16 Distribution reliability

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| Key points |
| * Reliability in distribution networks is usually measured by the frequency and duration of power interruptions, rather than the likelihood of interruptions as is the case in transmission networks * Most power interruptions that customers experience are as a result of faults or failures in distribution networks. * Distribution reliability varies significantly between jurisdictions, and businesses in the National Electricity Market (NEM) because it is affected by the specific characteristics of each network and the standards imposed. * In order to influence the reliability of distribution networks, state and territory governments and regulators apply reliability standards to distribution businesses, and the Australian Energy Regulator (AER) applies the Service Target Performance Incentive Scheme (STPIS). * This causes duplication and inconsistencies in the standards for some businesses, increasing their costs and making benchmarking of distribution businesses difficult. * Inappropriate reliability standards can also introduce inefficiencies: * standards that are too high or too low impose (net) costs on customers. * standards that restrict the choice of combinations of inputs that distribution businesses can use to achieve improved reliability (such as planning, maintenance and responding quickly to outages) increase costs to businesses and consumers. * requiring distribution businesses to adhere to, and report on, different standards, administered by different regulators, increases costs to businesses and consumers. * A national reliability framework for distribution businesses could overcome these inefficiencies and facilitate benchmarking. It should: * remove jurisdiction-specific reliability standards * reflect customers’ preferences through estimated values of customer reliability * apply all components and parameters of the STPIS to all businesses * streamline reporting requirements * set efficient standards * ensure incentives are efficient and reflect customer preferences. |
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## 16.1 Introduction

Distribution businesses seek to deliver reliable electricity supply to customers by planning, building, and maintaining networks to avoid outages, and by responding to outages promptly when they occur.

For distribution businesses in the National Electricity Market (NEM), delivering reliable supply to customers can be challenging due to:

* the characteristics of distribution networks. Distribution networks are made up of many physical components varying in age and condition and often spanning large distances
* the environments in which they operate. Some distribution networks deliver electricity to customers in difficult environments with inclement weather. Wind, lightening, birds, possums, cars, and contact with trees can affect overhead lines. Density of customers in different areas also affects reliability, with rural areas more likely, on average, to experience longer interruptions.

Reliability standards are applied to distribution networks to encourage the network businesses to maintain high levels of reliability even though there are factors that affect reliability that are beyond the control of businesses. Unlike most reliability standards for transmission networks, these standards are commonly (but not always) directly linked to customers’ experience of reliability.

There are several reasons why this customer-focused interpretation of reliability is appropriate for distribution networks:

* The majority (around 80–90 per cent) of power interruptions that customers experience occur as a result of faults or failures in distribution networks.
* Distribution networks are typically radial, rather than meshed, which limits the effects of an outage. Cascading failures between such radial networks are much less likely to occur. Therefore, the measures a distribution business takes to increase reliability usually only affect customers of that business. Similarly, changes to reliability in distribution networks do not cause the ‘network effects’ that occur in transmission networks. Reliability outcomes in distribution networks can therefore differ markedly between businesses without creating significant adverse effects on other networks in the NEM.
* Because distribution networks generally have more line length than transmission networks, reducing interruptions by building redundancy into the majority of distribution networks would have a prohibitively high cost.

These characteristics are reflected in the metrics that are used to measure distribution reliability outcomes (box 16.1). The ‘system average interruption duration index’ (SAIDI) and the ‘system average interruption frequency index’ (SAIFI) are the two most common measures of reliability performance in distribution networks. They describe for how long and how often a customer could expect to be without power over a given period of time (usually a year).

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| Box 16.1 Common metrics of reliability in distribution networks |
| * SAIDI — system average interruption duration index — is the total minutes on average that a customer could expect to be without power over a given period, usually a year. SAIDI is calculated by adding the total duration of each customer interruption and dividing that by the total number of customers. Separate indexes can be calculated for planned and unplanned interruptions. * SAIFI — system average interruption frequency index — is the number of times in a year that a customer could expect to experience an interruption. SAIFI is calculated by dividing the total number of interruptions across customers by the total number of customers. Separate indexes can be calculated for planned and unplanned interruptions. SAIFI does not usually include ‘momentary’ interruptions lasting for less than one minute. * CAIDI — customer average interruption duration index — is the average time a customer could expect to wait to have supply restored after an interruption. CAIDI is calculated by adding the duration of each customer interruption and dividing that by the total number of interruptions (that is, SAIDI divided by SAIFI). * MAIFI — momentary average interruption frequency index — is the number of momentary interruptions lasting less than a minute that a customer could expect to experience in a year. MAIFI is calculated as the total number of momentary interruptions across all customers divided by the total number of customers. |
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## 16.2 Reliability performance of distribution businesses in the National Electricity Market

Over the last ten years, average state and territory reliability performance data reflect reasonably consistent performance. International comparisons similarly show that the relative performance of Australia’s distribution businesses overall has been quite stable over time, though the NEM has consistently recorded significantly higher average SAIDI results than networks in many other countries.[[1]](#footnote-1)

Aggregate SAIDI results for jurisdictions and for the NEM as a whole, however, mask the variation in performance between distribution businesses, and even reliability performance data for a single distribution business may mask significant variations in the experience of customers in different parts of that business’s network.

Participants in this inquiry have suggested that many factors contribute to variation in reliability performance between and within distribution businesses over time:

Reliability is ultimately the key measure of the performance of a network and a [distribution business]… major events such as storms, the network design (planning standards/network type CBD/Rural/Urban) and the condition of the network have a major influence on this measure. (Ausgrid, sub. 19, p. 2)

… comparisons between jurisdictions can be difficult, as factors such as the level of customer density, the size of the network and the terrain it covers, and environmental factors (e.g. exposure to extreme weather) can have a significant impact on the reliability performance which is achieved and the costs of augmenting and maintaining each network. (AEMC, sub. 16, p. 2)

Some factors affecting reliability, such as the condition of the network and the level of redundancy, are controlled by the business. Others, such as severe weather events and customer density, are not. For example, some networks — and especially those in rural areas of the NEM — are ‘stringier’ than others with long lines, low customer densities and, on average, lower ‘redundancy’.[[2]](#footnote-2) These characteristics increase the likelihood of interruptions, and longer outage durations (for example, if maintenance crews must travel long distances).

In 2010, distribution businesses in Victoria attributed around 32 per cent of customer interruptions to equipment failure (AER 2012h, p. 38). Other common causes were vegetation falling on lines and weather events (figure 16.1). The significance of these causal factors varies across businesses. For example, SP AusNet’s distribution business recorded a high proportion of interruptions caused by vegetation, which it attributed to ‘the nature of the environment of the network’ (AER 2012h, p. 39), whereas Powercor had proportionately more interruptions from the weather.

Figure 16.1 Causes of supply interruptions in Victorian distribution networks

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| Causes of supply interruptions in Victorian distribution networks. This figure shows the percentage of total supply interruptions of other interruptions, inter-distributor connection failure, load shedding, transmission failure, third party impacts, animals, vegetation, operational error, equipment failure and weather in selected Victorian distribution networks. |

*Data source*: AER (2012h, p. 39).

