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Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020

Quality standards, targets, and incentives

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Regulation Branch, Commerce Commission

Wellington, NEW ZEALAND

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1.   Introduction

Purpose of paper

1.1   This paper outlines and explains the quality standards and the revenue-linked quality incentive scheme that have been set as part of the default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020.[1]

Minimum standards, targets, and incentives for service quality

1.2   As part of the periodic reset of default price-quality paths, we have specified minimum standards, targets, and incentives for service quality. The approach to regulate service quality is therefore more sophisticated than it was during the previous regulatory period.

1.3   The reasons for introducing an incentive scheme to complement the existing 'pass/'fail' limit on network reliability are explained in our 'main policy paper'.[2] Under this scheme, revenue will be automatically linked to the reliability of the network.

Consultation on the regulation of quality

1.4   In July 2014, we published a consultation paper on the minimum standards, targets, and incentives for service quality for each distributor.[3] The 'Proposed Quality Targets and Incentives' paper sought views on each of the components of the approach for regulating quality during the next regulatory period.

1.5   We view the quality standards, parameters of the revenue-linked quality incentive scheme and normalisation methodology for major event days as a package which have been set, and should be interpreted, as a whole.

1.6   Later, in October 2014, we consulted on the drafting of the legal determination that sets out the default price-quality paths, which includes the approach to regulate quality. The drafting that we consulted on in October 2014 took into account feedback received in response to the consultation material published in July 2014.

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[1]   This paper should be read in conjunction with the paper that outlines and explains the main components of the default price-quality paths. Refer: Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015" (28 November 2014).

[2]   Refer: Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Main policy paper" (28 November 2014), paragraph.

[3]   Commerce Commission "Proposed quality targets and incentives for default price-quality paths from 1 April 2015" (18 July 2014).

Feedback from a range of stakeholders

1.7   Throughout the course of consultation, we have received useful feedback from a range of stakeholders. The submissions that have been provided have raised a number of issues with our proposed approaches, and provided suggestions for how our approaches could be improved.

Incremental improvements to the approaches relied on in current regulatory period

1.8   As a result of the submissions received, we have been able to incrementally improve the approaches we relied on for the current regulatory period. Submissions were received about choices for the:

1.8.1   minimum standards for network reliability;

1.8.2   targets, caps, collars, and incentive rates for network reliability;

1.8.3   normalisation methodology to be used; and

1.8.4   revenue at risk under the incentive scheme.

1.9   The most material changes since our draft decision have been:

1.9.1   for the quality standards, the reliability limit has been set equal to the reliability cap for the incentive scheme, rather than the reliability target;

1.9.2   for the reliability target calculations, the adjustment for historical breaches has been removed;

1.9.3   for normalising major event days, both SAIDI and SAIFI have their own triggers instead of a single SAIFI trigger; and

1.9.4   for normalising major event days, the calculation for deriving the boundary value has been simplified such that distributors can expect an average of 2.3 major event days per year over time.

1.10   We are grateful to submitters for assisting us to make incremental improvements for the current regulatory period. Amongst other things, this paper explains our responses to the submissions we received.

Material released alongside this paper

1.11   This paper has been published alongside our main policy paper and the determination setting out the default price-quality paths to apply to electricity distributors from 1 April 2015.[4]

1.12   Additional material relevant to the minimum standards, targets, and incentives for service quality has also been published on our website alongside this paper. This material includes the model used to determine the targets, caps and collars, and incentive rates for quality of service.

1.13   We have also published:

   1.13.1   corrections or explanations of identified anomalies in the quality of supply information provided in response to the request for information issued by the Commission on 12 March 2014;[5] and

   1.13.2   information relating to planned and unplanned interruptions for transmission assets acquired from Transpower in response to a section 53ZD request.[6]

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[4]   Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015" (28 November 2014); *Electricity Distribution Services Default Price-Quality Path Determination 2015* [2015] NZCC 33.

[5]   Commerce Commission "Notice to supply information to the Commerce Commission under section 53ZD of the Commerce Act 1986" (12 March 2014).

[6]   Commerce Commission "Notice to supply information to the Commerce Commission under section 53ZD of the Commerce Act 1986" (13 August 2014).

2. Quality standards

Purpose of this chapter

2.1   This chapter explains the quality standards that distributors are required to meet. This quality standards requirement is in addition to the revenue-linked quality incentive scheme, which is described in Chapter 3.

Normalised SAIDI and SAIFI are used as the measures of quality

2.2   The quality standards focus solely on reliability. This is because reliability is generally considered to be the most important aspect of quality by consumers.[7] For example, the ENA Working Group on quality of service summarised customer surveys, undertaken by distributors, and found the frequency and duration of power cuts to be the most important aspect of quality for consumers.[8] The sole consideration of reliability for the compliance assessment is generally supported by submitters.[9]

2.3   We use SAIDI and SAIFI as the measures of reliability for the purposes of the quality standards.[10] SAIDI and SAIFI are internationally recognised and the most common method of measuring reliability. There is also a significant amount of historic SAIDI and SAIFI data available and SAIDI and SAIFI would continue to be measured in the future even if it were not required for the quality standards. A higher SAIDI or SAIFI represent poorer reliability performance.

Quality standards

2.4   Section 53M of the Commerce Act 1986 requires default price-quality paths to specify the quality standards that must be met by the regulated suppliers. This requirement has been met by setting quality standards for each non-exempt distributor in terms of reliability.

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[7]   The ENA notes that commercial consumers place more importance on the duration and number of interruptions than residential customers.

[8]   Measured in terms of System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI).

[9]   Examples include Orion New Zealand Limited "Submission on proposed quality targets and incentives for DPPs" 29 August 2014, paragraphs 9; and PwC "Submission to the Commerce Commission on Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015 - Made on behalf of 19 Electricity Distribution Businesses" 29 August 2014, paragraph 46.

[10]   SAIDI is the system average interruption duration index and SAIFI is the system average interruption frequency index.

2.5   A distributor is deemed to be non-compliant with the quality standards if they exceed the SAIDI or SAIFI limit in two-out-of-three consecutive years.[11] The SAIDI and SAIFI limits are set at one standard deviation above the historical average, which is the same as the SAIDI and SAIFI caps under the quality incentive scheme. The method used to calculate the limits and caps is explained in chapter 8.

2.6   The use of a quality standard that aggregates all consumers for each distributor is a simple, cost effective, and transparent method of applying quality standards. However, distributors should still address, where practicable, the preferences of individuals, groups, or classes of consumers.

Quality standards set to balance identification of quality against risk of false positives

2.7   The quality standards employ the two-out-of-three year rule because this allows for one-off poor performing years, which alone may not constitute an underlying material deterioration of reliability (for example, due to natural variability).

2.8   We received several submissions that support the quality standards as a two-out-of-three year rule with the limits set one standard deviation above the historical average. For example, a recent submission from Wellington Electricity Lines Limited said:

> "WELL supports the revised draft determination to reinstate the 'two-out-of-three' test for compliance with the quality path. Defining the quality compliance test as occurring when the reliability cap (mean plus one standard deviation) is exceeded in both the current regulatory year and one of the immediately preceding two regulatory years ensures that there is a lower probability of breaching the quality path simply due to natural variation."[12]

2.9   The reliability limits for the quality standards are set at one standard deviation above the historical SAIDI and SAIFI average to allow for a reasonable level of variability in reliability performance. Allowing for reasonable natural variability means that the quality standards better reflect underlying network performance.

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[11]   A thorough explanation of how the two out of three year rule works in different scenarios is provided in Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Compliance requirements" (28 November 2014), paragraphs 4.5-4.11. This includes explanation of how limit exceedances in the two years prior to the regulatory period are considered so that the two out of three year rule works in the first and second years of the regulatory period.

