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Transpower's individual price-quality path for the regulatory control period commencing 1 April 2025

Draft Decision Attachment D – Quality standards and grid output measures

Date of publication: 29 May 2024

Contents

1. Introduction

Purpose

1.1. This document is part of the package of draft decision documents on Transpower's individual price path (**IPP**) for the fourth regulatory period starting on 1 April 2025 (**RCP4**).[1] The draft decision package was published on 29 May 2024. We seek submissions on our draft decision, which will inform our final decision for the IPP reset.

1.2. This is one of five attachments to our main draft decision paper. The main draft decision paper sets out all of the decision as well as the context within which we are setting quality standards and grid output measures.

1.3. The purpose of this attachment is to set out our review of Transpower's proposal and detail our draft decision relating to quality standards and grid output measures for the RCP4 IPP reset, and to explain our reasons for that draft decision.

Background to our review

1.4. The Transpower Capital Expenditure Input Methodologies Determination (**Capex IM**)[2] allows Transpower to propose, and for us to set, certain types of grid output measures, such as asset performance measures, grid performance measures, asset capability grid performance measures, and asset health grid output measures.

1.5. These measures are important for ensuring that Transpower has incentives to provide transmission services at a quality that reflects consumers' demands.

1.6. Transpower has developed its proposed updated measures for this period in consultation with its stakeholders. Consequently, the package of measures proposed to us represent the measures most valued by customers while remaining aligned with Transpower's business priorities.

[1] Information about RCP4 consultation dates and formats for submissions can be found on our website here.

[2] Commerce Commission "Transpower Capital Expenditure Input Methodology (13 December 2023) **(Capex IM Amendment Determination 2023)**".

Structure of this paper

Table 1.1 Structure of this paper

Section	Title	Description
Chapter 1	Introduction	Prefaces the paper
Chapter 2	Our draft decision	Summarises our decision for grid output measures and quality standards providing some background
Chapter 3	Context and regulatory framework	Explains the various settings, how we formulated our reasoning and the legal requirements for us and Transpower
Chapter 4	Quality standards and revenue linked grid output measures	Discusses in detail the decision and reasons behind revenue linked grid output measures, quality standards revenue at risk.
Chapter 5	Reporting only grid output measures	Discusses in detail the decision and reasons behind reporting only grid output measures.

2. Summary of our draft decision

Context

2.1. From RCP2 onwards we have been using grid output measures in conjunction with quality standards to monitor and incentivise the quality of service provided by Transpower. The measures chosen are based on the best information available at the time and the areas of focus for Transpower's performance and quality of service.

2.2. Our aim is over the course of several regulatory periods to have a progressively improved understanding of Transpower's performance and ongoing refinement of the suite of measures to ensure the service provided by Transpower meets the desired outcomes as per Part 4 of the Commerce Act 1986 (**the Act**).

2.3. Each measure is set by applying a number of different settings. We then evaluate the measure as a whole, including comparison with other measures, and its role in the suite of measures considering the purpose of Part 4 of the Act. We set the targets and quality standards to help us identify systematic issues in performance and quality of service, consistently with the purpose of Part 4.

2.4. Given the complexity of the quality monitoring framework, we will first briefly provide an overview of the status quo and of our draft decision. Then in the relevant sections we will discuss in detail the various settings, background information, and reasons for our decision.

Transpower's performance to date

2.5. In RCP3 we made some changes to Transpower's grid output measures from the previous period (**RCP2**).

2.6. We introduced three new reporting only measures for monitoring purposes. We also amended the four revenue linked measures with quality standards to ensure they can provide better incentive mechanisms. Moreover, we set quality standards related to selected asset health measures as a proxy for functional asset risk modelling, and a forward-looking measure of potential quality outcomes. Finally, we introduced a requirement for Transpower to provide us with updated information over RCP3 about asset, and network risk modelling progress for selected asset classes.

2.7. We discuss Transpower's performance for these measures in detail in the relevant sections below. Table 2.1 presents a summary of performance for the grid output measures that are revenue linked and/or have a quality standard in both RCP2 and RCP3. Dark green indicates the quality limit for the reporting year was met. Red means the quality limit was not met. See Chapter 3 for details of quality limits and quality standards.

2.8. In RCP2 the asset health targets were volumetric and there was no associated quality standard. We use dark green to indicate where volumetric targets were met and red where the targets were not met. Empty cells are used when no reporting requirements and quality standards applied.

2.9. For measures which consistently scored “dark green” we are proposing minor refinements as RCP3 settings are deemed to be working. Conversely, where measures repeatedly scored “red” we are proposing deeper changes for RCP4.

Table 2.1 Transpower's performance in RCP2 and RCP3: grid output measures against quality limits and targets[3]

Grid output measures		RCP2					RCP3		
		2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Grid performance									
GP1 - number of unplanned interruptions	N-1 High economic - GP1A								
	N-1 material - GP1B								
	N - high - GP1C								
	N - material GP1D								
	N-1 Generator - GP1E								
	N generator - GP1F								
GP2 - average duration of unplanned interruptions	N-1 High economic - GP1A								
	N-1 material - GP1B								
	N - high - GP1C								
	N - material GP1D								
	N-1 Generator - GP1E								
	N generator - GP1F								
Asset performance									
AP1 - HVDC Availability									
AP2 - HVAC Availability									
Asset health									
AH - Asset health	Power transformers								
	Outdoor circuit breakers								
	Tower Grillage Foundations								
	Tower protective Coatings[4]								
	Insulators								
	OD to ID conversion								

Legend:
Red: below quality standard
Dark green: above quality standard
No fill: Not applicable

[3] Table 2 has been constructed using Transpower website, "Transpower RCP3 updates and disclosures (RCP3 Update and disclosures)".
[4] Includes insulators.

