality of service.

4.17 Retail standards of service are currently defined by governments or industry regulators in each jurisdiction. However, a national energy customer framework (NECF) is being developed through the Ministerial Council on Energy (MCE), to achieve greater national consistency in the non-economic regulation of network services and customer protection. The NECF would cover the following:[33]

---

[31] Energy Networks Association, March 2007, ENA Service Standard and Regulatory Policy and National Reliability Reporting Framework.

[32] Essential Services Commission of South Australia, November 2008, South Australian Distribution Service Standards 2010-12 Final Decision, pages 7-8.

[33] Ministerial Council on Energy Standing Committee of Officials, November 2009, National Energy Customer Framework Second Exposure Draft Explanatory Material, page 5.

- the retailer-customer relationship, and associated rights, obligations and consumer protection measures;
- distributor interactions with customers and retailers, and associated rights, obligations and consumer protection measures;
- retailer authorisations; and
- compliance monitoring and reporting; enforcement; and performance reporting.

4.18 Retail standards of service in the Territory currently focus on recording and reporting of customer complaints. As with the electricity generation sector, the absence of competition in the retail sector means that PWC Retail faces fewer incentives to provide improved service performance than exist in the NEM or a similar competitive environment.

Question 2.

Do you think that market conditions for electricity supply in the Territory warrant the definition of standards of service for electricity generation, electricity networks and electricity retail participants?

Indicators of service performance

4.19 There are three broad categories of indicators of electricity industry service performance used in Australia:

- reliability of supply, which apply to generation, transmission and distribution networks activities and performance;
- quality of supply, which apply to generation, transmission and distribution networks activities and performance; and
- customer service, which apply to distribution network and retail activities and performance.

Generation reliability indicators

4.20 The Reliability Standard applying to generators (and TNSPs) in the NEM defined as a measure of the system's capacity to continue to supply sufficient power to satisfy customer demand, allowing for the loss of generation capacity. [34]

4.21 The standard is set independently by the Australian Energy Market Commission (AEMC) Reliability Panel according to a process defined in the National Electricity Rules, and AEMO is responsible for ensuring there is sufficient generation and transmission capacity in each NEM region, or available via transmission interconnection from another region, to meet the standard.[35]

[34] Australian Energy Market Commission, December 2009, NEM Reliability Standard for Generation and Bulk Supply, page 8.

[35] Australian Energy Regulator, 2009, State of the Energy Market, page 65.

4.22 The reliability standard used in the Territory is N-2 (i.e. reserve capacity should be sufficient to meet demand with the loss of the two largest units of capacity). There is no statutory obligation or process for determining the generation reliability standard. Effectively, the generation reliability standard is set through an internal process by PWC System Control and PWC Generation, with consultation with the shareholding Minister. There has been no explicit economic assessment or community consultation on the appropriate level for generation reliability.

4.23 Generation reliability in the Territory is measured using SAIDI, SAIFI and CAIDI indicators. The Territory appears to be the only Australian jurisdiction where these reliability indicators are used for the generation sector.

4.24 PWC reported on generation reliability in the 2008-09 Standards of Service report using an indicator known as the Equivalent Forced Outage Factor (EFOF).[36] The EFOF indicator excludes forced outages due to external factors such as fuel supply constraints, third party industrial action, or replacement equipment held in transit. The term 'equivalent" refers to the conversion of partial outages to equivalent full outages.[37]

4.25 Performance reporting requirements in Tasmania require generators to report on the EFOF and equivalent availability factor (EAF) indicators to measure plant unavailability and forced outage rates. Information on generation reliability available for Tasmania includes:[38]

- planned outages, defined as outages due to planned work that generally involves overhaul work of a unit of components, and is scheduled more than one year in advance. Planned outages depend on the expenditure available for upgrade and maintenance activities. It follows that, as a consequence of planned upgrade and maintenance activities, the incidence of forced outages should decrease;
- forced outages, defined as outages that require the removal of a unit or component from service and which cannot be deferred beyond the next weekend. Forced outages are an indication of the amount and quality of maintenance performed, and the lower the outages, the better the performance. The rate of forced outages is measured using the EFOF indicator; and
- overall availability reflects the loss of generation capacity (MWh) due to all plant causes, expressed as a percentage. Overall availability is measured using the EAF indicator.

4.26 Reporting of the rate of planned and forced outages, and the overall availability of generation would appear to provide more useful and relevant indicators of generation reliability than SAIDI, SAIFI and CAIDI. In particular, the EFOF and EAF indicators signal the condition of generation assets, and inform expectations of future reliability.

---

[36] Power and Water Corporation , October 2009, Standards of Service 2008-09 - Key Service Performance Indicators, pages 28-9.

[37] Government of South Australia, Department for Transport Energy and Infrastructure, Annual Report of the Technical Regulator – Electricity 2007-08, page 84.

[38] Office of the Tasmanian Economic Regulator, March 2009, Reliability and Network Planning Panel – The 2008 Reliability Review Report, page 12.

Additionally, using the EFOF and EAF indicators would facilitate comparison of generation reliability in the Territory and elsewhere in Australia.

Question 3.

Do you consider reliability standards such as SAIDI, SAIFI and CAIDI effective measures of generation reliability in the Territory?

Do you consider the equivalent forced outage factor and the equivalent availability factor indicators would be more useful indicators of generation reliability?

Network reliability indicators

4.27 The indicators of transmission and distribution network reliability used in Australia are different. This reflects the different operating characteristics of TNSPs and DNSPs.

Transmission network reliability indicators

4.28 There is no specific or statutory distinction between transmission and distribution in the Territory. Nonetheless, a transmission network overlay exists in the Darwin region to transport electricity generated at three power station locations (Channel Island, Weddell and Berrimah) to primary load centres via two 132 kV transmission lines and seven 66 kV zone substations. This network is also connected with power stations and loads at Katherine and Pine Creek via a single 132 kV line from Channel Island. The transmission elements of the Territory system comprise 730 km of high voltage transmission lines, or about 10 per cent of total line length.

4.29 Elsewhere in Australia, there is a distinction between the transmission and distribution sections of an electricity system. Transmission networks carry electricity at high voltage from the generator to the distribution network, where the electricity is converted to a lower voltage and transported to customers.

4.30 The AER sets reliability standards for TNSPs in the NEM as part of the network regulation process using five core performance measures:[39]

- transmission circuit availability;
- average outage duration;
- frequency of outages;
- inter-regional constraints; and intra-regional constraints.

4.31 The AER reserves the right to use other methods, and may add or amend reliability indicators at the TNSPs request.

4.32 Currently, performance reporting requirements in the Territory do not require PWC Networks to separately report on transmission and distribution reliability. The reliability

[39] Australian Energy Regulator, November 2003, Statement of principles for the regulation of transmission revenues service standards guidelines.

of the transmission element of the system is measured as a component of the network SAIDI, SAIFI and CAIDI indicators.

Question 4.

Do you consider that there should be reliability indicators for the transmission elements of the Territory electricity system?

Distribution network reliability indicators

4.33 DNSPs in all Australian jurisdictions are required to report on the average network reliability using one or more of the SAIDI, SAIFI, CAIDI or MAIFI indicators. Some jurisdictions also require DNSPs to report on reliability of feeders (i.e. sections of the network). Table 4.1 below summarises the reliability indicators that DNSPs must report to regulators.