[12]   Wellington Electricity "Revised Draft Default Price-Quality Path Determination" 31 October 2014, p.2. The submission uses the word 'reinstate' because it was a two out of three year rule in the 2010-2014 regulatory period, but we considered dropping it for the 2015 determination at the draft stage.

2.10 These different approaches to reduce the number of false positives work together as a package (along with data normalisation).[13] They do this by taking extreme events and some variability into account. Therefore, the quality standards are more focused on performance over time than a single annual non-normalised measure.

2.11 Removal of any one of the different approaches would require a strengthening of the others to maintain a similar level of mitigation against false positives. We consider that in combination with the multi-year assessment and normalisation for major event days, it is appropriate to set reliability limits at one standard deviation above the historic average. We consider that this level establishes an appropriate balance between adequately identifying performance deterioration and avoiding an adverse amount of false positives.

2.12 This also means that useful information can be collected from distributors about assessment periods in which the reliability limit is exceeded, even if the multi-year assessment does not suggest a material deterioration of the network.

2.13 We have used a ten year reference period to calculate the reliability limits because we consider that a reference period of 10-years best reflects the current underlying level of reliability performance. We consider that five years is too short to capture the underlying level of reliability.

Possible penalties for non-compliance

2.14 Where quality standards are not met, we may seek pecuniary penalties, or compensation for an aggrieved person under section 87 of the Commerce Act for that underperformance.

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[13]   False positives refer to situations where a distributor is assessed as non-compliant with the quality standards when there is not a material deterioration of network performance.

3. Quality incentive scheme

Purpose of this chapter

3.1 This chapter explains the incentives that distributors will face under the revenue-linked quality incentive scheme.

3.2 These incentives are in addition to the incentives faced by distributors to comply with the quality standards, which are explained in Chapter 2.

Overview of approach

3.3 We have introduced a revenue-linked incentive scheme to the 2015-2020 regulatory period to explicitly convey an element of the cost-quality trade-off between distributors and consumers. By implementing a revenue-linked quality incentive scheme, we want to promote distributors' incentives to provide services at a quality that consumers demand, as required by section 52A(1)(b) of the Act. In turn, this affects distributors' incentives to invest and maintain assets, consistent with section 52A(1)(a) of the Act.

3.4 Our view is that a revenue-linked quality incentive scheme is an appropriate mechanism to incentivise distributors to maintain or improve reliability beyond that required by the quality standards, where cost effective. Likewise, the scheme will maintain an incentive for distributors to avoid over-investing in reliability where it is not cost effective.

3.5 The incentive scheme strengthens the incentives for distributors to improve their understanding and reaction to the cost of providing a given level of reliability. For example, the cost of tree cutting in a particular location can be compared to the revenue gain provided (or loss avoided) for the expected outcome in reliability.

3.6 We have set the parameters of the revenue-linked quality incentive scheme conservatively for its first regulatory period so the impact of the scheme will be material but not large. As discussed in the main policy paper, we may strengthen the scheme once we, distributors, and consumers have gained more experience with it.[14]

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[14] Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Main policy paper" (28 November 2014), paragraphs 6.52-6.51.

3.7   Most submissions on the draft decision supported the principle of a revenue-linked quality incentive scheme, although submitters requested some changes to the scheme, particularly in regards to the normalisation methodology and the quality standard. For example, the ENA submitted that they:

3.7.1   "in principle supports a move to a quality incentive scheme; however we note that determining the key features of the scheme are critical to its success"[15]

3.8   Under the incentive scheme, a percentage of a distributor's revenue will be dependent on the annual average reliability of the network, as explained in paragraphs 3.9 to 3.20 below.

Incentives under the revenue-linked quality incentive scheme

3.9   If reliability is better than the target, then future allowed revenue will be increased. Likewise, if reliability is worse than the target, then future allowed revenue will be reduced. Figure 3.1 illustrates how the revenue-linked incentive scheme will operate in practice and demonstrates the relationship between change in revenue, the SAIDI or SAIFI cap and collar, and the SAIDI or SAIFI incentive rate.

Figure 3.1: Stylised chart of the revenue-linked quality incentive scheme

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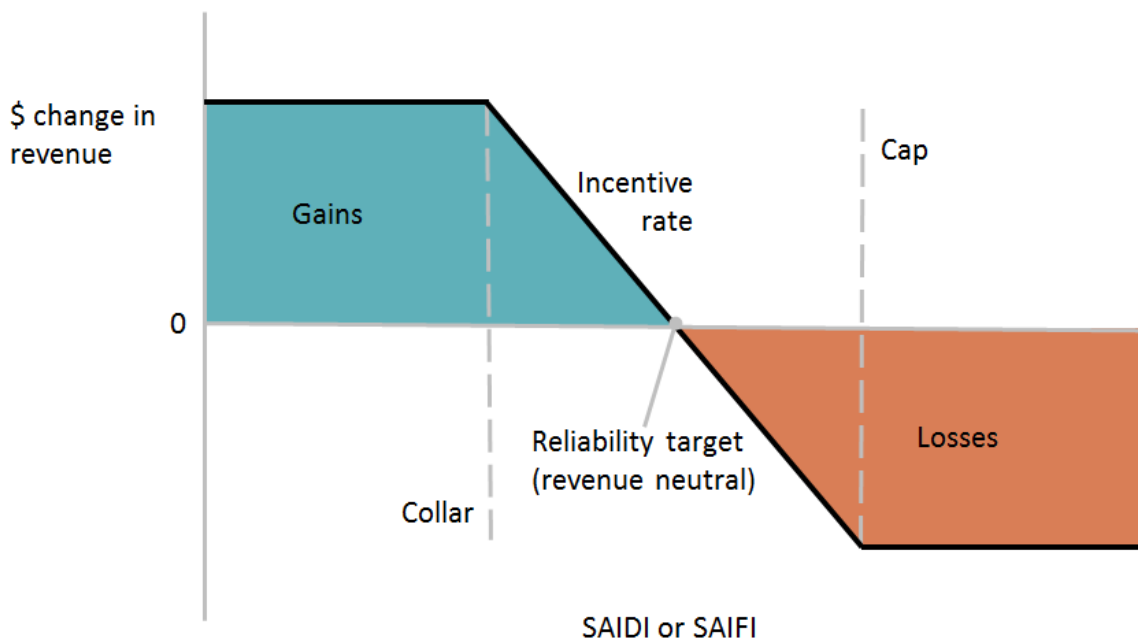
[15]   Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), p. 5.

3.10   SAIDI and SAIFI will be the reliability measures for the revenue-linked quality incentive scheme. SAIDI and SAIFI are internationally recognised and the most common method of measuring reliability. Reliability is generally considered to be the most important aspect of quality by consumers.

3.11   The incentive scheme will apply to both the average duration (SAIDI) and frequency (SAIFI) of interruptions. The revenue at risk will be shared equally between the two measures.

3.12   The scheme de-weights planned outages by 50% in recognition that the impact on customers of unplanned interruptions is generally greater than planned interruptions.

3.13   Under the incentive scheme the amount of revenue losses a distributor faces when performing worse than the reliability target increases up to a reliability limit at the cap. The maximum financial gain a distributor can receive from performing better than the reliability target is also subject to a limit – the SAIDI or SAIFI collar.

3.14   The size of the revenue gain or loss, up to the cap or collar, is determined by how much the distributor departs from the reliability target. The 'incentive rate' is the change in revenue resulting from a unit change in reliability:

   3.14.1   a higher incentive rate, ie, a steeper slope in the incentive rate line, leads to larger changes in revenue from a given change in reliability; and

   3.14.2   the incentive rate beyond the cap or collar is zero, ie, there are no additional automatic gains or losses for reliability exceeding either the cap or collar.

3.15   A revenue-linked incentive for reliability will provide better marginal incentives for each distributor to improve reliability where cost effective, which will encourage distributors to better understand the cost-quality trade-off on their network. This is intended to encourage a distributor to take reliability into account when making decisions, even if the distributor already expects to be compliant with the quality standards.