Summary of grid output measures in RCP4

2.10. For RCP4, Transpower's proposed package of measures is a refresh of the RCP3 grid output measures and quality standards. Overall, our draft decision is to keep the grid output measures largely unchanged. Our draft decision is to accept some of Transpower's proposed changes to the revenue linked measures and quality standards.

2.11. Our draft decision is to:

2.11.1. approve Asset Performance measures 3 and 4 (**AP3** and **AP4**) without changes;

2.11.2. discontinue Asset Performance measure 5 (**AP5**) and Grid Performance measure M (**GPM**);

2.11.3. approve Grid Performance measures 1 and 2 (**GP1** and **GP2**), and Asset Performance measures 1 and 2 (**AP1** and **AP2**), with changes;

2.11.4. approve Asset Health measures (**AH**) with changes;

2.11.5. introduce Customer Service measures 1 and 2 (**CS1** and **CS2**), Grid Performance measure 4 (**GP4**), and Asset Performance measure 1.2 (**AP1.2**); and

2.11.6. approve total revenue at risk for the revenue-linked grid output measures with changes to allocation across revenue-linked measures.

2.12. In our decision we must seek to strike the right balance between ensuring the targets and quality limits provide an incentive to perform efficiently, while recognising that some events are outside Transpower's control.

2.13. Table 2.2 summarises our proposed package of grid output measures, with further detail on the changes in chapters 4 and 5.

Table 2.2 Summary of draft decision for all grid output measures and quality standards for RCP4

Measure name	Revenue at risk ($m)[5]	Quality standard	Measure description	Summary of draft decision
Revenue linked measures with quality standard – Grid Performance				
GP1 – Grid Performance 1	**7.6**	Yes	Number of unplanned interruptions across all points of service (**POS**) in a sub-category during a disclosure year	Retain the measure with the following features: - update the POS sub-categories in line with Transpower's proposal. - set targets by using 8 years average of historic performance. - retain the cap and collar range of 1 standard deviations around target. - retain the quality limits at the collar. - retain pooling approach, assessing compliance with the quality standards across POS categories and across years.
GP2 – Grid Performance 2	**7.6**	Yes	Average duration of unplanned interruptions greater than one minute, across all POSs in a sub-category during a disclosure year	Retain the measure with the following features: - update the POS sub-categories in line with Transpower's proposal. - set targets by using 25 years average of historic performance as proposed by Transpower. - retain the cap and collar range a of 1 standard deviation round target. - retain the quality limits at the collar. - retain pooling approach, assessing compliance with the quality standard across POS categories and across years. - retain threshold for extreme events.

[5] Revenue amounts are in nominal dollars and not referenced to any particular year.

Measure name	Revenue at risk ($ million)	Quality standard	Measure description	Summary of draft decision
Revenue linked measures with quality standard – Asset Performance				
AP1: Asset Performance 1 – HVDC capacity availability	**1.0**	Yes	HVDC energy availability (%) of the inter-island HVDC system	Retain the measure with the following features: - set target as proposed by Transpower (98%). - set specified project allowances (with a limit) in the target. - set exclusion of planned outages due to resilience workstream, listed projects, enhancement, and development projects and major capex projects (**MCPs**). - retain the cap and collar range of 2% around target. - retain quality limit settings, retaining a dead band of 1% from collar.
AP2: Asset Performance 2 – HVAC selected asset availability	**2.0**	Yes	Average percentage of time HVAC assets are available during a disclosure year	Retain the measure with the following features: - set target as proposed by Transpower, based on a forecast model of unavailability.[6] - set exclusion of planned outages due to resilience workstream, listed projects, enhancement and development projects, and MCPs. - set the cap and collar based on a 1 standard deviation interval around mean of forecast model plus 300-hour deduction. - retain quality limit settings, retaining a dead band of 1 standard deviation from collar.

[6] Transpower, "Service Measures Report 2023 (November 2023) (**Service Measures Report**)", p 47-50, section 5.4.2.