Table 4.1: reliability indictors reported by DNSPs

Indicator	NT	SA	Vic	WA	Qld	ACT	Tas	AER
SAIDI	✓	✓	✓	✓	✓	✓	✓	✓
SAIFI	✓	✓	✓		✓	✓	✓	✓
CAIDI	✓		✓			✓		
MAIFI			✓					✓
Feeder performance	✓	✓	✓					

Source: state/territory and national regulatory instruments.

4.34 SAIDI and SAIFI are the most commonly used indicators of DNSP reliability. SAIDI is known as “average customer minutes off supply, and is a measure of the average total duration of outages for a year experienced by customers. SAIFI is a measure of how often on average a customer a customer loses supply in a year.[40]

4.35 CAIDI and MAIFI are less commonly used measures of DNSP reliability. CAIDI is known as “average restoration time” and is the average duration of each outage experienced by customers in a year. MAIFI is a measure of the average number of times a customer loses supply momentarily in a year – for one minute or less. MAIFI is associated with the immediate automatic restoration of supply capability of a network.

4.36 A survey of international service performance regulatory practice for the New Zealand Commerce Commission found that combinations of the SAIDI and SAIFI indicators, or close variants, were used by an overwhelming majority of regulators to measure and regulate network reliability. The survey also found that CAIDI was widely used, but that the use of all three together was not always useful as SAIDI is derived from CAIDI and SAIFI, unless further distinction is made in what is being measured.[41]

[40] Office of the Tasmanian Economic Regulator, March 2009, Reliability and Network Planning Panel, The 2008 Reliability Review Report, page 107-8. This reference is a source for the following paragraph.

[41] Parsons Brinckerhoff Associates, December 2007, Resetting the 2009 Quality Thresholds: Investigation Report (prepared for the Commerce Commission), page 10.

4.37 PWC has noted that CAIDI is a flawed indicator of reliability because there is the potential for a higher frequency of outages to improve the CAIDI result, without there being an actual improvement in either the average duration or frequency of outages.[42] A similar point about the potentially limited use of CAIDI in measuring reliability has been made by the Queensland regulator.[43]

4.38 The Territory, Victoria and South Australia require DNSPs to report on feeder performance to identify poorly performing sections of the distribution network. Using single network wide average performance figures (e.g. SAIDI and SAIFI) does not reflect the actual reliability experienced by large sections of the customer base and does not allow attention to be focused on those parts of a network where improvement may be required. This can provide the DNSP a perverse incentive to focus on those parts of the network where the most impact on the average reliability figures can be easiest to achieve, leading to the worse-performing areas to be ignored.[44]

4.39 Other indicators of DNSP reliability used around the world include:[45]

- electricity not supplied (ENS), which is expressed as a percentage of energy not distributed due to outages. This is generally restricted to transmission or high voltage distribution systems only (as predicting energy not supplied becomes increasingly problematic with smaller groups of consumers and lower diversity);
- index of reliability (IOR) – expressed as the portion of the time the distribution system is available. This is also know in some jurisdictions as Average System Availability Index;
- FMIK[46] - the average frequency of kVA interruptions per installed transformer capacity (kVA); and
- TTIK[47] - the total kVA-time of interruptions per installed transformer kVA.

4.40 The Commission is of the view that SAIDI and SAIFI are reasonable indicators of DNSP reliability, as they are widely used and understood by the electricity industry. Additionally, the Commission is of the view that reporting on feeder performance is a reasonable indicator of DNSP reliability, in particular to identify poor performance within a network. However, the Commission does not consider that CAIDI has proved a useful indicator of DNSP reliability so far in the Territory.

---

[42] Power and Water, October 2009, Standards of Service 2008-09, Key Service Performance Indicators, page 9.

[43] Queensland Competition Authority, April 2009, *Review of Electricity Distribution Network Minimum Service Standards and Guaranteed Service Levels to apply in Queensland from 1 July 2010*, page 10.

[44] Ibid, page 10.

[45] Parsons Brinckerhoff Associates, December 2007, *Resetting the 2009 Quality Thresholds: Investigation Report* (prepared for the Commerce Commission), page 10.

[46] Frecuencia Media de Interrupcion – PBA explains that this index is applied in South American countries, and is promoted by the CIER, Montiveido (Comision de Integracion Electrica Regional). Variants are also applied in Spain and Portugal.

[47] Tiempo total de interrupcion - PBA explains that this index is applied in South American countries, and is promoted by the CIER, Montiveido (Comision de Integracion Electrica Regional). Variants are also applied in Spain and Portugal.

Question 5.

Do you consider the following indicators of DNSP reliability should be reported in the Territory:

- SAIDI;
- SAIFI; and
- feeder performance

Do you consider there are other indicators of DNSP reliability that should be reported in the Territory?

Quality of supply indicators

4.41 Quality of supply refers to the electrical specification of supply, and is measured by such indicators as voltage levels, frequency and harmonic content. Poor quality of supply shows up as dimming, flickering or overly bright lights, motors speeding up or slowing down (e.g. on ceiling fans), and damage to electrical appliances. Quality of supply is increasingly of concern to industrial and commercial customers as voltage sensitive appliances and equipment become more prevalent.

4.42 Generators, TNSPs and DNSPs are generally obliged to operate their equipment within defined technical parameters so as to keep the power system in a secure and reliable operating state. However, quality of supply is difficult to measure, and there are no commonly used indicators for monitoring and reporting the response to, and prevention of, quality of supply problems.

4.43 The main approach used in Australia for monitoring quality of supply is to rely on customer feedback, or complaints, to DNSPs (or retailers). Another example is the approach adopted in Tasmania, where the DNSP is required to report:[48]

- over voltage events due to high voltage injection events;
- customers receiving over voltage due to high voltage injection (taken from claims made by customers for damaged equipment relating to those events);
- over voltage events due to lightning;
- customers receiving over voltage events due to lightning (taken from claims made by customers for damaged equipment relating to those events); and
- non-standard voltage events due to voltage regulation or other causes (taken from number of complaints attended where a recording of the supply of voltage has verified the non-standard voltage situation).

4.44 The Queensland regulator considered the possibility of introducing a new voltage supply measure as part of a recent investigation of DNSP service standards. However,

[48] Office of the Tasmanian Economic Regulator, May 2009, Electricity Supply Industry Performance and Information Reporting Guideline, page 20.

the conclusion was that further investigation was required before any quality of supply scheme was introduced.[49]

4.45 The Western Australian DNSP monitors quality of supply using specially designed meters deployed in various parts of the low voltage distribution network. The placement of the meters allows collection of unbiased data for regulatory compliance purposes. The number of meters has been increased from 28 to 56, but the deployment will not be further expanded due to the option of smart meters being considered.[50]

4.46 The AER service target performance incentive scheme does not specify any quality of supply indicators.[51]

4.47 Previous consideration of indicators of quality of supply in the Territory indicated that although voltage can be measured at individual customer premises, there is no cost effective way of aggregating individual customer voltage data and reporting on it at a system wide level. The ESS Code currently requires PWC Networks to report the number and nature of complaints by customers about voltage events such as voltage dips, swells and spikes.[52]

4.48 The Commission is not convinced that specifying specific quality of supply indicators to be reported by generators or the DNSP in the Territory would be an effective way of measuring or changing service performance. In particular as customers can address quality of supply concerns by installing equipment that ensures adequate quality of supply for sensitive equipment. In the absence of evidence to the contrary, the current approach of relying on the monitoring of compliance by generators and the DNSP with technical performance parameters, and customer complaints appears to be adequate.