3.16   Distributors will also still be incentivised to avoid over-investment in reliability because of the other incentives within the default price-quality path to reduce expenditure and because the incentive rates are not excessive. We have set incentive rates at a level necessary to provide meaningful incentives. In addition distributors also face a strong additional incentive to perform within quality standards due to exposure to section 87 of the Commerce Act 1986.

3.17 However, we acknowledge that the cost-quality trade-off is not always identifiable for all expenditure. Also, some changes in reliability resulting from expenditure in the 2015-2020 regulatory period will not eventuate until future regulatory periods.

3.18 For the first regulatory period over which this incentive scheme is operating it is appropriate to set conservative revenue at risk and incentive rates for each distributor. This means that the revenue gains and losses associated with the incentive scheme alone may understate consumers' broad 'willingness to pay' for changes in reliability.

3.19 This type of incentive scheme cannot completely reflect individual consumer demands for reliability, although a greater incentive rate in the future may be closer to reflecting general consumer willingness to pay.[16]

3.20 We recognise that, in the short term, a distributor may not be able to control all the determinants of short term reliability. However, the distributor's asset management decisions will have a strong bearing on reliability in the longer term.

Improvement on existing approach

3.21 The revenue-linked quality incentive scheme represents an improvement on the existing approach by introducing new incentives beyond quality standards compliance. For example, a distributor does not receive financial incentive for having a lower SAIDI or SAIFI than the reliability limit under the existing approach, but will receive financial incentive under the new approach.[17]

3.22 The ENA quality of supply and incentives working group and other submissions supported moving to a more incentive based approach to quality.[18]

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[16] 'Willingness to pay' should be interpreted in terms of the average consumer's willingness to pay increased prices for specific increases in reliability (or decreased prices for specific decreases in quality). This is not necessarily the same as the value of lost load.

[17] The financial incentive for lower SAIDI or SAIFI is either a smaller revenue loss or a larger revenue gain depending on whether it is above or below the target.

[18] As examples of support from submitters refer to: Electricity Networks Association "Pathway to Quality: Quality of Service Incentives Working Group Report" (February 2014) page 50; Alpine Energy Limited "Submission to the Commerce Commission on Proposed Quality Targets and Incentives for Default Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014) page 3; Vector "Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014) Page 1. As an example of opposition refer to The Lines Company "Submission on Proposed Quality Targets, Incentives and Compliance for Default Price Quality Paths from 1 April 2015" (August 2015) Page 1.

3.23 There are a number of other weaknesses with the existing approach as discussed in our Process and Issues Paper.[19]

Annual assessment of revenue gains and losses

3.24 SAIDI and SAIFI will be assessed annually and will form part of the distributor's compliance requirements.[20] Using the methodology as prescribed in the determination, distributors will calculate the quality incentive adjustment (gain or loss) applicable for the assessed year.[21]

3.25 Revenue will be adjusted by the applicable financial gain or loss in the financial year immediately following the derivation of the gain or loss amount. Consequently, it is necessary for a two-year lag to allow for performance to be assessed and calculated before it can be applied to revenue.

3.26 We do not consider that banking of quality incentive scheme gains or losses over the regulatory period is appropriate at this stage. Ideally, gains and losses should be passed on to the distributor or consumers as soon as practically possible after the performance has been assessed. We do not consider that doing so will result in significant price volatility because of the limit placed on revenue at risk.

Mergers, amalgamations, transmission asset purchases and major transactions

3.27 Following a major transaction, purchase of transmission assets, merger, or amalgamation a distributor must adjust the applicable revenue-linked quality incentive scheme parameters and reliability limits based on the historic performance of the assets sold or acquired. This also applies if forecast 2014/15 transmission asset purchases identified in Schedule 5F of the determination are made. The adjustment will include determining new reliability targets, limits caps, and collars for SAIDI and SAIFI.

3.28 This re-calculation is required because the transactions may materially change the network and therefore the underlying reliability characteristics of the network.

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[19] Commerce Commission "Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and issues paper" (21 March 2014), paragraphs 4.22-4.33.

[20] Quality compliance requirements are discussed in Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Compliance requirements" (28 November 2014), chapter 4.

[21] *Electricity Distribution Services Default Price-Quality Path Determination 2015* [2015] NZCC 33, Clause 9.

3.29 The method for re-calculation is specified in Schedule 4B of the determination.[22] This follows the same method that we took (as explained in this paper) to calculate the reliability targets, caps, collars, and limits but with interruption dataset including the purchased assets or excluding sold assets. Following re-calculation of the parameters, they will be used in the calculation of the quality incentive adjustment, as described in Schedule 5B of the determination.[23]

3.30 The specific formulas provided for major transactions and transmission asset purchases are different to the formulas for mergers and amalgamations due to the different nature of these situations but follow the same general approach.

3.31 The reference period for the interruption data to be used for re-calculation of the quality standards and quality incentive scheme parameters will need to be the same reference period as we have used for the initial calculation (ie 1 April 2004 to 31 March 2014). This is because keeping the same reference period is consistent with our decision to have fixed rather than rolling reliability targets.[24]

3.32 We included a re-calculation methodology in the draft determination that was simpler than a complete re-calculation as it enabled distributors to simply merge the quality incentive scheme parameters, by weighting the parameters of the two networks by the scale of the assets from each network. However, in light of submissions and further analysis we consider that this method may have produced unintended consequences which had distortionary impacts on the quality measures, largely relating to the re-calculation of the boundary value.[25]

3.33 The re-calculations will require the normalisation methodology to be re-applied to the new merged reference period data set of interruptions. This will require:

3.33.1 new unplanned SAIDI and SAIFI boundary values to be set by distributors as the 23rd highest daily unplanned SAIDI and SAIFI;

3.33.2 new targets to be calculated as the average annual normalised SAIDI and SAIFI over the reference period; and

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22 *Electricity Distribution Services Default Price-Quality Path Determination 2015* [2015] NZCC 33, schedule 4B.

23 *Electricity Distribution Services Default Price-Quality Path Determination 2015* [2015] NZCC 33, schedule 5B.

24 The decision to use fixed reliability targets is explained in paragraphs 6.15 to 6.17.

25 For example, Electricity Networks Association "Submission on the technical drafting of the Draft DPP Determination and IM amendments" 31 October 2014, paragraphs 23-36.

3.33.3   new caps and limits, and collars, to be calculated as one standard deviation above and below the SAIDI and SAIFI target, as discussed in Chapter 8.

Quality-only customised price-quality path is an option for extreme events

3.34   Some submitters suggested that the revenue-linked quality incentive scheme could be suspended where there are significant events that require significant repair work.[26] We do not consider that this is necessary given that:

3.34.1   limits are placed on daily SAIDI and SAIFI in the event of major event days;

3.34.2   targets that have been derived will incorporate any significant events during the reference period; and

3.34.3   no interpretation of what would constitute an such an event has been provided.

3.35   If a distributor faces a significant and prolonged event that would have a major impact on their quality assessment they may apply for a quality-only customised price-quality path.

Potential future refinements of the quality incentive scheme

3.36   We are considering the potential to improve the quality incentive scheme in the following ways in the future:

3.36.1   increase the breadth of measures of service quality;

3.36.2   refine the measures of reliability; and

3.36.3   strengthen the incentives of the quality incentive scheme.

3.37   We discuss scope for further refinement of the quality incentive scheme in the main policy paper.[27]

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[26]   For example refer to: Alpine Energy "Submission to the Commerce Commission on Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), paragraphs 38-40; PwC "Submission to the Commerce Commission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and issues paper - Made on behalf of 20 Electricity Distribution Businesses" (30 April 2014), paragraph 120.

[27]   Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Main policy paper" (28 November 2014), paragraphs 6.53-6.62.