Measure name	Revenue at risk ($ million)	Quality standard	Measure description	Summary of draft decision
Measures with quality standard – Asset Health				
AH: Asset Health	-	Yes	Proportion of assets in poor health for selected asset classes	Retain the measure with the following features: - introduce 5 new asset classes as proposed by Transpower.[7] - set the quality limits based on an 80% benefit from the 'with intervention' improvement. - introduce pooling approach, assessing compliance with quality standard across asset classes and across years.
Reporting only measures – Existing measures				
AP3: Asset Performance 3 – Return to service	-	No	Extent that Transpower keeps to planned outage times in relation to selected HVAC assets	Retain the measure as is, as proposed by Transpower.
AP4: Asset Performance 4 – Return to services communications	-	No	Extent that Transpower communicates delays to planned outage return times in relation to selected HVAC assets	Retain the measure as is, as proposed by Transpower.
AP5: Asset Performance 5 – N-security reporting	-	No	Extent that Transpower has placed customers on N-security of supply.	Remove the measure, as proposed by Transpower
GPM – Grid Performance Momentary interruptions	-	No	Number of momentary unplanned interruptions, <1min	Remove the measure, as proposed by Transpower

Measure name	Revenue at risk ($ million)	Quality standard	Measure description	Summary of draft decision and reasoning
Reporting only measures – new measures				
GP4: Energy not served (previously labelled NR and GP3)	-	No	Amount of energy demand that is not supplied due to a transmission interruption to supply.	Introduce the measure as proposed by Transpower, changing its name to GP4.
CS1: Customer Service 1 – Overall customer satisfaction	-	No	Average level of overall customer satisfaction based on responses in an annual customer engagement survey.	Introduce the measure, as proposed by Transpower.
CS2: Customer Service 2 – New and enhanced grid connections	-	No	Reports on delivery of new and enhanced grid connections.	Introduce the measure proposed by Transpower with amendments: - set reporting areas looking at various metrics for enquiries, investigations, and delivery of new and enhanced connections.
AP1.2: HVDC operational availability	-	No	Measures HVDC availability including all HVDC related assets to measure the actual HVDC operational capability.	Introduce the new measure: - set this new measure to run in parallel to the existing AP1 and avoid confusion when discussing HVDC availability. - measure introduced as reporting only with no quality standard or revenue linking.

[7] Transpower, Service Measures Report, p 53, section 5.7.1.

3. Context and regulatory framework

3.1. We are required to set Transpower's IPP in accordance with s 53ZC of the Act. The Act allows us to set the IPP using any process and in any way the Commission sees fit, but we must apply the relevant input methodologies (**IMs**). In practice, for grid output measures, this means the Capex IM.

3.2. We are required to apply s 53M(1)(b) of the Act by specifying the quality standards that must be met by Transpower. The Act allows us to set quality standards in any way we consider appropriate, such as using targets, bands, or formulae.

3.3. Under s 53M(2) we may include incentives to maintain or improve Transpower's quality of supply, which may include penalties, rewards, compensation schemes and reporting requirements for failure to meet quality standards.

3.4. Under the Act and the Capex IM we can set the following type of quality measures:[8]

3.4.1. revenue linked grid output measures in conjunction with a quality standard. In RCP3, GP1, GP2, AP1 and AP2 fall within this category;

3.4.2. non-revenue linked grid output measures in conjunction with a quality standard. In RCP3 only Asset Health (**AH**) measure falls within this category;

3.4.3. reporting-only grid output measures. In RCP3 AP3, AP4, AP5 and GPM fall within this category; and

3.4.4. revenue-linked grid output measure without a quality standard (none in this category in RCP3).

Setting grid output measures and quality standards

3.5. In setting the grid output measures, we are primarily seeking to provide Transpower with incentives to deliver its services at a quality that reflects consumer demands, in line with the Part 4 purpose.[9]

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[8] We are required by the Capex IM to set:
- Revenue-linked grid output measures, each of which includes a cap, collar, grid output incentive rate, and grid output target including at least one or more asset performance measures and at least one or more measures of grid performance (clause 2.2.2(1)(b) and (d)).
- Asset health grid output measures which may be revenue-linked or not revenue-linked (clause 2.2.2(1)c).

[9] We must also apply the criteria in the Capex IM Schedule A clause A4-A6 which includes the extent to which each measure is a recognised measure of risk in the supply and performance of electricity transmission services, and the relationship between the grid output measure and expenditure by Transpower.

3.6. For this purpose, we can set revenue linked grid output measures where Transpower will be financially rewarded for outperforming grid output targets (**targets**) and penalised for underperforming targets.[10]

3.7. The extent of potential financial rewards/penalties depends on the distance between the target and the cap/collar that we set, and the total revenue at risk.[11]

3.8. We also determine applicable quality standards for the purposes of compliance with the Act.[12] Quality standards set by us may differ from those proposed by Transpower, and Transpower is not required to propose quality standards to be associated with its grid output measures in its proposal. Breaching of the quality standard is a serious matter and we may investigate and take enforcement action, including seeking pecuniary penalties, under the Act.

3.9. We set quality standards to impose the minimum level of acceptable performance or quality demanded by consumers to promote Part 4 purpose. To ensure that the level is calibrated correctly, we usually set quality standards once we have sufficiently developed models and historic data. The quality standard may be set at any level where we consider an appropriate incentive would be provided under the Act.

3.10. In some cases, we measure compliance against the quality standard by 'pooling' across sub-categories for a grid output measure. Where we take a pooling approach, we set a 'quality limit' for each sub-category and compliance is achieved by meeting the quality limit for a minimum number of sub-categories.

3.11. We may also pool across years, with compliance achieved by meeting the quality limits across a minimum number of years.

3.12. Figure 3.1 provides a demonstration of how the incentives operate for the revenue-linked grid output measures with quality standards.