Distribution businesses can address common causes of faults in various ways, including by building redundancy into their networks to address some equipment failures, clearing vegetation away from overhead lines, installing animal shields on poles and building new lines away from roads. The mix of planning, operational and maintenance actions that distribution businesses take to deliver reliability to their customers is in turn a function of the:

* characteristics of each network, including the environments in which each operates, and the densities and types of customer
* regulatory frameworks (in each jurisdiction and NEM-wide) including reliability standards and incentive schemes.

An efficient distribution business will deliver high reliability outcomes, given the characteristics of the network, for a low cost, using instruments within its control to mitigate the effects of factors outside its control. Benchmarking could be used to identify these businesses.

As discussed in chapter 14, and in a similar vein to the discussion of reliability settings for transmission in chapter 15, efficient reliability levels for distribution networks have two dimensions.

* The framework for setting reliability should seek to achieve overall economic efficiency, so that costs of improving reliability are broadly equivalent to the benefits for customers from that improvement (that is, the marginal costs are equivalent to the marginal benefits). Regulatory benchmarking can help in the development of such a framework by highlighting instances where this benefit cost trade-off is integral to the process of determining reliability standards.
* Businesses should meet reliability standards efficiently, with their capacity for doing this tested through traditional benchmarking tools (chapter 4).

## 16.3 Reliability settings for distribution networks in the National Electricity Market

As discussed in chapter 14, under incentive regulation network businesses have an incentive to reduce costs by reducing reliability. Governments and regulators therefore apply reliability standards to complement incentive regulation in the NEM. The frameworks in which these standards are applied to distribution businesses differ between jurisdictions (tables 16.1).

Distribution businesses in the NEM are required to plan and build their networks to meet the security requirements contained in schedules 5.1a and 5.1 of the National Electricity Rules (the ‘Rules’). Apart from this requirement, ‘service reliability standards’ are state and territory functions (SCER 2011, p. 2).

Reliability standards applied to distribution businesses in the NEM can include:

* design planning criteria such as deterministic planning standards, or probabilistic requirements that customer benefits of network augmentations outweigh the costs
* reliability performance standards, which are usually measured using SAIDI and SAIFI, that are applied through state and territory regulatory instruments (for example, codes and licence conditions) as well as under the AER’s Service Target Performance Incentive Scheme
* ‘worst served’ requirements protecting customers who experience significantly poorer reliability outcomes than the average

In addition, distribution businesses may be required to make guaranteed service level payments to compensate customers when reliability standards are not met.

Table 16.1 Jurisdictional reliability planning and performance requirements

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Jurisdiction | Planning criteria | Performance measuresa | Performance measures applied to? | STPIS - current or due to commence? | Jurisdictional performance measures consistent with or additional to STPIS |
| NSW | Deterministic, set out in licence conditions | SAIDI, SAIFI standards set out in licence conditions | Feeder type | 2014 | Unknown until STPIS introduced |
| Vic | Probabilistic | SAIDI (planned and unplanned), SAIFI (exc. momentary interruptions), MAIFI, CAIDI set by DNSPs in line with STPIS targets set by AER | Feeder type | Currently in operation | Consistent |
| Qld | Deterministic, set by DNSPs in network management plans | SAIDI, SAIFI set out in Codeb | Feeder type | Currently in operation | Additional |
| SA | Deterministic, set by DNSPs | SAIDI, SAIFI set out in Codec | Region | Currently in operation | Additional |
| Tas | None | SAIDI, SAIFI set out in Coded | Customer category | Currently in operation | Additional |
| ACT | None | SAIDI, SAIFI, CAIDI minimum targets set out in Codee | n/a | 2014 | Unknown until STPIS introduced |

a In some jurisdictions, SAIDI and SAIFI performance standards apply only to unplanned outages. b Queensland Electricity Industry Code Electricity Distribution (Supply Standards) Code; c South Australian Electricity Distribution Code; d Tasmanian Electricity Code; e Electricity Distribution (Supply Standards) Code.

*Source*: AEMC (2012k).

Within these types of standard, significant variation exists between jurisdictions and even businesses within a jurisdiction. This variation in type and level of standards can affect how easily distribution businesses can be benchmarked, since reliability standards are generally outside of the control of businesses but have a large effect on costs.

Costs can also arise when the type, level, and combination of reliability standards applied to each distribution business are not efficient. For example, standards might not be set in a way that allows (and encourages) the business to provide reliability for a low cost, and at a level that reflects their customers’ preferences. There are three main dimensions of cost and inefficiency in reliability standards for distribution networks in the NEM:

* levels of reliability that are too high or too low will not equate benefits and costs — imposing unnecessary price imposts on customers if too stringent, or resulting in excessive outage related costs if too low (chapter 14)
* restrictions on the way that businesses deliver improved reliability can needlessly increase the costs of providing distribution services to customers
* it is costly to meet and report on reliability performance against standards. Hence standards with duplicative, overlapping or different reporting requirements inflate compliance costs to businesses. These costs increase further if applicable sets of standards are inconsistent with each other.

These three types of inefficiency provide a framework to assess whether reliability settings for distribution businesses in the NEM are contributing unnecessarily to costs for customers. This framework is used below to assess the consequences of different reliability standards applied in the NEM on costs to customers, keeping in mind the role that standards play under incentive regulation — an exercise of regulatory benchmarking. An assessment is also made of how current standards might hinder, or facilitate, benchmarking of the managerial efficiency of distribution businesses.

### Planning standards

In New South Wales, distribution businesses must comply with deterministic planning standards, which are set out in the businesses’ licence conditions (a description of deterministic standards in the context of transmission networks is contained in box 15.2). The standards were introduced in 2005 by the New South Wales Minster for Energy. Before then, businesses were responsible for determining the appropriate level of reliability (AEMC 2012i). These higher planning standards have been one of the main drivers of increases in capital expenditure by New South Wales distribution businesses and in customer bills (Brattle Group 2012a).

Although businesses in other states and territories use deterministic standards to some extent, they have more discretion in the way they are used and the levels at which they are set. In Queensland, Energex and Ergon Energy use explicit deterministic standards to plan their networks. SA Power Networks sets deterministic standards to help it meet the performance targets set by ESCOSA and the reliability requirements set out in the South Australian Electricity Distribution Code. The deterministic standards, however, are not strict, and investments are deferred when the risk of contingencies can be dealt with using other operational actions (ETSA Utilities 2012b, p. 7).[[3]](#footnote-3)

In Victoria, CitiPower and Powercor Australia use deterministic standards for small, localised upgrades (CitiPower and Powercor 2012, p. 2). The Victorian Electricity Distribution Code specifies that businesses must develop plans to ensure reliability is delivered with consideration of high cost, low probability events. Mostly, distribution businesses in Victoria use probabilistic planning when making their planning decisions (the probabilistic process they use is similar to that used by AEMO for transmission in Victoria and is described in box 15.4).