4.   Treatment of Orion New Zealand

Purpose of this chapter

4.1   This chapter explains how the quality standards and quality incentive scheme will be applied to Orion New Zealand in 2019/20, unless Orion New Zealand is subject to a new customised price-quality path covering 2019/20.

Treatment of Orion New Zealand

4.2   Orion will be subject to the default price-quality path for the 2019/20 year as it comes off of its customised price-quality path unless subject to a new customised price-quality path.

4.3   Under the default price-quality path, Orion will be subject to the same general revenue-linked quality incentive scheme mechanism as other regulated distributors. However, there will be adjustments that reflect Orion's unique situation due to a substantial programme of work following large natural disasters. In particular, we will:

4.3.1   set Orion's SAIDI and SAIFI reliability caps and limits equal to the SAIDI and SAIFI reliability limits for the last year of the customised price-quality path, ie, the 2018/19 year;

4.3.2   set the reliability collars and targets for the SAIDI and SAIFI incentive mechanisms equal to the respective reliability cap. This implies an incentive rate and revenue at risk of zero; and

4.3.3   retain the normalisation methodology, including the SAIDI and SAIFI boundary values, as applied during the customised price-quality path period.

4.4   The adjustments for Orion are appropriate, because:

4.4.1   currently, we do not have interruptions data categorised by planned and unplanned;

4.4.2   historic interruptions data before or during the customised price-quality path period is likely to be unrepresentative of Orion's future reliability performance. Future resets may require adjustments to be made to Orion's historic data;

4.4.3   in order to remain consistent with the methodology used to calculate the reliability targets, the normalisation methodology should remain the same as that for the customised price-quality path period; and

4.4.4 further enforcement action may be appropriate for a deterioration in reliability performance beyond the cap.[28]

4.5 We support placing Orion under an unadjusted revenue-linked quality incentive scheme at the time of the 2020 default price-quality path reset. However, we consider that an adjusted revenue-linked quality incentive scheme for Orion is most appropriate for this default price-quality path reset. This consideration is made with awareness of the quality standards that will also be in place for Orion in 2019/20 under the default price-quality path.

4.6 At the expiration of Orion's customised price-quality path determination, Orion will be subject to the default price-quality path generally applicable to all suppliers in accordance with section 53X(1) (unless Orion applies for another customised price-quality path in accordance with section 53Q). Orion will then be subject to the terms of the default price-quality path, including the generally applicable rate of change and the generally applicable quality standards, including any generally applicable incentives we include in accordance with section 53M(2) (though with the adjustments described in paragraph 4.3).

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[28] The two out of three year rule will also apply to Orion in 2019/20, including consideration of whether the reliability limits (as set in the CPP) were exceeded in either of the previous two years.

5. Normalisation methodology for reliability targets

Purpose of this chapter

5.1   This chapter explains the normalisation methodology that has been applied to historic interruption (SAIDI and SAIFI) data for the calculation of the boundary values and parameters of the quality incentive scheme.

5.2   This chapter also explains how and why planned interruptions are given a lower weighting than unplanned interruptions.

Overview

5.3   Normalisation affects the calculation of reliability targets and the assessed SAIDI and SAIFI values. In turn, these impact on the gains or losses that apply under the revenue-linked quality incentive scheme, and consequently, the incentives and outcomes created by the scheme.

5.4   This normalisation methodology is to also be applied by distributors for calculating assessed SAIDI and SAIFI values for the 2015-2020 regulatory period using these same historical boundary values. The implementation of the normalisation methodology by distributors is specified in Schedule 4A of the determination.[29]

5.5   In addition to normalisation, an adjustment made to SAIDI and SAIFI is that interruptions that are planned by the distributor are given a lower weighting than those that are unplanned. In particular:

   5.5.1   unplanned interruptions are given a 100% weighting, that is they are fully accounted for; and

   5.5.2   planned interruptions are given a 50% weighting, that is the impact of a planned interruption on SAIDI and SAIFI will be halved.

5.6   The SAIDI and SAIFI boundary values apply only to unplanned interruptions. We view this as appropriate because unforeseen major events that severely disrupt the network cannot be planned for.

5.7   A SAIDI major event day, which is subject to normalisation, applies when the SAIDI boundary is exceeded. Likewise, a SAIFI major event day applies when the SAIFI boundary is exceeded.

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[29]   *Electricity Distribution Services Default Price-Quality Path Determination 2015* [2015] NZCC 33, Schedule 4A.

5.8   In the event of a major event day, SAIDI and SAIFI will be replaced with the applicable boundary value.

5.9   We have assumed that a distributor can expect to have 2.3 SAIDI major event days and 2.3 SAIFI major event days per year.[30] The boundary value for SAIDI and SAIFI is calculated as to be consistent with this expectation.

Rationale for normalisation

5.10   SAIDI and SAIFI measures of reliability can be susceptible to variation from extreme events. Extreme events can lead the average duration and frequency of interruption measures to be unrepresentative of the underlying service reliability being provided by a distributor.

5.11   While there is a reasonable expectation that distributors can limit the disruption caused by large events, such as storms, we consider that for more extreme events it is appropriate that some protection is provided against high impact interruptions when assessing quality performance.

5.12   Protection against major event days is implemented through boundary values for both SAIDI and SAIFI which limits the daily unplanned SAIDI and SAIFI to a maximum value for major event days.

Weighting planned and unplanned interruptions differently

5.13   Interruptions that are planned by the distributor are given a lower weighting to those that are unplanned.[31]

5.14   This is appropriate as unplanned interruptions are generally more disruptive for consumers. Consumers have the ability to make alternative arrangements if notified an interruption will take place.

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[30]   SAIDI and SAIFI data is treated separately and their major event days may or may not coincide.

[31]   A planned interruption is an interruption where the distributor has provided at least 24 hours notice to the customer.

5.15 Many submissions agreed that planned interruptions should be weighted lower than unplanned interruptions.[32] For example, the ENA reason that:

> Currently there are incentives for ENBs [electricity distributors] to defer planned work, in order to avoid planned outages if these outages would give rise to a potential breach … We do not consider that it is in the long term interests of consumers for planned work to be deferred simply to avoid a potential quality standard breach. Planned outages are generally less disruptive to consumers as they are notified in advance, and in many cases scheduled to minimise the impact on consumers.

5.16 This approach is consistent with some overseas jurisdictions where unplanned and planned interruptions are treated differently. We have applied the same weightings as those used by Ofgem in the UK, where a planned interruption is weighted as half that of an unplanned interruption.[33]

Boundary values are applied to unplanned interruptions

5.17 The purpose of normalising major event days is to limit the impact of extreme events such that the assessed interruption measures are more representative of the underlying service reliability level provided by a distributor's network.

5.18 As interruptions to the network resulting from these extreme events often are not planned we consider it appropriate that boundary values are derived from and applied to unplanned interruptions only.[34]

5.19 We consider planned interruptions to be largely within the control of distributors. In the event of a major event disrupting the network, distributors can choose to delay planned work to prioritise the unplanned work required on the network.[35]

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[32] For example, refer to: Eastland Network "Submission to Commerce Commission: Default Price-Quality Paths from 1 April 2015 for 17 electricity distributors - Process and Issues Paper" (30 April 2014), p. 11; Electricity Networks Association "Submission on default price-quality paths from 1 April 2015 for 17 electricity distributors: process and issues paper" (30 April 2014), paragraphs 80-82; Powerco "Submission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and Issues paper" (30 April 2014), paragraph 64; Vector "Submission to Commerce Commission on the Default Price-Quality Paths from 1 April 2015: Process and issues paper" (30 April 2014), paragraph 119.

[33] Ofgem "Electricity Distribution Price Control Review: Final Proposals" (November 2004), paragraph 4.7.