[10] The Act, section 53M(2); The incentive reward or penalty applies up until the cap (maximum reward) or collar (maximum penalty) is reached and where no further reward or penalty will apply. See Figure 1 for more information.

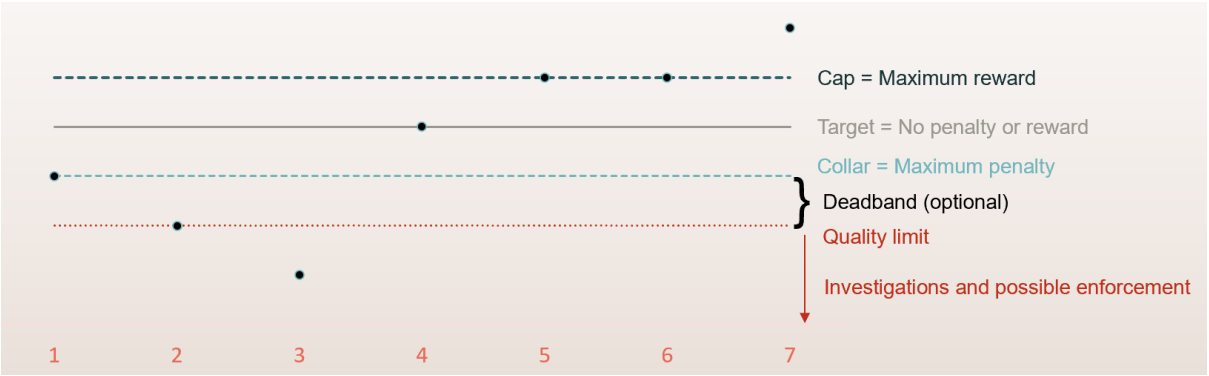
[11] We may also link the quality standard to a non-financial incentive mechanism, such as special purpose reporting requirements: see s 53M(2)(d) of the Act.

[12] The Act, section 53M(3).

3.13. In the figure, we use example data to show the different possible outcomes for Transpower as it achieves different levels of performance. From left to right, in year 1 Transpower hits the collar, resulting in a penalty equivalent to the entire revenue at risk for the measure or sub-category. In the subsequent two years (years 2-3) performance is still below the collar so the maximum penalty continues to apply. Performance is also at or below the quality limit. In year 4 performance improves and the target is reached. No penalty or reward applies. In the subsequent years 5-7 Transpower continues to improve its performance, outperforms the target and the maximum reward is achieved.

3.14. The quality standard setting will determine when a breach of the IPP occurs and statutory penalties could apply. If, for example, there is no pooling across years of this measure, the quality standard is equivalent to the quality limit and in year 3 the quality limit is not reached. This means the quality standard is breached and penalties, or other enforcement action, could apply. In contrast, if the quality standard is pooled across years (quality limit to be met in one year over a three- year period), Transpower would have complied with the quality standard and no statutory penalties apply.

Figure 3.1 Example of interaction between cap, target, collar, quality limit



3.15. Lastly, we may also have measures with a quality standard and no revenue linking (at present, Asset Health). This is an asymmetric incentive in that Transpower may be penalised if the quality standard is not met, but receives no financial reward for any level of performance.

3.16. The reasoning behind having only a quality standard and no revenue linking is that we want to set a quality standard to establish the minimum level of expected performance, but we do not want to set a performance level to be targeted as that may be inappropriate and incentivise over-investment into the grid.

Non-revenue linked measures without a quality standard

3.17. We use non-revenue-linked measures without a quality standard to better understand Transpower's performance and provide the information to customers. In other words, these are reporting-only requirements. Our proposed RCP4 reporting requirements include measures AP1.2, AP3, AP4, CS1, CS2, and GP4.

3.18. We use reporting-only measures to gather information to set optimal quality measures in future periods.

4. Quality standards and revenue linked grid output measures

4.1. In this chapter we discuss our approach to setting revenue linked grid output measures and quality standards. We discuss:

4.1.1. how we have set measures of grid performance;

4.1.2. how we have set asset performance measures;

4.1.3. how we have set the asset health measure; and

4.1.4. our approach to allocating revenue at risk across the revenue linked grid output measures.

Grid Performance 1 measure (GP1)

4.2. Our draft decision is to retain the GP1 measure for RCP4 with minor updates and modifications to its settings.

4.3. GP1 measures the number of unplanned interruptions of supply across the six POS sub-categories. We define an unplanned interruption as:

> means any **interruption** for a period of one minute or longer in respect of which less than 24 hours' notice, or no notice, was given, either to the public or to **customers** affected by the **interruption** and excludes:
>
> a) any unplanned interruptions originating on another party's system and where the Transpower grid operated correctly;
>
> b) any unplanned interruptions to the auxiliary load used by electricity generator assets;
>
> c) for all point of service sub-categories other than GP1E, GP1F, GP2E, and GP2F:
>
> a. load restrictions achieved completely by the use of controllable load, interruptible load or demand-response; and
>
> b. automatic under-frequency load-shedding (**AUFLS**); and
>
> c. unplanned interruptions for which all load is supplied by a backfeed or by embedded generation.[13]

4.4. Table 4.1 summarises Transpower's proposal and our draft decision for the GP1 measure. Table 4.2 shows the draft decision settings in detail.