Question 6.

Do you consider there is merit in requiring generators or the DNSP in the Territory to report against specific quality of supply indicators?

Are you aware of any difficulties associated with collecting and reporting specific quality of supply indicators?

Customer service indicators

4.49 Customer service refers to the interaction between a DNSP or retailer and customers, and is generally monitored by measuring responsiveness and dependability in service provision, and the level of complaints. All Australian jurisdictions impose some

[49] Queensland Competition Authority, April 2009, Review of Electricity Distribution Network Minimum Service Standards and Guaranteed Service Levels to apply in Queensland from 1 July 2010, page 12.

[50] Western Power, September 2009, Annual Reliability & Power Quality Report - Financial Year Ending June 2009, page 5.

[51] Australian Energy Regulator, November 2009, Electricity Distribution Network Service Providers – Service Target Performance Incentive Scheme, page 13.

[52] Power and Water Corporation, November 2004, Submission to the Standards of Service Framework Issues Paper, page 9.

requirement for DNSPs and retailers to report customer service performance, with specific indicators for each sector.

4.50 Commonly used indicators for measuring the customer service of DNSPs include:[53]

- the time taken to provide network connection services;
- the timely notice of planned interruptions to supply;
- the time taken to repair faulty streetlights;
- the provision of telephone services, such as the time taken for telephone calls to be answered by a human operator;
- the time taken to respond to written enquiries; and
- customer complaints.

4.51 Commonly used indicators for measuring the customer service of retailers include:[54]

- disconnection due to non-payment of bills;
- reconnections in the same name;
- use of alternative payment methods by customers having difficulty paying bills;
- the number of security deposits being held by retailers, and held longer than 12 months (residential customers) and 24 months (non-residential customers);
- call centre responsiveness, including the number of telephone calls abandoned or that drop before being answered, and the time for a telephone call to be answered by a human operator; and
- the number of customer complaints, such as about marketing, billing, transfer and supply matters.

4.52 In the Territory, the ESS Code establishes customer service indicators for the following activities:

- the number of connections to the network not provided within a specified time frame;
- the number of telephone calls responded to within 20 seconds from when the customer chooses to speak to a human operator; and
- the number of complaints about DNSP and retail activities.

4.53 The customer service reporting arrangements in the Territory do not distinguish between DNSP and retailer customer service. For example, there is no information on the break down of complaints or telephone calls about PWC Retail and PWC Networks activities or performance.

---

[53] Australian Energy Regulator, November 2009, Electricity Distribution Network Service Providers – Service Target Performance Incentive Scheme, Appendix A, pages 22-3; South Australia, January 2003 (as last varied in December 2009), Electricity Distribution Code, clause 1.2.2; and Independent Pricing and Regulatory Tribunal, December 2009, Distribution businesses' performance against customer service indicators.

[54] Independent Pricing and Regulatory Tribunal, December 2009, Electricity retail businesses' performance against customer service indicators; Tasmanian Electricity Code, clause 12.8.2.

4.54 The Commission considers there is a case for harmonising the customer service indicators reporting in the Territory, and establishing specific indicators for retailers and PWC Networks.

4.55 Possible customer service indicators for PWC Networks are:

- time taken to answer telephone calls, and the number of calls abandoned or that drop out;
- number of disconnections and reconnections; and
- the number of new connections not provided within a specified timeframe.

4.56 Possible customer service indicators for retailers are:

- time taken to answer telephone calls, and the number of calls abandoned or that drop out;
- the number and type of complaints about retail services; and
- the time to respond to written enquiries.

4.57 Additionally, the Commission considers there might be a case for establishing customer service indicators relating to customer hardship. The Territory is the only Australian jurisdiction where customer hardship is not measured. The AER has started consultation on the development of national hardship indicators to monitor retailer performance in dealing with customer hardship as part of a National Energy Customer Framework.[55]

4.58 Possible indicators of customer hardship include:[56]

- disconnections for failure to pay and reconnections in the same name;
- customer service and customer complaints;
- the use of prepayment meters;
- concessions; and
- security deposits.

Question 7.

Do you consider there is merit in requiring PWC Networks and retailers operating in the Territory to report against nationally consistent customer service indicators?

Do you consider there is merit in establishing customer service indicators relating to customer hardship?

Are you aware of any difficulties associated with collecting and reporting nationally consistent customer service indicators?

[55] Australian Energy Regulator, April 2010, Developing National Hardship Indicators.
[56] Ibid, page 2.

Setting standards of service targets

4.59 All parts of the electricity supply chain in Australia are required to comply with specified standards of service. However, the focus of standards of service arrangements is most commonly on the activities and performance of DNSPs and TNSPs, and to a lesser extent, the activities and performance of retailers.

4.60 Generation standards of service appear to be managed as an operational matter to achieve reliable and safe supply into distribution networks. The lesser focus on generation standards of service could also be due to the high reliability of generation in the NEM over time. The AER noted in the 2009 State of the Energy Market report that:[57]

Generation [in the NEM] has proved highly reliable. Reserve levels are rarely breached and generator capacity across all regions of the market is generally sufficient to meet peak demand and allow for an acceptable reserve margin.

The performance of generators in maintaining reserve levels has improved since the NEM began in 1998 most notably in South Australia and Victoria. This reflects significant generation investment and improved transmission interconnection capacity across the regions.

4.61 Generation reliability is not generally perceived to be an issue in the NEM, as a failure to supply by one generator can instantaneously be covered by other generators elsewhere in the system. This reflects adequate investment in new capacity or demand side participation over time to ensure sufficient reserve capacity to meet demand.

4.62 The operational and technical focus of generation service performance in the NEM is supported by the mechanism for defining the reliability and quality standards. The AEMC Reliability Panel is responsible for determining the Reliability Standard, and AEMO is responsible for monitoring operating performance against specific parameters.

4.63 Retail standards of service are generally defined as part of broader customer protection arrangements to establish minimum standards for customer service performance. The New South Wales regulator has noted that requiring retailers to report on customer service facilitates disclosure of the affordability and accessibility of electricity services, and customer satisfaction with the quality of service.[58]

4.64 Currently, network standards of service are defined by the AER for TNSPs, and by jurisdictions for DNSPs. As with generation, having a single regulator of the standards applying to all TNSPs (in the NEM) has meant that the approach to determining the standards of service targets is consistent.

[57] Ibid.

[58] Independent Pricing and Regulatory Tribunal, December 2009, Electricity retail businesses' performance against customer service indicators.

