Service Standards for Western Power Corporation's South West Interconnected System

Report prepared for
Economic Regulation Authority
Western Australia

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Contents

1 EXECUTIVE SUMMARY

Western Power submitted a proposed Access Arrangement for its South West Interconnected System (SWIS), together with an Access Arrangement Information and draft Technical Rules, to the Western Australian Economic Regulation Authority (the Authority) on the 24 August 2005.

The *Electricity Networks Access Code 2004* (Access Code) requires that an Access Arrangement must include service standard benchmarks for reference services that are:

> *(a) reasonable; and*
>
> *(b) sufficiently detailed and complete to enable a user or applicant to determine the value represented by the reference service at the reference tariff.*[1]

Western Power has proposed service standard benchmarks for its:

- Distribution reference services based on customer interruption minutes, using the System Average Interruption Duration Index (SAIDI); and
- Transmission reference services based on circuit availability and system minutes interrupted for meshed circuits.

Western Power has proposed that these benchmarks be used as the basis of:

- A proposed service standards adjustment mechanism, whereby it would receive financial rewards if it out-performs the benchmarks and would incur financial penalties for under-performances; and
- The Authority's monitoring and reporting of Western Power's reliability of supply.

Distribution SAIDI and transmission circuit availability and system minutes interrupted are widely used reliability service standards across the National Electricity Market (NEM), including as part of service incentive regimes. However, the NEM jurisdictions also apply a range of other jurisdictional-specific reliability-related service standards as part of the regulatory regimes for their network service providers (NSP), including:

- Design planning criteria – these are the standards that an NSP uses to plan and develop its network;
- Average reliability performance standards – these standards typically define the maximum average duration and frequency of outages allowed across an NSP's network;

[1] Western Australian Government, *Electricity Networks Access Code 2004,* November 2004, section 5.6, URL http://www.slp.wa.gov.au/gazette/gazette.nsf/gazlist/2C360789573C223148256F5C0010ED84/$file/gg205.pdf

- Worst performing feeder standards – these are minimum standards for individual feeders before an NSP must investigate and, where necessary, take remedial action to improve its performance. An NSP may also be required to report on the reliability provided from its worst performing feeders or to its worst serviced customers; and
- Guaranteed customer service standards – under these schemes an NSP is required to make a payment to a customer if it exceeds defined standards in recognition that the quality of service that the customer has received is unsatisfactory.

This report considers the adequacy of the types of service standard benchmarks that Western Power has included in its proposed Access Arrangement, having regard for practice in the NEM, and the basis for the Authority assessing benchmarks having regard for the requirements of the Access Code.

Design Planning Criteria

Western Power has not included design planning criteria as service standard benchmarks in its proposed Access Arrangement although it has included "reliability criteria" in its draft Technical Rules as a basis for designing and operating its network.

It is not recommended that Western Power be required to include its design planning criteria as service standard benchmarks in its Access Arrangement. However, in order to create a clear link between the design planning criteria in the Technical Rules and the service performance outcomes that customers have a right to receive, it is recommended that Western Power be required to include as service standard benchmarks:

- "Time to restore supply standards" for its distribution system, whereby Western Power must restore defined percentages of customers within defined time periods, where the percentages differ by geographic area. This is consistent with the requirement under *South Australian Electricity Distribution Code*, which the distributor ETSA Utilities then uses as the basis for developing its design planning criteria for its distribution network; and
- Specified standards for transmission services at connection points that are explicitly linked to design planning criteria, in a similar manner to the requirements of the *South Australian Electricity Transmission Code*.

These requirements could be included in a code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*.

Average reliability performance standards

Western Power has not included average reliability performance standards in its proposed Access Arrangement. Furthermore, it is not proposing to adopt the "benchmark" reliability standards set out in the *Electricity (Supply Standards and System Safety) Regulations 2001* nor is it committing to achieve the service standard

benchmarks that it has proposed for the purposes of the service standards adjustment mechanism.

It is recommended that average reliability performance standards be set for Western Power in order to give customers certainty about the minimum reliability outcomes that Western Power must achieve on average across its network and to provide an effective basis for comparing its reliability performance over time and with other NSPs. Furthermore, average reliability performance standards have the potential to provide strong incentives for Western Power to deliver at least a defined mandatory base level of performance.

This could be achieved by mandating average reliability performance standards in the regulatory framework, such as in a code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*.

Worst serviced customers and worst performing feeders

Western Power has not included any specific service standards in its proposed Access Arrangement in relation to its worst serviced customers or its worst performing feeders although it has identified a "worst performing feeder program" in its Access Arrangement Information. However, Western Power's draft Access Arrangement does not mention the "worst performing feeder program" and there is therefore no apparent regulatory obligation on Western Power to deliver it.

In order to provide an increased focus on the worst performing parts of Western Power's system it is recommended that it be required either to:

- Report regularly to the Authority on the reliability performance of its worst performing feeders or its worst serviced customers, in a similar manner to what is required in each of the four NEM jurisdictions considered in this report; and / or

- Take remedial action if the reliability performance of individual feeders exceeds defined reliability performance thresholds in a similar manner to that required in NSW.

This could be achieved by incorporating these standards or reporting requirements into a code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*.

Customer payment scheme

Western Power has not included a reliability-based customer payment scheme as a service standard benchmark in its proposed Access Arrangement. It did, however, note in its Access Arrangement Information that its existing "Customer Reliability Payment Scheme" is one of its other service delivery commitments.

It is recommended that Western Power be required to include a reliability based customer payment arrangement as a service standard benchmark in its Access Arrangement. This could be achieved by extending the requirements of the *Code of Conduct (for the Supply of Electricity to Small Use Consumers)* to include reliability standards or imposing requirements in another code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*. Imposing this obligation would:

- Recognise that this payment arrangement is a standard for the "reliability of delivered electricity" in accordance with the Code definition of a "service standard";

- Recognise that individual customers are entitled to receive a payment from Western Power if this service standard is not met;

- Create a clear link between the need for the payment arrangement and the Access Arrangement; and

- Mandate a requirement for a reliability-based payment as part of the regulatory regime, whereas Western Power currently only has a scheme of its own volition.

Service standards adjustment mechanism

It is recommended that the Authority should only approve the inclusion of penalty and reward payments in Western Power's service standards adjustment mechanism if it is satisfied that:

- Western Power is currently providing a base level of service that merits rewarding Western Power for improved performance;

- Western Power currently has the capacity to accurately measure, and report on, its reliability performance; and

- A service standards adjustment mechanism would encourage Western Power to improve its reliability performance.

If the Authority is satisfied of these matters then it is recommended that it approve the inclusion of a service standards adjustment mechanism in Western Power Access Arrangement providing that it promotes the best practice principles and features of service incentive regimes applied in the NEM jurisdictions.

2 INTRODUCTION

2.1 BACKGROUND

The nature and quality of a good or service being supplied by a seller and the price being paid by a buyer are fundamental elements of any commercial transaction – the provision of electricity network services is no exception.

In entering into a commercial relationship, electricity customers have certain expectations about the quality of supply that they will receive and a network service provider (NSP) plans, builds, manages and operates its system with certain expectations about the standard of electricity supply that it will deliver.

Because electricity networks are monopoly services, customers can not choose their supplier – they are serviced by the NSP that owns and operates the system to which their electrical installation is connected. Given this monopoly position, and left to its own devices, an NSP seeking to maximise its profits may unilaterally decide to:

- Increase the price it charges for a given service;
- Decrease the service it provides for a given price; or
- Both increase its price and decrease its service.

It is generally accepted that this position of monopoly power justifies the regulation of an NSP's prices and services. The outcome of this process is typically referred to as the "regulatory bargain", where the maximum price and the minimum service level are set with a view to one another.

While electricity is considered to be a homogenous product, the nature and quality of electricity supplied to customers can differ markedly within and between electricity systems. There is therefore a need to establish appropriate measures of service quality in order to understand what customers are receiving from their NSP for the prices they are paying.

An NSP's service quality can generally be assessed by reference to three main types of issues: reliability of supply, quality of supply and quality of customer service:

- Reliability of supply relates to the continuity of a customer's electricity supply and is typically measured by reference to the number and duration of outages;
- Quality of supply relates to matters such as the voltage and harmonics of a customer's supply; and
- Customer service for a NSP can relate to a range of matters, such as call centre responsiveness, the efficient management of customer connections, disconnections, reconnections or planned interruptions and punctuality for appointments.

Consistent with the commercial relationship between the NSP and its customer, measures of electricity service quality for these matters should be set with regard to what is:

- Important and valuable to customers – the measures should reflect service qualities that customers want and are willing to pay for;
- Controllable and deliverable by NSPs – the measures should reflect outcomes that the business can achieve; and
- Measurable by NSPs and regulators – the measures should be quantifiable so that the NPSs and regulator can assess whether or not specified standards have been achieved.[2]

The regulatory regime for the Western Australian electricity industry provides a basis for setting, monitoring and reporting service standards for the state's electricity businesses. An important element of this regime is the *Electricity Networks Access Code 2004* (Access Code) under which service providers are required to submit to the Western Australian Economic Regulation Authority (the Authority) for approval proposed Access Arrangements that include service standard benchmarks for their network activities.

Western Power's network business recently submitted a draft Access Arrangement to the Authority for approval, which included certain service standard benchmarks for its South West Interconnected System (SWIS).

2.2 PURPOSE, SCOPE AND STRUCTURE

The Authority has engaged Network Advisory Services to prepare this report to aid public comment on Western Power's proposed Access Arrangement and to assist the Authority to assess Western Power's proposed service standard benchmarks, having regard for the requirements of the Access Code and the Authority's broader regulatory powers and responsibilities.

This report is structured as follows:

- Section 3 overviews the legislative and regulatory framework governing the development of network service standards in Western Australia and the matters the Authority is required to have regard to in considering whether to approve Western Power's proposed service standard benchmarks for the SWIS;
- Section 4 overviews the service standard benchmarks that Western Power has included in its proposed Access Arrangement;
- Section 5 examines the range of reliability-related network service standards that have been implemented for transmission and distribution NSPs across the National Electricity Market (NEM) and the regulatory mechanisms applied in each jurisdiction to implement, monitor and enforce these service standards; and

[2] NERA, *Review of Energy Licensing Regimes in NSW: Minimum Service Standards*, January 2002, page 5, URL http://www.iprt.net/ (August 2005)

- Section 6 considers the adequacy of the types of service standard benchmarks that Western Power has included in its proposed Access Arrangement. It also considers the basis for the Authority assessing service standard benchmarks having regard for the requirements of the Access Code.

Importantly, this report does not:

- Assess the merits of the service standard benchmarks that Western Power included in its proposed Access Arrangement, including whether the proposed levels are appropriate – this is a task for the Authority;
- Consider network quality of supply or customer service standards for Western Power's SWIS – the scope of this report is limited to reliability of supply considerations;
- Consider non-network service standards within the SWIS, such as for retail or generation activities;
- Consider service standards for any of Western Power's networks outside of the SWIS; or
- Consider service standards for NSPs, other than Western Power, that operate in Western Australia.

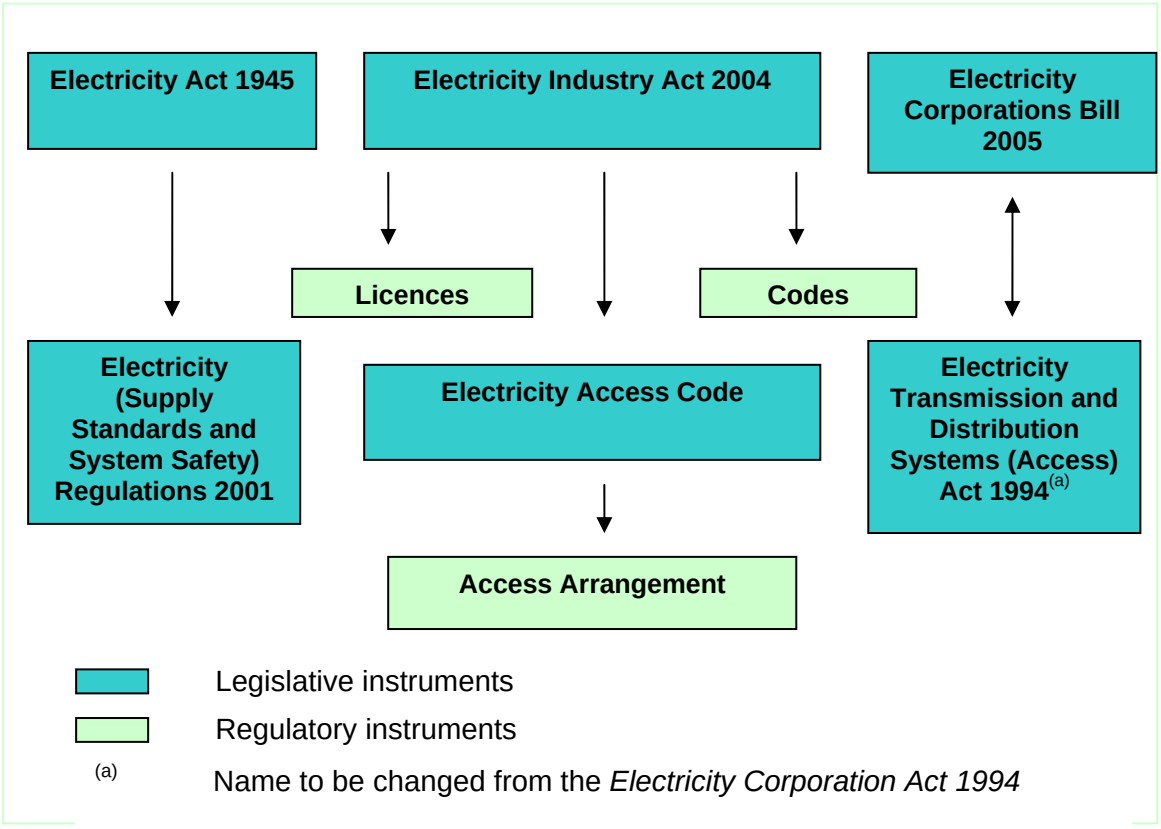
2.3 DISCLAIMER

Neither Network Advisory Services nor any employee of Network Advisory Services takes responsibility arising in any way whatsoever to any person (other than the Economic Regulation Authority) in respect of this report, for any errors or omissions herein, arising through negligence or otherwise however caused.

3 LEGISLATIVE AND REGULATORY FRAMEWORKS

The Authority's consideration of service standards for Western Power is occurring in an environment of significant legislative and structural reform of the Western Australian electricity industry. The legislative framework supporting the Western Australian Government's electricity market reforms confers the Authority with a range of responsibilities to support the development of a competitive market. The current state of transition to the competitive market means that the detailed rules and regulations underpinning the framework are necessarily fluid in nature, with a range of legislative and regulatory instruments under development.

There are a number of statutory and regulatory instruments, both proposed and existing, that are relevant to the Authority's consideration of appropriate service standards for Western Power. These are represented diagrammatically below:



3.1 EXISTING LEGISLATIVE AND REGULATORY FRAMEWORK

The existing electricity supply and reliability standards applicable to network operators in Western Australia are contained in the *Electricity (Supply Standards and System Safety) Regulations 2001* (*Supply Regulations*).

The planning criteria governing the design of the transmission and distribution system is addressed through the regulations supporting the *Electricity Corporation Act 1994 (Electricity Corporation Act).*

3.1.1 Electricity (Supply Standards and System Safety) Regulations 2001

The *Supply Regulations* are made pursuant to the *Electricity Act 1945* and confer the Director of Energy Safety within the Department of Consumer and Employment Protection (Director) with responsibility for a range of technical and safety issues. Standards for the reliability of supply are captured under this framework.

Section 5(1) of the *Supply Regulations* provides that:

> *…a network operator must use all reasonable endeavours to ensure that the supply of electricity to a consumer conforms to the benchmark standards for electricity quality and reliability set out in Schedule 1.*

Schedule 1 Division 3 of the *Supply Regulations* specifies a number of 'benchmark' reliability standards, with respect to:

- Planned supply interruptions (Schedule 1, section 6) such that a network operator:
    - Must use "reasonable endeavours" to provide each affected consumer with an interruption notice three days prior to the interruption;
    - Must use "reasonable endeavours" to ensure the interruption does not exceed six hours or four hours, varying with the parallel of latitude and temperature of the area;
    - Must use "all reasonable endeavours" to reduce the effect of the supply interruption including by considering providing supply by portable generating facilities in certain specified circumstances; and
    - Must "consult" with the consumer about means of minimising disruption to the consumer's activities where the consumer's consumption is likely to exceed 50kW during the period of the interruption.
- Unplanned supply interruptions (Schedule 1, section 7) such that a network operator must ensure supply is restored "as soon as is reasonably practicable"; and
- Reliability (Schedule 1, section 8) such that a network operator must use "reasonable endeavours" to ensure that unplanned full or partial interruptions do not occur more often and for periods which on average each calendar year do not exceed the periods specified in the Table 1 below:

Table 1 – Reliability Standards

Network Location	Avg number of times customer supply is interrupted per year	Avg durations of interruption (minutes)
Perth CBD	1	30
Perth metropolitan area other than CBD	3	45
Rural and country areas other than areas supplied from an isolated network	4	60
Isolated network	5	30

Section 9 of Schedule 1 also allows a network operator to apply "to the Director for the approval of special standards for the quality and reliability of electricity supplied to its customers". It is understood that no such approval has to date either been sought or granted.

The requirement for the network operator to adhere to these benchmark standards is qualified under section 5(3) of the Regulations in certain specified circumstances, such that:

> *The standards set out in Schedule 1 do not apply at times when the network or a relevant part of it -*
>
> *(a) is damaged, adversely affected, or disrupted by a network emergency or by a storm to such an extent that is not reasonably foreseeable and preventable by a network operator who complied with relevant industry standards;*
>
> *(b) has been deliberately or accidentally damaged, adversely affected, or disrupted by a person other than the network operator; and*
>
> *(c) in the opinion of the Director, has been damaged, adversely affected, or disrupted by an emergency that has resulted in a widespread interruption to the supply of electricity to consumers supplied with electricity from the network.*

Obligations for compliance monitoring are also created, with compliance reporting undertaken on both an annual and 'exception' basis against the benchmark standards and certain notifiable events. Section 6 of the Regulations provides that:

> *(1) A network operator must take all reasonable steps to monitor and record the performance of its network to ensure that the standards set out in Schedule 1 are satisfied.*

(2) The monitoring of the network must include the monitoring of parts of the network that are known to be or are likely to be susceptible to supply interference or other problems.

(3) A network operator must record every complaint made by a consumer in relation to the quality or reliability of the electricity supplied from its network to the consumer's premises.