[13] Commerce Commission, "Transpower Individual Price Quality Path Determination 2020" (14 November 2019) (**RCP3 IPP**), p 19.

Table 4.1 Summary of Transpower proposal and our draft decision for GP1

Element	Transpower proposal	Draft decision
Revenue at risk ($ 000)	**$8,314**	**$7,565**
Points of Service settings	• Update the allocation POS to each sub-category using 2023 load forecast; • Use the historic sub-category averages to adjust targets when setting targets for new POS.	• Update the allocation POS to each sub-category using 2023 load forecast; • Use the historic sub-category averages to adjust targets when setting targets for new POS.
Grid output target	• Set the targets by using: o **5-year average** for equipment-related unplanned interruptions; and o the **25-year average** for non-equipment related causes.	• Set the targets by using: o **8-year average** for all causes.
Cap and collar	• Cap and collar set at **+/- 1 standard deviation** from the target. [14]	• Cap and collar set at **+/- 1 standard deviation** from the target. [15]
Quality standard	• Quality limit set at collar. • **Pooling across sub-categories** for quality standard • **Pooling across years** for quality standard: o No compliance assessment for DY 2026; o Comply with quality limit for DY 2027 or have complied in DY 2026; o For remainder of RCP4 comply in DY or comply in previous two DYs.	• Quality limit set at collar. • **Pooling across sub-categories** for quality standard. • **Pooling across years** for quality limits: o comply with the measure of grid performance in DY; or o have complied in the previous two DYs.

[14-15] Except for the 'Material Economic Consequences' sub-categories where a 1.5 standard deviation was applied as greater variation was observed in the data.

Table 4.2 GP1 draft decision settings

Measure and sub-category GP1: number of interruptions (per annum)	Cap (number)	Target (number)	Collar (number)	Quality Limit (number)	Incentive rate ($ per event)	$ at risk per annum
N-1 security high economic consequence – GP1A	0	4	8	8	789,666	3,158,663
N-1 security material economic consequence – GP1B	4	21	38	38	170,537	2,899,122
N security high economic consequence – GP1C	0	2	4	4	185,592	371,184
N security material economic consequence – GP1D	4	15	26	26	57,795	635,741
N-1 security generator – GP1E	4	9	14	14	50,000	250,000
N security generator – GP1F	4	7	10	10	83,333	250,000

4.5. Below we set out the Verifier and stakeholder's views and our analysis.

Approach raised in the Issues paper

4.6. In the issues paper we signalled, for both GP1 and GP2:

4.6.1. our intention to focus our assessment on the implications of Transpower's proposed changes and whether the intent of the grid performance measures is still being met; and

4.6.2. our intention to seek further information on the implications of Transpower's approach to categorising the points of supply, and the approach it will take for new points of supply.

4.7. Our early view was that Transpower updating categories based on forecast load is a sensible approach, and this was supported by the Verifier. We discuss Transpower's proposal, the Verifier's views and our assessment of the GP1 measure below.

What Transpower proposed

4.8. Table 4.3 shows Transpower's proposed setting for RCP4.

Table 4.3 Transpower's proposed settings for GP1 – number of interruptions

Category	Cap	Target	Collar	Quality Limit
N-1 High economic - GP1A	0	5	10	10
N-1 material - GP1B	5	24	43	43
N - high economic - GP1C	0	2	4	4
N - material GP1D	6	22	38	38
N-1 Generator - GP1E	5	10	15	15
N generator - GP1F	7	12	17	17

4.9. For targets, caps, collars, incentives, and quality standards Transpower is proposing:

4.9.1. to use the 5-year average for equipment-related unplanned interruptions, as equipment failures have reduced in recent years, and to use the 25-year average for non-equipment related causes;

4.9.2. for new POS, where no historical data exists, to use the average of the other POS in the sub-category for determining the GP1 targets;

4.9.3. to exclude from historical data events due to automatic under-frequency load shedding (**AUFLS**), as well as events that did not originate in Transpower's network;

4.9.4. to set the caps, collars and quality limits for each sub-category at +/- one standard deviation from the target based on the data for the relevant POS, except for the 'Material Economic Consequences' sub-categories where a 1.5 standard deviation was applied as greater variation was observed in the data;

4.9.5. to base the proposed incentive rates on the economic value and the spread (how far the cap/collar is from the target) for each sub-category;

4.9.6. to retain the current approach for setting the quality standards. This includes pooling across disclosure years and sub-categories, which are assessed against annual quality limits standard. The annual quality limits standard proposed for GP1 for RCP4 aligns with the collar values; and

4.9.7. to set the requirement for meeting the quality standards as four or more of the six POS sub-category quality limits for each measure are not exceeded for the disclosure year (**DY**) and:

(a) for DY 2026, there is no compliance assessment;

(b) for DY 2027, either comply with the measure of grid performance in the disclosure year to have complied in DY 2026; and

(c) for DY 2028 to DY 2030, either comply with the measure of grid performance in disclosure year, or if not, then to have complied in the previous two disclosure years.