4.65 However, there is not currently a consistent approach to determining the standards of service targets for DNSPs. The AEMC has recommended that the Ministerial Council on Energy initiate a review of distribution reliability standards, noting that:[59]

The security of supply and reliability standards, set out in jurisdictional instruments, underpin how the network planning, investment and operation processes are currently undertaken by DNSPs. We consider that divergent arrangements and processes in the setting of reliability standards may affect the achievement of the desired objectives for the national framework…

There is a lack of consistency and transparency in how the different jurisdictional standards are determined and described. Also how the distribution businesses interpret and comply with these standards can vary significantly across the NEM. These factors undermine market participants' understanding of, and expectations regarding, network reliability and security performance, reducing their capacity to make efficient location decisions.

…if the form of standard is not economically derived (such that they would consider customer value of reliability), efficient provision of reliability may not occur…

4.66 The Commission considers that such a review would inform the development of effective standards of service arrangements in the Territory.

4.67 A key question facing the Commission is whether, and how, to set standards of service for generation. Although subject to different regulators and regulatory approaches, the process for setting the service targets to be achieved by TNSPs and DNSPs elsewhere in Australia is a well understood part of the network regulation process, and is generally comparable across jurisdictions. Similarly, the process for setting service targets to be achieved by retailers is dealt with through customer protection regimes, and GSL schemes.

4.68 However, there appears to be a gap in the Territory's regulatory framework, with no transparent or independent process for determining the service targets to be achieved by the generation sector (e.g. equivalent to the roles of the AEMC Reliability Panel and AEMO). In particular, there is no independent or transparent process for determining the generation reliability standard. Given the greater propensity for generation related outages to affect customers in the Territory than in the NEM, there appears to be a case for examining what represents a reasonable generation reliability standard.

Question 8. Should the Commission determine generation, networks and retail standards of service for the Territory?

[59] Australian Energy Market Commission, September 2009, Review of National Framework for Electricity Distribution Network Planning and Expansion, Final Report, pages xii and xiii.

Average and minimum standards of service

4.69 Measurement of service performance generally includes consideration of the average (system wide) standard of a service and the minimum standard of a service. An average standard identifies performance which customers (on average) do not value an increase in service performance greater than the incremental cost of providing that level of performance. A minimum standard identifies performance below which the service is unacceptable.

4.70 The standards of service established by the ESS Code are referred to as minimum standards. However, except in a few circumstances, service performance to date has been significantly better than the minimum standard.

4.71 Minimum standards are generally defined for the purposes of GSL schemes, where payments to customers are made if they experience poor service performance. Most commonly, minimum standards apply to the performance of specific network feeders, or specific services to customers (e.g. connection services). Average standards are used to determine the average network or system performance that should be achieved over time, and the associated capital and maintenance expenditure.

4.72 For example, the South Australian regulator has defined poor feeder performance by comparing the SAIDI performance of individual feeders against the SAIDI target for the region. This approach links minimum and average reliability, and compares feeder performance against average historical reliability performance.[60] In Victoria, poorly performing feeders are defined using a threshold of five per cent of customers exceeding SAIDI values in each feeder category (that is, CBD, urban, rural short and rural long).

4.73 The focus of this review is the average generation, network and retail service performance. A separate Review of Options for Implementation of a Customer Service Incentive Scheme for Electricity Customers is considering minimum standards and thresholds for a GSL scheme.

4.74 However, conceptually, a minimum standard could be related to the average standard, and a process for setting average standards of service could influence minimum standards of service. In particular, a minimum standard for feeder performance would be influenced by a standard for average network reliability performance.

Question 9.

Should the Commission define a relationship between minimum standards and average standards? For example, should minimum standards for individual feeder performance be linked to average network reliability performance?

[60] Essential Services Commission of South Australia, November 2009, South Australia Electricity Distribution Standards: 2010-2015, Review of Regulatory Instruments – Issues Paper, page 14.

Options for setting standards of service targets

4.75 The service performance targets set through the ESS Code for the Territory are based on service performance in 1999-00, except for some services where accurate data on performance was not available, and the target was based on performance in an alternative later year.

4.76 At the time the ESS Code was developed, the Commission considered that the advantages of using past performance to determine targets was that this implicitly takes into account the operating characteristics of the service provider in question and provides information continuity. The Commission also noted that past performance does not always provide an accurate guide to future performance, particularly if technology changes, or if the service providers face lower incentive to improve service quality.[61]

4.77 Nonetheless, past performance is not the only method of setting service performance targets. The Commission has identified the following approaches to setting service performance targets:

- targets based on a multiple year rolling average;
- targets based on benchmarks; and
- targets to improve service quality.

Multiple year rolling average

4.78 Service targets are commonly based on past performance of the service provider (whether a generator, DNSP or retailer). However, basing service targets on past performance implies that this level of performance was reasonable and should be maintained.

4.79 When developing the ESS Code in 2004, the Commission acknowledged there was a risk of establishing targets based on a year when performance was atypical, and suggested that this might be avoided by looking at rolling average of performance over several years, rather than one year in isolation.[62] A rolling average should ensure that a service providers average performance is maintained at least to average historic performance levels (that is, no material deterioration).

4.80 However, the Commission did not have access to sufficient or accurate performance data to be able to determine if the eventual targets were atypical or not. A response to this uncertainty was to foreshadow a review of the targets once an adequate data set was available. The service performance data collected to date suggests that the service targets set through the ESS Code may not be representative of minimum or average service performance.

4.81 A further consideration if setting a target based on a rolling average is that a poor year or series of poor years would make the target less onerous, leading to a planned

[61] Utilities Commission, August 2004, Developing a Standards-of-Service Framework - Issues Paper, page 19.
[62] Ibid.

reduction in network performance. However, the potential for a lower targets due to a deterioration in performance could be avoided by putting a floor on the target.

4.82 An example of this approach is the AER service target performance incentive scheme, which indicates that service targets will be based on average performance over the past five years, and should not deteriorate year to year during a regulatory period.[63]

4.83 Similarly, in South Australia, the average service performance targets to be achieved by the local DNSP for 2010-11 to 2015-16 were determined by the regulator based on service performance data for 2005-06 to 2008-09, and the first three quarters of 2009-10.[64]

Question 10.

Do you consider that using a multiple year rolling average of recent service performance is the most effective way of setting average service targets?

Benchmarking performance

4.84 An alternative approach to setting service targets is to benchmark local performance against comparable service providers elsewhere. For example, the network reliability performance targets to be achieved by PWC Networks could be based on reliability performance of Ergon Energy, a DNSP in Queensland.

4.85 The benchmarking of performance may not be a useful approach due to a lack of consistency in the standards of service adopted by individual service providers, and differences in operating practices, planning, or reporting arrangements. This problem was recognised by the AEMC in a recent investigation of service standards and reporting obligations for DNSPs in the NEM.[65]

4.86 In particular, the AEMC noted that the differences between existing distribution reliability statistical calculations and levels of jurisdictional reporting and target setting are material, and that this makes it difficult for market participants to understand and compare network performance across the NEM.[66]

4.87 The AER 2009 State of Energy Market report noted the following issues associated with attempting to compare distribution network performance across jurisdictions:[67]

- varying accuracy of data between DNSPs information systems;
- differences in design, geographic conditions and historical investment across the networks;

[63] Australian Energy Regulator, November 2009, Electricity Distribution Network Service Providers – Service Target Performance Incentive Scheme, clause 3.2.1 (a).

[64] Essential Services Commission of South Australia, April 2010, South Australia Electricity Distribution Standards: 2010-2015, Review of Regulatory Instruments – Draft Decision, page 13.