#### Consequences for efficiency

Distribution businesses that are required to comply with higher deterministic planning standards will generally have higher capital expenditure, and this would need to be accounted for, as far as possible, in any benchmarking exercise.

There are also costs in specifying how a distribution business should plan its network in regard to meeting reliability standards. These costs arise from the substitutability between reliability ‘inputs’. For a given level of reliability, the lowest cost combination of inputs (redundancy, maintenance, operational flexibility, and others) is different from one business to the next and even within a business over time. According to Jamasb et al. (2010):

Due to the presence of possible trade-offs between Opex and Capex … utilities might adopt different strategies to combine operating and capital inputs to improve service quality. (p. 5)

Deterministic planning standards therefore reduce the flexibility of a business to find the most efficient input mix to ensure reliability.

There are, however, some benefits of setting deterministic planning standards for distribution businesses. Requiring a distribution business to maintain a level of redundancy ensures that the business does not defer augmentations that are needed to maintain reliability in order to reduce costs under incentive regulation. These benefits largely drove the recommendation for the use of deterministic standards in Queensland as described in the Somerville report (2004), which included the recommendation that distribution businesses in Queensland adopt deterministic standards of the form N‑1 (box 15.4).[[4]](#footnote-4) These standards, however, have imposed high costs on Energex and Ergon Energy and it is not clear that the resulting increased levels of reliability are adequately valued by customers. Both distribution businesses have recently suggested that the deterministic standards be scaled back, with ensuing cost savings of $505 million in the current regulatory period (Somerville 2011, p. 74).

Customers would only be willing to pay for augmentations to a distribution network to meet deterministic standards if they value the increasing reliability more than the price increases arising from the cost of the required investments (chapter 14). There is little evidence to suggest that the deterministic standards applied in New South Wales and Queensland are the result of an analysis of customer value of reliability and consequently, the likelihood of those standards being efficient is low.

While this type of inefficiency is less likely to exist for distribution businesses that use probabilistic planning (as it uses a cost-benefit framework), there are costs attached to undertaking a full probabilistic assessment every time a constraint emerges on a distribution network.

### Jurisdiction-specific performance standards

Distribution businesses are required to meet performance standards set at the jurisdictional level, and at the national level through the AER’s STPIS. Distribution businesses in Queensland, Tasmania, South Australia, and Victoria are currently operating under the STPIS. In Queensland, Tasmania and South Australia, state governments and regulators also apply different and additional performance targets to distribution businesses. In Victoria, distribution businesses are required under the Victorian Electricity Distribution Code to set their own SAIDI and SAIFI targets but all of the businesses have currently chosen to adopt the STPIS targets set by the AER. In this way, distribution businesses in Victoria are not subject to additional jurisdiction based standards. Whether the jurisdictional standards in New South Wales and the ACT will continue to apply in addition to the STPIS will be determined when the STPIS comes into force in 2014 and 2015, respectively.

Performance standards are set most commonly using SAIDI and SAIFI performance indicators (for example, table 16.2) although in some jurisdictions, there are also standards for MAIFI and CAIDI . In most jurisdictions, performance standards are determined according to feeder type — whether they are CBD, urban, or short or long rural feeders. Categorising performance targets by feeder type recognises that those feeders that are longer, have less redundancy and are further from maintenance crews, generally have lower reliability and that these feeders generally service areas with lower customer density. South Australia, however, does not use feeder types, but rather sets standards for seven regional areas, and Tasmania classifies each community into one of five customer categories (critical infrastructure, high-density commercial, urban and regional centres, high density rural, and low density rural) with corresponding performance targets.

Table 16.2 Queensland distribution network performance targets

2010-11

|  |  |  |  |
| --- | --- | --- | --- |
| Distribution business | Feeder type | SAIDI (minutes) per year | SAIFI per year |
| Energex | CBD | 15 | 0.15 |
| Urban | 106 | 1.26 |
| Short-rural | 218 | 2.46 |
| Ergon Energy | Urban | 149 | 1.98 |
| Short-rural | 424 | 3.95 |
| Long-rural | 964 | 7.40 |

*Source*: AEMC 2012k, p. 64.

Sometimes, as is the case in Tasmania and South Australia, the levels of standards are informed by averaging past performance. Other times, they are set at a more demanding level than past performance to encourage businesses to improve reliability. Targets can be static or become more demanding over time, as was the case in New South Wales between 2005‑06 to 2010‑11, and is currently occurring in Queensland. While ActewAGL and the Office of the Tasmanian Economic Regulator have considered the use of customer values of reliability, neither have explicitly incorporated value of customer reliability estimates into the setting of their standards.

Jurisdiction-specific performance standards are set by a regulator in South Australia, Tasmania and the ACT.[[5]](#footnote-5) In Queensland the Minister can amend the Code and the regulator can propose amendments subject to stakeholder consultation. In New South Wales the Minister sets the standards.

Businesses in Queensland, South Australia, Tasmania, and Victoria are required to use ‘best’ or ‘reasonable’ endeavours to meet standards. ActewAGL faces penalties for missing targets unless they can provide a ‘reasonable excuse’ and businesses in New South Wales must be as compliant as ‘reasonably practicable’ by 2014 and fully compliant by 2019. Penalties apply in all jurisdictions if businesses contravene their reliability requirements and can range from fines of around $100 000 to revocation of a business’s licence (although this has never occurred in the NEM).

Distribution businesses are required to report their performance against their standards, with (potentially) additional reporting in the event of a failure to meet standards. For example, in New South Wales, distribution businesses are required to report their performance against the standards to the Minister quarterly and include reasons for failing to comply with standards. Distribution businesses in New South Wales are also required to provide an independently audited report annually to the Independent Pricing and Regulatory Tribunal(IPART) (AEMC 2011g, p. 18).

#### Consequences for efficiency

The discussion above highlights that no two jurisdiction-specific reliability performance frameworks are the same. The AEMC (2009b) agreed:

There is a lack of consistency and transparency in how the different jurisdictional standards are determined and described. Also how the distribution businesses interpret and comply with these standards can vary significantly across the NEM. (pp. executive summary)

In this type of regulatory environment, benchmarking distribution businesses is difficult. Reliability settings that vary considerably from one jurisdiction to the next create another factor that is external to the business that would need to be controlled for in any meaningful benchmarking exercise.

Benchmarking the standards themselves, and the frameworks in which they sit, however, is more straightforward, and a number of costs and benefits can be identified.