Verifier comments and stakeholder submissions on our Issues paper

4.10. The Verifier agreed with Transpower's approach to GP1. However, the Verifier noted that by using historical averages of network performance to set targets there is a risk, if network performance deteriorates over time, that this performance will be 'baked in' when averaging historical performance to set targets.[16]

4.11. Meridian noted that Transpower's approach risked incorporating any deterioration in network performance into the target.[17]

Our review of Transpower's proposed settings

4.12. Unplanned interruptions negatively impact customers. By measuring the number of unplanned interruptions, we are measuring the quality of the service provided to customers. We use the quality standard and revenue linking as an incentive for Transpower to provide services at a quality demanded by consumers.[18]

4.13. Our draft decision is to retain GP1 with certain modifications. We have reviewed Transpower's proposed updates and modifications to the GP1 settings. Our review assessment of this measure focused on:

4.13.1. setting the quality target, and caps and collars;

4.13.2. assessing compliance with the quality standard; and

4.13.3. POS settings.

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16 GHD Advisory and Castalia, "GHD Advisory and Castalia Independent verification report – RCP4 base expenditure and service measures 2025-2030 proposal. Transpower New Zealand Limited" (12 September 2023) **(IV Report)**, p 469.

17 Meridian, Meridian "Submission on RCP4 Issues paper" (21 February 2024) (**Meridian's submission on Issues paper**), p 2, para 7.

18 s52A(1)(b)

4.14. Grid performance measures quantify interruptions of supply across six supply and generation POS sub-categories.[19] The POS sub-categories proposed by Transpower are the same as RCP3. The POS categorisations are based on:

4.14.1. security standards;[20]

4.14.2. whether it is a generation or supply POS; and

4.14.3. whether the supply connection is of material or high economic consequence.

4.15. Table 4.4 shows the number of POS per sub-category in RCP3 and proposed for RCP4 by Transpower.

Table 4.4 Number of POS per sub-category in RCP3 and proposed for RCP4

Level of service	Sub-category	RCP3 Actuals	RCP4 Transpower proposal	% change
N-1 security	High Economic Consequence	48	37	-23%
	Material Economic Consequence	95	105	11%
	Generator	44	41	-7%
	N-1 security total	187	183	-2%
N-security	High Economic Consequence	12	9	-25%
	Material Economic Consequence	21	26	24%
	Generator	9	10	11%
	N-security total	42	45	7%
	Total	**229**	**228**	**0%**

4.16. For assigning interruptions to new POS, Transpower used the average performance of other POS in the respective sub-category. Although Transpower's proposed treatment of new POS is not optimal, we consider it a reasonable option in terms of feasibility and simplicity.

[19] POS comprise grid exit points (**GXP**) and grid injection points (**GIP**).

[20] Security standards are determined by the Electricity Authority under s 8 of the Electricity Industry Act 2010. For more information on security standards, see Electricity Authority, "Security Standards Assumptions Document (14 November 2012)".

4.17. Ideally, new points of supply should perform better than existing ones (of the same sub-category) because of the lower asset age. Using the average performance of other similar POS means that, over time, the target becomes less stringent when more and more POS are introduced. However, we can use the more recent average performance to set appropriate targets, as discussed below.

4.18. Transpower's approach to using load forecast to allocate POSs to sub-categories resulted in a change in the number of POSs in the sub-categories. The updated POS list and categorisation reflect the changes in service provided since the commencement of RCP3.

4.19. A significant change is that the number of high economic consequence POS proposed for RCP4 is a fifth lower than the number of POS within the same sub-categories in RCP3. These are the highest criticality POS.

4.20. We are satisfied that Transpower's approach is appropriate because future demand may not follow historical trends.

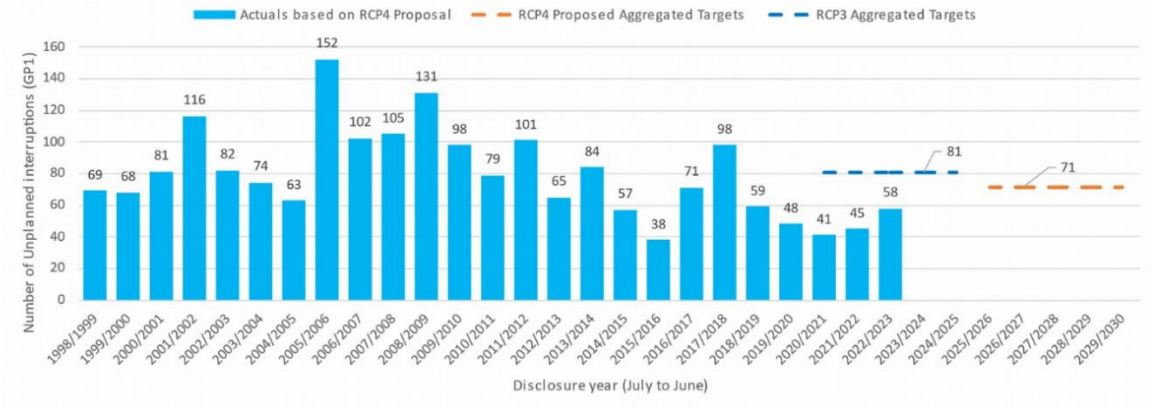
4.21. Our draft decision is to approve Transpower's proposed RCP4 sub-categories and POS allocation methodologies for both new and existing POS. We consider this is appropriate because it provides a time series of data on performance of the grid while also being forward looking, and simple to implement.