[65] The Australian Energy Market Commission, September 2009, Final Report – Review of National Framework for Electricity Distribution Network Planning and Expansions, page 73, 78-9.

[66] Ibid, page 79.

[67] The Australian Energy Regulator, 2009, State of the Energy Market, page 176.

- differences in customer density and load density; and
- until recently, no consistent approach to auditing performance outcomes.

4.88 The AER suggested that a comparison by feeder category might be more meaningful than across networks as a whole.[68]

4.89 Despite these potential problems with benchmarking performance, the Commission considers that service targets and service performance in the Territory should take into account performance available to electricity customers elsewhere in Australia, but recognise relevant local supply conditions.

4.90 For example, minimum standards of service to be achieved by DNSPs in Western Australia are set with reference to any unique geographical constraints, the existing network performance capability and 'reasonable' comparison with other states in Australia.[69] Similarly, the Queensland regulator has based the SAIDI and SAIFI targets levels for DNSPs for the 2010-11 to 2014-15 on the performance of comparable distributors in other jurisdictions and customers' willingness to pay for improved reliability.[70]

Question 11.

Do you consider that service targets and service performance in the Territory should take into account the service performance of service providers elsewhere in Australia?

Improving service performance

4.91 Basing performance targets on past performance implies that past service levels were reasonable and should be maintained.

4.92 In Victoria, the regulator set average service targets to be achieved by the local DNSPs from 2000-01 to 2005-06 to reflect expected improvements in service performance during the regulatory period. This decision was based on extensive customer consultation which revealed that customers valued improvements in reliability. With the exception of one distributor, service performance during the period improved significantly.[71]

4.93 However, for the 2006-07 to 2010-11 regulatory period, the Victorian regulator based the service targets on actual service performance in 2005-06, except where a DNSP had been consistently outperforming this target. This decision appeared to be

[68] Ibid, page 177.

[69] Government of Western Australia Office of Energy, December 2005, Electricity Industry (Network Quality and Reliability of Supply) Code 2005 – Explanatory Guide, page 4.

[70] Queensland Competition Authority, April 2009, Review of Electricity Distribution Network Minimum Service Standards and Guaranteed *Service Levels to apply in Queensland from 1 July 2010*, page 5.

[71] Essential Services Commission, October 2006, Electricity Distribution Price Review 2006-10, October 2005 Price Determination as amended in accordance with a decision of the Appeal Panel dated 17 February 2006 – Final Decision Volume 1 Statement of Purpose and Reasons, page 28.

supported by the views of customers, and indicates that customers considered a reasonable level of service performance was being achieved, and no further improvement was required (relative to the potential cost).

4.94 The minimum standards set by the Queensland regulator to be achieved by the local DNSPs between 2005-06 and 2009-10 were raised over the regulatory period (i.e. requiring better service performance). The new standards which are to apply for the 2010-11 year onwards, are based on the recent performance of the local DNSPs, the performance of comparable distributors in other jurisdictions and customers' willingness to pay for improved reliability.[72]

4.95 Service targets that require gradual improvement in service performance would need to be supported by financial incentives to be effective, such as by allowing for increased capital and maintenance expenditure through the network regulation process.

4.96 Further, the regulator would need a detailed understanding of asset condition to ensure that achieving the stretch targets was feasible in the timeframe. For example, discovery part way through the regulatory period that network assets were in a worse condition than previously thought would likely prevent a DNSP meeting the stretch target as expenditure would be diverted to maintaining, rather than improving reliability.

Question 12.

Do you consider that service targets and service performance in the Territory should be set to encourage improvement in service performance over time?

Do you think the Queensland approach could be applied in the Territory context?

Customer preferences and willingness to pay

4.97 The reliability and quality of electricity supply is important to the Territory community and economy. The increased reliance on electrical devices means households and business place greater value on electricity reliability and quality, and frequent or extended power outages are considered inconvenient, and can be costly.

4.98 Although perfect supply is ideal, this is not feasible as the effect of major events (e.g. a cyclone) are outside the reasonable control of service providers, at least without passing the cost of significant capital expenditure on to customers.

4.99 The level of reliability and quality of electricity supply is determined by system planning and design and operating practices, which in turn influence capital and maintenance expenditure decisions, and the price of electricity for customers. As such, defining a standard of service requires a trade off between desired service performance and the cost borne by customers. This is a key consideration of regulators in undertaking

[72] Queensland Competition Authority, April 2009, *Review of Electricity Distribution Network Minimum Service Standards and Guaranteed Service Levels to apply in Queensland from 1 July 2010*, page 5.

network regulation. For example, the AER noted in the 2009 State of the Energy Market report that:[73]

A reliable distribution network keeps interruptions or outages in the transport of electricity down to efficient levels. It would be inefficient to try to eliminate every possible interruption. Rather, an efficient outcome requires assessing the value of reliability to the community (measuring the impact on services) and the willingness of customers to pay.

4.100 Similarly, the Western Australia Office of Energy has noted that:[74]

Achieving 100% reliability in electricity supply would not be economically practical, but the importance of reliable electricity to our economy and quality of life means that it is very important to continue improving our reliability of supply, to identify particular problem areas for special attention, and to focus on the needs of the electricity users.

4.101 A number of Australian and overseas regulators take into account the economic cost of electricity outages to customers during the network regulation process when considering capital or maintenance expenditure proposals intended to contribute to the system reliability and security. Customer preferences or willingness to pay are also referred to as the value of customer reliability (VCR) or value of lost load (VoLL).

4.102 Methods of identifying the appropriate balance between an acceptable level of service performance over time and cost include an economic assessment of the value of customer reliability or by undertaking customer preference surveys.

4.103 The task of measuring willingness to pay is difficult, as there are very few opportunities to observe customers' responses to changes in prices and service standards in industries where there is little or no competition. Further, willingness to pay relates to elusive factors such as perception and expectations of services. Evidence from Victoria is that:[75]

Consumers' willingness to pay for improvements to service quality will often be affected by their perceptions of the quality of service they are currently receiving and their expectations of the service quality they should be receiving.

4.104 A cost-benefit approach to assessing the merits and cost effectiveness of each potential network augmentation has been used in Victoria. However, the most common approach to measuring willingness to pay in Australia is to survey customer perceptions of the VCR across customer types (e.g. household, industry and agriculture).

---

[73] Australian Energy Regulator, 2009, *State of Energy Market,* page 173.

[74] Government of Western Australia Office of Energy's website: www.energy.wa.gov.au (refer to Electricity Network Quality & Reliability of Supply Code).

[75] The Essential Services Commission of Victoria, *Electricity Distribution Price Review 2006, Service Consultation Paper No 2.*

4.105 An example of this survey based assessment is presented in Table 4.1 below, which shows the findings of results of the weighted VCR over time for different sectors in Victoria.[76]

Table 4.1: Value of customer reliability for Victoria (weighted estimates)

Customer ($/kWh)	1997	2002	2007
Residential	0.25	3.94	4.46
Agricultural	2.03	1.26	1.31
Commercial	22.78	18.46	30.82
Industrial	3.81	5.93	11.26
Total VCR (weighted)	28.29	26.60	47.85

Source: CRA International, August 2008, Assessment of the Value of Customer Reliability (VCR) – Final Report.