(4) Not more than 40 working days after the end of a calendar year, a network operator must provide the Director with a report on the performance of the operator's network during the calendar year, including the matters referred to in subregulations (1), (2) and (3).

For the purposes of enforcement, section 7(8) provides that a failure by a network operator to satisfy the benchmark standards does not constitute a contravention of the *Supply Regulations*. The Department of Consumer and Employment Protection reports on Western Power's performance against the standards in its annual report. Western Power also publishes its historic and targeted reliability performance in its own annual report.[3]

Section 35(1)(b) of the Regulations provides that a network operator must notify the Director of:

any unplanned interruption to the supply of electricity from the network to –

(i) any consumer who has an average load of not less than 1 MW or whose annual electricity consumption usually exceeds, or can reasonably be expected to exceed, 8760 MWhs; or

(ii) at least 200 other consumers.

Notification under section 35 is to be provided in the form of an annual statistical report to the Director and the provision of an investigation report within 20 days of the incident or such further period as the Director allows.

3.1.2 Electricity Corporation Act 1994

The *Electricity Corporation Act 1994* provides for the development of regulations to make provisions for quality and reliability of supply in the transmission and distribution networks (section 2(3) of Schedules 5 and 6 respectively).

Clause 27 of the *Electricity Transmission Regulations 1996* and clause 29 of the *Electricity Distribution Regulations 1997* require Western Power to develop and publish network planning criteria in relation to both the interconnected network and the regional power systems. These criteria are contained in Technical Codes

[3] Western Power, *Annual Report 2004*, 2004, URL - http://www.westernpower.com.au/about_us/company_profile/annual_reports/index.html (August 2005)

published by Western Power as amended from time to time.[4] The most recently published Codes are:

- The *Distribution Technical Code and Planning Criteria* (July 1997);
- The *Interim Electricity Transmission Access Technical Code* (December 2004); and
- The *Regional Distribution Technical Code and Planning Criteria* (July 1997).

As discussed below, it is intended that the first two Codes will be replaced by Technical Rules that have been submitted by Western Power to the Authority in conjunction with its proposed Access Arrangement and Access Arrangement Information.

3.2 NEW LEGISLATIVE AND REGULATORY FRAMEWORK

The *Electricity Industry Act 2004* (*Electricity Industry Act*) and the *Electricity Corporations Bill 2005* (*Electricity Corporations Bill*) are the primary legislative instruments through which the Government's market reforms are being delivered.

3.2.1 Electricity Industry Act 2004

The *Electricity Industry Act* contains two heads of power which enable the Authority to introduce standards with respect to the reliability of supply:

- The establishment of a licence regime under Part 2 Division 2 and the power to determine the terms and conditions of licences under section 11.

  The Authority is not restricted in the terms and conditions that may be applied to a licence, although Schedule 1 identifies a number of areas which may form the subject matter of the terms and conditions. These include:

  - Specifying methods or standards to be applied in supplying electricity under the authority of the licence (clause j);
  - Requiring the licensee to observe specified codes (clause k);
  - The performance of functions by the licensee including performance criteria to be met by the licensee (clause o);
  - Requiring the licensee to publish specified information in relation to its performance under the licence (clause p); and
  - Regulating the construction or operation, or both, of any generating works, transmission system or distribution system to which the licence applies (clause r).

[4] URL: http://www.westernpower.com.au/networks/network_access/general_information/network_access_documents.html (August 2005)

Section 11(4) further provides that the terms and conditions determined by the Authority under the licence must not be inconsistent with any other terms and conditions provided for in the *Electricity Industry Act* or its regulations, the *Electricity Networks Access Code*, or any regulations made under the *Electricity Act*.

As a consequence, any service standards developed by the Authority and applied through the licensing regime must be consistent with:

- The benchmark standards approved by the Authority under the Access Arrangement; and
- The supply and reliability standards applied to network operators through the *Supply Regulations*.

- The power to develop codes under Part 2 Division 7.

  Under section 39, the Authority may prepare and issue a code or codes in relation to any one of a number of specified issues, including:

  (d) standards relating to the quality and reliability of the supply of electricity that are to be observed by the holders of transmission licences or distribution licences.

  In circumstances where the Authority has not exercised this power, the Minister may prepare and issue a code in respect of a code matter or declare an intention to do so by notice published in the Government Gazette. If this occurs, the Authority cannot issue a code in respect of the same code matter.

  It is understood that a *Reliability and Quality of Supply Code* is being developed by the Minister for Energy, in accordance with section 39 of the *Electricity Industry Act.*

In terms of the licensing scheme, it is a function of the Authority to:

- Administer the licensing scheme, in accordance with section 37; and
- Monitor and report to the Minister on the operation of the licensing scheme and inform the Minister about any failure by a licensee to meet performance criteria or other requirements of its licence, in accordance with section 38.

Section 13 also imposes an obligation on the licensee to provide the Authority with a performance audit of the effectiveness of the measures undertaken by the licensee to meet the performance criteria specified in the licence.

The Authority is in the process of developing the performance criteria and reporting requirements for its electricity licensees.

3.2.2 Electricity Corporations Bill 2005

The *Electricity Corporations Bill*, currently before the Western Australian Parliament, is intended to establish the new electricity corporations in place of Western Power and to amend a number of existing legislative provisions as a consequence of these changes to the industry's structure.

The *Electricity Corporations Bill* largely repeals and replaces the *Electricity Corporation Act* which established and conferred functions on Western Power, including with respect to access to the corporation's transmission and distribution systems.

As a transitional measure, the provisions in the *Electricity Corporation Act* relating to Western Power's transmission and distribution systems will be continued with the *Electricity Corporation Act* renamed the *Electricity Transmission and Distribution Systems (Access) Act 1994* (*Access Act*). The *Access Act* is intended to ensure that Western Power's existing obligations with respect to third party access to its transmission and distribution networks continue to apply to the newly created network entities until such time as the Authority approves the Access Arrangement.

The *Electricity Corporations Bill* confers the new network entities with the same broad functions with respect to the management, planning, and expansion of the transmission and distribution systems as that previously conferred on Western Power under the *Electricity Corporation Act*.

In addition, the *Electricity Corporations Bill* provides for section 39 of the *Electricity Industry Act* to enable codes that require the network entities to provide compensation payments to customers in the event that prescribed reliability and quality of supply standards are not met. An initial customer service code of conduct has been introduced through the *Code of Conduct (for the Supply of Electricity to Small Use Consumers)* (Code of Conduct), established under Schedule 3 section 1 of the *Electricity Industry Act*. The Code of Conduct requires the retailer or the distributor to provide a payment to non-contestable customers in circumstances of an act or omission. The payment scheme is tied to service standards relating to: customer reconnections; wrongful disconnections; acknowledgements and responses to complaints; and notification of planned interruptions. It is also noted that Western Power has its own "extended outage payment scheme" whereby eligible customers affected by power outages lasting 12 continuous hours or more receive an $80 payment.[5]

[5] Details of the extended outage payment scheme are available on Western Power's website at URL http://www.westernpower.com.au/networks/contact_us/claim_forms/claim_form_eops.html?src=seghome (August 2005)

3.3 ELECTRICITY NETWORKS ACCESS CODE 2004

The *Electricity Networks Access Code 2004* (Access Code) is established under section 104(1) the *Electricity Industry Act* and commenced on 30 November 2004. The Access Code details a framework for generators, retailers and large loads obtaining access to the services provided through Western Power's regulated (covered) networks. Currently, the SWIS is the only 'covered' network for the purposes of the Access Code although this may be extended over time to include network areas outside the SWIS.

The Access Code establishes a 'propose and respond' model under which the service provider submits a proposed Access Arrangement (having regard to the requirements of the Access Code) to the Authority for the purposes of approval. Western Power submitted its proposed Access Arrangement to the Authority for the SWIS on 24 August 2005.

Chapter 5 of the Access Code lists a number of 'required contents' for inclusion in the proposed Access Arrangement, including a requirement under section 5.1(c) for:

> *service standard benchmarks… for each reference service.*

"Service standards" is defined as:

> *either or both of the technical standard, and reliability, of delivered electricity.*

"Service standard benchmarks" are defined as:

> *the benchmarks for a reference service in an access arrangement under section 5.1(c).*

A "reference service" is defined as:

> *a covered service designated as a reference service in an access arrangement under section 5.1(a) for which there is a reference tariff, a standard access contract and service standard benchmarks.*

The Code also requires that an Access Arrangement include a "service standards adjustment mechanism". Section 6.29 states that:

> *A "service standards adjustment mechanism" is a mechanism in an access arrangement detailing how the service provider's performance during the access arrangement period against the service standard benchmarks is to be treated by the Authority at the next access arrangement review.*

The Code goes on to say:

> *An access arrangement must contain a service standards adjustment mechanism*.[6]
>
> *A service standards adjustment mechanism must be:*
>
> *(a) sufficiently detailed and complete to enable the Authority to apply the service standards adjustment mechanism at the next access arrangement review; and*
>
> *(b) consistent with the Code objective.*[7]
>
> *A service standards adjustment mechanism in an access arrangement applies at the next access arrangement review.*[8]

Section 4.1 of the Access Code requires Western Power to submit proposed Technical Rules at the same time as it submits its proposed Access Arrangement and Access Arrangement Information. Chapter 12 and Appendix 6 of the Access Code set out the required nature and contents of these Rules, which must include amongst other things:

- Performance standards in respect of service standard parameters; and
- Network planning criteria.

Western Power submitted draft Technical Rules to the Authority on 24 August 2005, which will be assessed in conjunction with the proposed Access Arrangement and Access Arrangement Information. It is intended that these rules will replace the technical codes and planning criteria established under the *Electricity Transmission Regulations* and the Electricity Distribution Regulations 1997 referred to in section 3.1.2 above.

Section 4.29 of the Access Code explicitly provides that the Authority must not approve an Access Arrangement *"which omits something listed in section 5.1"*, such as service standard benchmarks.

The Authority needs to assess whether the service standard benchmarks proposed by Western Power in its Access Arrangement are appropriate as part of the process for determining whether the Access Arrangement should be approved.

In carrying out this assessment, the Authority needs to ensure that the benchmarks satisfy the Access Code's specific and general criteria. In particular:

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[6] Western Australian Government, *Electricity Networks Access Code 2004,* November 2004, section 6.30, URL http://www.slp.wa.gov.au/gazette/gazette.nsf/gazlist/2C360789573C223148256F5C0010ED84/$file/gg205.pdf

[7] Ibid, section 6.31

[8] Ibid, section 6.32

- Whether the information provided in support of the Access Arrangement is adequate to allow the Authority to understand how the service standard benchmarks are derived and whether they meet the requirements of the Access Code. Section 4.2 places the onus on Western Power to provide adequate information to:

  … enable the Authority, users and applicants to:

  (a) understand how the service provider derived the elements of the proposed access arrangement; and

  (b) form an opinion as to whether the proposed access arrangement complies with the Code.

- In making a decision (draft or final) about whether the proposed Access Arrangement meets the Access Code objective and the requirements set out in Chapter 5. Section 4.28 provides that:

  (a) if the Authority considers that:

  (i) the Code objective and the requirements set out in Chapter 5... are satisfied – it must approve the proposed access arrangement; and

  (ii) if the Code objective or a requirement set out in Chapter 5… is not satisfied – it must not approve the proposed access arrangement;

  and

  (b) to avoid doubt, if the Authority considers that the Code objective and the requirements set out in Chapter 5… are satisfied, it must not refuse to approve the proposed access arrangement on the ground that another form of access arrangement might be better or more effectively satisfy the Code objective and the requirements set out in Chapter 5…

  The objective of the Access Code is defined in section 2.1 as:

  … to promote the economically efficient:

  (a) investment in; and

  (b) operation of and use of,

  networks and services of networks in Western Australia in order to promote competition in markets upstream and downstream of the networks.

The Chapter 5 criteria for service standards are contained in section 5.6, and provide that:

> *A service standard benchmark for a reference service must be:*
>
> *(a) reasonable; and*
>
> *(b) sufficiently detailed and complete to enable a user or applicant to determine the value represented by the reference service at the reference tariff.*

Sections 2.3 and 2.4 of the Access Code provide guidance in seeking to balance the specific and general criteria identified above:

> *Where this Code specifies one or more specific criteria in relation to a thing (including the making of any decision or the doing, or not doing, of any act), then:*
>
> *(a) subject to section 2.3(b), the specific criteria and the Code objective all apply in relation to the thing; and*
>
> *(b) subject to section 2.4, to the extent that a specific criterion and the Code objective conflict in relation to the thing, then:*
>
> *(i) the specific criterion prevails over the Code objective in relation to the thing; and*
>
> *(ii) to the extent that the specific criterion conflicts with one or more other specific criteria in relation to the thing, the Code objective applies in determining how the specific criteria can best be reconciled and which of them should prevail.*
>
> *If the Code objective is specified in a provision of this Code as a specific criterion, then the Code objective is to be treated as being also a specific criterion for the purposes of section 2.3, but to the extent that the Code objective conflicts with one or more other specific criteria the Code objective prevails.*

Section 4.30(d) of the Access Code requires the Authority to have regard to *"written laws and statutory instruments"* in deciding whether to approve an Access Arrangement. As a licence under the *Electricity Industry Act* is a statutory instrument for this purpose, there is a clear link between any performance standards that may be imposed through the licence and the service standard benchmarks under the Access Arrangement. This would suggest that consistency between the licence obligations and Access Arrangement is required although the obligations need not be the same.

In terms of the obligation imposed on the network operator to comply with the service standard benchmarks, section 11.1 provides that:

> *A service provider must provide reference services at a service standard at least equivalent to the service standard benchmarks set out in the access arrangement…*

This requirement is underpinned in Chapter 11 by a compliance and reporting framework. Section 11.2 imposes an obligation on the Authority to:

> *…monitor and, at least once each year, publish a service provider's actual service standard performance against the service standard benchmarks.*

This monitoring function is supported by the Authority's ability to:

- Section 11.3 – request a service standard performance report;
- Section 11.4 – specify, in the service standard performance report, the period of time to be covered, the criteria to be addressed, and the format of the report; and
- Section 11.5 - consult and request submissions from network users.

Section 11.6 provides that a failure to comply with the service standards exposes Western Power to the potential imposition of civil penalties under regulations.

3.4 SUMMARY

The Western Australian legislative and regulatory framework provides for the following arrangements in relation to service standards:

- The *Supply Regulation* sets out reliability standards and reporting requirements;
- The *Electricity Industry Act* enables the Authority to introduce reliability standards as conditions of a licence and to issue a code in relation to reliability standards;
- The *Code of Conduct (for the Supply of Electricity to Small Use Consumers)* provides for a service standards payment regime for eligible customers;
- The Access Code requires that service standard benchmarks and a service standards adjustment mechanism be included in an Access Arrangement;
- The Access Code requires Western Power to submit proposed Technical Rules for approval, which must include amongst other things performance standards in respect of service standard parameters and network planning criteria;
- The Access Code sets out a basis for the Authority to assess service standard benchmark proposals and requires the Authority to have regard to *"written laws and statutory instruments"* in deciding whether to approve an Access Arrangement. This creates a clear link between the approval of an Access Arrangement and service standards in any licence or Code; and
- The Access Code requires the Authority to monitor a service provider's actual service standard performance against its service standard benchmarks.

4 OVERVIEW OF WESTERN POWER'S PROPOSED SERVICE STANDARD BENCHMARKS

This section details the nature of the service standards benchmarks that Western Power has included in its proposed Access Arrangement submitted to the Authority on 24 August 2005. As already noted, this report does not seek to assess the merits of these proposed service standard benchmarks. This will be separately undertaken by the Authority.

Western Power's proposed service standard benchmarks are set out in section 3.11 of its proposed Access Arrangement and are explained and justified in section 3 of the accompanying Access Arrangement Information. Separate benchmarks have been proposed for transmission and distribution reference services with a view to these being used as the basis for assessing Western Power's performance for the purposes of:

- A proposed service standards adjustment mechanism; and
- A performance monitoring and reporting regime to be administered by the Authority.

4.1 TRANSMISSION SERVICE STANDARD BENCHMARKS

Western Power has proposed using two service standard benchmarks for its transmission reference services under the Access Arrangement:

- Circuit availability; and
- System minutes interrupted for meshed circuits.

4.1.1 Circuit availability

Western Power has advocated the use of circuit availability as a performance measure because it considers that it:

- Provides a general indicator of performance;
- Can be calculated to include both planned and unplanned outages;
- Can be calculated to include all transmission assets;
- Is widely used across Australia as a service standard indicator;
- Has existing data to calculate its historical circuit availability performance.[9]

[9] Western Power, *Access Arrangement Information for the South West Interconnected System owned by Western Power Corporation*, August 2005, pages 139-140

Western Power has proposed:

- Measuring circuit availability as "the actual circuit hours available for transmission circuits divided by the total possible defined circuit hours available"[10]. This is consistent with the definition applied by the Australian Competition and Consumer Commission (ACCC) in its *Statement of Principles for the Regulation of Transmission Revenues – Service Standard Guidelines*[11] in November 2003;
- Sourcing data for the calculation from Western Power's SCADA and system operation databases;
- Excluding from the calculation:
    - All zone substation equipment including power transformers;
    - Tee configuration line circuits;
    - Unregulated transmission assets;
    - Outages caused by a fault or other event on a 3rd party system; and
    - *Force majeure* events.

  It is noted that the first two items are not exclusions under the ACCC's *Statement of Principles.*
- Including in the calculation:
    - "Primary transmission equipment"; and
    - Outages from all causes other than those events defined as exclusions.[12]

Western Power indicates that its historical circuit availability performance has been as detailed in Table 2.

Table 2 – Western Power's Circuit Availability (% by year)[13]

2000/01	2001/02	2002/03	2003/04	2004/05
98.87	98.86	98.47	98.73	98.77

[10] Ibid, page 141

[11] ACCC, *Statement of principles for the regulation of transmission revenues – Service standard guidelines,* November 2003, page 4, URL http://www.aer.gov.au/content/item.phtml?itemId=660260&nodeId=file4283fe58ce3fa&fn=Guidelines%20(12%20November%202003).pdf (August 2005)

[12] Western Power, *op cit,* August 2005, page 141

[13] Ibid, page 143

On the basis of this historical information Western Power has proposed the circuit availability levels detailed in Table 3 as service standard benchmarks for the coming Access Arrangement period.