Grid output target

4.22. Our draft decision is to set Transpower's targets based on an eight-year average of historic performance, as per Table 4.2. Our view is that Transpower's proposed approach of using 5-year average for equipment-related unplanned interruptions and the 25-year average for non-equipment related causes does not appropriately reflect its improvement in performance. Figure 2 shows the historical data Transpower used to quantify its proposed settings for GP1.[21]

[21] Transpower, Service Measures Report, section 5.1.2, figure 2.

Figure 4.1 Historical GP1 performance and Transpower's proposed targets[22]



4.23. Figure 4.1 shows that there is an observable trend with the number of interruptions gradually reducing over time. Transpower has identified the following reasons for this improvement in unplanned interruptions:

4.23.1. fewer interruptions caused by equipment failures with a decrease of 43% over the current decade since 2014, compared with the previous decade between 2004-2013;

4.23.2. fewer interruptions due to human error interruptions, with a decrease of 36% over the same periods as above;

4.23.3. several other factors such as:

4.23.3.1. asset management improvements in asset health, replacement and refurbishment planning, and maintenance processes;

4.23.3.2. grid security improvements with system changes;

4.23.3.3. improving risk mitigation planning for outages; and

4.23.3.4. programmes to reduce human error events during maintenance and project activities.[23]

[22] Transpower, Service Measures Report, p 37 figure 2.
[23] Transpower, Service Measures Report, section 3.6.

4.24. Performance has improved largely due to the increased base capex and opex since RCP1, and improvements in Transpower's processes. In our view, a shorter historic average (eight years rather than 25 years as proposed by Transpower) better shares the benefits of those recent improvements, between Transpower and consumers.

4.25. Our draft decision is to use eight years of historical performance data from the beginning of RCP2 to develop our proposed settings as this reflects the recent observable improvement in quality.

4.26. Because the number of POSs within the sub-categories has changed since RCP2, we used the total number of interruptions to calculate our quality targets, instead of using interruptions per sub-category. The average number of total annual interruptions since RCP2 is 57, while Transpower's RCP4 target has an annual total of 75 interruptions. We based our draft settings by scaling Transpower's targets, to a total of 57 interruptions.

4.27. We tested the reasonableness of our proposed RCP4 quality targets on actual performance since RCP2. Table 4.5 below shows our comparison of Transpower's and our proposed targets against actual performance since RCP2.[24]

Table 4.5 GP1 - Transpower's performance since RCP2; Transpower's proposed RCP4 collars; our draft decision RCP4 collars

GP1 Sub-category	Draft RCP4 decision collar	Transpower RCP4 proposal collar	2015/ 2016 actual	2016/ 2017 actual	2017/ 2018 actual	2018/ 2019 actual	2019/ 2020 actual	2020/ 2021 actual	2021/ 2022 actual	2022/ 2023 actual
N-1 high economic	8	10	1	10	8	3	2	0	1	4
N-1 material	38	43	13	21	47	19	25	12	18	11
N high economic	4	4	2	0	3	4	2	1	1	3
N material	28	38	12	13	28	10	10	19	12	15
N-1 generator	12	15	7	20	7	11	2	6	6	12
N generator	10	17	3	7	5	12	7	3	7	13

Legend: Red: below Transpower's proposed collar
Dark green: below our and Transpower's proposed collar
No colour: above collar

[24] Transpower, "RCP4 RT02 Output Incentives Model (November 2023)".

4.28. Table 4.5 shows that:

4.28.1. under Transpower's proposed settings there would only be two actual measures below the collar (shown in red). One was in 2017/2018 for the N-1 material sub-category, and the other was in 2016/2017 for the N-1 Generator sub-category. Most of the results (shown in black or with no filling) were above the target; and

4.28.2. under our proposed settings, six actual measures (or 12.5%) of performance (shown in red and dark green) would be below the collar.[25] None would result in Transpower contravening the quality standard because of the pooling approach.[26] This suggests Transpower's proposed settings are generous which could result in positively biased incentive outcomes. The 12.5% of poor performance better aligns with the spread in performance we expect when setting the collar to one standard deviation.[27]

4.29. Our analysis suggests that Transpower's proposed targets for GP1 do not adequately reflect the impact of investments since RCP1, as Transpower has been able to reach performance levels above the target and capture increased benefits which should be shared with customers.

4.30. Quality standards should incentivise Transpower to make investments in the grid that are to the long-term benefit of consumers. Better quality transmission services through decreased interruptions of service is one such benefit.[28]

4.31. Historic data indicates the number of interruptions is declining, indicating an improvement in the quality of service. As Transpower states this is largely due to investments and improvement in Transpower's asset management processes.

4.32. We consider the settings of the performance measures should reflect this gain and that it is more appropriate to base the settings on more recent performance, considering the strength of the relationship between base capex and interruptions. This is consistent with the requirements of cl. A7(b) of the Capex IM.

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[25] 6 (in red and green) out of 48 reported values are at or below both collars (proposed by Transpower or us).

[26] As discussed below, pooling is used to consider overall trends rather than single observations in the presence of small samples.