[34] This differs from our previous normalisation methodology where all interruptions were considered when calculating and applying a boundary value.

[35] Many submitters generally agreed with our reasoning for applying normalisation to unplanned interruptions only. For example refer to: Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), paragraph 32; Aurora Energy Limited "Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), p.3.

5.20 Top Energy submitted that regular planned work relating to one major circuit would see them exceed their boundary value.[36] Pricewaterhouse Coopers submitted that this concern is also applicable to other distributors.[37] We note that this applies equally to historic and future assessed data so they will be assessed against targets, caps, and limits that take account of previous major planned interruptions.

SAIDI and SAIFI major event days are triggered independently

5.21 A SAIDI major event day, which is subject to normalisation, occurs when the daily SAIDI boundary value is exceeded. Likewise, a SAIFI major event day occurs when the SAIFI daily boundary value is exceeded.

5.22 This treatment is different from that proposed in the draft decision where the SAIFI boundary had to be breached to trigger a major event day for both SAIFI and SAIDI. Many submitters expressed concern that the SAIFI boundary was triggered very few times over the 10 year reference period. For example, Wellington Electricity submitted that between 2004 and 2014 the present SAIFI boundary was only exceeded twice, an infrequent occurrence given their largest substation holds 11,000 connections and to trigger SAIFI 18,000 connections would need to be interrupted.[38]

5.23 This change for the final decision is appropriate as major events can have different characteristics such as:

5.23.1 they may affect a large number of customers in an urban area for a relatively short period of time and therefore triggering SAIFI but not SAIDI; or

5.23.2 a relatively small number of customers may be affected for a significant length of time and therefore triggering SAIDI but not SAIFI, for example a severe storm in a remote area.

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[36] Top Energy Limited "Submission on Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), paragraph 22.

[37] PwC "Submission to the Commerce Commission on Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015 - Made on behalf of 19 Electricity Distribution Businesses" (29 August 2014), paragraph 58.

[38] Wellington Electricity "Submission on Draft Decision on Quality Targets and Incentives for 2015-20 Default Price-Quality Path" (29 August 2014), p.6.

Major event days are replaced with a boundary value

5.24   In the event of a major event day unplanned SAIDI and SAIFI will be replaced with the applicable boundary value. This approach of applying the boundary value for a major event day is consistent with the approach that applied to the 2010-2015 default price-quality path.

5.25   Normalisation is used to reduce the excessive impact that an extreme event may have on underlying data. We do not consider that normalisation should completely exclude major event days for consideration under the quality incentive scheme.

5.26   The ENA Working Group proposed that SAIDI and SAIFI major event days be normalised to the daily average or zero with the support of many submitters.[39] They reason that:

5.26.1   the number of extreme events would create unnecessary volatility in assessed reliability and therefore should be excluded from the dataset; and

5.26.2   this is similar to what is done in some other regulatory jurisdictions including the UK and parts of Australia.[40]

5.27   Any decision made regarding the treatment of major event days should be reconciled with the historical dataset the distributors provided to the Commission. While we consider that it may be appropriate to exclude major events resulting from severe weather events, we are not able to consistently apply this to the historic information provided by distributors. For example, the causes for many major events were unlisted, unknown, or too high-level.

5.28   We do not consider it appropriate to exclude major events that are to some degree within the control of the distributor—for example, tree contacts or defective equipment. Our analysis of the available data suggests that there are a number of major events that are not attributable to severe weather or other extreme events outside of the distributor's control.

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[39]   Electricity Networks Association "Pathway to Quality: Quality of Service Incentives Working Group Report" February 2014, p. 47. Supported by: Powerco "Submission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and Issues paper" (30 April 2014), paragraph 67; PwC "Submission to the Commerce Commission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and issues paper - Made on behalf of 20 Electricity Distribution Businesses" (30 April 2014), paragraph 64.

[40]   Although we note that Ofgem excludes qualifying interruptions relating to extreme weather events but limits other qualifying major events to some threshold. Refer to: Ofgem "Electricity Distribution Price Control Review Final Proposals - Incentives and Obligations" (7 December 2009), pp.88-89.

5.29   Excluding the impact of major event days would result in a significant step change where similar significant events could have materially different impacts on assessed reliability depending on whether a major event day is triggered or not.

5.30   While we acknowledge that the number of extreme events would create some volatility, some of which will be out of the control of the distributor, there is no evidence of systematic bias. Targets are based on a 10-year historical average and are applied consistently with assessed values going forward. Removing major event days would shift the source of volatility to the number of events that are close to but do not trigger a major event.[41]

Boundary values will be based on an expectation of 2.3 major event days per year

5.31   The SAIDI boundary value is determined to be the 23rd highest unplanned SAIDI day over the historical ten year reference period. Likewise the SAIFI boundary value is the determined to be the 23rd highest unplanned SAIFI day over the historical ten year reference period. This is consistent with an expectation of 2.3 major event days per year as suggested by the internationally recognised IEEE-1366 standard.[42]

5.32   The normalisation methodology used for the previous regulatory period was based on a definition set out in IEEE-1366, a standard published by the Institute of Electrical and Electronics Engineers (IEEE). However, given their assumption of no zero event days does not hold true for many New Zealand distributors, we modified the IEEE methodology to account for zero event days for the draft decision.[43]

5.33   Some submitters have noted that while the adjustment methodology is an improvement, the number of times the boundary is exceeded for many distributors did not achieve the expected 2.3 major event days per year, as illustrated in Figure 5.1. They have attributed this to the dataset not having a log-normal distribution as assumed by the IEEE methodology.[44]

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[41]   We note that with revisions to our methodology the boundary value is generally lower (in some cases substantially lower) which reduces some of the impact of a major event and thus the volatility.

[42]   Institute of Electrical and Electronics Engineers "IEEE 1366 Guide for Electric Power Distribution Reliability Indices" 2012.

[43]   Commerce Commission "Proposed Quality Targets and Incentives for Default Price-Quality Paths From 1 April 2015" (18 July 2014), paragraphs 3.37 to 3.42.

[44]   PwC "Submission to the Commerce Commission on Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015 - Made on behalf of 19 Electricity Distribution Businesses" (29 August 2014), paragraph 56; Top Energy Limited "Submission on Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), paragraph 20.

5.34   We consider that the alternative suggestion by the ENA of using the 23rd highest
        SAIDI and SAIFI day (top 0.62 percentile day) of the historical dataset to determine
        the boundary value is appropriate and best provides a consistent expectation of 2.3
        major event days per year.[45]

Figure 5.1: Average annual frequency that SAIDI and SAIFI boundaries are exceeded during the reference period