Table 3 – Proposed Circuit Availability Service Standard Benchmarks (% by year)[14]

2006/07	2007/08	2008/09
98.67	98.63	98.67

4.1.2 System Minutes Interrupted

Western Power has advocated the use of system minutes interrupted as a performance measure for its meshed network only (i.e. not radial connections) because it:

- Indicates the impact of transmission faults on customers;
- Is normalised by system peak demand and so allows different size systems to be compared; and
- Has existing data to calculate its historical performance.[15]

Western Power has proposed:

- Measuring system minutes interrupted as "the summation of MW Minutes of unserved energy at substations which are connected to the meshed transmission network (which are not radially fed) divided by the system peak MW"[16]. This measure is not included in the ACCC *Statement of Principles for the Regulation of Transmission Revenues – Service Standard Guidelines*;
- Sourcing data for the calculation from Western Power's SCADA and system operation databases;
- Excluding from the calculation:
    - Zone substations connected to the transmission network via radial connections. Western Power proposes excluding these assets because they are "relatively few in number and their performance is dramatically affected by even a single significant event"[17];
    - Unregulated transmission assets;
    - Outages caused by a fault or other event on a 3rd party system; and
    - Force majeure events.

[14] Ibid, page 144

[15] Western Power, *op cit*, August 2005, page 140

[16] Ibid, page 141

[17] Ibid, page 140

- Including in the calculation all unserved energy due to:
    - Outages on "primary transmission equipment"; and
    - All causes other than those events defined as exclusions.[18]

Western Power indicates that its historical system minutes interrupted on its meshed network has been as detailed in Table 4.

Table 4 – Western Power's System Minutes Interrupted (minutes by year)[19]

2000/01	2001/02	2002/03	2003/04	2004/05
6.5	7.8	10.8	7.9	5.8

On the basis of this historical information Western Power has proposed the system minutes interruption levels for its meshed network detailed in Table 5 as service standard benchmarks for the Access Arrangement period.

Table 5 – Proposed System Minutes Interrupted Service Standard Benchmarks (minutes by year)[20]

2006/07	2007/08	2008/09
8.3	8.3	8.3

4.2 DISTRIBUTION SERVICE STANDARD BENCHMARKS

Western Power has proposed using the System Average Interruption Index (SAIDI) as the sole service standard benchmark for its distribution reference services under the Access Arrangement.

Western Power has advocated the use of SAIDI because it:

- Has been the primary reliability measure used for the SWIS in recent years;
- Is well understood by key stakeholders, including customers;
- Is the measure used by Western Power for its network planning and investment evaluation and therefore underpins its expenditure forecasts;
- Covers both the frequency and time for restoring interruptions;
- Has existing data to calculate its historical performance.[21]

[18] Ibid, page 142

[19] Ibid, page 143

[20] Ibid, page 144

[21] Western Power, *op cit*, August 2005, page 140

Western Power has proposed:

- Specifying separate SAIDI targets for its:
    - "Urban" sub-network covering the Perth metropolitan area and Geraldton, Bunbury, Albany and Kalgoorlie; and
    - "Rural" sub-networks covering everything that is not in the "urban" sub-network.

  It is noted that this distinction between "urban" and "rural" sub-networks is:
    - Consistent with that applied in the *Code of Conduct (for the Supply of Electricity to Small Use Customers)*;
    - Different to the classification used in the *Supply Regulations* for defining reliability standards, which classifies the network between Perth CBD, Perth metropolitan area other than CBD, rural and country areas other than areas supplied from an isolated network and isolated networks;
    - Different to the classification used in Western Power's most recent annual reports, which uses Perth CBD, metropolitan area, SWIS rural / country, regional and Pilbara; and
    - Different to the classification used in the Department of Consumer and Employment Protection's annual report, which is the same as Western Power's most recent annual reports other than that the regional and Pilbara areas are classified as Isolated Networks.

  It is also noted that, whereas Western Power is proposing just to use SAIDI:
    - It reported on "outage duration", the System Average Interruption Frequency Index and the Customer Average Interruption Duration Index in its most recent annual reports; and
    - The *Supply Regulations* set reliability standards for both the frequency and average duration of individual interruptions. Western Power's performance against these standards is reported in the Department of Consumer and Employment Protection's annual report.
- Measuring SAIDI as "Over a 12 month period, the sum of the duration of each sustained (greater than 1 minute) customer interruption (in minutes) customer interruption (in minutes) attributable solely to distribution (after exclusions) divided by the average of the total number of connected consumers at the beginning and end of the period"[22]; and

[22] Ibid, page 146

- Excluding from the calculation of SAIDI:
    - o "Major event days in accordance IEEE1366-2004 definitions as adopted by Steering Committee on National Regulatory Reporting Requirements (SCNRRR)"[23]
    - o Outages caused by a fault or other event on a 3rd party system; and
    - o Force majeure events.

The Access Arrangement Information states Western Power's "overall service performance objective is to achieve a 25% improvement in reliability from the June 2004 SAIDI by June 2009 (i.e. the end of the first Access Arrangement period)"[24]. Western Power has used this objective as the basis for setting the SAIDI service standard benchmarks detailed in table 6 for the Access Arrangement period. It appears that Western Power has used the June 2005 SAIDI performance as the base year and applied annual reductions so that an improvement of approximately 24% is achieved over the period.

Table 6 – Proposed Circuit Availability Service Standard Benchmarks (minutes by year)[25]

	Actual	Projected	Proposed Service Standard Benchmarks		
	June 2005	June 2006	June 2007	June 2008	June 2009
SWIS Total	294	289	277	259	224
Urban	256	252	242	226	195
Rural	539	530	509	476	410

It is noted that the SAIDI performance for the year to June 2005 reported in this table of 294 minutes is significantly different from that represented in Figure 3 of the Access Arrangement Information, where the reported SAIDI is graphed to be in excess of 350 minutes.[26]

4.3 APPLICATION OF BENCHMARKS IN SERVICE STANDARDS ADJUSTMENT MECHANISM

The application of the proposed service standard benchmarks to the proposed service standards adjustment mechanism is dealt with in section 4.8 of Western Power's Access Arrangement Information.

[23] Ibid, page 146
[24] Ibid, page 146
[25] Ibid, page 147
[26] Ibid, page 37

Western Power has proposed a "dead band" comprising an "upper bound" and a "lower bound", which are 10 percent above and below the service standard benchmark. It has then proposed a "high limit" and "low limit" which is a further 10 percent above and below the upper and lower bounds respectively.

For Western Power's distribution SAIDI performance:

- Incentive penalties (i.e. where Western Power loses revenue) apply based on a per minute incentive rate where Western Power's annual performance is between the upper bound and the high limit; and
- Incentive rewards (i.e. where Western Power gains revenue) apply based on a per minute incentive rate where Western Power's annual performance is between the lower bound and the low limit.

Similar types of penalties and rewards apply for Western Power's transmission service standards, however the incentive rate for:

- The circuit availability measure is based on each 0.1 percent circuit availability; and
- The system minute interrupted measure is based on each 0.1 system minute interrupted.

It is unclear from Western Power's proposal if its annual performance falls above the upper limit or below the lower limit whether it is then assumed that its performance was at the limit so that either the maximum penalty or reward then applies.

4.4 OTHER STANDARDS

In section 3.6 of its Access Arrangement Information, Western Power identifies the following service obligations and commitments in addition to the service standard benchmarks:

- Quality of supply obligations in the Technical Rules;
- Western Power's Networks Customer Charter, which sets out service standards for residential and small business customers using less than 50 MWh of electricity per year;
- Western Power's customer reliability payment scheme whereby an $80 rebate is paid to residential and small business customers using less than 50 MWh of electricity per year who have a supply interruption of more than 12 hours.[27]

[27] Ibid, pages 147-148

5 SERVICE STANDARDS IN THE NEM JURISDICTIONS

The NEM jurisdictions have introduced a range of jurisdictional-specific service standards for their transmission and distribution NSPs through legislation, regulations, licences and codes to complement the requirements of the National Electricity Rules, including:

- Design planning criteria – these are the standards that an NSP uses to plan and develop its network;
- Average reliability performance standards – these standards define the maximum average duration and frequency of outages allowed across an NSP's network;
- Worst performing feeder standards – these are minimum standards for individual feeders before an NSP must investigate and, where necessary, take remedial action to improve their performance. An NSP may also be required to report on the reliability provided from its worst performing feeders or to its worst serviced customers;
- Guaranteed customer service standards – an NSP is required to make a payment to a customer if it exceeds these standards in recognition that the quality of service that the customer has received is unsatisfactory; and
- Service incentive regimes – these regimes incentivise NSPs to improve their service performance through explicit financial arrangements included in their regulatory control.

This section examines the nature and purpose of each of these types of standards, including where and how they have been practically applied in NSW, Queensland, Victoria and South Australia. The standards in Tasmania and the Australian Capital Territory have not been reviewed as a result of the relatively small size of their markets.

5.1 DESIGN PLANNING CRITERIA

Design planning criteria are the standards that an NSP uses to plan and develop its network. There are two broad approaches that NSPs can take to its design planning:

- A "deterministic" approach involves an NSP building redundancy into its network to enable it to maintain supply for one or more credible contingencies (i.e. faults or outages) on the network. Under an "N-1" planning criterion, an NSP invests to duplicate network components such that, if one component fails, there is one other component that can be used to continue to supply customers without there being a supply interruption. Under the more conservative "N-2" planning assumption, supply would be maintained if there were outages on two network components. These situations contrast with an "N" planning assumption whereby, if a single component failed, there would be no spare component to service customers and their supply may be involuntarily interrupted unless alternative arrangements, such as load switching, can be implemented. The

length of any interruption would depend on the nature of the response required to restore supply; and

- A "probabilistic" approach involves an NSP using simulation studies to estimate the frequency, duration and severity of an outage occurring on a network element, especially at times of peak system demand. The NSP weighs the potential cost of an outage against the probability of it occurring and makes its investment decisions by balancing the cost of investing in the network against the cost of it being exposed to loading levels beyond its network's capacity. An NSP would typically invest under this approach when the quantity and value of its load at risk reaches an unacceptable level, having regard for alternative contingency plans and other arrangements for managing and mitigating the risk. Put another way, an "augmentation proceeds only when the total expected (probability-weighted) cost of not proceeding exceeds the cost of the investment required to remove those costs"[28].

A deterministic approach based on an "N-1" or "N-2" planning assumption builds redundancy into the system and so typically:

- Increases the system security by enabling supply to be maintained following the loss of one or more network components by switching to the available duplicate network component;
- Enables the system to deal with unexpected increases in load or severe weather conditions by drawing on more than one network component;
- Limits exposure to loading levels beyond the system's capability;
- Reduces the likelihood of individual assets becoming overloaded and so increases the potential for assets to remain in service up to and beyond their estimated useful lives;
- Does not create a direct relationship between the planning standard and the actual load at risk – that is, it focuses on the number of interruptions to network assets rather than the consequences for customers of those interruptions;
- Raises the potential for some network components being built to service short periods of peak system demand – this may result in these assets being under-utilised over their operating lives; and
- Involves relatively high capital and maintenance costs by virtue of the duplication built in to the system.

In contrast, under a probabilistic approach where investment decisions are based on an assessment of unserved energy, an NSP generally:

[28] VENCorp, *Submission to ACCC – Electricity Revenue Cap Application for the period 1 January 2003 to 30 June 2008*, April 2002, page 65, URL http://www.vencorp.com.au/docs/VENCorp_Publications/VENCorp%20Revenue%20Cap%20Application%202003%20-%20%2030%20Apr%2002%20-%20Final.pdf (August 2005)

- Accepts an exposure to loading levels beyond its system's capability for limited periods of time, that is, where the capacity of certain assets is insufficient to meet the actual demand, particularly during peak periods;
- Creates a direct relationship between the required planning standard and the actual load at risk - that is, it focuses on the consequences for customers of network interruptions, rather than on the number of interruptions themselves;
- Recognises that peak system demand only occurs for very short periods of time during the year and deems it uneconomic to install the capacity required to meet all extreme loading scenarios;
- Relies on alternative means than duplicating assets to manage individual network components becoming overloaded and to maintain supply to customers, such as load switching or load shedding;
- Accepts the system being relatively highly utilised. In extreme cases, this may result in assets being operated at levels which, in time, reduce their estimated useful lives; and
- Seeks to limit the cost of investing in, and maintaining, assets that may be under-utilised to the minimum efficient level.

In practice, an NSP may use a combination of deterministic and probabilistic approaches in planning its network. For example, a distributor may apply:

- A deterministic approach to key network elements, such as major bulk and zone substations and sub-transmission feeders; and
- A probabilistic approach to other network elements, such as distribution substations and feeders, which by their nature have less load at risk if a network element fails.

The approach chosen by, or mandated for, an NSP to plan and develop its system has wide-ranging consequences, including for the cost of servicing customers. A variety of approaches have been taken across the NEM jurisdictions to the regulatory treatment of design planning criteria for transmission and distribution systems, which are discussed below.

5.1.1 National Electricity Rules

Schedule 5.1 of the National Electricity Rules (NER) details the network performance requirements for transmission and distribution NSPs in the NEM, including in relation to network reliability. Schedule 5.1.2.1 states that:

> *Network Service Providers must plan, design, maintain and operate their transmission networks and distribution networks to allow the transfer of power from generating units to Customers with all facilities or equipment associated with the power system in service and may be required by a Registered Participant under a connection agreement to continue to allow the transfer of power with certain facilities or plant associated with the power system out of service, whether or not accompanied by the occurrence of certain faults (called "credible contingency events").*

The Schedule goes on to define the minimum level of credible contingency events to be considered by the NSPs. The Rules also detail:

- The required processes for developing the transmission and distribution networks, including the need to consult with generators, DNSPs and customers and to apply the ACCC regulatory test in the economic evaluation of transmission network investment decisions; and
- The minimum standards of service for the networks and connections to the networks.

However, as well as the National Electricity Rules, the NEM jurisdictions have each established various additional design planning requirements for their NSPs, which are discussed below.

5.1.2 New South Wales

Distribution

The NSW Minister for Energy recently imposed new deterministic design planning criteria as conditions of the three NSW distribution NSP's (DNSPs) licences.[29] The DNSPs must comply with the criteria for new network elements that they install from 1 July 2007 and for all existing and new network elements from 1 July 2009.

The criteria:

- Are expressed as N, N-1 or N-2 deterministic standards with maximum customer interruption times for each standard associated with the first or second contingency event;
- Differ by types of network element across the distribution system and for the types and size of load that are serviced from the network elements; and
- Are common across the State, so that consistent standards apply to the three NSW DNSPs.

The NSW DNSPs are required, by notice issued under clause 5(1)(a) of the NSW *Electricity Supply (Safety and Network Management) Regulation 2002*, to lodge annual Network Management Plans with the Director-General of the Department of Energy, Utilities and Sustainability. Clause 6(1) of the Code states that "The object of a network management plan is to ensure that the transmission system or distribution system to which it relates provides an adequate, reliable and safe supply of electricity of appropriate quality". Clause 6(2)(c)(ii) of the Regulation requires that the Plan includes details of the "system reliability planning standards on a customer

[29] IPART, *Design, Reliability and Performance Licence Conditions imposed on Distribution Network Service Providers by the Minister for Energy and Utilities,* August 2005, URL

http://www.ipart.nsw.gov.au/documents/DesignReliabilityandPerformanceLicenceConditionsimposedonDNSPsbyMinisterforEnergyandUtilitie.PDF (August 2005)

class or group, or geographic basis, for each distinct voltage level". Clause 2 of Schedule 1 of the Regulation also requires the Plan to include:

> *A description of the planning process employed for the purpose of assessing the adequacy of the transmission or distribution system and the need for development of the transmission or distribution system must include the following:*
>
> *(a) the process used for setting system reliability planning standards and identifying development needs and demand management opportunities,*
>
> *(b) strategies for managing and complying with that process and those standards.*

In the past, the NSW DNSPs each reported their own internally-set planning standards in their Network Management Plans for the purposes of clause 6(2)(c)(ii) of the Regulation. In the future, the DNSPs' Plans will need to comply with the new design planning criteria in their licences.

The NSW DNSPs' licences require them to have an annual independent audit of their compliance with the design planning criteria. They must then submit an annual design planning criteria report to the Minister detailing any network element or classes of network elements that did not comply with the design planning criteria and the remedial action the DNSP intends to take to ensure compliance in the future.

It is expected that the NSW DNSPs will need to incur significant additional capital and maintenance expenditure to meet the new criteria over and above what was approved in their *NSW Electricity Distribution Pricing 2004/05 to 2008/09 – Final Report*. As a result, it is likely that they will apply to their jurisdictional regulator, the Independent Pricing and Regulatory Tribunal, to have the new criteria treated as a "pass through event" for the purposes of this determination.

Transmission

Unlike the NSW DNSP's licences, the NSW transmission network service provider (TNSP), TransGrid's, licence does not provide a detailed specification of the required design planning criteria for its transmission system. Rather, TransGrid described its planning requirements as follows in its 2005 Annual Planning Report:

> *In addition to meeting requirements imposed by the NEC, environmental legislation and other statutory instruments, TransGrid is expected by the NSW jurisdiction to plan and develop its transmission network on an "n-1" basis. That is, unless specifically agreed otherwise by TransGrid and the affected distribution network owner or major directly connected end-use customer, there will be no inadvertent loss of load (other than load which is interruptible or dispatchable) following an outage of a single circuit (a line or a cable) or transformer, during periods of forecast high load.*[30]

[30] TransGrid, *NSW Annual Planning Report 2005*, 2005, page 116, URL http://www.transgrid.com.au/media/TransGrid_APR_2005.pdf (August 2005)

On the basis of the NSW jurisdiction's expectation of it planning and developing on an "N-1" basis, TransGrid has developed deterministic planning criteria "taking into account the historical performance of the components of the NSW system, the sensitivity of loads to supply interruption, and the state of art asset maintenance procedures"[31]. These deterministic planning criteria are detailed in Schedule 2 of TransGrid's Annual Planning Report for 2005.

5.1.3 Queensland

Distribution

The Queensland Government initiated an independent review of the state's electricity distribution system in 2004, following concern about the two DNSPs', ENERGEX and Ergon Energy's, reliability performance during a series of storms and hot weather earlier that year. The resulting "Somerville Report"[32] made wide-ranging findings and recommendations in relation to the distribution systems, including in relation to the DNSPs' design planning standards. In particular, the Report found that the sustained use of probabilistic planning had resulted in ENERGEX's network becoming over-utilised and unable to meet the challenges of high load growth and severe weather conditions. In order to restore contingent capacity into the system it advocated the future use of deterministic planning assumptions as:

- "the application of RAP (i.e. ENERGEX's probabilistic planning methodology) without appropriate safeguards in place and without due regard to reliability has, in the Panel's view, resulted in the over utilisation of significant parts of ENERGEX's network"; and
- "the accepted industry standard for bulk and zone sub-stations is an 'N-1' planning philosophy"[33]. This conclusion was made on the basis of contact with "six of the other major distributors in the NEM and all confirmed that they used a minimum of N-1 (with very few exceptions) as the base planning criterion for bulk and zone supply sub-stations"[34].