4.106 The total weighted VCR for Victoria increased from 1997 to 2007 by 69 per cent from $28.29 kWh to $47.85 kWh. The significant increase in the VCR over this period was attributed to a substantial increase in the value of reliability to the commercial and industrial sectors.[77] The commercial and industrial sectors dominate the composite state VCR by contributing 88 per cent to the 2007 total VCR figure.

4.107 Table 4.2 presents the unweighted VCR estimates for Victoria for 2007. These are the values attributed by each customer sector to reliability, whereas the weighted values reflect the contribution of each sector to the state average VCR.

Table 4.2: Value of customer reliability for Victoria in 2007 (unweighted estimates)

Sector	Residential	Agricultural	Commercial	Industrial
Outages (GWh)	11 872	417	11 981	11 007
% of total outages (GWh)	34%	1%	34%	31%
VCR (unweighted)	$13.25	$111.06	$90.76	$36.07

Source: CRA International, August 2008, Assessment of the Value of Customer Reliability (VCR) – Final Report.

Customer preference surveys

4.108 The South Australian regulator undertook a survey of customer preferences to inform the service quality aspect of the 2005-10 network regulation determination process.[78] The survey sample included residential (with low, medium and high income groups),

[76] The Centre for Advanced Engineering, 1993, Reliability of Electricity Supply; the Centre for Advanced Engineering, September 2004, Assessment of the Value of Lost Load for the Electricity Commission – Consultation Paper; Charles River Associate on behalf of VENcorp, 2003, Value of Customer Reliability; McLennan Magasanik Associates on behalf of VENcorp, September 2005, The Value of Customer Reliability for Gas; and CRA International (prepared for VENCorp), August 2008, Assessment of the Value of Customer Reliability (VCR) – Final Report, page 6.

[77] VENcorp, September 2008, The Value of Customer Reliability used by VENcorp for Electricity Transmission Planning: Consultation Planning, page 2.

[78] KPMG on behalf of the Essential Services Commission of South Australia, September 2003, Consumer Preferences for Electricity Service Standards.

commercial, industrial, urban and rural customers. The survey findings indicated that residential and business customers:

- were satisfied with their power supply (more than 85 per cent);
- believed in the principle of user pay for electricity use (more than 90 per cent);
- thought that customers using electricity at off-peak times should pay less (about 70 per cent);
- agreed to switch off equipment for less than half an hour if the network is overloaded (more than 80 per cent);
- preferred interruption time between 11pm and 6am (more than 75 per cent); and
- preferred long interruptions to short but frequent interruptions (nearly 80 per cent).

4.109 Surveys of customer preferences have also been undertaken by the regulator in Victoria, and by a DNSP in Queensland.[79] The outcomes of these surveys differ, with Victorian customers indicating that customers may be willing to pay slightly more for electricity if there was a corresponding increase in reliability, whereas customers in south east Queensland did not necessarily see the value in paying for further improvements in reliability of electricity supply.

4.110 What this demonstrates is that customer preferences differ significantly, and that accurate estimates of customer preferences in the Territory would probably be unreliable if inferred from preferences expressed in a different region or jurisdiction. As such, understanding customer preferences in the Territory requires engagement with Territory customers.

Question 13.

Do you think that there is merit in assessing Territory customer preferences and willingness to pay for a certain level of electricity service performance to inform the development of standards of service?

Customer consultation

4.111 DNSPs in New Zealand are required to undertake customer consultation every two years to develop an understanding of customer preferences, and ensure that service performance reflects customer preferences.[80] The consultation process involves:[81]

- advising customers about the price-quality trade offs available to them in relation to the goods and services provided by the DNSP;

[79] The Essential Services Commission of Victoria, Electricity Distribution Price Review 2006, Service Consultation Paper No 2; and Energex, August 2008, Energex's Response to the AER's Preliminary Positions – Framework and approach paper – Application of schemes Energex and Ergon Energy 2010-15, page 2.

[80] Commerce Commission, June 2003, Regulation of Electricity Lines Businesses Targeted Control Regime, Threshold Decisions.

[81] Commerce Commission, Commerce Act (Electricity Lines Thresholds) Notice 2004, clause 6(1)(c).

- consulting with customers about the quality of goods and services that they require, with reference to the prices of those goods and services;
- considering the views expressed by customers; and
- adequately take these views into account when making asset management decisions.

4.112 The customer consultation process involves customers in the development of the DNSPs standards of service, and asset management planning (which determines design and investment decisions), and pricing outcomes. [82]

4.113 A similar approach is being considered in Britain, with a proposal for DNSPs to demonstrate evidence of customer consultation when considering the DNSPs capital and maintenance programs as part of the network regulation process.[83]

4.114 Explicit recognition and assessment of customer preferences has not been a factor in determining standards of service and electricity infrastructure investment priorities in the Territory. However, engagement with customers to determine their satisfaction with existing levels of service, and willingness to pay for a higher or lower level of service is the only effective way of determining customer preferences. An advantage of customer consultation is that customers would develop a greater awareness of the price and reliability trade off, and an improved understanding of the supply conditions in the Territory.

4.115 The Commission's preliminary view is that improved understanding of customer preferences in the Territory would assist in setting standards of service that reflect customer expectations and their willingness to pay.

Question 14.

Should there be an explicit obligation for electricity service providers in the Territory to consult with customers on their preferences for standards of reliability and quality of supply, given the cost of supply and price implications?

Exclusion of events

4.116 Service performance (whether generation, networks or retail) can be affected by events that are outside the reasonable control of the service provider, such as acts of nature (e.g. fire, flood or tempest), industrial action or terrorism. These are events that a service provider cannot reasonably be expected to prevent or avoid, at least without substantial capital investment.

4.117 Standards of service arrangements commonly define excluded events for the purposes of determining service targets, and reporting on service performance. The common

[82] Orion New Zealand Limited, March 2008, Commerce Act (Electricity Distribution Thresholds) Notice 2004 – Threshold Compliance Statement – Consumer Engagement, pages 13-39.

[83] Ofgem, January 2010, Regulating energy networks for the future: RPI-X@20, Emerging Thinking – Enhanced Engagement, pages 5-6.

reasons for adjusting service performance targets or data are whether an outage is defined a major event or was planned or unplanned.

4.118 The commonly used methods for adjusting performance data to identify underlying performance are the 2.5 beta method, and a subjective list of excluded events.

Exclusion of events for reporting service performance

4.119 The ESS Code allows PWC to adjust the network reliability indicators to exclude the effects of severe interruptions to supply using the "2.5 beta method", in order to determine the underlying network related reliability performance.[84] However, the ESS Code requires both the adjusted and unadjusted reliability data to be reported.[85]

4.120 The 2.5 beta method is an objective statistics based methodology for identifying outlying performance. Instances may arise where an event may not be a statistical outlier, but is still an event that a network service provider cannot reasonably be expected to prevent or avoid. Conversely, where an event would be a statistical outlier, but is within the control of the service provider, some regulators specify a comprehensive list of excluded events so that these events count for reporting purposes.[86]

4.121 The AER service target performance incentive scheme for DNSPs also uses 2.5 beta method to identify major event days that should be excluded when reporting network reliability performance.[87]

4.122 Reporting arrangements in South Australia and Western Australia do not allow exclusions from the calculation of network reliability. Generally the interruptions which can be excluded are those with of duration of a minute or less, those caused by transmission or generation failures, or those caused during emergency situations. Conversely, the ACT regulator allows the exclusion of extended outages due to storms which affect 10 per cent or more customers in an area.[88]

4.123 The Commission's preliminary view is that a defined list of excluded events be used for the purpose of reporting service performance.