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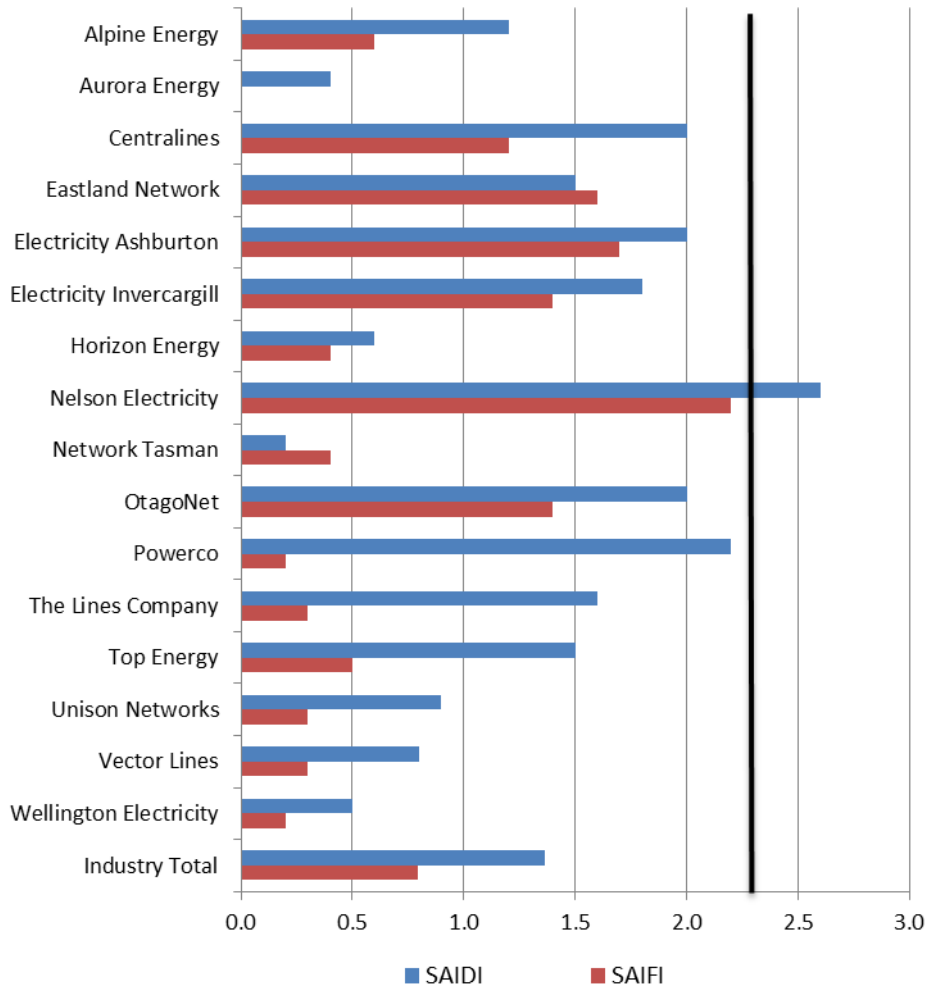
[45]   Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-
        Quality Paths from 1 April 2015" (29 August 2014), paragraph 42.

Major events that span multiple days will not be normalised as one event

5.35   Some submitters suggested that we consider extending the 24 hour normalisation test period to capture the full impact of extreme events.[46] They state that major events spanning multiple days and causing multiple individual outages should be treated as a single event.

5.36   As acknowledged by ENA, aggregating multiple interruptions starting on different days as a result of the same major event is not feasible at this stage.[47] There are problematic data and definitional problems with interpreting such a major event including:

5.36.1   setting targets based on the available historical data that we have;

5.36.2   interpreting the start and end dates of a major event and which interruptions apply to that event; and

5.36.3   verifying that the same major event is applicable to multiple days.

Deriving the boundary values for SAIDI and SAIFI

5.37   This section outlines the steps that we have taken to derive the boundary values for each distributor.

Individual SAIDI and SAIFI

5.38   Using individual interruption data provided by distributors for the reference period, we have calculated SAIDI and SAIFI for each interruption.

Daily SAIDI and SAIFI

5.39   Unplanned interruptions for each day are aggregated together for the purposes of calculating boundary values.

Boundary SAIDI and SAIFI

5.40   The SAIDI boundary value is determined by the 23rd highest unplanned SAIDI day over the reference period for each distributor.

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46   Electricity Networks Association "Pathway to Quality: Quality of Service Incentives Working Group Report" (February 2014), page 47; PwC "Submission to the Commerce Commission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and issues paper - Made on behalf of 20 Electricity Distribution Businesses" (30 April 2014), paragraph 64; Wellington Electricity Lines Limited "Submission on issues paper on 2015-2020 Default Price-quality Path" (30 April 2014), p. 14.

47   Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), paragraph 62.

5.41 The SAIFI boundary value is determined by the 23rd highest unplanned SAIFI day over the reference period for each distributor.

5.42 Table 5.1 shows the boundary values for unplanned SAIDI and SAIFI for each distributor subject to the quality incentive scheme from 2015/16.

Table 5.1: Boundary values by electricity distributor

Distributor	SAIDI Boundary	SAIFI Boundary
Alpine Energy	9.17	0.072
Aurora Energy	3.38	0.061
Centralines	8.52	0.294
Eastland Network	13.07	0.183
Electricity Ashburton	8.08	0.098
Electricity Invercargill	3.24	0.080
Horizon Energy	10.77	0.100
Nelson Electricity	2.70	0.033
Network Tasman	6.98	0.067
Orion	4.4	0.06
OtagoNet	13.24	0.176
Powerco	11.21	0.059
The Lines Company	10.97	0.144
Top Energy	28.43	0.332
Unison Networks	4.54	0.077
Vector Lines	3.37	0.039
Wellington Electricity	2.10	0.031

6. Reliability targets

Purpose of chapter

6.1   This chapter explains the methodology we used to determine the reliability targets that apply to each distributor under the revenue-linked quality incentive scheme.

Overview of the proposed methodology

6.2   The reliability target is the point at which there will be no financial gain or loss from the quality incentive scheme. A reliability target is the adjusted average of the annual normalised SAIDI and SAIFI over the reference period— from 1 April 2004 to 31 March 2014.

6.3   The SAIDI and SAIFI annual targets are calculated independently and planned interruptions are given a lower weighting than unplanned interruptions.

6.4   The methodology for calculating the reliability targets is also used in setting the reliability limits for the quality standards because the limits use the same underlying data and approach as they require the reference period average to be calculated.

Targets are applicable to SAIDI and SAIFI

6.5   SAIDI and SAIFI targets are set for the revenue-linked quality incentive scheme based on average historical performance. Both SAIDI and SAIFI are considered to be important measures of network reliability.

6.6   There is potential for further quality measures to be introduced at a later stage, such as customer service measures; however insufficient data and consistency across distributors is available at this stage.

Targets are calculated as the average of the reference period

6.7   The targets are calculated as the 10-year average of normalised SAIDI and SAIFI, where, as discussed in Chapter 5:

6.7.1   planned interruptions are given a 50% weighting;

6.7.2   boundary values apply to unplanned interruptions only; and

6.7.3   major event days are replaced with the respective unplanned boundary values.

6.8   The targets and limits have been calculated using more recent data than was used for the draft determination because more data has been provided by distributors in response to an information request made under section 53ZD of the Commerce Act 1986. The use of more recent data has resulted in more appropriate targets.

6.9 We consider that a reference period of ten years best reflects the current underlying level of reliability performance, which is, therefore, the most appropriate reference period for the quality incentive scheme and quality standards parameters. We consider that five years is too short because of the year-to-year volatility of SAIDI and SAIFI. Some submitters supported this position, while others disagreed. For example:

6.9.1 Powerco submitted that "network assets have long lives and weather patterns vary over the short term. Ten years of data provides a balance between the changing nature of a network and the long term reliability drivers."[48]

6.9.2 Wellington Electricity Lines Limited submitted that only the most recent five years of data should be used. They suggest that older data should be excluded from the reference dataset as it is less relevant and not necessarily reflective of the current network. Further, they submitted that a five year reference period is consistent with that proposed by the IEEE.[49]

6.10 A target is the point at which there will be no financial gain or loss applicable under the quality of service incentive scheme. The targets are calculated as the average of annual normalised SAIDI and SAIFI between 1 April 2004 and 31 March 2014.

6.11 Powerco and Wellington Electricity have submitted that the reliability targets should include an uplift of one standard deviation.[50] We reject applying an uplift to the 10-year normalised average SAIDI and SAIFI because this would represent a wealth transfer from consumers to distributors without a corresponding expected benefit to consumers.[51]

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[48] Powerco "Submission on Proposed Quality Targets and Incentives for Default Price-Quality Paths" (29 August 2014), paragraph 15.4.

[49] Wellington Electricity Lines Limited letter "Draft Decision on Quality Targets and Incentives for 2015-20 Default Price-quality Path" (29 August 2014), section 4.1.