The benefits of imposing jurisdiction-specific performance standards in addition to the STPIS are not immediately obvious. However, it is possible that jurisdictional authorities see value in retaining the ability to strip a distribution business of its licence in the case of extreme underperformance. It is not clear though, that while retaining the authority to remove a business’s licence, why jurisdictional authorities do not align their standards with those in the STPIS, such as is currently done in Victoria. Requiring distribution businesses to adhere to and report their performance against two sets of standards is costly and does not seem to produce obvious benefits. According to Endeavour Energy (2012):

We do however see benefits in aligning national and jurisdictional reporting requirements where duplicate reporting regimes are to be maintained (for example the AER’s STPIS and jurisdictional requirements. (p. 3)

Another possible benefit arises from customers ‘feeling closer’ to the standard-setting body, especially if that body is the state government, and therefore feeling that they have more control over the reliability they receive. However, no jurisdiction‑specific standards incorporate customer values in their standard setting process. Rather, significant changes to standards by jurisdictional authorities appear to occur in response to political pressure or intervention and publicly expressed customer discontent, which suggests that the ‘closeness’ of the relationship produces, at best, delayed and reactive responses to customer demands. These ‘reactive’ responses could also be disproportionate to the actual value the customers overall place on rectifying the issues in question, and may not be targeted appropriately in any case.

Another inefficiency arises from setting standards using a business’s historical performance. Setting standards without reference to customer values of reliability creates inefficiency. Standards for reliability are only efficient when the value that customers place on the extra reliability is equal to the cost to the business to provide it; otherwise, customers incur unjustified additional costs (chapter 14).

The current AEMC review of distribution reliability seeks to assess whether standards in New South Wales are indeed too high or too low by measuring consumer willingness to pay for improvements in reliability. The report concluded that:

Over a fifteen year timeframe, each of our three scenarios for lower reliability outcomes would provide net benefits and would result in significant reductions in distribution expenditure for reliability. (AEMC 2012l, p. v)

### **The AER’s service target performance incentive scheme**

The STPIS provides incentives for distribution businesses to deliver reliability outcomes to customers. Its purpose is to:

… balance the incentive to reduce expenditure with the need to maintain and improve service quality for customers through establishing a direct financial link (reward or penalty) between revenue and service standards. (AER 2007a, p. 7)

The Rules set out requirements for the AER to establish and publish the STPIS (clause 6.6.2(b)). In carrying out this role, the AER was required to meet a number of criteria including taking into account the willingness of customers to pay for improved performance in the delivery of services, and the need to ensure that incentives are sufficient to offset any incentive the business might have to reduce costs at the expense of service levels.

The STPIS has five components:

1. reliability of supply
2. quality of supply
3. customer service
4. guaranteed service levels
5. information and reporting

All components of the STPIS, except the guaranteed service level component, operate in addition to existing jurisdiction-specific requirements. The guaranteed service level component only applies where no corresponding jurisdiction‑specific requirement exists. As a result, it is not currently applied to any distribution business in the NEM.

#### Reliability of supply

The STPIS sets performance targets according to feeder type for distribution businesses using unplanned SAIDI, unplanned SAIFI, and MAIFI indicators.[[6]](#footnote-6)

The AER sets performance targets for these indicators at the beginning of each regulatory control period during the revenue determination process (table 16.3). The targets are calculated as the average of the available performance data for the five most recent years. The AER then makes adjustments, such as for:

* impacts on past performance from events that are considered to be outside of the control of a distribution business, for example, load shedding due to generation shortfall or failures in transmission networks, or interruptions during extreme weather events (box 16.2)
* any improvements in reliability that are anticipated to result from expenditure that the AER has or will approve in past or current revenue determinations.

Distribution businesses report their performance against their targets annually, and differentiate outages that they believe should be excluded from the calculation of their reward or penalty.

Table 16.3 Example targets for STPIS reliability of supply parameters

Ergon Energy

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Parameter | Unit | Targets | | | | |
|  |  | 2010-11 | 2011-12 | 2012-13 | 2013-14 | 2014-15 |
| SAIDI | Minutes |  |  |  |  |  |
| Urban |  | 129 | 128 | 127 | 127 | 126 |
| Short rural |  | 296 | 291 | 287 | 283 | 279 |
| Long rural |  | 699 | 687 | 675 | 664 | 652 |
| SAIFI | Interruptions |  |  |  |  |  |
| Urban |  | 1.69 | 1.68 | 1.66 | 1.64 | 1.63 |
| Short rural |  | 3.06 | 3.02 | 2.98 | 2.94 | 2.91 |
| Long rural |  | 5.59 | 5.52 | 5.44 | 5.37 | 5.29 |

*Source*: AER (2009c, p. 304).

Some events are excluded from the measurement of performance against targets because, in theory, distribution businesses should not be penalised for interruptions that were not their fault. Excluding certain types of event, however, also weakens the incentives that businesses have to prevent those types of event from recurring. The AEMC gives the example of an interruption caused by a car accident; while the business is not ‘directly responsible’ for the accident, there are measures that it could take to avoid future accidents, such as positioning poles further from roads (albeit at a cost) (AEMC 2012k, p. 32).

These matters illustrate a problem common with many incentive schemes that sometimes they motivate as much ‘internal’ focus on debating and defining the ‘rules and exceptions’ as they do on businesses genuinely looking outwards and trying to achieve the intended objective — in this case improved satisfaction in the eyes of end customers. Apart from the issues around VCR, for some of the other components included in the STPIS, it is not entirely clear whether customers have been adequately consulted for example about whether they care much about the exact reasons for an outage. It is likely that for some, the fact that there is an outage, planned or unplanned, due to an event defined as ‘controllable or uncontrollable’, all they really care about is getting their power supply restored quickly. It is important moving forward that distribution businesses and the AER spend adequate time gathering feedback from end customers about their views in regard to supply interruptions, and that over time the STPIS targets are adjusted to reflect this feedback.

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| Box 16.2 Major event days — an exclusion from STPIS performance measures |
| A major event is defined as a catastrophic event that exceeds the capacity of the electricity network to avoid significant power interruptions. Major event days (MED) are calendar days on which a major event occurs – even if the power interruption lasts for several days, only one day is recorded as an MED.  A day with a large unplanned SAIDI can be classified as an MED if the total unplanned SAIDI for that day is unusually high.[[7]](#footnote-7)  The unplanned SAIDI from MEDs are not included in the calculation of how far a business’s performance is from its target in a regulatory year. Therefore, there has been some debate about the best way to define a MED, with less stringent definitions leading to more events being excluded (and therefore the appearance of an improved performance by the business against its target).  Similarly, as discussed by SP AusNet (2010, p. 37), setting the definition of a MED too leniently might create perverse incentives for businesses to allow an event with negative consequences for unplanned SAIDI to escalate into a major event (by failing to reconnect power as quickly as possible), such that it ‘creates’ an MED.  Setting the definition of an MED too stringently might put businesses’ revenue at risk from events that are outside of their control. For example, there have been suggestions that raising the threshold would be more appropriate.[[8]](#footnote-8) Businesses, however, were concerned that many events that were caused by extreme weather events (and therefore outside of the control of businesses) would cause unplanned SAIDI results of less than the MED threshold and consequently put business revenue at risk from not meeting STPIS targets. |
| *Sources*: AER (2009d); SP AusNet (2010). |
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#### Quality of supply component

There is provision in the STPIS for quality of supply to be measured, however, currently there are no parameters specified.

#### Customer service component

The STPIS includes parameters for customer service that distribution businesses are required to meet, including times for making streetlight repairs, new connections, answering telephone enquiries and responding to written queries.