Exclusion of events for setting service targets

4.124 Using past performance as a benchmark for current or future service performance requires consideration of whether that past performance was typical or atypical, and reflects the underlying average performance of the service provider. This requires

[84] Institute of Electronics and Electrical Engineers, Standard 1366 – 2003.

[85] Electricity Standards of Service Code, December 2005, Schedule 1, code 1.6.

[86] For example, refer the Queensland Electricity Industry Code, Fourth Edition, July 2008, page 23.

[87] Australian Energy Regulator, November 2009, Electricity Distribution Network Service Providers – Service Target Performance Incentive Scheme,, Appendix D, page 35.

[88] Australian Capital Territory, December 2000, Electricity Distribution (Supply Standards) Code, Schedule 1, note (5).

adjustment of performance data to remove the impact of events that could not be reasonably avoided.

4.125 The Commission's preliminary view is that 2.5 beta method is the most appropriate method for adjusting performance for the purpose of setting service targets.

Question 15.

Do you consider the 2.5 beta method an appropriate method for identifying the underlying reliability performance of a service provider for the purposes of reporting service performance and setting service targets, or should the Commission consider specifying excluded events?

Planned and unplanned outages

4.126 Interruptions to supply can be planned or unplanned. The ESS Code defines an interruption as any loss of electricity supply to a customer which is associated with an outage on any party of the electricity up to, but not including, the service fuse, and which is greater than one minute duration.[89]

4.127 As with most DNSPs in Australia, PWC Networks advises customers of upcoming planned outages.[90] However, the ESS Code does not distinguish between planned and unplanned outages.

4.128 In Victoria, DNSPs are required to report reliability performance using planned and unplanned SAIDI, unplanned SAIFI, unplanned CAIDI, and MAIFI data.[91] Similarly, the South Australian DNSP is required to report reliability performance using planned and unplanned SAIDI and SAIFI data, for seven geographical areas.[92]

4.129 Separately reporting the contribution of planned and unplanned outages to overall system reliability performance could provide useful information on condition of electricity assets, particularly if the cause of the unplanned outages was also identified.

Question 16.

Do you consider there is merit in requiring separate reporting of unplanned and planned outages for electricity networks and generation in the Territory?

[89] Utilities Commission, December 2009, Electricity Standards of Service Code, Schedule 1, clause 1.2.

[90] Power and Water Corporation, February 2007, Customer Contract, page 8.

[91] Essential Services Commission, 2010, Electricity Distribution Code, clauses 5.1.1 and 5.1.2.

[92] South Australia, January 2003 (as last varied in December 2009), *Electricity Distribution Code,* clause 1.2.3.1.

Data segmentation

4.130 Network reliability performance in Australia is generally reported using the categories adopted by the AER, and originally proposed by the Utilities Regulators Forum (a forum of Australian regulators):[93]

- CBD – a feeder supplying predominantly commercial, high rise and office buildings through an underground distribution network containing significant interconnection and redundancy when compared to urban areas;
- urban – a feeder that is not a CBD feeder, with actual maximum demand over the reporting period per total feeder route length greater than 0.3 megavolt amperes per km;
- rural short – a feeder which is not a CBD or urban feeder with a total feeder route length less than 200 km; and
- rural long – a feeder which is not a CBD or urban feeder with a total feeder route length greater than 200 km.

4.131 In developing the ESS Code, the Commission noted that segmenting performance data would allow comparison among systems with broadly similar characteristics:[94]

Customer densities vary significantly across the Territory and, as a result, this can lead to different levels of service delivered. For example, in high-density areas such as the Darwin CBD, the network is characterised by multiple redundancy. Conversely, the very low customer density such as in remote rural areas means that there will be limited, if any, redundancy in local distribution systems.

4.132 The importance of data segmentation is noted by the AER in the 2009 State of Energy Market report:[95]

There tend to be different reliability standards for different feeders (parts) of a distribution network. A higher reliability standards is usually required, for example, for a central business district (CBD) network with a large customer base and a concentrated load density than for a highly dispersed rural network with a small customer base and low load density. While the unit costs of improving reliability in a dispersed rural network are relatively high, an outage is likely to affect few customers. Conversely, the unit costs of improving reliability in a high density urban network are relatively low, and an outage is likely to affect many customers.

4.133 However, when developing the ESS Code the Commission concluded that performance data should be segmented into the following categories:[96]

- regional categories: Darwin, Katherine, Tennant Creek, Alice Springs and other;

---

[93] Utility Regulators Forum, 2002, National Regulatory Reporting for Electricity Distribution and Retailing Business.

[94] Utilities Commission, August 2004, *Developing a Standard-of-Service Framework Issues Paper*, page18.

[95] Australian Energy Regulator, 2009, *State of Energy Market*, page 174.

[96] Electricity Standards of Service Code, December 2005, Schedule 1, clauses 4.2 to 4.4.

- feeder categories: urban and rural; and
- customer categories: residential customers and commercial/industrial customers.

4.134 The two feeder categories are also referred to as interconnected and radial feeders, and are consistent with the urban and rural short definitions commonly used elsewhere in Australia. The Darwin urban region and Alice Springs are serviced by interconnected feeders, and radial feeders service the Darwin rural region, Katherine and Tennant Creek.

4.135 The reasons the ESS Code does not require reporting on performance of CBD and rural long feeder categories are:[97]

- PWC Network advised that there were no long rural feeders in the market systems; and
- CBD feeders cannot be isolated from urban feeders (with the exclusion of Darwin) and were included in the urban category.

4.136 Nonetheless, the Commission notes that requiring PWC Networks to report on performance of CBD and rural long category feeders (subject to data availability) should not impose any additional reporting burden until there are feeders that meet these categories.

Question 17. Do you consider service performance data should be reported using nationally consistent categories?

[97] Power and Water Corporation, November 2004, *Developing a Standards of Service Framework – Power and Water's Submission in response to the UC's Issues Paper*, page 10.

CHAPTER 5

Implementation in the Northern Territory

Requirements of the terms of reference

5.1 The terms of reference require the Commission to recommend a course of action and provide detailed plans for implementation of that recommendation.

Matters potentially affecting standards of service arrangements in the Territory

Availability and quality of performance data

5.2 The Commission considers that quality of regulation is dependent on the quality of the information provided as it enables the regulator to set accurate and relevant quality standard levels, and monitor quality on a meaningful and consistent basis over time. The Commission is of the view that it needs to develop audit mechanism framework to ensure that the information provided by PWC is accurate and prepared in accordance with the Commission guidelines

5.3 When developing the ESS Code, the Commission noted that there was some uncertainty about the quality of performance data, and that this could mean the service targets may not have been appropriate. The Commission has previously indicated an expectation that the quality of performance data would improve as data collection protocols improved and more robust service performance data accumulates.[98]

5.4 Common practice for obtaining certainty about data quality is to undertake an audit of the process and practice involved in collecting and reporting the data. Audit requirements are a feature of most standards of service arrangements.[99] Depending on the jurisdiction, audit procedures may range from random checks to various degrees of intrusiveness dependent on the accuracy of the information.