[50] Powerco "Submission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and Issues paper" (30 April 2014), paragraph 63; Wellington Electricity Lines Limited "Submission on issues paper on 2015-2020 Default Price-quality Path" (30 April 2014), page 13.

[51] The wealth transfer would occur because the expected average reliability performance (ie the historical average) would be better than the target and therefore provide financial gains for average performance.

6.12 Some submitters suggest the possibility of a dead-band around the reliability target, for example 0.2 standard deviation, to reflect natural variation.[52] We consider that this is unnecessary as:

6.12.1 assuming that a suitable reliability target and normalisation methodology is implemented, natural variation will not unduly penalise, reward, or create perverse incentives; and

6.12.2 we expect that natural variation will be symmetric about the target, and variations will tend to be offsetting over the regulatory period.

Adjustments are not made for previous quality standards non-compliance

6.13 An adjustment for quality breaches was proposed in the draft decision but was objected to by submitters.[53] Following consideration of these submissions, the adjustment has been removed from the final determination. One of the main reasons for objection by submitters was that a breach does not always imply negligence or fault.

6.14 We also considered further drawbacks to the adjustment, including:

6.14.1 a breach is not necessarily equivalent to material deterioration; and

6.14.2 past compliance limits used a different normalisation methodology, which we acknowledge has several drawbacks compared to the new methodology.

Targets are fixed for the regulatory period

6.15 Submissions generally agree that fixed targets for the regulatory period provide certainty for distributors.[54]

6.16 Forward looking targets (whether fixed or moving toward a long run target) could be considered the ideal, but because of data limitations are impractical to implement for this reset.

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[52] An example of the submissions is Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), section 4.1.1.

[53] Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), paragraphs 72-75.

[54] Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-Quality Paths from 1 April 2015" (29 August 2014), paragraphs 76-77; Powerco "Submission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and Issues paper" (30 April 2014), paragraph 61; Vector "Submission to Commerce Commission on the Default Price-Quality Paths from 1 April 2015: Process and issues paper" (30 April 2014), paragraph 124.

6.17 A possible alternative to fixed targets are rolling targets, for which the target is updated every year. However, we agree with Powerco that this creates unnecessary uncertainty and complication.[55]

Summary of the targets for SAIDI and SAIFI

6.18 Table 6.1 shows the SAIDI and SAIFI targets each distributor will be subject to after the default price-quality path reset. These are also the reference period averages used to calculate the reliability limits for the quality standards.

Table 6.1: Reliability targets by electricity distributor

Distributor	SAIDI Target[56]	SAIFI Target[57]
Alpine Energy	132.8	1.30
Aurora Energy	74.5	1.29
Centralines	119.1	3.52
Eastland Network	242.1	3.09
Electricity Ashburton	132.8	1.39
Electricity Invercargill	24.1	0.59
Horizon Energy	150.1	1.92
Nelson Electricity	16.2	0.18
Network Tasman	112.5	1.23
Orion	73.4	0.87
OtagoNet	224.6	2.52
Powerco	188.9	2.11
The Lines Company	208.8	3.07
Top Energy	405.4	5.28
Unison Networks	99.1	1.94
Vector Lines	96.0	1.29
Wellington Electricity	35.4	0.55

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[55] Powerco "Submission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and Issues paper" (30 April 2014), paragraph 61.

[56] Annual SAIDI, which is the (adjusted) total duration of interruptions averaged per ICP over a year.

[57] Annual SAIFI, which is the (adjusted) number of interruptions averaged per ICP over a year.

7.   Revenue at risk

Purpose of chapter

7.1   This chapter explains our approach to setting the revenue at risk for the revenue-linked quality incentive scheme.

Overview of the proposed methodology

7.2   Revenue at risk is set at 1% of the starting price maximum allowable revenue for the regulatory period. Revenue at risk is allocated equally between SAIDI and SAIFI.

7.3   For the first regulatory period that this scheme is operating we have applied a conservative approach in setting the revenue at risk per year at 1% of the starting price maximum allowable revenue. We consider that 1% of starting price maximum allowable revenue is the minimum level of risk required to create meaningful incentives.

7.4   Higher rates of revenue at risk of up to 5% have been considered, similar to other overseas jurisdictions with a similar incentive scheme in place.[58] We consider a more conservative approach is appropriate when setting a new quality regime. We note that this approach is consistent with our recent final decision of Transpower's individual price-quality path quality incentive scheme, which puts roughly 1% of revenue at risk for grid performance and asset performance measures.[59]

7.5   Many submitters agreed that an initial low level of revenue at risk is an appropriate starting point. For example:

7.5.1   Vector suggests that 1% revenue at risk is appropriate and still provides meaningful incentives;[60] and

7.5.2   PwC (on behalf of 19 distributors) suggests that the low 1% revenue at risk is appropriate for the first regulatory period of the scheme because it is untested in New Zealand;[61] and

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[58]   For example in the United Kingdom, Ofgem applied revenue at risk of 3% for electricity distributors under their revenue-linked quality incentive scheme.

[59]   A further 0.3% (approximately) of revenue will be at risk for Transpower's asset health measures.

[60]   Vector "Submission to Commerce Commission on the Default Price-Quality Paths from 1 April 2015: Process and issues paper" (30 April 2014), paragraphs 165 and 167.

7.5.3   Horizon suggested starting at 1% and rising to 2% revenue at risk over the regulatory period.[62]

7.6   Unison submitted that a conservative approach was appropriate, but also needed to be balanced so that the revenue at risk and incentive rates are sufficiently material to be effective.[63]

7.7   As further information becomes available in future resets and as distributors adapt to the incentive scheme we will consider increasing the percentage of a distributor's revenue at risk under the incentive scheme.

7.8   The conservative setting of the revenue at risk means that the incentive rate must be conservative because we have set it endogenously. This is discussed further in Chapter 8.

Allocation of revenue at risk between SAIDI and SAIFI measures

7.9   Revenue at risk will be allocated evenly between SAIDI and SAIFI reliability incentive schemes, ie at 0.5% of starting price maximum allowable revenue each.

7.10   We recognise that there exists a degree of 'double counting' between SAIDI and SAIFI in that the duration of interruptions implicitly captures information on the frequency of interruptions. This double counting may have an effect on incentives.

7.11   However, as suggested by the Electricity Networks Association, "there is insufficient evidence to suggest that differential weightings for these measures would be valued by consumers."[64]

7.12   Horizon and PwC also submitted that a 50/50 allocation of revenue at risk between SAIDI and SAIFI is an appropriate starting point. They indicate that there is scope to

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[61]   Pricewaterhouse Coopers "Submission to the Commerce Commission on Proposed Quality Targets and Incentives for Default Price-Quality Paths from 1 April 2015, Made on behalf of 19 Electricity Distribution Businesses" (29 August 2014), paragraph 46.

[62]   Horizon Energy Distribution Limited "Submission on the Default Price-Quality Paths from 1 April 2015 for 17 Electricity Distributors: Process and Issues Paper" (24 April 2014), paragraph 36.

[63]   Unison Networks Limited "Submission on the Default Price-quality paths from 1 April 2015: Process and issues Paper" (30 April 2014), paragraph 72.

[64]   Electricity Networks Association "Submission on proposed quality targets and incentives for Default Price-quality Paths from 1 April 2015" (29 August 2014), paragraph 92.

adjust this split once more information is available – for example, on which consumers value more.[65]

Summary of the revenues at risk

7.13   Table 7.1 summarises the proposed starting price maximum allowable revenue for each distributor and the corresponding revenue at risk for SAIDI and SAIFI.