Distribution businesses that exceed (do not meet) the targets that the AER sets for these parameters can gain (lose) in total a maximum of 1 per cent of their allowed revenue. The targets are usually an average of the performance of the previous five years and are also adjusted for anticipated improvements from customer service related expenditure allowed under past or current revenue determinations.

#### Guaranteed service levels

The guaranteed service level component of the STPIS is intended to provide an incentive for distribution businesses to acknowledge and address the sub-standard reliability and service outcomes that some customers experience. The parameters covered under this component and the target levels of performance for businesses are contained in table 16.4, along with the payments that businesses would be required to pay, for each instance of performance shortfall.

These payments are not linked to the cost that poor service imposes on customers but are intended to be an acknowledgment of poor service. Payments must be made directly to consumers as soon as a distribution business becomes aware of having missed a target and where it is responsible for that failure.[[9]](#footnote-9) This is not the case in some jurisdiction‑specific guaranteed service level schemes that require customers to apply for payments.

This component of the STPIS is not currently applied in any jurisdiction in the NEM (although it is anticipated to begin in the next regulatory control period for Victoria). Instead, jurisdiction specific schemes containing a wide range of parameters, targets and levels of payments are applied.

Table 16.4 Guaranteed service level parameters, thresholds and payments in STPIS

subtitle

|  |  |  |
| --- | --- | --- |
| Parameter | Threshold | Penalty per occurrence ($) |
| Frequency of interruptions – CBD and urban feeders | 9 interruptions | 80 |
| Frequency of interruptions – rural short and long feeders | 15 interruptions | 80 |
| Duration of interruptions – CBD and urban | 12 hours | 80 |
| Duration of interruptions – rural short and long feeders | 18 hours | 80 |
| Total duration of interruptions – level 1 | 20 hours | 100 |
| Total duration of interruptions – level 2 | 30 hours | 150 |
| Total duration of interruptions – level 3 | 60 hours | 300 |
| Streetlight repair | 5 days | 25 |
| New connections | Connection on or before the agreed day | 50 per day (maximum 300) |
| Notice of planned interruptions | 4 days excluding weekend and public holidays | 50 |
| Frequency of interruptions – CBD and urban feeders | 9 interruptions | 80 |

*Source*: AER (2009d, p. 18).

#### Information and reporting requirements

The STPIS requires distribution businesses to report annually against the parameters under the scheme, and stipulate any exclusions that the business believes should be applied. The AER can review the reports to ensure they account for exclusions accurately, calculate the consequences for allowed revenue correctly, and that the data collected match the parameters under the scheme.

Aspects of the reporting requirements, and related information gathering processes appear to lack transparency. For example, the AER issues each business a request for information notice outlining the business specific data that it wants to collect. Any public reporting of this data needs to be approved by the business before it is released and currently, there is no public reporting that is specific to the STPIS.

Nevertheless, STPIS reporting and information requirements mostly exceed, and are in addition to, jurisdiction‑specific reporting requirements, with the exception of Victoria. In the latter case, the AER’s Annual Performance Report (2012h) for the Victorian distribution businesses details reliability performance at the zone substation level and identifies the main causes of faults in the networks. This reporting structure and detail were inherited by the AER in the transition of responsibilities from the Essential Services Commission of Victoria (ESCV) and now form the basis of the reporting requirement for Victoria under the STPIS. This report provides a useful benchmark for establishing consistent, transparent and detailed reporting of reliability performance NEM-wide.

#### Incentives under the STPIS

The first three components of the STPIS have incentives attached to them to encourage the distribution businesses to meet their specific targets. The incentives are based on a VCR and the gap between the performance of the business and the target. The AER calculates the incentive rates using a VCR that is specific for each feeder type. The VCR for a CBD-feeder is $96 per kWh (indexed to the CPI from September 2008). For all other feeder types, the VCR is $48 per kWh (AER 2009d, p. 10). In this way, the incentives for businesses to meet their targets are directly related to the costs (benefits) that customers experience when businesses fall short of (exceed) their targets.

The incentives are converted into a share of the annual maximum allowable revenue for a business, termed the ‘s-factor’. The maximum that a business can be rewarded or penalised is termed the ‘revenue at risk’. The default level for each year in a regulatory control period is 5 per cent, though actual levels range from 3 per cent for Ergon Energy in Queensland to 7 per cent for SP AusNet in Victoria. Distributors can apply to postpone the incorporation of the revenue increments or decrements for a year to avoid excessive price fluctuations for customers.

Under the STPIS, a business that meets all its targets gets additional revenue by being allowed by the AER to increase its prices to customers — who effectively pay an additional price for the improved ‘quality’ of the service they receive. Likewise, if a business fails to meet its targets it gets penalised and has to reduce its prices to customers who receive some compensation for the poorer performance. The fact that customers thus end up directly paying for the performance that is incentivised by the STPIS, emphasises the point made earlier about the importance of aligning the STPIS targets with things that customers most value.

#### Consequences for efficiency

On the one hand, the reporting requirements under the STPIS are likely to facilitate benchmarking of businesses if the information currently collected by the AER is consistent and reasonably detailed. However, it appears there is room for significant strengthening and streamlining of reporting requirements in the STPIS, especially outside of Victoria, and all non-commercially confidential information should be released publically (and there should be an onus of proof on the business to show why any of this information is commercially confidential — these are regulated monopolies after all).

On the other hand, because the STPIS operates alongside existing jurisdiction‑specific reliability standards, not every business is subject to the same parameters of the scheme. This inconsistency adds to the factors that must be controlled for in a benchmarking exercise, making such an exercise more difficult.

The STPIS has many valuable features, including the consistency between the incentives offered and the reliability related revenue approved by the AER. Nonetheless, several concerns remain:

* The targets are based on a business’s historical performance. As discussed in the context of jurisdiction‑specific standards, historical performance as a basis for a reliability standard does not have regard to customers’ willingness to pay.
* The rewards and penalties received under the scheme are unlikely to be providing the right incentives to distribution businesses to encourage them to efficiently meet customer preferences, due to issues in using a single VCR (box 16.3) and the implications of errors (box 16.4). Furthermore, the AER uses the same VCR for all distribution businesses, which ignores the different preferences that customers between, and indeed within, distribution networks might have.
* The default revenue at risk is 5 per cent to avoid ‘imposing undue risk’ on businesses by making businesses ‘accountable for events caused by factors over which [they have] little or no control’ (AER 2008b, p. 16, AER 2007a, p. 23). It is not clear, however, from the discussion contained in the documents establishing the STPIS, that 5 per cent revenue at risk provides a large enough incentive to prompt businesses to adjust their reliability performance sufficiently.

Consumers also incur risk from uncapped revenue at risk in the form of excessive price fluctuations from one year to the next, although the s-bank mechanism in the STPIS helps to smooth volatility in prices over time (AER 2009d, p. 30).