[98] Utilities Commission, December 2005, Electricity Standards of Service 2005-06, page 11.

[99] For example, see Office of the Tasmanian Economic Regulator, May 2009, Electricity Supply Industry Performance and Information Reporting Guideline. section 4.2.4.

5.5 The Commission has not yet undertaken a specific audit of the PWC performance data collection and reporting systems. However, an audit is planned for later in 2010.

Question 18.

Do you know of any data quality problem that may mean currently available or future performance data is not suitable for setting service targets, or reporting service performance?

Firms subject to standards of service arrangements

5.6 PWC is effectively the only firm currently actively operating in the market systems. Although PWC's role as monopoly provider of network services is unlikely to change, other generators and retailers are expected to enter the Territory electricity market in the future.

Question 19.

Should standards of service arrangements apply to all service providers operating in the Territory electricity market?

Coverage

5.7 Standards of service generally apply to regulated electricity service providers. However, this would exclude customers in regional and remote centres of the Territory, where electricity supply is managed through a contract for service model. Service performance in such situations may best be dealt with through contractual arrangements between the service purchaser and the service provider.

Question 20.

Should standards of service arrangements only apply in the regulated market systems?

Performance data recording systems

5.8 Accurate and consistent data is required for a service target performance incentive scheme to be effective.

5.9 System wide reliability measures for SAIDI, SAIFI and CAIDI have been reported by PWC under the Electricity Standards of Service Code since 2005. However the Commission has not yet verified if PWC's data systems accurately record the number or duration of interruptions experienced by individual customers.

5.10 Although PWC could be required to undertake system improvements to enable it to more comprehensively record service performance, the costs involved in implementing systems improvements may outweigh the benefits. Further, these costs might ultimately be borne by customers as PWC passes them through as increased prices.

5.11 As such, there may be a case for including only those service performance measures in a GSL scheme which can be accurately and reliably recorded, even if this means

using fewer measures than elsewhere in Australia, as the scheme would be implemented at low cost with existing PWC systems.

Question 21.

Do you have views on the capability of performance reporting systems, and the willingness of customers to accept the costs of improving reporting systems?

The Commission is particularly interested in the Power and Water Corporation's views on this matter, most notably in relation to systems capability.

APPENDIX A

INDEX OF QUESTIONS

Q.1	Do you agree that reliability and customer service performance should be determined based on a 'best endeavours' approach? If not, what other alternative approaches are appropriate?
Q.2	Do you think that market conditions for electricity supply in the Territory warrant the definition of standards of service for electricity generation, electricity networks and electricity retail participants?
Q.3	Do you consider reliability standards such as SAIDI, SAIFI and CAIDI effective measures of generation reliability in the Territory? Do you consider the equivalent forced outage factor and the equivalent availability factor indicators would be more useful indicators of generation reliability?
Q.4	Do you consider that there should be reliability indicators for the transmission elements of the Territory electricity system?
Q.5	Do you consider the following indicators of DNSP reliability should be reported in the Territory: SAIDI; SAIFI; and feeder performance Do you consider there are other indicators of DNSP reliability that should be reported in the Territory?
Q.6	Do you consider there is merit in requiring generators or the DNSP in the Territory to report against specific quality of supply indicators? Are you aware of any difficulties associated with collecting and reporting specific quality of supply indicators?
Q.7	Do you consider there is merit in requiring PWC Networks and retailers operating in the Territory to report against nationally consistent customer service indicators? Do you consider there is merit in establishing customer service indicators relating to customer hardship? Are you aware of any difficulties associated with collecting and reporting nationally consistent customer service indicators?
Q.8	Should the Commission determine generation, networks and retail standards of service

	for the Territory?
Q.9	Should the Commission define a relationship between minimum standards and average standards? For example, should minimum standards for individual feeder performance be linked to average network reliability performance?
Q.10	Do you consider that using a multiple year rolling average of recent service performance is the most effective way of setting average service targets?
Q.11	Do you consider that using that service targets and service performance in the Territory should take into account the service performance of service providers elsewhere in Australia?
Q.12	Do you consider that service targets and service performance in the Territory should be set to encourage improvement in service performance over time? Do you think the Queensland approach could be applied in the Territory context
Q.13	Do you think that there is merit in assessing Territory customer preferences and willingness to pay for a certain level of electricity service performance to inform the development of standards of service?
Q.14	Should there be an explicit obligation for electricity service providers in the Territory to consult with customers on their preferences for standards of reliability and quality of supply, given the cost of supply and price implications?
Q.15	Do you consider the 2.5 beta method an appropriate method for identifying the underlying reliability performance of a service provider for the purposes of reporting service performance and setting service targets, or should the Commission consider specifying excluded events?
Q.16	Do you consider there is merit in requiring separate reporting of unplanned and planned outages for electricity networks and generation in the Territory?
Q.17	Do you consider service performance data should be reported using nationally consistent categories?
Q.18	Do you know of any data quality problem that may mean currently available or future performance data is not suitable for setting service targets, or reporting service performance?
Q.19	Should standards of service arrangements apply to all service providers operating in the Territory electricity market?
Q.20	Should standards of service arrangements only apply in the regulated market systems?
Q.21	Do you have views on the capability of performance reporting systems, and the willingness of customers to accept the costs of improving reporting systems? The Commission is particularly interested in the Power and Water Corporation's views on this matter, most notably in relation to systems capability.

APPENDIX B

SUMMARY OF PRELIMINARY PROPOSALS

Table 1: Summary of preliminary proposals for standards of service arrangements

Proposals	DNSP	TNSP	Generation	Retail
Reliability indicators	• SAIDI • SAIFI • Feeder performance	• Number of planned and unplanned outages • Total duration in system minutes	• SAIDI • SAIFI • EFOF • EAF	NA
Quality indicators	• Complaints about quality	Same	NA	NA
Customer service indicators	• Provision of connection services • Number of inquiries relating to network activities • Complaints received • Telephone calls answered within a time limit • Telephone calls abandoned	NA	NA	• Number of inquiries relating to retail activities • Complaints received • Disconnections/reconnections • Telephone calls answered within a time limit • Telephone calls abandoned
Service targets	• Service targets take into account customer preferences, historical performance, comparison with other jurisdictions	Same	Same	Same

Proposals	DNSP	TNSP	Generation	Retail
Customer preferences	• Requirement for service providers to undertake customer consultation on service performance	Same	Same	Same
Excluded events for setting service targets	• Exclude events using the 2.5 Beta method	Same	Same	NA
Reporting performance	• Report planned and unplanned outages • Exclude events using a defined list.	Same	Same	NA
Data segmentation	• Segment data by region – Darwin, Katherine, Tennant Creek and Alice Springs • Segment data by customer – household, business • Segment data by feeder – CBD, urban, rural short and long	NA	NA	• Segment data by region and customer type
Audit/monitoring	• Requirement to audit data quality	Same	Same	Same