The Report recommended that:

- "ENERGEX be required to maintain "N-1" on all bulk supply sub-stations, zone supply sub-stations and sub-transmission feeders. Critical high voltage feeders should also meet "N-1" with the exception of those where ENERGEX can provide satisfactory evidence that this does not put significant numbers of customers at risk. Where ENERGEX chooses to use interconnection to provide "N-1" capacity for single transformer bulk or zone supply sub-stations, it should be required to demonstrate that there is adequate transfer capacity to meet "N-1" in a timely manner"[35]; and

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[31] Ibid, page 119

[32] Independent Panel, *Electricity Distribution and Service Delivery for the 21st Century*, July 2004, page 110, URL http://www.energy.qld.gov.au/independent_report.cfm (August 2005)

[33] Ibid, page 110

[34] Ibid, page 92

[35] Ibid page 113

- "Ergon Energy be required (unless otherwise agreed with major customers) to maintain "N-1" on all bulk supply sub-stations and large zone supply sub-stations (5MVA and above) and sub-transmission feeders". Critical high voltage feeders should also meet "N-1" with the exception of those where Ergon Energy can provide satisfactory evidence that this does not put significant numbers of customers at risk"[36].

In addition, the Report recommended that the two DNSPs be required to prepare and submit to the Government for approval an annual Network Management Plan, setting out how they would plan, manage and operate their systems for the next five years.

The Government accepted the Report's recommendations and required the DNSPs to act on those recommendations that were directed to them. It also introduced the Queensland *Electricity Industry Code*, under which it mandated the requirement for the annual Network Management Plans. The Code requires the Plans to contain "a statement of the distribution entity's planning policy and a qualitative assessment of its compliance with that policy"[37]. The Code also requires a DNSP to evaluate its performance for the proceeding year in its Network Management Plan.

In their 2005/06 Network Management Plans, ENERGEX and Ergon Energy have both adopted deterministic planning approaches for the "backbone" of their networks, consistent with the Somerville Report's recommendations, supported by probabilistic planning elsewhere.[38] For example, ENERGEX states in its Plan that:

> *The change to a summer maximum demand peak, coupled with highly utilised network and more demand for electricity security requirements, has caused ENERGEX to change its planning philosophy to move away from RAP and towards the deterministic N-1 planning for the 'backbone' of the network. The N-1 planning criteria will apply to all bulk supply substations, zone substations and sub-transmission feeders. While RAP will continue to be used as a planning tool for the lower 'levels' of the network, the threshold of load at risk and the duration of the risk will be reduced substantially.*[39]

The Queensland DNSPs' design planning criteria are similar in nature to those now mandated in NSW but:

- Are proposed by the DNSPs to the regulator in their Network Management Plans, rather than being mandated in licence conditions (although the Government's

[36] Ibid, page 113

[37] Queensland Government Department of Energy, *Electricity Industry Code*, 9 December 2004, clause 3.2(d), URL http://www.energy.qld.gov.au/zone_files/Electricity/electricity_industry_code.pdf (August 2005)

[38] Energex, *Annual Network Management Plan 2005/06 to 2009/10*, July 2005, page 21, URL http://www.energex.com.au/pdf/network/Annual_Network_Management_Plan.pdf (August 2005)

Ergon Energy, *Network Management Plan: Part A Electricity Supply for regional Queensland, 2005/06 to 2009/10,* July 2005, page 30, URL http://www.ergon.com.au/about_us/download/NMP%20Part%20A%20Final.pdf (August 2005)

[39] Energex, *Annual Network Management Plan 2005/06 to 2009/10*, July 2005, page 20, URL http://www.energex.com.au/pdf/network/Annual_Network_Management_Plan.pdf (August 2005)

acceptance of the Somerville Report's recommendations makes it clear that deterministic criteria are to be applied);

- Are not identical across the State, with ENERGEX and Ergon Energy having different criteria, whereas there are uniform standards in NSW;
- Apply immediately, rather than being phased in over time, as is the case in NSW; and
- There is no specific monitoring and reporting regime for the Queensland DNSP's performance against their design planning criteria.

Transmission

Powerlink is the Queensland TNSP and it is licensed under a transmission authority by the Queensland Government. Although this authority is not a public document, Powerlink indicated in its Annual Planning Report for 2005 that the authority requires it to meet an N-1 planning criterion. The Report states that:

> *It is a condition of Powerlink's transmission authority that Powerlink plan and develop its transmission grid in accordance with good electricity industry practice such that power quality and reliability standards in the NER are met for intact and outage conditions, and the power transfer available through the power system will be adequate to supply the forecast peak demand during the most critical single network element outage, unless otherwise varied by agreement.*[40]

Powerlink has developed its design planning criteria on the basis of this N-1 requirement, which is a key element in the development of its 2005 Annual Planning Report.

5.1.4 Victoria

Distribution

Clause 3.5.1 of the Victorian *Electricity Distribution Code* requires each of the five Victorian DNSPs to:

> *submit to the Office (i.e. the Essential Services Commission) an annual report called the 'Distribution System Planning Report' detailing how it plans over the following five calendar years:*
>
> *(a) To meet predicted demand for electricity supplied through its subtransmission lines, zone substations and high voltage lines; and*
>
> *(b) To improve reliability to its customers.*[41]

[40] Powerlink, *Annual Planning Report 2005*, 2005, page 11, URL http://www.powerlink.com.au/data/portal/00000005/content/14798001120085919564.pdf (August 2005)

[41] ESC, *Electricity Distribution Code,* January 2002, page 11, URL http://www.esc.vic.gov.au/PDF/2002/DistributionCodeJan02.pdf (August 2005)

Clause 3.5.2 of the Code requires that the DNSPs' reports must include, amongst other things, details of their planning standards.

In this respect, the Distribution System Planning Report is the Victorian equivalent of the NSW and Queensland Network Management Plans however unlike:

- NSW where the new licence conditions mandate the detailed planning criteria that the NSW DNSPs must apply; and
- Queensland where the Government's adoption of the Somerville Report's recommendations require the Queensland DNSPs to adopt a deterministic planning approach, albeit with discretion about the detail of the criteria themselves;

the Victorian DNSPs have full discretion to decide the nature of the planning criteria they will include in their Distribution System Planning Report and will apply across their networks. The result is that each of the five Victorian DNSPs has chosen to combine both "probabilistic" and "deterministic" approaches in their system planning.[42] For example, Powercor explains its approach to system planning in its December 2004 Distribution System Planning Report as follows:

> *In some Australian jurisdictions, strict deterministic planning standards (for instance, "N-1") are applied across transmission and distribution system development. Powercor, however, takes into account a probabilistic approach when planning system development.*
>
> *Under this combined planning approach, the strict deterministic criterion is relaxed, and simulation studies are undertaken to assess the amount of energy that would be supplied if an element of the network were out of service. The application of this approach can lead to the deferral of significant network capital works that would otherwise proceed if a deterministic standard were strictly applied. This is because:*
>
> - *in a network planned in accordance with the probabilistic approach, there are conditions under which all the load cannot be supplied with a network element out of service (hence the N-1 criterion is not met); however*

[42] Powercor Australia, *Distribution System Planning Report,* December 2004, URL http://www.powercor.com.au/docs/2004_DSPR_v3.pdf (August 2005)

Citipower, *Distribution System Planning Report,* December 2004, URL http://www.citipower.com.au/body/pdffiles/distribution/CitiPower%20Distribution%20Planning%20Report%202004.pdf (August 2005)

AGL, *Distribution System Planning Report,* December 2004, URL http://www.agl.com.au/NR/rdonlyres/xmqgcajpd5cdhmgihcltjjreerzhoz44zsavgwhmeaifucyokkqkxu6l36mfpqnjstafupliirdauxlhcqug7pai3a/AGLE_DSPR04.pdf (August 2005)

TXU, *Distribution System Planning Report 2005-2009,* December 2004, URL

http://www.sp-ausnet.com.au/CA256FE40021EF93/Lookup/PlanningRep/$file/DSPR%5f2005%2d2009.pdf (August 2005)

United Energy, *Distribution System Planning Report 2004,* December 2004, URL

http://www.ue.com.au/industry/download/Distribution%20System%20Planning%20Report%202004.pdf (August 2005)

- *under these conditions, the actual load at risk is very small when considering the probability of a forced outage of a particular element of the network*.[43]

The result is that the Victorian DNSPs generally apply probabilistic approaches but have regard for the deterministic outcomes that result.

Transmission

VENCorp is the Victorian TNSP responsible for planning Victoria's transmission network in accordance with the NER as well as its licence, Victorian legislation and the Victorian *Electricity System Code*. In its *Electricity Transmission Network Planning Criteria*, VENCorp's describes its preference for a probabilistic planning approach as follows:

> *VENCorp applies a probabilistic planning approach to evaluate the risks associated with transmission constraints, where practicable, except in those cases where VENCorp is required to meet a performance standard under Schedule 5.1 of the Code……..*
>
> *A market simulation model is used to determine the hourly dispatch for a large number of scenarios to capture the range of variations of these key parameters. Critical transmission plant loadings are then determined on an hour by hour basis and compared with the network capability ratings. This allows the risks associated with the transmission system to be identified.*
>
> *A range of statistics is then used to build a comprehensive picture of the risks associated with different levels of transmission augmentation…..*
>
> *The "energy at risk" is a critical parameter in justifying any network investment. The probabilistic approach to network planning aims to ensure that an economic balance is struck between:*
>
> - *the cost of providing additional network capacity to remove any constraints; and*
> - *the cost of having some exposure to loading levels beyond the network's capability.*
>
> *In other words, recognising that very extreme loading conditions may occur for only a few hours in each year, it may be uneconomic to provide additional network capacity to meet all anticipated loading requirements. Rather, the probabilistic approach indicates that network augmentation should take place only when its cost is less than or equal to the value of the reduction in energy at risk.*

[43] Powercor Australia, *Distribution System Planning Report,* December 2004, page 13, URL http://www.powercor.com.au/docs/2004_DSPR_v3.pdf (August 2005)

> *The probabilistic approach is more compatible and consistent with a competitive market environment, since it allows an economic assessment to be made on the benefits achieved through network augmentation compared to net costs with Participants (including consumers) may sustain.*[44]

VENCorp therefore applies a probabilistic analysis of energy at risk, rather than a deterministic approach, to its transmission investment decisions.

5.1.5 South Australia

Distribution

The South Australian DNSP, ETSA Utilities, must comply with a range of regulatory guidelines issued by the Essential Services Commission of South Australia (ESCOSA). Guideline 12 requires ETSA Utilities to publish an annual Electricity System Development Plan identifying the main foreseeable constraints in its distribution system and a basis for addressing them.[45] Amongst other things, the Plan must include "a summary of the system planning and reliability criteria used by ETSA Utilities for determining when system augmentation or extensions are deemed to be required, and how these planning and reliability criteria relate to the planning and reliability requirements of the *National Electricity Code* (NEC)"[46].

Clause 1.2.3.1 of the South Australian *Electricity Distribution Code* includes a set of "Time to restore supply" standards for ETSA Utilities in planning and operating its system.[47] These standards represents the maximum times that ETSA Utilities must take to restore given percentages of supply in different geographic areas caused by interruptions on the high voltage distribution network.

ETSA Utilities notes in its 2005 Electricity System Development Plan that it "has applied the reliability requirements of the EDC (i.e. *Electricity Distribution Code*) to develop the network planning criteria. When the forecast load exceeds the planning criteria a constraint is defined and a suitable solution is sought"[48]. By applying this approach, ETSA Utilities has established deterministic *Network Planning Criteria* for each of its sub-transmission system and its substations, where either an N-1 or N criteria is set with a defined associated supply restoration time.[49]

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[44] VENCorp, *Electricity Transmission Network Planning Criteria*, July 2003, pages 2-3, URL http://www.vencorp.com.au/docs/Electricity_Transmission/Transmission_Planning/Elec%20Trans%20Plan%20Criteria%20June2003.pdf (August 2005)

[45] ESCOSA, *Demand Management for Electricity Distribution Networks: Electricity Industry Guideline No. 12,* September 2003, URL http://www.saiir.sa.gov.au/webdata/resources/files/030901-O-Guideline12-DemandManagement.pdf (August 2005)

[46] Ibid, page 8

[47] ESCOSA, *Electricity Distribution Code,* January 2003 Refer to http://www.saiir.sa.gov.au/webdata/resources/files/050623-D-ElecDistCodeEDC05.pdf (August 2005)

[48] ETSA Utilities, "Electricity System Development Plan", 2005, page 5 http://www.etsautilities.com.au/pdf/ESDP_report_2005_Issue_1_050628.pdf (August 2005)

[49] Ibid, pages 7 to 9

The South Australian approach therefore shares some elements of the approaches applied in the three other states. It is similar to:

- The NSW approach in that it defines maximum customer interruption times for the DNSPs; and
- The Victorian and Queensland approaches in that it leaves it to the DNSP's discretion to determine the detail of the design planning standards.

Transmission

Clause 6.1(a) of ElectraNet's transmission licence requires it to "comply with all applicable provisions of the *Electricity Transmission Code* (including any service standards)"[50].

Clause 2.2.2 of the *Electricity Transmission Code* requires ElectraNet to plan and develop its transmission system to provide specified levels of transmission services to connection points that fall within five load categories. Each load category specifies reliability standards that:

- Require ElectraNet not to contract for an amount of agreed maximum demand greater than 100 percent of installed line capacity; and
- Specify the amount of line, transformer or other capacity that must be provided to meet contingency events. These standards are expressed in N-1 and N-2 terms.

ElectraNet must use its best endeavours to meet the standards within 12 months or in any event within three years.

ESCOSA is responsible for allocating a load category to each connection point and these are key elements in ElectraNet's planning criteria, which it explains in its *Annual Planning Review 2004-2014* as follows:

> *The planning criteria on which the system is developed are predominantly 'deterministic'; that is, the need for reinforcement is initiated when a pre-determined set of conditions is met (for example, peak load + single contingency = equivalent emergency rating).*[51]

The *Annual Planning Review 2004-2014* provides a set of tables that detail ElectraNet's reliability and security guidelines for investigating development options at connection points. When the criteria are violated, ElectraNet examines proposals to take action to ensure that they are met in the future.

[50] ESCOSA, *Electricity Transmission Licence – ElectraNet Pty Ltd,* URL http://www.escosa.sa.gov.au/webdata/resources/files/030527-D-ElectranetTransLicence.pdf (August 2005)

[51] ElectraNet, *Annual Planning Review 2004-2014*, 2004, page 23, URL http://www.electranet.com.au/news/home.html (August 2005)

5.2 AVERAGE RELIABILITY PERFORMANCE STANDARDS

The reliability of supply for a DNSP concerns the number and duration of interruptions that a customer experiences to its electricity supply. There are four common measures of supply reliability:

- *System Average Interruption Duration Index* (SAIDI) – this is the total number of minutes, on average, that a customer is without electricity in a year and is calculated as the sum of the duration of each sustained customer interruption (measured in minutes), divided by the total number of customers for the year. A sustained customer interruption is one that lasts for at least one minute;
- *System Average Interruption Frequency Index* (SAIFI) – this is a measure of the average number of times a customer's supply is interrupted in a year and is calculated as the total number of sustained customer interruptions divided by the total number of customers for the year;
- *Customer Average Interruption Duration Index* (CAIDI) – this is a measure of the average duration of each sustained customer interruption and is calculated as the sum of the duration of each sustained customer interruption (in minutes) divided by the total number of sustained customer interruptions. It is therefore SAIDI divided by SAIFI; and
- *Momentary Average Interruption Frequency Index* (MAIFI) – this is the average number of momentary interruptions per customer per year of one minute or less and is calculated as the total number of momentary customer interruptions divided by the total number of customers for that year.[52]

The Utility Regulators Forum, comprising Australia's economic regulators, has endorsed the use of these four reliability measures however it has identified a number of issues with their practical application, including that they:

- Rely on the DNSP's information systems being able to link the physical network to customer numbers in order for the reliability measures to be accurate. Some DNSPs do not have the capability to measure and record momentary interruptions of less than one minute, which prevents them using MAIFI as a reliability measure;
- Report system-wide averages, whereas reliability can vary significantly between the same type of feeders across a system;
- Should be supported by information on the causes of interruptions in order to be useful in improving reliability over time; and

[52] Utility Regulators' Forum, *National Regulatory Reporting for Distribution and Retailing Businesses*, March 2002, page 6, URL http://www.accc.gov.au/content/item.phtml?itemId=332190&nodeId=file422f80656d999&fn=National%20regulatory%20reporting%20for%20electricity%20distribution%20and%20retailing%20businesses.pdf (August 2005)

Note that this report was prepared for the Forum by the Steering Committee on National Regulatory Reporting Requirements (SCNRRR). It is noted that the Economic Regulation Authority is a member of the Forum but that there was no representation from Western Australia on the Steering Committee.

- Do not analyse the nature or size of the loads that have been affected by a supply interruption.[53]

Nevertheless, SAIDI and SAIFI (and therefore CAIDI) are used throughout the NEM jurisdictions as a basis for setting reliability standards to assess DNSPs' reliability performance and to compare their performance with other DNSPs over time. Several jurisdictions use SAIDI and SAIFI (and thereby CAIDI) measures as average reliability performance standards. These standards typically:

- Represent mandatory minimum levels that a DNSP must achieve however each DNSP typically chooses to set lower (i.e. harder and better) internal targets in order to ensure that it meets the mandatory minimum standards;
- Differ between "feeder types" but are common for each "feeder type" across a DNSP's system. The NEM jurisdictions have adopted the following feeder categorisation endorsed by the Utility Regulators Forum:
    - CBD – "A feeder supplying predominantly commercial, high-rise buildings, supplied by a predominantly underground distribution network containing significant interconnection and redundancy when compared to urban areas";
    - Urban – "A feeder, which is not a CBD feeder, with actual maximum demand over the reporting period per total feeder route length greater than 0.3 MVA/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 200km".[54]
- Are not standards that individual customers are entitled to receive from their DNSP or that DNSPs must achieve for each and every individual feeder but rather are average system-wide standards across all customers and feeders of a particular type; and
- Provide a basis for monitoring and reporting DNSP's actual reliability performance and for analysing trends in that performance over time and for comparing performance with that of DNSPs within and between jurisdictions in order to gauge relative service quality being delivered.