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| Box 16.3 The problem with a single value of customer reliability |
| The efficient level of reliability, as discussed in chapter 14, is where the marginal benefit to customers of extra reliability is equal to the marginal cost to the business of supplying it.  Assuming that the targets in the STPIS are set at the efficient level, the optimal incentive to apply to businesses that perform above or below their target is a function of the VCR and the gap between the target and the performance. Theoretically, however, the VCR is not constant, and the incentives should be higher when a business under-performs than when it over-performs.  In the figure below, when a business performs at R’, below its efficient (and target) level of R\*, the optimal penalty should recognise that the cost to customers, VCR’, is higher than the cost to the business of improving reliability. Penalising the business using VCR\* will not be equivalent to the loss that consumers experience for this level of underperformance.  This figure adds to the figure found in Box 14.3 in chapter 14 to show the impacts of varying reliability levels on cost. It shows that different levels of reliability correspond to varying levels of VCR.  Similarly, if a business exceeds the target at R’’, it will be rewarded using VCR\* when customers only value the increased reliability at VCR’’. This means that businesses are being rewarded by more than the marginal benefit accruing to customers.  In reality, however, applying variable VCRs that correspond to a marginal benefits curve like that in the figure is challenging, especially considering the difficulties associated with identifying accurate VCRs as discussed in chapter 14. |
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| Box 16.4 What happens if the value of customer reliability and the targets are wrong? |
| Using the figure below it is possible to examine how incentive schemes can produce inefficient levels of reliability when the VCR and/or the targets are not at their optimal points.  Assume first that the target is set optimally at R\*, but the VCR is set at VCR’. As the business will receive a payment greater than its marginal costs at the point R\*, it will have an incentive to supply reliability up to the point R’’. This point is not optimal for customers, and inefficiencies are generated.  Assume instead, that that target is set incorrectly at point R’’, but the VCR for the incentives is the correct VCR\*. Businesses will have the incentive to supply reliability only up to point R\* but not beyond. Beyond R\*, the costs to the business are larger than the penalties they will incur for failing to meet the targets.  This figure adds to the figure found in Box 14.3 in chapter 14 to shows how different levels of incentives encourage network businesses to increase or decrease reliability above or below the efficient level.  These examples suggest that in theory as long as the VCR is set at an appropriate level, businesses will tend towards supplying a level of reliability that reflects customer preferences, regardless of the target set. |
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## 16.4 An efficient and effective distribution reliability framework — a bolstered STPIS

The discussion of the current reliability frameworks in the NEM suggest there are opportunities for efficiency gains to be realised, both in terms of encouraging managerial efficiency by facilitating benchmarking, and also by reducing inefficiencies in reliability standards and the frameworks in which they operate.

### Removing input standards

An efficient reliability framework will set reliability targets at levels that reflect customer preferences, and encourage distribution businesses to pursue those targets through the best combination of building, maintaining and managing their networks and responding to outages. To some extent, these inputs can be substituted. Imposing restrictions on the way that businesses choose the mix of inputs, such as through imposing deterministic standards, increases costs. According to the Brattle Group (2012a):

… rigid planning standards could be counter-productive because they can prevent distributors implementing innovative approaches to improving reliability. (p. 160)

Costs can also be imposed on a network business by requiring that they plan using a probabilistic process. While probabilistic planning is likely to lead to cost effective augmentation decisions, it may not be the most appropriate planning tool for all businesses, for all investments, all the time. Distribution businesses should therefore be free to choose the way that they plan.[[10]](#footnote-10) Jemena (2012) submitted that:

… the adoption of probabilistic planning for our network has improved reliability and cost outcomes and in our case has provided a superior alternative approach to deterministic planning. That said, we believe the [distribution businesses] should be allowed to decide the most suitable approach to network reliability planning having regard to local network characteristics or geographic conditions. (p. 3)

Energex (2012) agreed:

… planning standards should be the responsibility of [distribution businesses]. Regulators and/or governments should not be involved in determining the design planning criteria as [distribution businesses] are the parties that are best placed to perform this function. (p. 2)

#### How much is this change worth?

The possible benefits of removing planning standards for distribution businesses are not to be underestimated. As an example, AEMO calculated the cost savings of removing the deterministic standards that apply to Ausgrid. Using a probabilistic process, AEMO found that one proposed substation could be safely deferred for up to ten years. In total, AEMO identified $1.1 billion in augmentation capex that could be deferred until the next regulatory period. For the average customer, this would equate to a saving of around $50 per year from their electricity bill from 2014 onwards.

Smaller gains were identified by the AEMC (2012l) in their current review of distribution reliability outcomes in New South Wales. The ‘extreme’ reduction in reliability outcomes scenario in New South Wales identified a possible saving of $15 a year for residential customers that could be expected to be realised from 2028. Several points might help explain these smaller results:

* The reliability reductions that were modelled might not have been very ‘extreme’.[[11]](#footnote-11) For example, Public Interest Advocacy Centre (PIAC) was ‘surprised by the very modest reductions in customer reliability … that occur under the three scenarios modelled by the AEMC’ (2012, p. 4).
* The capital requirements to meet existing deterministic standards into the future have already been built, leaving few investments to be deferred, and resulting in lower expected benefits (AEMC 2012l, p. 129).
* The distribution businesses might have been unable to identify all the areas in which efficiencies could be realised given the ‘simplifying assumptions’ they made to prepare the data for the report in a ‘relatively short timeframe’ (AEMC 2012l, p. 26).

The total change in capital expenditure in the ‘extreme’ scenario was projected to be $1.1 billion over the next 15 years (net present value), which would equate to an annual saving of around 4 per cent of the forecast capital expenditure in New South Wales in 2012-13.

In reality, the effect of removing planning standards for distribution businesses is likely to result in larger benefits than those that have been estimated and described above. Combining the flexibility of choosing exactly how to meet target levels of reliability (by removing any bias towards capital expenditure) with incentives to meet standards efficiently (and removing the incentive to over‑invest — chapter 5) should result in larger savings for customers NEM‑wide. Further, as demand increases, and the current redundancy built into the network diminishes, the value of deferring new investments efficiently will produce higher savings to customers in the long-run.

### Bolstering the STPIS

Removing *planning* standards altogether would increase the need for *performance* standards (the output measure) to be set efficiently, and supported by strong incentives to encourage businesses to achieve standards of reliability that customers are willing to pay for.

#### Establishing a national framework

Requiring distribution businesses to adhere to more than one set of performance standards increases the risk of businesses inefficiently delivering reliability outcomes below (or above) the level that customers are willing to pay for. The AEMC (2012k) also points to possible unclear or inconsistent incentives from ‘duplication between jurisdictional requirements and the requirements of the STPIS’ (p. 41).

In the Commission’s view, removing jurisdiction‑specific performance standards and relying on the STPIS is likely to be the most efficient option for the NEM.

The Commission notes that the third option for a national framework for distribution reliability outcomes identified by the AEMC (2012k) recommends removing ‘some of the existing jurisdictional requirements that may no longer be needed once the STPIS is in place’ (p. 41). This option is (notionally) widely supported by participants in the review, including CitiPower and Powercor, SP AusNet, Essential Energy, Major Energy Users Inc. and Jemena (Energex supports a national framework, and Endeavour Energy proposes a larger role for the AER).