Table 7.1: Revenue at risk by electricity distributor

Distributor	Maximum allowable revenue 2016 ($m)	SAIDI revenue at risk ($m)	SAIFI revenue at risk ($m)
Alpine Energy	30.46	0.152	0.152
Aurora Energy	56.51	0.283	0.283
Centralines	9.98	0.050	0.050
Eastland Network	22.73	0.114	0.114
Electricity Ashburton	33.05	0.165	0.165
Electricity Invercargill	13.57	0.068	0.068
Horizon Energy	22.03	0.110	0.110
Nelson Electricity	6.82	0.034	0.034
Network Tasman	28.09	0.140	0.140
Orion	N/A	0	0
OtagoNet	24.78	0.124	0.124
Powerco	250.42	1.252	1.252
The Lines Company	34.71	0.174	0.174
Top Energy	34.23	0.171	0.171
Unison Networks	100.10	0.501	0.501
Vector Lines	395.25	1.976	1.976
Wellington Electricity	98.79	0.494	0.494

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[65]   PwC "Submission to the Commerce Commission on Default price-quality paths from 1 April 2015 for 17 electricity distributors: Process and issues paper - Made on behalf of 20 Electricity Distribution Businesses" (30 April 2014), paragraph 72; Horizon Energy Distribution Limited "Submission on the Default Price-Quality Paths from 1 April 2015 for 17 Electricity Distributors: Process and Issues Paper" (24 April 2014), paragraph 35.

8. Limits, caps, collars and incentive rates

Purpose of chapter

8.1 This chapter explains the methodology we used to determine the reliability caps, collars and incentive rates under the revenue-linked quality incentive scheme.

Overview of the methodology

8.2 The key features of our methodology for calculating limits, caps, collars and incentive rates include:

    8.2.1 the caps and collars are symmetric;

    8.2.2 the caps and limits are one standard deviation above the targets and collars are one standard deviation below the targets;

    8.2.3 the incentive rates are calculated based on a given revenue at risk and caps and collars; and

    8.2.4 updated data has been used as an input for the calculation used in the final determination.

8.3 We refer to the cap as the maximum SAIDI or SAIFI values at which point no further marginal losses apply. Conversely, the collar is the minimum SAIDI or SAIFI values at which point no further marginal gains apply.

8.4 The SAIDI and SAIFI caps are equal to the reliability limits that make up part of the quality standards, which is explained in chapter 2. Therefore, the same calculation methodology is used for both, although there are some differences in the reasoning for setting them at one standard deviation above the historic average.

8.5 The reasons for our decisions on how the reliability limits are set for the quality standards are described in the main policy paper.[66]

Symmetric caps and collars

8.6 We consider that a symmetric cap and collar, and therefore incentive rate, are appropriate as there is no evidence to suggest that consumers value reliability differently for underperformance and over-performance relative to the target.

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[66] Commerce Commission "Default price-quality paths for electricity distributors from 1 April 2015 to 31 March 2020: Main policy paper" (28 November 2014), paragraphs 6.5-6.11.

One standard deviation from the target

8.7   A cap to collar range of reliability performance equal to one standard deviation above and below the target provides appropriate coverage over which a distributor's reliability performance faces a positive marginal incentive. The cap and collar do not need to be symmetric for the scheme, but we consider that this is the appropriate range in which the incentive scheme should operate in a practical and meaningful way.

8.8   Setting too narrow a range between the caps and collars could result in it effectively becoming a binary scheme, with most distributors' receiving either the maximum revenue gain or the maximum loss. This would not be effective in creating the marginal incentives on reliability we seek to create.

8.9   Conversely, if the cap and collar span is too wide, the resulting incentive rate may be unnecessarily low and risk also not producing the desired quality incentives because the marginal incentives for changes in reliability could be too small to affect distributors' decisions.

8.10   The standard deviations are calculated from daily data, rather than annual data. Using daily data is more accurate and less volatile than using annual data.

Incentive rate based on caps and collars

8.11   Given our decision on revenue at risk, we consider a cap and collar range equal to one standard deviation about target is the minimum spread required to ensure that distributor's performance faces desirable marginal incentives. Once the cap and collar range is set, the incentive rate is calculable without further inputs.

8.12   For the first regulatory period over which this incentive scheme is operating it is appropriate to set conservative incentive rates for each distributor. This means that the revenue gains and losses associated with the incentive scheme alone may understate consumers' broad 'willingness to pay' for changes in reliability.

8.13   This type of incentive scheme cannot completely reflect individual consumer demands for reliability, although a greater incentive rate in the future may be closer to reflecting general consumer willingness to pay.[67]

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[67]   'Willingness to pay' should be interpreted in terms of willingness to pay increased prices for specific increases in reliability (or decreased prices for specific decreases in quality). This is not necessarily the same as the value of lost load.

8.14   We recognise that, in the short term, a distributor may not be able to control all the determinants of short term reliability. However, the distributor's asset management decisions will have a strong bearing on long term average reliability.

Summary of the limits, caps and collars

8.15   Table 8.1 summarises the limits, caps and collars for SAIDI and SAIFI for each distributor, based on one standard deviation about the target and reference period average.

Table 8.1: Limits, caps and collars for electricity distributors

Distributor	SAIDI collar[68]	SAIDI cap and limit[68]	SAIFI collar[69]	SAIFI cap and limit[69]
Alpine Energy	111.5	154.2	1.09	1.51
Aurora Energy	65.6	83.4	1.14	1.45
Centralines	98.8	139.3	2.84	4.20
Eastland Network	210.2	274.1	2.64	3.53
Electricity Ashburton	114.7	151.0	1.16	1.61
Electricity Invercargill	17.0	31.1	0.42	0.77
Horizon Energy	124.4	175.8	1.63	2.21
Nelson Electricity	10.2	22.2	0.11	0.24
Network Tasman	95.1	129.8	1.04	1.42
Orion	73.4	73.4	0.87	0.87
OtagoNet	194.2	254.9	2.12	2.93
Powerco	167.1	210.6	1.94	2.27
The Lines Company	183.4	234.2	2.67	3.47
Top Energy	340.1	470.8	4.50	6.06
Unison Networks	88.1	110.2	1.74	2.15
Vector Lines	87.9	104.2	1.19	1.40
Wellington Electricity	30.2	40.6	0.47	0.62

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[68]   Annual SAIDI, which is the (adjusted) total minutes of interruptions averaged per ICP over a year.

[69]   Annual SAIFI, which is the (adjusted) average number of interruptions per ICP over a year.

Summary of the incentive rates for SAIDI and SAIFI

8.16   Table 8.2 summarises the incentive rates for SAIDI and SAIFI for each distributor. Also shown is the implied cost per hour of interruptions related to SAIDI and the cost per interruption related to SAIFI.

Table 8.2: Implied incentive rates by electricity distributor

Distributor	SAIDI incentive rate ($/SAIDI)[70]	Implied cost per SAIDI minute ($)	SAIFI incentive rate ($/SAIFI)[71]	Implied SAIFI cost for each interruption ($)
Alpine Energy	7,134	41,869	725,665	23.25
Aurora Energy	31,741	197,954	1,856,663	22.29
Centralines	2,462	1,689	73,229	8.79
Eastland Network	3,560	13,867	256,077	10.02
Electricity Ashburton	9,080	18,365	735,989	41.52
Electricity Invercargill	9,620	8,649	380,660	22.07
Horizon Energy	4,285	24,695	376,939	15.24
Nelson Electricity	5,664	2,473	516,939	56.79
Network Tasman	8,100	42,465	732,537	19.64
OtagoNet	4,084	11,279	307,095	20.75
Powerco	57,526	2,761,139	7,528,471	23.37
The Lines Company	6,830	13,564	438,210	18.64
Top Energy	2,619	19,166	220,465	7.20
Unison Networks	45,378	329,773	2,449,901	22.41
Vector Lines	242,885	8,548,672	19,005,110	35.45
Wellington Electricity	95,091	754,936	6,307,379	38.27

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[70]   Dollars per minute of SAIDI (adjusted total annual duration of interruptions averaged per ICP).

[71]   Dollars per average interruption per ICP.