A key element of the minimum average reliability standards that have been set in the NEM jurisdictions is the exclusions policy. This policy specifies the types of supply interruptions that the DNSP can exclude from its reported reliability performance. Exclusions are typically justified because the interruption is:

- Considered to be so large or unusual that if it were reported it would distort the DNSPs' underlying reliability performance; or

[53] Ibid, page 4

[54] Ibid, page 7

- Caused by an event that is outside of the DNSPs' normal operating conditions and therefore its control.

However, developing an appropriate exclusions policy can be problematic because:

- There are significant differences within and between DNSPs' operating environments, which might mean an interruption that may be "normal" in one system, or part of a system, may be unusual or extreme in another;
- Allowing exclusions may be seen to be incentivising a DNSP not to prepare appropriately for the potential for major events that can interrupt supply or to be incentivising them not to respond appropriately to major events when they occur;
- Customers experience "unadjusted" reliability outcomes and removing long interruptions from reliability performance reporting may be seen as simply ignoring the occasions when customers receive the very worst service;
- It typically allows a DNSP to exclude large or unusual events that are outside of its control but does not adjust for periods when the DNSP has avoided "normal" interruptions for longer periods than would "usually" be expected; and
- If an exclusions policy is not uniformly applied, including between jurisdictions, then it is difficult to compare, on a like-for-like basis, reliability results of different DNSPs and so accurately understand their relative performance.

The Utility Regulators Forum considered that the appropriate way of dealing with these types of issues, while recognising the merit in allowing exclusions to enable DNSPs to report their underlying reliability performance, is to report "raw", unadjusted reliability outcomes as well as outcomes adjusted for allowed exclusions. The Forum endorsed a "national" exclusions policy in 2002, which allows DNSPs to exclude:

- Momentary outages of less than one minute;
- Transmission outages;
- Outages caused by directed load shedding;
- Outages in accordance with a "three minute rule" covering outages that:
    - "exceed a threshold SAIDI of three minutes
    - are caused by exceptional natural or third party events
    - the DNSP cannot reasonably be expected to mitigate the effect of the event on interruptions by prudent asset management".[55]

Despite the Forum's endorsement, this exclusion policy has not been exclusively adopted across the NEM jurisdictions because of concerns that the three minute rule:

[55] Ibid, page 7

- Is subjective as it relies on the regulator or the DNSP making a judgement about the types of events that will be excluded; and
- Potentially disadvantages large, regionally dispersed DNSPs by making it difficult for them to claim exclusions because their outages tend to be geographically isolated. It would take an extremely large outage to achieve a system-wide average interruption of three minutes or more.

As well as focussing on the number and duration of outages, some TNSP's monitor and report on:

- The number of loss of supply events of more than a defined period, such as 0.2 minutes and 0.1 minutes; and
- The percentage of interruptions not restored within a defined period.

TNSPs also monitor and report on their reliability by reference to:

- Transmission circuit availability, being the percentage of time that the transmission system is in an operating state;
- The amount of energy in MWh not supplied lost to customers.

The nature of the distribution and transmission reliability performance standards that apply in NSW, Queensland, Victoria and South Australia are discussed below.

5.2.1 New South Wales

Distribution

The NSW DNSPs' licences include minimum average reliability standards based on SAIDI and SAIFI that are:

- Set by CBD, urban, short and long rural feeders;
- Set for the 2005/06-2010/11 period with significant improvement required from year to year (i.e. the standards reduce each year); and
- Different for the three NSW DNSPs, although the businesses' standards converge for each feeder type up to 2010/11.

The licence allows the NSW DNSPs to exclude from their reliability reporting momentary interruptions and outages caused by failures of the transmission system or load shedding, as endorsed by the Utility Regulators Forum. However, rather than applying the "three minute rule", NSW has adopted a statistically-based approach, known as the "2.5 beta rule", whereby interruptions are excluded if they are extreme having regard for the DNSP's own past performance. The exclusion threshold is calculated as the average of the logarithmic distribution of SAIDI plus 2.5 times the standard deviation of the average.[56]

[56] For a detailed explanation of the "2.5 beta rule" refer to:

This approach is seen to address the main short-comings of the Utility Regulators Forum's "three minute rule" that previously applied in NSW and to have the advantages of being:

- Equitable between DNSPs because it only allows interruptions to be excluded that are "outliers" for that DNSP based on its own historic reliability performance; and
- Objective because it is a statistical measure based on a DNSP's historic reliability performance - there is therefore no need for judgement to be applied by any party to the calculation.

The NSW DNSPs' licences require them to have an annual independent audit of their compliance with the average reliability performance standards. They must then submit a quarterly reliability standards report to the Minister detailing their performance against the standards, the reasons for any non-compliance and the remedial action they intend to take to ensure compliance in the future.

It is also noted that the NSW DNSPs report on their annual performance using the Utility Regulator Forum's framework in their Electricity Performance Reports.

Transmission

The NSW TNSP TransGrid does not have mandated minimum average reliability standards of the kind that are specified in the NSW DNSPs' licences. However, it sets internal targets for:

- The number and duration of unplanned outages;
- Energy not supplied; and
- Transmission circuit availability.

TransGrid reports on its reliability performance in its annual *Network Management Plan*[57] and in its annual *Electricity Network Performance Report*[58]. It also reports on its performance for the purposes of the ACCC's service incentive regime, as discussed in section 5.5 below.

Kowalewski, D.A., *A Comparable Method for Benchmarking the Reliability Performance of Electric Utilities*, 2002 IEEE Power Engineering Society Summer Meeting, URL http://ieeexplore.ieee.org/xpl/tocresult.jsp?isNumber=22355 (August 2005)

[57] Transgrid, *Network Management Plan 2001-2006*, 2001, URL http://www.transgrid.com.au/publications/ (August 2005)

[58] Transgrid, *Electricity Networks Performance Report 2003-2004*, October 2004, URL http://www.transgrid.com.au/publications/ENPR_2003-04_Dec_04.pdf (August 2005)

5.2.2 Queensland

Distribution

Prior to the Somerville Report in 2004, ENERGEX and Ergon Energy reported their SAIDI, SAIFI and CAIDI performance to the Queensland Competition Authority (QCA) based on a "5 percent rule" whereby the DNSPs were allowed to exclude outages that impacted more than 5 percent of their customer base. However, the Somerville Report discounted the merits of this approach, noting that:

> *The Panel believes that the current approach is arbitrary and that a more statistically sound methodology should be investigated. For the purposes of comparison, the Panel decided to use unadjusted data and to rely on peer group assessments to put the performance of Ergon Energy and ENERGEX in context.* [59]

It went on to add:

> *Excluding events which exceed 5% of customers from SAIDI, SAIFI and CAIDI reporting distorts the reliability statistics. It is recognised that some consideration needs to be given to excluding extreme events when determining compliance with set standards. This normalisation does not, however, assist customers.*[60]

As a consequence, the Report recommended that:

> *ENERGEX, Ergon Energy and the QCA consider applying a statistically-based reliability approach to SAIDI, SAIFI and CAIDI normalisation.*[61]

Following a detailed assessment of ENERGEX and Ergon Energy's reliability performance, the Report also recommended that:

> *Ergon Energy should bring its SAIDI, SAIFI and CAIDI for short rural and urban feeders to the standard equivalent to its peer group;*
>
> *Government and Ergon Energy should agree performance targets for the long rural feeders, taking into account their unique nature. It is further recommended that Ergon Energy be required to develop a programme to achieve this in a reasonable timeframe. This requirement should included in the regulatory framework;*

[59] Independent Panel, *Electricity Distribution and Service Delivery for the 21st Century*, July 2004, page 65, URL http://www.energy.qld.gov.au/independent_report.cfm (August 2005)

[60] Ibid, page 81

[61] Ibid, page 82

> *ENERGEX should be required to bring its SAIDI, SAIFI and CAIDI for urban and short rural feeders to the standard equivalent to its peer group. A further recommendation is that ENERGEX be required to develop a programme to achieve this in a reasonable timeframe. This requirement should be included in the regulatory framework.*[62]

The Queensland Government accepted the Somerville Report's recommendations and included new minimum reliability standards in the Queensland *Electricity Industry Code* that came into effect on 1 January 2005. Like the standards that were later introduced in NSW, these are SAIDI and SAIFI standards that are:

- Set by CBD, urban, short and long rural feeder types;
- Set for the 2004/05-2009/10 period with significant improvement required from year to year; and
- Different for ENERGEX and Ergon Energy, although the standards for each feeder type for the businesses converge up to 2009/10.

The Queensland Government also responded to the Somerville Report's recommendation that a statistically-based approach be examined for exclusions by adopting the "2.5 beta rule" that was later applied in NSW, whereby interruptions are excluded if they are extreme having regard for the DNSP's own past performance.

The Code also requires the Queensland DNSPs to submit quarterly performance reports to the licensing regulator (i.e. the Director-General of the Department of Energy) addressing their compliance with the minimum service standards. They must also have an annual audit undertaken of their reporting against the standards.

It is also noted that in its April 2005 *Final Determination – Regulation of Electricity Distribution* for the 2004/05-2009/10 regulatory period, the QCA (as the economic regulator) required the Queensland DNSPs to report their "raw" reliability performance, and their performance net of the "2.5 beta rule" exclusions policy, for the purposes of on-going performance monitoring and reporting.[63]

Transmission

Powerlink does not have mandated minimum average reliability standards of the kind that are specified in the Queensland *Electricity Industry Code* for the Queensland DNSPs. However, it sets internal targets for:

- The number and duration of unplanned outages resulting in a loss of supply to customers;
- Energy not supplied;

[62] Ibid, page 82

[63] QCA, *Final Determination – Regulation of Electricity Distribution*, April 2005, page 221, URL http://www.qca.org.au/www/welcome.cfm (August 2005)

- Transmission circuit availability;
- The total number of loss of supply events of more than 0.2 minutes and 0.1 minutes; and
- The percentage of unplanned connection point interruptions not restored within 3 days.[64]

It also reports on its performance for the purposes of the ACCC's service incentive regime, as discussed in section 5.5 below.

5.2.3 Victoria

Distribution

In its September 2000 *Electricity Distribution Price Determination 2001-2005*, which followed its review of the Victorian DNSPs' 1999 reliability performance, the ESC (then the Office of the Regulator General) noted that:

> *Given that performance has exceeded the minimum standards, it is questionable whether setting a numerical minimum standard would have any additional effect on the distributors' performance. The Office considers that the preferred approach is to set more realistic targets for performance and to provide additional incentives in the form of financial rewards and penalties to encourage further improvement, rather than observance of the minimum. It will also continue to monitor the performance of the distributors.*
>
> *Where a distributor provides an unacceptably low level of reliability, the Office will consider whether there is a case for taking action against the distributor for breaching its licence conditions. It will rely on the good asset management provisions of the Distribution Code in such cases.* [65]

As a consequence, the minimum reliability standards that had been included in the Victorian *Electricity Distribution Code* were repealed. They were replaced with a requirement under clause 5.1 of the Code for the DNSPs to publish annual reliability targets by feeder type for the following year, including SAIDI targets for planned and unplanned interruptions and SAIFI, MAIFI and CAIDI targets. Clause 5.2 of the Code then requires the DNSP's to "use their best endeavours to meet targets required by the Price Determination and targets published under clause 5.1 of the

[64] ACCC, *Transmission Network Service Provider (TNSP) – Service Standards - Stage 1 – Discussion Paper*, March 2002, pages 16-17 and Appendix F, URL –

http://www.aer.gov.au/content/item.phtml?itemId=660268&nodeId=file428405e2204ad&fn=Stage%201%20discussion%20paper%20(March%202002).pdf (August 2005)

[65] ESC, *Electricity Distribution Price Determination 2001-2005*, volume 1, September 2002, page 18-19, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/detervol1sep00.pdf (August 2005)

Code and otherwise meet reasonable customer expectations of reliability of supply"[66].

The ESC included in Appendix C of its *Electricity Distribution Price Determination 2001-2005* a set of reliability targets for the DNSPs. These targets form the basis of the ESC's financial incentive regime, under which the DNSPs get rewarded or penalised if their actual reliability performance is above or below the ESC's targets. The nature of the financial incentive regime is discussed further in section 5.5.

Each year between 2001 and 2005 the Victorian DNSPs have published their annual reliability targets in accordance with their requirements under clause 5.1 of the *Electricity Distribution Code*. [67] In many cases, these targets have replicated those set by the ESC in Appendix C of its *Electricity Distribution Price Review 2001-2005* but this is not always the case. In some years, a DNSP has set a higher (i.e. worse) standard of performance than that targeted by the ESC.

In its June 2005 *Electricity Distribution Price Review 2006-10 Draft Decision*, the ESC indicated its intention to continue to apply the approach it used for the 2001-2005 period. However, for the 2006-2010 period, the ESC is not proposing to incorporate annual improvements in the reliability targets for the purpose of the financial incentive regime.[68]

The ESC's *Electricity Distribution Price Review 2001-2005* allows the DNSPs to apply to the ESC to have certain supply interruptions excluded from their reliability performance for the purposes of the financial incentive regime. These exclusions are also reflected into the DNSPs' reliability performance for the purposes of the *Comparative Performance Report* issued by the ESC, which compares the DNSPs' actual performance against their own targets and the targets set for the purposes of the ESC's financial incentive regime.

The ESC's exclusion arrangements for the 2001-2005 period are generally consistent with the Utility Regulators Forum interruption policy, except that it does not apply the "three minute rule". Instead, the ESC allows an exclusion if the DNSP

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[66] ESC, *Electricity Distribution Code*, January 2002, clause 5.2, URL http://www.reggen.vic.gov.au/PDF/2002/DistributionCodeJan02.pdf (August 2005)

It is noted that, as a level of protection to customers, the Victorian *Electricity Industry Act 1993* gives the ESC powers to vary standards that present actual or possible disadvantage to a class of customers.

[67] Refer to the following for details of the five DNSPs current reliability targets:

Powercor – http://www.powercor.com.au/infocentre/fs_electricity.html (August 2005)

Citipower – http://www.citipower.com.au/ (August 2005)

AGL - http://www.agl.com.au/AGLNew/About+AGL/Energy+networks/AGL+Electricity+Networks/Network+performance/Reliability+targets+2005.htm (August 2005)

TXU - http://www.sp-ausnet.com.au/CA256FE40020993B/page/Distribution-Your%20supply-Reliability?OpenDocument&1=100-Distribution~&2=200-Your+supply~&3=200-Reliability~ (August 2005)

United Energy - http://www.ue.com.au/industry/supply_reliability/sr_level_targets.htm (August 2005)

[68] ESC, *Electricity Distribution Price Review 2006-10*, Draft Decision, June 2005, page 34, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/EDPR_DraftDecisionJune2005.pdf (August 2005)

can demonstrate "widespread supply interruptions due to rare events, which were not reasonably able to be foreseen and, to the extent that the distribution business was not reasonably able to mitigate their impact"[69].

In its Draft Decision for the 2006-2010 period, the ESC has proposed replacing the "widespread, rare and unforeseeable" exclusion provisions because they are seen to be administratively complex and costly for both the ESC and the DNSPs. The ESC has proposed introducing a new exclusions policy based on a "Daily unplanned interruption frequency threshold". Under this approach, thresholds will be set for each DNSP based on 2.7 standard deviations from the mean of the lognormal distribution of the daily SAIFI. When the SAIFI exceeds the threshold for a day, the day's reliability data will be replaced with the mean annual reliability data for the purposes of the financial incentive regime and the Guaranteed Service Level regime.[70]

The ESC publishes annual *Comparative Performance Reports* that detail and analyse the Victorian DNSPs' reliability of supply, including against their reliability targets.[71] The intention of these reports is to provide:

- The DNSPs with an incentive to improve their performance relative to their counterparts; and
- Customers with comprehensive public information about the DNSPs' performance.

The ESC's Draft Decision for the 2006-2010 regulatory period has proposed including a number of additional requirements in the Comparative Performance Report, including for the DNSPs to:

- Report on the annual duration of interruptions experienced by the 15 percent of customers experiencing the longest time off supply for the year; and
- Provide a detailed breakdown of the causes of unplanned interruptions.[72]

It is also noted that the ESC reports on the Victorian DNSPs annual performance using the Utility Regulator Forum's framework.

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[69] ESC, *Electricity Distribution Price Review 2001-2005*, Volume 1, September 2000, page 242, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/detervol1sep00.pdf (August 2005)

[70] ESC, *Electricity Distribution Price Review 2006-10*, Draft Decision, June 2005, page 117 to 119, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/EDPR_DraftDecisionJune2005.pdf (August 2005)

[71] For the ESC's latest performance report refer to – http://www.reggen.vic.gov.au/apps/page/user/pdf/RPT_04ElecDistBusinessesCompPerformReportFullFinalJul2005.pdf (August 2005)

[72] ESC, *Electricity Distribution Price Review 2006-10*, Draft Decision, June 2005, pages 34-35, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/EDPR_DraftDecisionJune2005.pdf (August 2005),

Transmission

In Victoria, VENCorp is responsible for transmission planning and SP AusNet (formerly known as SPI PowerNet) is the transmission asset owner, manager and operator. As a consequence, SP AusNet's performance accountabilities are more limited than in other states where the TNSPs have integrated planning, management and operational responsibilities.

VENCorp and SP AusNet have a Network Agreement under which SP AusNet pays a rebate to VENCorp when network elements are not available for service. SP AusNet is required to report against targets for the availability of transmission circuits and other assets.[73]

SP AusNet also reports on its performance for the purposes of the ACCC's service incentive regime, as discussed in section 5.5 below.

5.2.4 South Australia

Distribution

The Essential Services Commission of South Australia (ESCOSA) issued its *2005 - 2010 Electricity Distribution Price Determination* for ETSA Utilities' distribution network in April 2005. As part of its determination, ESCOSA introduced new reliability standards, which were reflected into the South Australian *Electricity Distribution Code* with effect from 1 July 2005. The new clause 1.2.3.1 of the Code sets out:

- Maximum average supply restoration standards for unplanned interruptions on the high voltage distribution network; and

- Minimum SAIDI and SAIFI average reliability standards based on planned and unplanned interruptions of more than 30 seconds on the low and high voltage distribution networks.