Retaining even some reliability requirements in jurisdictional codes and licence conditions, however, inefficiently adds to costs for distribution businesses:

* the costs of ‘unclear or inconsistent incentives’ discussed above are maintained
* new costs are introduced from the uncertainty for distribution businesses from state and territory governments and regulators having the authority to introduce or change reliability requirements at will
* for example, as a result of the politicisation of reliability outcomes, the potential for which was identified by the Brattle Group (2012a, p. 28).

All reliability requirements should therefore be removed from distribution business licence conditions and jurisdictional codes and regulations. This would require the Standing Council on Energy and Resources (SCER) to effectively transfer the responsibility of setting a reliability performance framework to the national level, through an amendment of the Australian Energy Market Agreement as well as introduce legislative amendments, and agree that the STPIS becomes the only vehicle for delivering reliability outcomes to customers. Under this framework, reliability targets would be set by the AER using business specific average past performance, and rewards and penalties would be set using customer preferences specific to the region in which the business operates.

#### Harmonising parameters

Removing duplicative jurisdiction‑specific reliability requirements, but at the same time ensuring that an incentive scheme is as effective as possible, requires that all parameters of the components in the STPIS are applied to all network businesses.

The Commission recognises that some businesses might not currently be able to record and report on all parameters, such as for example, MAIFI performance. In these instances, the AER should approve the revenue required for the businesses to install the additional equipment needed, subject to the business showing that it has not had the revenue or opportunity to do so previously, and the AER is satisfied that the long term benefits of applying the parameter outweigh the costs of the required investment.

#### Addressing worst served customers

Participants in the AEMC’s review commonly identified the lack of provisions in the STPIS to address the experience of worst served customers. According to Essential Energy (2012):

[T]he STPIS, as currently structured, will encourage [distribution businesses] to focus reliability improvements on parts of the network in urban areas that may already be performing quite well at the expense of poorly performing parts of the network in rural areas. (p. 2)

Essential Energy recommended that the AER establish minimum service standards such as already exist in New South Wales. The Brattle Group (2012a), however, while recommending supplementary mechanisms relating to worst served customers, believed a requirement to publish annual distribution planning statements was more appropriate than establishing financial incentives attached to targets specifically designed for worst performing feeders.

The Commission concurs that publicly reporting performance (and possibly planning) is likely to encourage an improvement in the performance of worst performing feeders, provided distribution businesses are responsive to public pressure and reputational consequences. Furthermore, licence conditions that require businesses to supply connected customers, and develop contingency plans for how to deal with outages are likely to help ensure that at least minimum acceptable levels of service are met.

For individual customers, poor service is recognised by distribution businesses through the payments for guaranteed service levels. While these payments are not intended to be compensation for poor reliability, their reporting, especially at a disaggregated level, is likely to increase awareness of areas where distribution businesses are failing to provide reliable supply. Importantly though, it should be recognised that the goal is not to pursue uniformly high reliability across all parts of Australia. As discussed in chapter 14, the much higher cost of improving reliability in parts of the NEM — and especially in more remote areas — means that differences in reliability levels are both inevitable and efficient.

To support more disaggregated reporting of reliability for worst served customers, the relevant reporting requirements under the STPIS should be amended to reflect the level of detail and consistency currently contained in the Victorian Annual Performance Reports. Where distribution businesses are unable to collect the information required to report to the AER in that detail, the AER should approve efficient expenditure required to upgrade recording and reporting equipment.

#### Setting efficient targets

The reliability performance targets in the STPIS, based on historical performance, are unlikely to be efficient. The conceptual requirement to set reliability standards at a level where the incremental costs and benefits of further improvements are aligned cannot reasonably be disputed. But the hard part is performing that calculus in an imperfect real world.

One issue here is that businesses are likely to know their marginal cost functions but regulators are not, at least not without significant increases in information and data from businesses. While methodology exists for estimating the marginal cost curves for distribution businesses in the NEM,[[12]](#footnote-12) it is not apparent that robust estimates would be available for use in setting reliability targets in the near future, especially at a disaggregated level.

So how should efficient targets be set? The key lies not in the targets themselves, but in the incentives (or penalties) that apply for divergence from target levels, which are based on an appropriate VCR.

Applying the right incentives (in terms of rewards and penalties to businesses) over time can encourage businesses to adjust their reliability levels to reflect the levels that customers prefer even if only one value of VCR is used (box 16.3) and the initial targets are incorrect (box 16.4). Box 16.5 sets out a means for progressively iterating the current historical performance targets towards this goal.

To motivate this adjustment the AER should issue the performance targets for businesses annually using a moving five year average of past performance.

The difficulty still remains, however, of ensuring that the VCR used to calculate the penalties and rewards is set at the right level to reflect the preferences of customers of each distribution business.

Were the Australian Bureau of Statistics to conduct regular surveys of customers as recommended by the Commission (draft recommendation 14.1), it would be able to identify a VCR corresponding to the level of reliability that customers have recently experienced. If the incentives for distribution businesses are then based on this VCR, it will be possible to tell if the business has been performing below (or above) the efficient level by the way that the business responds to the incentives. If the business responds by improving performance, then the target will eventually shift up and the VCR (after new surveys have been conducted) should shift down.

Therefore, while a moving historical average can ensure targets for a business converge to an efficient level, so too must the VCRs used for calculating incentives also be re-estimated regularly. In this way, over time, reliability targets and incentive rates should move toward levels that encourage businesses to find least costs ways to provide the level of reliability preferred by customers.

Compared to current processes, these changes are not a significant shift for the AER or distribution businesses already operating under the Scheme, however, they do ensure that reliability targets and the incentives to meet them are firmly planted within a cost-benefit framework. In short, the Commission proposes that:

* performance targets be set using a rolling five year average of past performance
* the incentives be business specific (or more disaggregated) and based on the VCRs estimated by the ABS as recommended in draft recommendation 14.1.

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| Box 16.5 Adjusting to efficient targets and incentives |
| The figure below shows the efficient level of reliability at R\*. If the business supplies reliability at RA instead of R\*, and VCR\* is used to calculate the penalty, the penalty would be larger than the marginal costs to the business of increasing reliability. The business will therefore have an incentive to increase reliability up to R\*.  Similarly, if the business performs at RB, the reward it receives will be less than the cost of providing the reliability, and reliability will adjust back over time to R\*. This means that so long as rewards and penalties are based on VCR\* (that is, the VCR corresponding to the efficient level of reliability), reliability performance will converge to R\*. As the targets adjust using the moving average of historical performance, the targets also will eventually adjust to R\*.  This figure adds to the figure found in Box 14.3 in chapter 14 to show the impacts of varying reliability levels on VCR. It shows that setting the incentives at the right level will encourage network businesses to adjust the levels of reliability they supply to iteratively move towards the efficient level.  Identifying VCR\*, however, is not necessarily straightforward. If, for example, a distribution business has consistently been performing at RA, below efficient levels, the surveys of customer values of reliability might identify a VCR greater than VCR\* (VCRA in the figure) reflecting recently experienced levels of reliability. If incentives are then based on this higher VCR, the business would have an incentive to increase performance past the efficient point.  This would also apply for a distribution business performing consistently above R\* (RB in the figure), leading to incentives based on an identified VCRbelow VCR\*. The business would have an incentive to reduce performance below R\* and the targets would eventually adjust to reflect this. In response to these changes in reliability, however, customers will adjust the value they place on more reliability. By taking regular surveys to identify these values and incorporating the updated values into the incentives, the reliability performance should slowly adjust towards its efficient level. |
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#### Ensuring incentives are strong

The transition path to efficient reliability targets will be slower if the incentives that distribution businesses respond to are capped. The Brattle Group (2012a) noted that:

We also found that … distributors with the most to lose (i.e. facing the highest potential penalties) tend to comply more closely with reliability standards than those facing less punitive sanctions, at least as regards the average duration of interruptions. (p. 11)

As revealed in the discussion above, incentives should also be two sided — that is, businesses should incur penalties for under performance and rewards for exceeding performance targets. The Brattle Group (2012a) contended that this avoids a ‘cliff edge’ effect:

… whereby distributors will be reluctant to invest to improve reliability when they are close to their target if this could lead to higher than target reliability for which they will not be rewarded. (p. 14)

There is a mix of opinions regarding how incentives should be set for distribution businesses. Some businesses, for example SP AusNet, preferred uncapped two-sided incentives. In response however, the Energy Users Coalition of Victoria (EUCV 2010) noted that there is already an implicit floor in the penalty that the AER can apply, because removing too much revenue from a business will ultimately result in a loss of supply of electricity to SP AusNet customers. This would make the incentives ‘asymmetric’ (p. 45).

There is also a concern that because rewards and penalties affect the prices that customers pay, large incentives can lead to excessive fluctuations in price for customers (AER 2010b, p. 674).

Similarly, point targets for businesses can introduce uncertainty if small changes in performance can tip a business over the line from receiving a reward to having to pay a penalty and vice versa. To address this, some commentators discuss the possibility of using ‘dead bands’ — that is, having a target range for businesses rather than a point (for example Yahav et al. 2008 and Ramanathan et al. 2006). However, as small variations from performance targets result in small rewards and penalties, it seems reasonable to suggest that across a five year regulatory period, small deviations from targets year to year should even out.

An advantage of ensuring incentives are sufficiently strong is that it encourages businesses to more efficiently use their choice of inputs into achieving reliability over time. This means that while operational inputs can be used to meet performance targets in a given year (such as responding quickly when faults occur), longer-term investments in network capacity should also be made when they are needed, and it is cost effective to do so. The likelihood of large future penalties for poor performance from inefficiently deferring investment should create the incentive for businesses to make efficient decisions about their choice of inputs over both the short term and the long term.

While the default for incentive of 5 per cent under the STPIS should therefore remain, the revenue at risk that each business faces should be negotiated with the AER during the revenue determination process, leaving room for the AER and the business to negotiate away from the default where this would be appropriate. In this way, the AER can use all the information available to it more effectively, including the past responsiveness of the business to incentives, the revenue granted for improvements to reliability and the specific characteristics of a network that might make fluctuations in performance more common (for example, inclement weather that results in more events that are nearly classified as ‘major events’).

DRAFT RECOMMENDATION 16.1

The Standing Council on Energy and Resources should specify that reliability requirements for distribution businesses be included in the Australian Energy Regulator’s Service Target Performance Incentive Scheme, replacing all existing jurisdiction-specific reliability settings.

* The reliability requirements should reflect the preferences of customers by using the estimated values of customer reliability, as spelt out in draft recommendation 14.1, and should be specific to the distribution business.

DRAFT RECOMMENDATION 16.2

The Australian Energy Regulator should also make the following amendments to the Service Target Performance Incentive Scheme:

* reliability performance targets for the system average interruption duration index, system average interruption frequency index and momentary average interruption frequency index should be adjusted annually, according to rolling five‑year average annual performance
* revenue at risk should be negotiated as part of the Australian Energy Regulator’s revenue determination process
* the reporting and information component of this scheme should require distribution businesses to report their reliability performance at the zone substation level. Worst performing feeders should be identified as part of this process
* reporting by all distribution businesses of performance against the parameters in the scheme should be published annually and be at least as detailed and comprehensive as current reporting mechanisms for distribution businesses in Victoria.

DRAFT RECOMMENDATION 16.3

Where a distribution business can show that they are unable to technically comply with one or more parameters of the Service Target Performance Incentive Scheme, and where satisfied that the benefits exceed the costs, the Australian Energy Regulator should:

* approve the required revenue for the distribution business to install the necessary equipment
* require compliance as soon as possible.

1. For example, the Brattle Group (2012a) compared average SAIDI results for the NEM with Italy, New Zealand, the Netherlands, New York, the United Kingdom and California to find that performance had shown no trend anywhere except in Italy where reliability appears to be improving. [↑](#footnote-ref-1)
2. Redundancy involves the duplication of critical components to reduce the likelihood that a fault or failure will cause an outage to occur. [↑](#footnote-ref-2)
3. Operational actions might include diverting supply through another route or temporarily running equipment at a higher rate of utilisation until the fault can be rectified. [↑](#footnote-ref-3)
4. For example, the Panel recommended, ‘that for assets as important as bulk supply sub-stations, “N-1” should be the standard used’(p. 15). [↑](#footnote-ref-4)
5. In the ACT, these are minimum standards and the business can set higher targets. [↑](#footnote-ref-5)
6. Some distribution businesses are excluded from meeting MAIFI targets if they can show that they do not have the capabilities to measure and report on momentary interruptions and the costs of installing the required equipment are expected to outweigh the benefits. [↑](#footnote-ref-6)
7. That is, where unplanned SAIDI is more than 2.5 standard deviations from the mean of the log normal distribution of five regulatory years’ SAIDI data. [↑](#footnote-ref-7)
8. Specifically, proposals called for the threshold to be raised from the current (minimum) 2.5 standard deviations, up to 3.5 standard deviations. [↑](#footnote-ref-8)
9. Distribution businesses do not have to make payments when they are not responsible for missing a target (for example, due to transmission failure). [↑](#footnote-ref-9)
10. While this arm’s length approach is appropriate for distribution businesses, which can be encouraged to deliver reliability through the use of incentives, it is not appropriate for transmission networks where transmission specific characteristics (box 15.3) require a more ‘hands on’ approach to NEM-wide transmission planning. [↑](#footnote-ref-10)
11. The ‘extreme’ scenario was expected to result in 15 more minutes of outage a year. IPART (2012d) suggested the AEMC use more objective descriptors for the scenarios (p. 3). [↑](#footnote-ref-11)
12. For example, Jamasb et al. 2010 estimate marginal cost curves for UK electricity distribution companies at an aggregate level. [↑](#footnote-ref-12)