Both of these standards are expressed as applying to defined geographic areas, rather than specific types of feeders, and ETSA Utilities is obliged to use its best endeavours to meet the standards. Importantly, the Code makes very limited provision for exclusions from the stated standards. As ESCOSA noted in its final determination:

> *The Commission's determination is to include all sustained interruptions, except those caused by transmission and generation failures, and those caused by disconnections during emergency situations. Other causes of*

[73] ACCC, *Transmission Network Service Provider (TNSP) – Service Standards, Stage 1 – Discussion Paper*, March 2002, pages 17-18 and Appendix F available at –

http://www.aer.gov.au/content/item.phtml?itemId=660268&nodeId=file428405e2204ad&fn=Stage%201%20discussion%20paper%20(March%202002).pdf (August 2005)

interruptions, including those caused by weather or other factors outside ETSA Utilities' direct control (e.g. third party events), will be captured in the performance data.[74]

Clause 1.2.5 of the *Electricity Distribution Code* requires ETSA Utilities to report annually to ESCOSA on its performance against, amongst other things, the reliability standards. Following the release of its Final Determination, and in conjunction with its amendment of the *Electricity Distribution Code*, ESCOSA has re-issued its guideline for *Electricity Regulatory Information Requirements – Distribution*[75]. This guideline details the information that ETSA Utilities must report under clause 1.2.5, which includes the following reliability-related information:

- SAIDI and SAIFI performance, without exclusions, by the geographic areas detailed in clause 1.2.3.1 of the *Electricity Distribution Code*;
- Average time to restore supply by the geographic areas detailed in clause 1.2.3.1 of the *Electricity Distribution Code*; and
- SAIDI, SAIFI and CAIDI performance by feeder type reported as: overall, planned and unplanned interruptions without exclusions as well as overall performance net of exclusions using the Utility Regulator Forums' endorsed definitions, including the 3 minute rule.

This reporting also requires ETSA Utilities to set out the causes of overall SAIDI interruptions and "severe weather events", which are defined as "a weather related event where the contribution to regional SAIDI was the greater of three (3) minutes, or three (3) percent of the Regional SAIDI standard in clause 1.2.3.1 of the *Electricity Distribution Code*"[76].

ESCOSA therefore publishes information in relation to the service standards in the *Electricity Distribution Code*, as well as in a format that is consistent with the arrangements endorsed by the Utility Regulators Forum.

Transmission

ESCOSA prepares an annual report of ElectraNet's performance, which details its performance against the design planning standards specified in clause 2 of the South Australian *Transmission Code* that were discussed in section 5.1. The report also addresses the performance measures used by the ACCC for the purposes of its service incentive regime, that is:

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[74] ESCOSA, *2005 - 2010 Electricity Distribution Price Determination*, Part A, April 2005, page 44, URL http://www.saiir.sa.gov.au/webdata/resources/files/050405-EDPD_Part_A_StatementofReasons_Final.pdf

[75] ESCOSA, *Electricity Regulatory Information Requirements – Distribution – Electricity Industry Guideline No 1*, July 2005, URL http://www.saiir.sa.gov.au/webdata/resources/files/050701-ElectricityGuideline1_InformationRequirementsDistr.pdf

[76] ESCOSA, *Electricity Regulatory Information Requirements – Distribution. Electricity Industry Guideline No. 1*, July 2005, page 32, URL http://www.saiir.sa.gov.au/webdata/resources/files/050701-ElectricityGuideline1_InformationRequirementsDistr.pdf

- Circuit availability;
- Loss of supply event frequency index; and
- Average outage duration.

ElectraNet also reports on its performance to the ACCC for the purposes of the service incentive regime, as discussed in section 5.5 below.

5.3 WORST PERFORMING FEEDER STANDARDS

One of the key limitations that has been raised with the use of minimum average reliability standards of the kind discussed above is that they focus on average reliability, when in fact there can be wide variations in the actual reliability performance within a class of feeders or across a geographic area. Furthermore, there can be wide variations in the reliability performance of sections within a single feeder, particularly long feeders. The nature and extent of these variations can be lost in reporting average reliability results.

This is particularly a problem when, as is typically the case, a DNSP has a very large number of feeders (or feeder sections) that are extremely reliable and have very minimal interruptions from year to year, and a relatively small number of feeders (or feeder sections) that suffer regular or lengthy interruptions.

The NEM jurisdictions have undertaken a number of measures to focus their DNSPs on improving the performance of their worst performing feeders, with a view to this also improving the DNSPs' overall average reliability performance. The nature of these measures is discussed below, noting that these measures apply only to the distribution sector.

5.3.1 New South Wales - Distribution

The new licence conditions recently introduced in NSW include "individual feeder standards", which specify minimum standards of reliability performance for individual feeders for each DNSP. The purpose of the standards is to focus the DNSPs on continually improving the reliability of their worst performing feeders and to enable the performance of these feeders to be monitored over time.

The standards, which take effect from 1 October 2005, are expressed as an annual SAIDI threshold by feeder type, with different standards applying to the three NSW DNSPs. If a DNSP has a feeder whose annual reliability performance, net of exclusions, is above the defined standard then it must:

- Immediately investigate the causes of the poor performance;
- Complete an investigation report by the end of the quarter following the quarter in which the feeder first exceeded the standards, which identifies the causes and, where appropriate, any action required to improve the performance of the feeder to the standard; and

- Complete any actions identified in the investigation report to improve the performance of the feeder to the required standard by the end of the third quarter following the quarter in which the feeder first exceeded the standards.

The NSW DNSPs' licences require them to have an annual independent audit of their compliance with the individual feeder standards and to report to the Minister, within one month of the end of each quarter, on those feeders that did not comply with the individual feeder standards during the previous 24 month period. They must also provide details of the date when any feeder first failed to comply with the standards and on the remedial action taken to improve the feeder's performance to the required standard.

5.3.2 Queensland - Distribution

The 2004 Somerville Report examined the relative performance of feeders across ENERGEX and Ergon Energy's systems. It found that:

- "Reliability in ENERGEX's service area varies significantly between feeders, with the 10% of worst performing feeders having more than double the duration of outages as measured by SAIDI than the overall ENERGEX average"[77]; and

- "Reliability in Ergon Energy's service area varies significantly between feeders, with the 10% of worst performing feeders having more than five times longer outages as measured by SAIDI than the overall Ergon Energy average"[78].

As a consequence, the Report recommended that:

- "ENERGEX be required to develop a programme for improving the current 10% of worst performing feeders (which have more than double the duration of outages than the ENERGEX average) with the objective of bringing them within 50% of the ENERGEX average"[79]; and

- "Government and Ergon Energy should agree performance targets for the long rural feeders, taking into account their unique nature"[80].

The Queensland Government accepted the Somerville Report's recommendations. It incorporated in the new Queensland *Electricity Industry Code* that took effect on 1 January 2005 a requirement for the DNSPs to include in their Network Management Plans a statement of "how worst performing feeders are defined and an analysis of the performance of worst performing feeders in the past financial ear and of worst

[77] Independent Panel, *Electricity Distribution and Service Delivery for the 21st Century*, July 2004, page 80, URL http://www.energy.qld.gov.au/independent_report.cfm (August 2005)

[78] Ibid, page 80

[79] Ibid, page 82

[80] Ibid, page 82

performing feeders identified in the preceding network management plan"[81]. As a result, both DNSPs have detailed specific programs for improving the reliability of their worst performing feeders in their 2005 Network Management Plans.

5.3.3 Victoria - Distribution

As discussed above, the ESC publishes annual Comparative Performance Reports on the quality, service and profitability of the five Victorian DNSPs. This report is based on analysis of a wide range of information provided by the DNSPs, including in relation to their reliability performance.

In order to compare the variation in the reliability of supply received by customers, each DNSP provides the ESC with details of the percentage of their customers whose minutes off-supply fall within various defined time ranges. The DNSPs are also required to report to the ESC on low reliability distribution feeders whose SAIDI performance is above a defined threshold. This threshold is a single SAIDI value for each DNSP that does not vary by feeder type.[82]

The ESC has foreshadowed in its June 2005 *Electricity Distribution Price Review 2006-10 Draft Decision* the introduction of a range of additional reporting requirements to further increase the DNSPs focus on their worst performing feeders. These measures include:

- Reporting on the annual duration of unplanned interruptions experienced by the 15 percent of customers who experience the worst service. The ESC has proposed in its draft decision a SAIDI threshold that the DNSPs should not exceed for these customers;
- Reducing the current SAIDI threshold above which the DNSPs need to report on low reliability feeders;
- Reporting on low reliability feeders whose MAIFI performance is above a defined threshold; and
- Requiring the DNSPs to advise the ESC of the nature of its plans to address the performance of its low reliability feeders.[83]

[81] Queensland Government Department of Energy, *Electricity Industry Code*, December 2004, clause 3.2(k), URL http://www.energy.qld.gov.au/zone_files/Electricity/electricity_industry_code.pdf (August 2005)

[82] ESC, *Electricity Distribution Businesses - Comparative Performance Report, 2004*, July 2005, pages 97 and 101 –

http://www.esc.vic.gov.au/apps/page/user/pdf/RPT_04ElecDistBusinessesCompPerformReportFullFinalJul2005.pdf (August 2005)

[83] Ibid, page 30

5.3.4 South Australia - Distribution

The South Australian regulatory regime does not have any specific minimum individual feeder standards. Rather, it relies upon the following measures to focus ETSA Utilities on improving the reliability of its worst performing feeders:

- The maximum average supply restoration standards for unplanned interruptions on the high voltage distribution network detailed in clause 1.2.3.1 of the South Australian *Electricity Distribution Code* discussed in section 5.1.5 above;

- A guaranteed service level regime detailed in Part B of the South Australian *Electricity Distribution Code*, which is discussed in section 5.4 below; and

- A service incentive regime, which ESCOSA has specifically designed to improve the reliability performance of the 15 percent of worst served customers. The nature of this regime is discussed in section 5.5 below.

5.4 GUARANTEED CUSTOMER SERVICE STANDARDS

Design planning standards, average reliability performance standards and minimum individual feeder standards are standards that a DNSP must meet across all, or parts, of its system. However, individual customers are not typically entitled to receive any of these standards, that is, they do not have a right to make a claim against the DNSP if the reliability that they receive does not meet these standards. As a consequence, each of the NEM jurisdictions has introduced various forms of guaranteed customer service standards (GCSS) to complement the other system-related reliability standards.

While GCSSs may be introduced for a wide range of customer service measures, reliability related GCSSs are typically designed to provide financial recognition to those customers who receive the poorest reliability of supply that their service has been unsatisfactory. Importantly, GCSSs are typically not designed to provide financial "compensation" to customers, as the effects of an outage can vary significantly from customer to customer and from incident to incident, and are generally covered by other consumer protection arrangements.

The nature of the reliability-related GCSS measures that have been introduced in NSW, Queensland, Victoria and South Australia is discussed below, noting that they only apply to the distribution sector.

5.4.1 New South Wales - Distribution

The new licence conditions that were recently introduced in NSW include "customer service standards" for the DNSPs, which take effect from 1 July 2006. The licence specifies "interruption duration standards" in minutes and "interruption frequency standards" in terms of the number of interruptions at the customer's premises for various geographic areas.

If a customer experiences an interruption that lasts longer than the maximum specified in the "interruption duration standards" or has more interruptions than are specified in the "interruption frequency standards" then it may make a claim to its DNSP within three months of the relevant interruption for a payment. The DNSP must pay $80 to a customer for each valid claim up to an annual maximum of $320, although the DNSP is only required to pay one $80 amount each year in relation to "interruption frequency standards".

The licence includes a range of types of interruptions that may be excluded for the purposes of assessing whether the customer's service exceeds the interruption duration and frequency standards. Importantly, the "2.5 beta" rule that applies under the NSW licence for "average reliability performance standards" does not apply to the "customer service standards". Rather, interruptions are able to be excluded if they are momentary interruptions, are caused by a variety of defined "external events" or have occurred in an area in which a natural disaster or a "severe storm" as defined by the Bureau of Meteorology has occurred.

The NSW DNSPs' licences require them to have an annual independent audit of their compliance with the customer service standards and to report quarterly to the Minister on the number of claims they have received, the number they have accepted and paid and the number they have rejected.

5.4.2 Queensland - Distribution

The Queensland *Electricity Industry Code* includes a "guaranteed service level" (GSL) regime, which came into effect on 1 July 2005, covering a range of service-related matters, including the reliability of supply that the DNSPs provide to their customers. As is the case in NSW, Queensland:

- Customers are eligible for reliability GSLs if they experience an interruption that lasts longer than a defined threshold or have more than a defined number of sustained interruptions;
- Customers must lodge a claim with their DNSP in order to be eligible for a GSL;
- DNSPs must pay $80 to a customer for each valid claim up to an annual maximum of $320 but are only required to pay one $80 amount each year for "interruption frequency GSLs";
- DNSPs can exclude interruptions if they are momentary interruptions, are caused by a variety of defined "external events" or have occurred in an area in which a natural disaster has occurred; and
- DNSPs must report quarterly to the regulator on the number of GSL claims they have received, the number they have accepted and paid and the number they have rejected.

However, unlike NSW, the Queensland:

- GSL regime only applies to "franchise" customers, whereas the NSW regime applies to all types of customers;
- GSL standards are defined by the feeder type through which the customer's premises is supplied, rather than by geographic areas as is the case in NSW; and
- GSLs are payable through rebates on the customers' bill whereas in NSW they are payable through direct payments from the DNSP.

5.4.3 Victoria - Distribution

Like its Queensland equivalent, the Victorian *Electricity Distribution Code* includes a "guaranteed service level" (GSL) regime covering a range of service-related matters, including DNSPs' reliability. The Victorian reliability related GSL regime requires the DNSPs to make an $80 payment to a customer if it experiences an interruption that last longer than a defined threshold, or has more than a defined number of sustained interruptions.

Unlike the arrangements in NSW and Queensland, the Victorian GSL regime:

- Applies uniformly across all classes of customers using less than 160 MWh of electricity in a year and does not distinguish between geographic areas (like NSW) or feeder types (like Queensland);
- Must be paid proactively by the DNSP, rather than following an application from the customer;
- Does not include an annual maximum cap on the amount of GSL payments;
- Is explicitly set up in the Code as a "minimum" regime, so that the DNSPs may extend the requirements if they chose to do so;
- Applies similar exclusions provisions as for the "average reliability performance standards" referred to in section 5.2.3 above, including allowing exclusions for "widespread supply interruptions due to rare events, which were not reasonably able to be foreseen and, to the extent that the distribution business was not reasonably able to mitigate their impact"[84].

[84] ESC, *Electricity Distribution Code*, January 2002, clause 6.3.4, URL http://www.reggen.vic.gov.au/PDF/2002/DistributionCodeJan02.pdf (August 2005)

In its June 2005 *Electricity Distribution Price Review 2006-10 Draft Decision*, the ESC has indicated its intention to modify the current GSL regime by introducing a series of payment tiers, whereby higher payments would be made to the worst affected customers.[85]

The ESC's annual Comparative Performance Report provides details of the number of payments that the DNSPs' make for reliability-related GSLs.

5.4.4 South Australia - Distribution

The Connection and Supply Contract, which is Part B to the South Australian *Electricity Distribution Code*, was amended with affect from 1 July 2005 to include a GSL regime covering a range of service-related matters, including DNSPs' reliability. As is the case in the other jurisdictions, the South Australian GSL regime requires ETSA Utilities to make a payment to a customer if the customer experiences an interruption that last longer than a defined threshold, or has more than a defined number of sustained interruptions.

The South Australian GSL regime:

- Applies uniformly across all classes of customers and does not distinguish between geographic areas (like NSW) or feeder types (like Queensland);
- Must be paid proactively by the DNSP, rather than following an application from the customer;
- Does not include an annual maximum cap on the amount of GSL payments;
- Includes thresholds of increasing payments ranging from $80 to $160 for worsening reliability; and
- Provides for a very limited set of exclusions, covering transmission and generation failures, disconnections in emergency situations and single customer faults.[86]

[85] ESC, *Electricity Distribution Price Review 2006-10*, Draft Decision, June 2005, page 78, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/EDPR_DraftDecisionJune2005.pdf (August 2005)

[86] ESCOSA, *Electricity Distribution Code*, Part B "Connection and Supply Contract", clause 5.3(d), URL http://www.saiir.sa.gov.au/webdata/resources/files/050623-D-ElecDistCodeEDC05.pdf (August 2005)

5.5 SERVICE INCENTIVE REGIMES

In setting the "regulatory bargain" between an NSP and its customers, a regulator needs to decide, within the context of its regulatory framework[87], what standards of service are:

- Important and valuable to customers, having regard for a view of what customers want to receive and are willing to pay for; and
- Deliverable by the NSP, having regard for its past performance and the improvement that it can realistically achieve if it manages and operates its network consistent with good industry practices while undertaking prudent and efficient investment.

Mandated design planning standards, average reliability performance standards and minimum individual feeder standards are different expressions of minimum levels of performance that a regulator may require from an NSP in exchange for the NSP being able to charge prices or recover revenue of defined maximum levels. However, none of these standards on their own necessarily provide an NSP with a financial incentive to improve its service performance above the minimum mandated level.

Because NSPs are commercially-focussed businesses they typically, like other commercial businesses, respond to the economic incentives presented to them to maximise their profits while meeting their regulatory and other obligations. If there is no financial benefit in improving customers' service above an approved "base" level, then it is generally likely that NSPs, as monopoly businesses, will not spend money to do so.

If a regulator wants an NSP to pursue service performance improvements over and above defined minimum standards, or wants to avoid an NSP pursuing costs reductions at the expense of service to customers, then the regulator must provide appropriate incentives to the NSP.

GCSS or GSLs are one means of providing DNSPs with incentives to improve their reliability performance, but this is generally likely to be limited to avoiding making payments to customers receiving the very worst levels of service. Regulators in several of the NEM jurisdictions have also established "service incentive regimes" that provide financial rewards and penalties to NSPs through their regulated revenue or price control for over and under performing against a "target" level of service. The nature of the regimes in each jurisdiction's distribution sector is discussed below.

[87] Clause 6.10.5(2) of the National Electricity Rules requires jurisdictional regulators in the NEM to have regard to the service standards applicable under the Rules and any other standards imposed by the jurisdictional regulator in setting a regulatory cap for a DNSP.

This is followed by an examination of the regime that the ACCC has applied across the transmission sector, as it is the same in each jurisdiction.

5.5.1 New South Wales - Distribution

The NSW Independent Pricing and Regulatory Tribunal (IPART) gave extensive consideration to introducing a "monetary" service incentive regime for the NSW DNSPs for the current 2004-2009 regulatory period. However, it ultimately decided against doing so because of fundamental concerns about the accuracy of the DNSPs' reported reliability performance information, in particular that:

- The only viable option given the available reliability data was to base the monetary incentives on the whole of each DNSP's network, however this would incentivise the DNSPs to concentrate on "easy wins" rather than on improving the reliability of the worst parts of the network, which was IPART's real aim;

- The difficulties in setting the reliability thresholds that would form the basis for the service incentive regime given the year to year variability in annual reliability performance results; and

- The DNSPs have planned significant improvements in their data measurement systems to increase the accuracy of reliability performance reporting, which was expected to result in a worsening of the DNSPs' reported reliability performance by an amount that was not readily able to be estimated. This further increased IPART's difficulties in setting the reliability thresholds.[88]

Instead of introducing a "monetary" service incentive regime, IPART decided that it would run a "paper trial" of a potential regime by:

- Collecting reliability performance data;

- Analysing the data and comparing it to the reliability data that the DNSPs indicated that they expect to be able to achieve over the regulatory period;

- Assessing the DNSP's performance under potential "paper" service incentive regimes.[89]

Rather than using the regulatory control, IPART is therefore relying on performance monitoring and reporting and the GSL regime discussed in section 5.5 as the main incentives for the NSW DNSPs to improve their reliability performance during the current regulatory period.

[88] IPART, *NSW Electricity Distribution Pricing 2004/05 to 2009/10*, Final Report, June 2004, pages 119-123, URL http://www.iprt.net/ (August 2005)

[89] Ibid, pages 122-123

5.5.2 Queensland - Distribution

The Somerville Report that examined Queensland's electricity distribution sector was released in July 2004, almost a year before the QCA issued its *Final Determination - Regulation of Electricity Distribution* for the 2004/05-2009/10 regulatory period in April 2005. The Report recommended that:

> *The QCA introduce a service quality incentive regime as part of its revenue determination for the next regulatory period based on a set of service standards determined by Government and the QCA. Service standards will therefore need to be set before the QCA finalises its revenue determination for the next regulatory period.* [90]

This recommendation was consistent with the:

- Intention that the QCA set out in its *Final Determination – Regulation of Electricity Distribution* for the 2000/01-2004/05 regulatory period to introduce a service quality incentive regime in the next regulatory period (i.e. 2004/05-2009/10)[91]; and

- The QCA's *Final Decision – Service Quality Incentive Scheme for Electricity Distribution Services in Queensland* released in April 2004, in which it set out the features of a service quality incentive regime that it intended to introduce in the 2004/05-2009/10 regulatory period.

However, in its Final Determination for the 2004/05-2009/10 regulatory period, and in the light of the Somerville Report's findings about ENERGEX and Ergon Energy's reliability performance, the QCA ultimately decided against introducing its proposed service incentive regime. It noted:

> *….a fundamental assumption underlying a service quality incentive scheme is that, without providing additional financial incentives, the distributor is unlikely to further improve service quality. To put this another way, service quality incentive schemes implicitly assume that the current base is about right (that it is meeting broad community expectations) and that some targeted improvement will lift the general level of service quality to a slightly higher standard and also address specific pockets where service quality is unsatisfactory. These conditions do not appear to be met at present.*[92]

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[90] Independent Panel, *Electricity Distribution and Service Delivery for the 21st Century*, July 2004, page 57, URL http://www.energy.qld.gov.au/independent_report.cfm (August 2005)

[91] QCA, *Final Determination – Regulation of Electricity Distribution*, May 2001, pages 164-166, URL http://www.qca.org.au/www/welcome.cfm (August 2005)

[92] QCA, *Final Determination – Regulation of Electricity Distribution*, April 2005, page 206, URL http://www.qca.org.au/www/welcome.cfm (August 2005)

The Final Determination went on to say that:

> *Once service quality has been improved in line with the Government's minimum service standards and these have reached a level consistent with broad community expectations, it would be appropriate to consider implementing the Authority's service quality incentive regime.*
>
> *In the meantime, the Authority proposes to expand its data base by continuing to monitor (and publish) quarterly and annual service quality outcomes. It will also work with the distributor to better develop implementation plans for the future and monitor performance against the minimum service standards.*[93]

On this basis, the QCA decided to review the timing for the introduction of any service incentive regime during the current regulatory period. Queensland, like NSW, is therefore relying on performance monitoring and reporting and the GSL regime discussed in section 5.5 as the main incentives for its DNSPs improving their reliability performance during the current regulatory period.

5.5.3 Victoria - Distribution

The ESC introduced a service incentive regime in its *Electricity Distribution Price Determination* for the 2001-2005 regulatory period by incorporating an "S-factor" into the DNSPs' price cap formula.

Under the scheme, a DNSP's allowed revenue recovered through the weighted average prices for all customers is increased or decreased based on its reliability performance against defined reliability targets. The reliability targets are those set by the ESC for the period that were discussed in section 5.2.3 above. Importantly, the S-factor for a year reflects the reliability outcome from two years earlier because of the need to audit the DNSPs' performance data. For example, the 2005 "S-factor" used for 2005 pricing is based on the reliability performance for 2003.

The "S-factor" is calculated by multiplying the "performance gap" for each key indicator by an incentive rate, where:

- The "performance gap" is the difference between the actual and targeted improvement in performance, where out-performance results in a positive performance gap and therefore a positive "S-factor" and an increase in the price cap. Under-performance results in a negative performance gap, a negative "S-factor" and a decrease in the price cap;

- The key indicators are unplanned SAIFI, unplanned CAIDI and planned SAIDI for CBD, urban and rural feeders incorporating the exclusion regime described in section 5.2.3 above; and

[93] Ibid, page 207

- "The incentive rates are set for individual indicators to reflect customers' relative preference for improvement in each indicator"[94]. The levels of these rates are equivalent for rewards and penalties.

As a result, a DNSP is financially rewarded (or penalised) if it increases (or decreases) its reliability above (or below) the target by being able to increase (or required to decrease) its average tariff relative to what it would otherwise be able to charge.

For the 2001-2005 regulatory period, the reliability targets set by the ESC were based on improving reliability by 25 percent for urban customers and 17 percent for rural customers, with the average Victorian customer receiving a 20 percent improvement, which equates to about 36 minutes of supply.

The Victorian DNSPs have improved their reliability performance over the 2001-2005 regulatory period and the ESC has proposed in its Draft Decision for the 2006-2010 regulatory period to retain the service incentive regime. In doing so, it intends:

- Applying the reliability targets set out in its Final Decision for the 2001-2005 regulatory period to the calculation of the "S-factor" in 2006 and 2007, based on the DNSPs' performance in 2004 and 2005;

- Changing the indicators that will be used for the "S-factor" for the 2008-2012 period, that will be calculated based on the DNSPs' performance for the 2008-2012 period, to unplanned SAIDI, unplanned SAIFI, MAIFI and call centre performance in responding to calls within 30 seconds;

- Changing the weightings between the various indicators and the level of the incentives for the 2008-12 period.[95]

The ESC is therefore relying on a combination of performance monitoring and reporting, the GSL regime discussed in section 5.5 and the service incentive regime through the regulatory control to focus the five Victorian DNSPs on improving their reliability performance during the current regulatory period.

5.5.4 South Australia - Distribution

South Australia introduced the first service incentive regime in Australia for electricity DNSPs in 2000-2001 under Schedule 2 of the *Electricity Distribution Code*. The Scheme was based on a points system that allowed ETSA Utilities' maximum average revenue to be increased or decreased based on its performance against targets for SAIDI, SAIFI, CAIDI, time to restore supply to not less than 80 percent of customers and operating cost per customer. Points were averaged for the first four

[94] ESC, *Electricity Distribution Price Determination 2001-2005*, volume 1, September 2000, page 24, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/detervol1sep00.pdf (August 2005)

[95] ESC, *Electricity Distribution Price Review 2006-10*, Draft Decision, June 2005, pages 74-97, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/EDPR_DraftDecisionJune2005.pdf (August 2005)

measures across CBD, metropolitan and rural/remote areas and for a category specified as the forty worst feeders in South Australian based on SAIFI performance. The available level of the potential rewards and penalties was not structured symmetrically for over and under-performance against the target.

Following a customer preferences survey that found that 85 percent of South Australian customers were satisfied with their supply reliability and 15 percent were unsatisfied and were willing to pay for service improvements, ESCOSA made several changes to the service incentive scheme in its *2005-2010 Electricity Distribution Price Determination*. In particular, it changed the scheme to incentivise ETSA Utilities to improve the reliability to the 15 percent of customers with the worst reliability levels while maintaining the existing levels of service to the remainder. To do this, it based the performance targets on feeders that have had two consecutive years of three or more interruptions of 180 or more minutes off supply per annum, although the feeders that were used to set the target need not be those for which ETSA Utilities' performance is assessed. In order to minimise the affects of performance variability, performance against the targets is to be assessed using the average of a two year period.

The scheme for the 2005-2010 regulatory period:

- Is based on a single area, whereas the previous scheme was based on several areas;
- Is symmetrical so that the same level of rewards and penalties are available for over and under-performance against the targets; and
- Involves adjustments to the performance targets from year to year based on actual performance in the previous year.

Like Victoria, South Australia is therefore relying on a combination of performance monitoring and reporting, the GSL regime discussed in section 5.5 and the service incentive regime through the regulatory control to focus ETSA Utilities on improving its reliability performance during the current regulatory period.

5.5.5 All NEM jurisdictions – transmission

The ACCC is the economic regulator of TNSPs in the NEM. Clause 6.2.3(b) of the Australian Electricity Rules requires the ACCC to apply a "revenue capping" form of regulation. In setting the revenue cap, clause 6.2.4(c)(2) requires the ACCC to have regard for:

> *the service standards imposed by the Rules which are applicable to the Transmission Network Service Provider, and any other standards imposed on the Transmission Network Service Provider by the AER in accordance with the Rules by agreement between the Transmission Network Service Provider and the relevant Transmission Network Users.*

The ACCC issued a *Statement of Principles for the Regulation of Transmission Revenues – Service Standard Guidelines*[96] in November 2003, which details how it will have regard for the TNSPs' service standards through a service incentive regime in setting their revenue caps.

The ACCC's service incentive regime provides financial incentives of up to +/-1 percent of the TSNPs revenue cap for under or over-performing against a set of performance targets based on:

- Transmission circuit availability;
- Average outage duration; and
- Frequency of "off-supply" events.

Because of historic differences in the nature of the performance information that each TNSP has collected and reported (with no two jurisdictions having the same performance measures), the ACCC has needed to apply considerable flexibility in defining the standards for each TNSP. Appendix B of the *Statement of Principles* details the definitions that the ACCC is applying in each jurisdiction and Appendix A details the nature of the associated performance targets.

The TNSPs are required to submit an annual report to the ACCC of their performance against the targets in accordance with service standard guidelines detailed at Appendix E of the *Statement of Principles*. These annual reports are independently audited. The guidelines also define a limited set of exclusion events for the purposes of the service incentive regime, which relate to: unregulated assets; outages caused by faults or events on a third party system; and certain *force majeure* events.

It is noted that, although the *Statement of Principles* was released in November 2003, the ACCC applied similar principles to the service incentive regimes that were included in its earlier revenue determinations for ElectraNet (South Australia) and SP AusNet (Victoria) in December 2002 and for Transend (Tasmania) in September 2003.

5.6 NEM JURISDICTION – SUMMARY OF SERVICE STANDARD ARRANGEMENTS

Table 7 summarises the types of regulated service standards that have been mandated for transmission and distribution networks in NSW, Queensland, Victoria and South Australia.

[96] ACCC, *Statement of principles for the regulation of transmission revenues – Service standard guidelines,* November 2003, URL http://www.aer.gov.au/content/item.phtml?itemId=660260&nodeId=file4283fe58ce3fa&fn=Guidelines%20(12%20November%202003).pdf (August 2005)

Table 7 – Regulated Mandatory Service Standards in NEM Jurisdictions

	NSW	Queensland	Victoria	South Australia
Design planning criteria (other than National Electricity Rules)				
- **Transmission**	Proposed and reported by TNSP	High level criteria set in Licence	Proposed and reported by TNSP	Set in Code
- **Distribution**	Set in Licence	Proposed and reported by DNSP	Proposed and reported by DNSP	Proposed and reported by DNSP based on standards set in Code
Average reliability performance standards – Distribution	Set in Licence	Set in Licence	No	Set in Code
Worst distribution feeders / worst serviced customers				
- **Minimum individual feeder standards**	Set in Licence	No	No	No
- **Reporting obligations**	Set in Licence	Set in Code	Set in Code	Set in Code
Guaranteed customer service standards – Distribution	Set in Licence	Set in Code	Set in Code	Set in Code
Service incentive regime				
- **Transmission**	Set in revenue determination	Set in revenue determination	Set in revenue determination	Set in revenue determination
- **Distribution**	No	No	Set in Code	Set in Code

6 ASSESSING WESTERN POWER'S SERVICES STANDARD BENCHMARKS

This section considers the adequacy of the types of service standard benchmarks that Western Power has included in its proposed Access Arrangement having regard for the five types of service standards discussed in section 5. It also considers the basis for the Authority assessing service standard benchmarks having regard for the requirements of the Access Code.

6.1 THE ACCESS CODE REQUIREMENTS

Section 4.28 of the Code provides that the Authority must only approve Western Power's Access Arrangement if it is satisfied that it meets:

- The Code objective set out in section 2.1, being:

  … to promote the economically efficient:

  (a) investment in; and

  (b) operation of and use of,

  networks and services of networks in Western Australia in order to promote competition in markets upstream and downstream of the networks.

- The requirements set out in Chapter 5 of the Code, including under section 5.1(c) for there to be a service standard benchmark, which must, according to section 5.6, be:

  (a) reasonable; and

  (b) sufficiently detailed and complete to enable a user or applicant to determine the value represented by the reference service at the reference tariff.

The Authority must therefore assess whether the service standard benchmarks that:

- Western Power has included in its proposed Access Arrangement; or
- The Authority may require Western Power to include in its Access Arrangement;

satisfy these requirements in order to approve an Access Arrangement under the Code.

In undertaking this assessment, the Authority must have regard for the Code definitions of:

- Service standards as "either or both of the technical standard, and reliability, of delivered electricity";

- Service standard benchmarks as "the benchmarks for a reference service in an Access Arrangement under section 5.1(c)"; and

- A reference service as "a covered service designated as a reference service in an Access Arrangement under section 5.1(a) for which there is a reference tariff, a standard access contract and service standard benchmarks".

6.2 ASSESSING COMPLIANCE WITH THE ACCESS CODE

6.2.1 Design Planning Criteria

Western Power has not included design planning criteria as service standard benchmarks in its proposed Access Arrangement although it has included "reliability criteria" in its draft Technical Rules as a basis for designing and operating its network. The reliability criteria that Western Power has proposed are set out in clause 2.5 of its draft Technical Rules and are based on a range of deterministic and other standards for different parts of the network as summarised in Table 8.

Table 8 – Western Power's proposed network reliability planning criteria[97]

Criteria	Network elements to which criteria apply
N-0 (i.e. N)	- Transmission sub-networks and zone substations with a load of less than 20MVA - The 220kV network supplying the Eastern Goldfields Region - The distribution network - automatic and manual reconfiguration is used to restore supply in the Perth CBD and in urban areas.
1% risk criterion and NCR criterion	- Zone substation power transformers in the Perth metropolitan area and major regional areas - a common spare transformer is shared among a population of zone substation power transformers
N-1	- Zone substations in the Perth CBD that lose one transmission line or one power transformer - The remainder of the transmission network to which other criteria do not explicitly apply
N-2	- All 330kV lines, terminal stations and power stations except in the Bunbury load area - All 132 kV terminal stations in the Perth metropolitan area, and Muja power station 132kV substation - All 132kV transmission lines that supply a sub-network comprising more than 5 substations with peak load exceeding 400KVA - All power stations whose export to the transmission network exceeds 25% of the transmission network system peak - Any group of zone substations in the Perth CBD that lose any of two transmission lines, two power transformers or one transmission line or one power transformer

[97] Western Power, *Draft Technical Rules for submission to the Technical Rules Committee,* Version 1, August 2005, pages 26-33

These reliability planning criteria constitute "contingency criteria" as part of the "network planning criteria" for the purposes of section A6.1(m) of Appendix 6 of the Access Code. While the criteria are technical standards that relate directly to the reliability of the network, by not including them as service standard benchmarks Western Power has apparently taken the view that they do not constitute "service standards" for the purposes of the Access Arrangement. This is presumably because they consider that the criteria are not either technical or reliability standards of *delivered electricity*. This interpretation would mean that they are standards that Western Power must apply to designing and planning the network but are not standards that customers have a right to receive.

This interpretation is generally consistent with the approach taken in the NEM jurisdictions where criteria are either imposed directly by the regulator (such as for NSW's distribution system) or developed by NSPs (either with or without shareholder or regulatory guidance) for designing, planning, operating and managing the system. The exception is in South Australia where, as noted in section 5.1.5, a direct link has been created between the customer and the design planning criteria:

- Clause 1.2.3.1 of the South Australian *Electricity Distribution Code* sets a series of "Time to restore supply standards", whereby ETSA Utilities must restore defined percentages of customers within defined time periods, which differ by geographic area. ETSA Utilities uses these standards as the basis for developing its design planning criteria for its distribution network. It is noted that these standards are in addition to "SAIDI and SAIFI standards" set under the Code; and
- Clause 2.2.2 of the South Australian Electricity Transmission Code that requires ElectraNet to plan and develop its transmission system to provide specified levels of transmission services to connection points that fall within five load categories. Each load category specifies reliability standards that:
    - Require ElectraNet not to contract for an amount of agreed maximum demand greater than 100 percent of installed line capacity; and
    - Specify the amount of line, transformer or other capacity that must be provided to meet contingency events. These standards are expressed in N-1 and N-2 terms.

  South Australian users that are serviced from connection points therefore have a right to receive these defined performance outcomes.

The benefit of the South Australian approach is that it creates a clear link between the criteria that the NSPs use to design, plan, operate and manage their systems and the service performance outcomes that customers have a right to receive. Without this link, it is unclear to customers what service levels they are entitled to based on the delivery of design planning criteria.

For this reason, it is therefore recommended that Western Power be required to include as "service standard benchmarks" in its Access Arrangement the same types

of provisions as apply for both distribution and transmission services in South Australia, that is:

- "Time to restore supply standards" that define the percentages of customers to be restored within certain time periods in different geographic areas across the distribution system; and

- Reliability standards at connection points across the transmission system.

These requirements could be included in a Code issued by the Authority under section 39(2)(d) of the *Electricity Industry Act 2004*, with Western Power being required to reference the relevant provisions of the Code in its service standard benchmarks in its Access Arrangement. The Code could either set out the standards to which Western Power must comply (in a similar manner to the South Australian codes) or leave Western Power to propose appropriate standards. If the latter approach is adopted then, in order to satisfy section 5.6 of the Access Code, it is recommended that Western Power be required to demonstrate that these standards are set at levels that are consistent with:

- The design planning criteria to be provided for in the Technical Rules;

- Its network reliability standards provided for in the Access Arrangement, including any measures for improving the worst performing parts of the network;

- The nature, location, condition, capacity and performance of its network assets; and

- The nature, timing, quantum and expected impact of its capital and operating expenditure, in particular for reliability-related works.

Recommendation 1

Network Advisory Services recommends that Western Power be required to include as service standard benchmarks in its Access Arrangement "time to restore supply standards" for its distribution system and reliability standards at connection points across its transmission system. This could be achieved by incorporating these standards into the regulatory framework, such as through a condition of a code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*. It is not recommended that Western Power be required to include design planning criteria as service standard benchmarks.

6.2.2 Average reliability performance standards

Western Power has not included average reliability performance standards in its proposed Access Arrangement. Instead, it has set targets for the purposes of its proposed service standards adjustment mechanism and has proposed these as its service standard benchmarks. As noted in section 4, Western Power's:

- Distribution targets are based on SAIDI minutes; and
- Transmission targets are based on circuit availability and system minutes interrupted for meshed circuits.

Importantly, Western Power has not based its distribution targets on the supply reliability targets set in the *Electricity (Supply Standards and System Safety) Regulations*. It justifies this decision as follows in its Access Arrangement Information:

- *The Regulation's reliability standards were established at a time when reliability data was captured in Western Power's Distribution Fault recording system (DFR). Western Power has since replaced the DFR system with the Trouble Call Management System (TCMS). The TCMS system captures a broader range of outages and customers connection issues than the previous DFR system. As a result, the basis on which the reliability standards are expressed in the Regulations is not consistent with the basis on which Western Power now records SAIDI performance. In effect, if the reliability standards in the Regulations were restated on the basis of the TCMS system the SAIDI target in the Regulations would probably be less onerous than is presently the case.*
- *The definition of exclusions applicable to the supply reliability standards in the Regulations is different to that adopted by Western Power for SAIDI performance reporting purposes. Western Power's reporting of SAIDI performance would also apply a less onerous reliability target than that prescribed by the Regulations.*

For these reasons, Western Power believes that it is appropriate to update the supply reliability standards contained in the Regulations to better reflect the present arrangements in relation to reporting faults. This is a matter that the company will take forward with the Office of Energy.[98]

Western Power goes on to explain its proposed service standard benchmarks as follows:

Whilst Western Power will plan its investment and expenditure programs, and use its best endeavours to meet these challenging service standard benchmarks, the company cannot guarantee that the service standard benchmarks will always be met. Instead, Western Power believes that the objectives of the Code are best satisfied by:

- *Setting service standard benchmarks which are commensurate with the standard of service that the company is targeting to deliver, given its expenditure plans; and*
- *In accordance with the spirit of the provisions set out in section 11.1 of the Code, exposing the company to a financial penalty (via the service standards adjustment mechanism) in the event that actual performance falls short of the*

[98] Western Power, *Access Arrangement Information,* Draft, August 2005, page 39

benchmark level. The service standards adjustment mechanism will also provide Western Power with an opportunity to earn a bonus if performance is better than the benchmark.[99]

The result is that Western Power is not proposing either to comply with the existing regulatory requirements nor is it committing to achieve the service standard benchmarks that it has proposed.

It is considered that including average reliability performance standards in the regulatory regime is important in order to give customers certainty about the minimum reliability outcomes that Western Power must achieve on average across its network and to provide an effective basis for comparing its reliability performance over time and with other NSPs. Furthermore, average reliability performance standards have the potential to provide strong incentives for Western Power to deliver at least a defined mandatory base level of performance. This contrasts with a failure to meet Western Power's currently proposed benchmarks, which would simply result in a loss of revenue that Western Power could recover from its customers. Because they are standards that Western Power must achieve, it is recommended that any average reliability performance standards be set at levels below those at which Western Power could be financially rewarded under the service standards adjustment mechanism.

New average reliability performance standards could be mandated in a technical code issued under section 39(2)(d) of the *Electricity Industry Act 2004*¸ with Western Power being required to reference the relevant provisions of the Code in its service standard benchmarks in its Access Arrangement. Any such standards should:

- Provide a clear basis for:
    - Defining a supply interruption for the purposes of reliability reporting;
    - Defining a "customer" for the purposes of reliability reporting;
    - Distinguishing between different service standards across Western Power's network, for example by geographic area or feeder type; and
    - Excluding defined events for the purposes of accounting for, and reporting on, supply interruptions.
- Require Western Power to demonstrate a clear basis and capability for accurately measuring its performance and reporting against its standards across its network, including:
    - Assessing the current accuracy of its reliability reporting;
    - Addressing any existing deficiencies in its measurement and reporting arrangements within a defined period; and

[99] Ibid, page 137

  - Managing any existing deficiencies in the interim so that its reported performance can be appropriately relied upon.

- Be set at levels that have regard for:
  - Recent trends in Western Power's reliability performance;
  - The community's expectations about Western Power's reliability performance, including any information available about its willingness to pay for performance improvements above the current level of service;
  - The reliability performance of Western Power's "peer group" of other Australian NSPs that provided comparable services;
  - Improvements that should reasonably be expected in Western Power's reliability performance over time;
  - The nature and level of Western Power's proposed capital and operating expenditure, including for reliability related works;
  - The levels of any:
    - Design planning criteria and related standards of the kind discussed in section 6.2.1;
    - Standards for worst serviced customers and worst performing feeders;
    - Customer service standards; and
    - Targets used for the service standards adjustment mechanism.
  - The likely effect of any approved exclusions policy.
- Include appropriate arrangements for Western Power to report, and for the Authority to monitor, compliance with the average reliability performance standards.

As with the service standards adjustment mechanism, different standards would need to be set for Western Power's distribution and transmission systems.

Consistent with the average reliability performance standards that have been set in NSW and Queensland, the distribution standards should:

- Account for both the duration and frequency of outages - that is include both SAIDI and SAIFI (and thereby CAIDI) - in order to provide transparency about the contribution of the frequency and duration of individual outages to customers' total annual outage levels;

- Be based on the SCNRRR standards endorsed by the Utility Regulators Forum, with any variations from these SCNRRR standards being appropriately justified;
- Have regard for the reliability targets set in the *Electricity (Supply Standards and System Safety) Regulations*; and
- Include an objective exclusions policy, such as the 2.5 beta approach that has been adopted in NSW and Queensland.

The transmission standards should take one or more of the following forms (or something similar):

- Transmission circuit availability, being the percentage of time that the transmission system is in an operating state.
- The number and duration of unplanned outages resulting in a loss of supply to customers;
- The amount of energy in MWh not supplied lost to customers; and
- The total number of loss of supply events of more than 0.2 minutes and 0.1 minutes.

Recommendation 2

Network Advisory Services recommends that Western Power be required to include average reliability performance standards for its transmission and distribution systems as service standard benchmarks in its Access Arrangement. This could be achieved by incorporating these standards into the regulatory framework, such as through a condition of a code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*.

6.2.3 Worst serviced customers and worst performing feeders

Western Power has not included any specific service standards in its proposed Access Arrangement in relation to its worst serviced customers or its worst performing feeders although it has identified a "worst performing feeder program" in its Access Arrangement Information. This program involves "identifying and implementing technical solutions for the 40 worst performing feeders"[100]. The worst 20 metropolitan, 10 "North Country" and 10 "South Country" feeders would be targeted at an estimated cost of $15.7 million over four years, with a view to delivering a 49 minute SAIDI improvement over the access arrangement period.[101]

[100] Ibid, page 105

[101] Ibid, page 105

However, there is no mention of the "worst performing feeder program" in the Access Arrangement itself and there would therefore be no apparent regulatory obligation to deliver it if the proposed Access Arrangement were approved. In order to impose such an obligation it is recommended that Western Power be required either to:

- Report regularly to the Authority on the reliability performance of its worst performing feeders or its worst serviced customers, in a similar manner to what is required in each of the four NEM jurisdictions considered in section 4; and / or

- Take remedial action if the reliability performance of individual feeders exceeds defined reliability performance thresholds – not just the worst 40 feeders - in a similar manner to that required in NSW and discussed in section 5.3.1.

These requirements would provide a clear incentive for Western Power to improve the least reliable parts of its network and to allow them to be continually monitored. Again, this could be mandated in a technical code issued under section 39(2)(d) of the *Electricity Industry Act*¸ with Western Power being required to reference the relevant provisions of the Code in its Access Arrangement. The Code could either set out the standards to which Western Power must comply (in a similar manner to the NSW licence requirements) or leave Western Power to propose appropriate standards. If the latter approach is adopted then, in order to satisfy section 5.6 of the Access Code, Western Power's obligations in relation to its worst serviced customers or worst performing distribution feeders should:

- Aim to improve the reliability of the customers or feeders experiencing the worst, say, 5 to 10 percent performance;

- Take one or more of the following forms (or something similar):

    - SAIDI and or SAIFI thresholds by feeder type that no individual feeder should exceed; and / or

    - Threshold percentages of customers who experienced the worst reliability; and / or

    - Threshold percentages of worst performing feeders by feeder type.

- Require Western Power to advise the Authority of:

    - The details of the feeders or customers that experienced reliability performance above the threshold; and / or

    - The causes of the poor performance; and / or

    - The remedial action Western Power will take to improve the feeders' or customers' future performance. This performance improvement might be to ensure that a defined SAIDI or SAIFI threshold is not exceeded in the future.

- Be set having regard for matters such as:
    - The distribution of Western Power's SAIDI or SAIFI performance;
    - The numbers of feeders or customers above a defined threshold;
    - Western Power's targeted reliability performance improvement;
    - Improvements that should reasonably be expected in Western Power's reliability performance over time;
    - The nature and level of Western Power's proposed capital and operating expenditure, including for reliability related works; and
    - The levels of any:
        - Average reliability performance standards;
        - Guaranteed customer service standards; and
        - Targets used for the purposes of a service standards adjustment mechanism.

Recommendation 3

Network Advisory Services recommends that Western Power be required to include minimum standards or reporting requirements for its worst serviced customers or its worst performing distribution feeders as "service standard benchmarks" in its Access Arrangement. This could be achieved by incorporating these standards or reporting requirements into the regulatory framework, such as through a condition of a code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*.

6.2.4 Customer payment scheme

Western Power has not included a reliability-based customer payment scheme as a service standard benchmark in its proposed Access Arrangement. It did, however, note its "Customer Reliability Payment Scheme" (otherwise known as the "extended outage payment scheme") as one of its other service delivery commitments and obligations.[102]

It is recommended that Western Power be required to include a reliability based customer payment arrangement as a service standard benchmark in its Access Arrangement. This could be achieved by extending the requirements of the *Code of Conduct (for the Supply of Electricity to Small Use Consumers)* to include reliability standards or creating an obligation in another Code issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*.

[102] Ibid, page 147

Imposing this obligation would:

- Recognise that this payment arrangement is a standard for the "reliability of delivered electricity" in accordance with the Code definition of a "service standard";
- Recognise that individual customers are entitled to receive a payment from Western Power if this service standard is not met;
- Create a clear link between the need for the payment arrangement and the Access Arrangement; and
- Mandate a requirement for a reliability-based payment as part of the regulatory regime, whereas Western Power currently only has a scheme of its own volition.

These standards could be expressed in terms of the number and duration of outages, in a similar manner to what applies in each of the NEM jurisdictions discussed in section 5, or be limited to the duration of outages as is currently the case under Western Power's extended outage payment scheme. In order to satisfy section 5.6 of the Access Code, Western Power's customer payment arrangement should:

- Be consistent with the proposed new requirements to be defined in the Code of Conduct - Western Power may propose "improvements" to the minimum requirements in the Code of Conduct; and
- Include appropriate arrangements for Western Power to report, and for the Authority to monitor, compliance with the customer reliability standards.

Recommendation 4

Network Advisory Services recommends that the Code of Conduct be extended, or another Code be issued pursuant to section 39(2)(d) of the *Electricity Industry Act 2004*, to include a customer reliability standard with an associated payment scheme and that Western Power be required to include this as a service standard benchmark under its Access Arrangement.

6.2.5 Service standards adjustment mechanism

As noted in 3.3, the Access Code requires that:

> *An access arrangement must contain a service standards adjustment mechanism*.[103]
>
> *A service standards adjustment mechanism must be:*
>
> *(a) sufficiently detailed and complete to enable the Authority to apply the service standards adjustment mechanism at the next access arrangement review; and*
>
> *(b) consistent with the Code objective.*[104]
>
> *A service standards adjustment mechanism in an access arrangement applies at the next access arrangement review.*[105]

In accordance with these requirements, and as discussed in section 4, Western Power has included a service standards adjustment mechanism in its proposed Access Arrangement, which would provide financial rewards and penalties to Western Power if it over or under-performed against:

- Distribution targets based on SAIDI minutes; and
- Transmission targets based on circuit availability and system minutes interrupted for meshed circuits.

It is recommended that the Authority should only approve the inclusion of penalty and reward payments under the service standards adjustment mechanism if it is satisfied that:

- Western Power is currently providing an "acceptable" base level of service that warrants Western Power being rewarded if its performance improves – this should be assessed having regard for the same matters that should be considered in setting the average reliability performance standards. As noted in section 5.5.2, failing to meet the community's base reliability expectations was the key reason the QCA decided not to pursue a service incentive regime for the Queensland DNSPs from 1 July 2005;

- Western Power currently has the capacity to measure accurately, and report on, its distribution and transmission reliability performance - this includes sufficiently detailed and accurate historical reliability data to enable the Authority to determine past performance and improvement benchmarks. The accuracy of

[103] Western Australian Government, *Electricity Networks Access Code 2004,* November 2004, section 6.30, URL http://www.slp.wa.gov.au/gazette/gazette.nsf/gazlist/2C360789573C223148256F5C0010ED84/$file/gg205.pdf

[104] Ibid, section 6.31

[105] Ibid, section 6.32

reliability data should be assessed in the course of setting Western Power's average reliability performance standards. As noted in section 5.5.1, failing to be able to demonstrate this was the key reason IPART decided not to pursue a service incentive regime for the NSW DNSPs from 1 July 2004; and

- A service standards adjustment mechanism would encourage Western Power to continuously improve its reliability performance.

The ESC applied the following key principles in developing the service incentive regime for the Victorian DNSPs:

- "The scheme should be as simple as possible for both distributors and consumers to understand as is possible (sic) without distorting the incentive.
- The incentives should be based on reliable and verifiable performance measures with independent scrutiny of the distributors' measurement of their performance.
- The scheme should address both worst-case performance as well as average performance, to ensure that benefits flow to all customers.
- The incentives should encompass both penalties for under-performance and rewards for superior performance.
- The amount of revenue that distributors stand to gain or lose under the scheme should be limited, but large enough to provide a meaningful commercial incentive."[106]

ESCOSA applied the following objectives in developing the service incentive regime for ETSA Utilities:

- "*Exclusivity* – the measures should be unique and not a derivation of other measures included in the service incentive scheme;
- *Reflective of consumer preferences* – the measures incorporated into a service incentive scheme should reflect those areas of performance that are most valued by consumers;
- *Appropriate* – the measures should, to the greatest extent possible, reflect those aspects of performance that can be influenced by the distributor;
- *Accurate and available at a reasonable cost* – the measures must be based on data that is reliable and not be excessively costly to obtain; and

[106] ESC, *Electricity Distribution Price Review 2006 – Service Incentive Arrangements – Consultation Paper No 2*, April 2004, page 11, URL http://www.reggen.vic.gov.au/apps/page/user/pdf/EDPR_ConsultPaperNo.2_Apr04.pdf (August 2005)

- *No potential for perverse incentives* – the measures should provide the correct incentives for the distributor to target those aspects of service most preferred by consumers and eliminate any incentive for 'game playing.'"[107]

Drawing on the approaches taken by the ESC and ESCOSA, in order to satisfy section 5.6 of the Access Code, a service standards adjustment mechanism for Western Power should:

- Be simple to understand and apply;
- Apply reliable and verifiable performance measures that Western Power can influence and that customers value;
- Provide symmetrical rewards and penalties for under and over-performance against defined targets; and
- Limit the annual amount that Western Power stood to gain or lose to, say, 1 percent of its aggregate revenue.

A service standards adjustment mechanism for Western Power should therefore detail the:

- Performance measures to be applied drawing on the service standard benchmarks, such as average SAIDI or SAIFI for particular classes of customers;
- Targets to be set for each type of performance measure, including any changes in the targets from year to year. These targets should have regard for any average reliability performance standards that are set for Western Power;
- Rewards and penalties (in dollars) to be applied for over or under-performing against each of the targets – it is desirable for these to be the same in order to provide Western Power with symmetrical incentives;
- Percentage cap on the level of the rewards and penalties to apply;
- Mechanism by which Western Power can recover the reward or pay the penalty, such as through its revenue or price control;
- Timing for when Western Power's performance is measured and when the rewards or penalties are applied; and
- Compliance arrangements, including in relation to verifying Western Power's service performance and applying the rewards or penalties.

[107] ESCOSA, *Electricity Distribution Price Review: Service Standard Framework – Working Conclusions*, June 2004, page 30, URL http://www.saiir.sa.gov.au/webdata/resources/files/040629-D-SSFworkingconclusions.pdf (August 2005)

As with the average reliability performance standards, the level of the targets under the service standards adjustment mechanism should be set having regard for:

- Recent trends in Western Power's reliability performance;
- The community's expectations about Western Power's reliability performance, including any information available about its willingness to pay for performance improvements above the current level of service;
- The reliability performance of Western Power's "peer group" of other Australian NSPs that provided comparable services;
- Improvements that should reasonably be expected in Western Power's reliability performance over time;
- The nature and level of Western Power's proposed capital and operating expenditure, including for reliability related works; and
- The likely effect of any approved exclusions policy.

As noted above, it would be expected that the average reliability performance standards will generally be lower (i.e. worse than) than the levels at which Western Power could earn financial rewards under the service standards adjustment mechanism.

Recommendation 5

Network Advisory Services considers that the Authority should only approve the inclusion of penalty and reward payments under the service standards adjustment mechanism if it is satisfied that:

- Western Power is currently providing a base level of service that merits rewarding it for improved performance;
- Western Power currently has the capacity to accurately measure, and report on, its reliability performance; and
- A service standards adjustment mechanism would encourage Western Power to improve its reliability performance.

Network Advisory Services recommends that, if the Authority is satisfied of these matters, then it approve the inclusion of a service standards adjustment mechanism in Western Power Access Arrangement providing that it promotes the principles and includes the features identified above.