[27] As discussed below, we set cap and collar at 1 standard deviation from the target. Assuming the target is the correct expected value, from a statistical perspective, this means that in 68% of the cases, values should fall within cap and collar. This would leave about 16% of observations that would fall below collar.

[28] s 52A(1) of the Act.

Cap and collar

4.33. Since RCP2, we have set the cap and collar at a level we consider achievable and appropriate to incentivise good performance. If the target is set at the expected level of performance, or mean value (as per above), the cap and collar would provide a range or confidence interval around the target.

4.34. We have maintained this approach for RCP4. We consider it is the most consistent with cl. A7(d) of the Capex IM, which specifies the caps and collars are to be set in relation to the plausible range of the relevant grid outputs likely to be delivered, considering capex and effects of unrelated factors which may impact outputs.

4.35. Consequently, our draft decision is to agree with Transpower and set the caps and collars for each sub-category at +/- one standard deviation from the target based on the data for the relevant POS, except for the 'Material Economic Consequences' sub-categories, where a 1.5 standard deviation was applied "as greater variation was observed in the data".[29] In its proposal Transpower demonstrated that the cap and collar ranges it had proposed were supported by analysis and we have agreed with those ranges.

Quality standard

4.36. Our draft decision is to set the quality standard so that it is met if four or more of the six POS sub-category quality limits for each measure are met for the disclosure year or in the previous two disclosure years. This is consistent with what Transpower has proposed and a continuation of our approach in RCP3.

4.37. We want the quality standard not to be met only when the performance is at the lower tail of expected performance, or in other words, when performance is below a minimum level.

4.38. Our focus is on the overall performance trend not individual observations. Therefore, we have continued to set pooling across years and sub-categories to ensure we are measuring long-term performance to promote service delivered at the level demanded by customers.

4.39. We are maintaining our approach to measuring quality over multiple periods because in our view the existing approach is effective at providing the right incentives.

[29] Transpower, Service Measures Report, p 37, figure 2.

4.40. In our RCP3 decision, we introduced pooling across disclosure years and sub-categories because it increased the effective sample size of the individual grid performance measures. Pooling reduces the risk of quality breaches from volatility due to low numbers of observations in a point of service category, and to filter single-year performance issues in individual categories. We consider that these reasons are still relevant.

4.41. While we are updating the annual quality limits, we are retaining the compliance standard which applies across regulatory periods. We do not agree with Transpower's proposal to have no compliance assessment for DY 2026 or a special requirement for DY 2027.

4.42. Having no compliance requirement for DY 2026 would effectively mean removing the quality standard for 2026. This approach would prevent the ongoing monitoring of performance, which is contrary to the requirements of cl. A5 of the Capex IM.

Grid Performance 2 measure (GP2)

4.43. Our draft decision is to retain the GP2 measure for RCP4 with minor updates and modifications to the specific GP2 settings.

4.44. GP2 measures the average duration of unplanned interruptions greater than one minute, across six supply and generation POS sub-categories.

4.45. Table 4.6 summarises Transpower proposal and our draft decision for the GP2 measure. Table 4.7 shows the draft decision settings in detail.

Table 4.6 Summary of Transpower's proposal and our draft decision for GP2

Element	Transpower proposal	Draft decision
Revenue at risk ($ 000)	**$8,314**	**$7,565**
Grid output target	• Set the targets by using the **25-year average** for all causes	• Set the targets by using the **25-year average** for all causes
Points of Service settings	• Update the allocation POSs to each sub-category using 2023 load forecast; • Use the historic sub-category averages to adjust targets when setting targets for new POS.	• Update the allocation POSs to each sub-category using 2023 load forecast; • Use the historic sub-category averages to adjust targets when setting targets for new POS.
Cap and collar	• Cap and collar set at **+/- 1 standard deviation** from the target [30]	• Cap and collar set at **+/- 1 standard deviation** from the target [34]

Quality standard	• Quality limit set at collar
	• **Pooling across subcategories** for quality standard
	• **Pooling across years** for quality standard:
	  ○ No compliance assessment for DY 2026
	  ○ Comply with quality standard for DY 2027 or have complied in DY 2026
	  ○ For remainder of RCP4 comply in DY or comply in previous two DYs
		• Quality limit set at collar
		• **Pooling across subcategories** for quality standard
		• **Pooling across years** for quality standard:
		  ○ comply with the quality standard in DY or
		  ○ have complied in the previous two DYs.

[30] Except for the 'Material Economic Consequences' sub-categories where a 1.5 standard deviation was applied as greater variation was observed in the data.

Table 4.7 Summary of draft decision for GP2

GP2: average duration of interruptions (per annum)	Cap (minutes)	Target (minutes)	Collar (minutes)	Quality Limit (minutes)	Incentive rate ($ per min)	$ at risk per annum
N-1 security high economic consequence – GP1A	23	73	123	123	63,173	3,158,663
N-1 security material economic consequence – GP1B	27	74	121	121	61,683	2,899,122
N security high economic consequence – GP1C	15	66	117	117	7,278	371,184
N security material economic consequence – GP1D	-	104	208	208	6,113	635,741
N-1 security generator – GP1E	30	225	420	420	1,282	250,000
N security generator – GP1F	-	123	246	246	2,033	250,000

4.46. We discuss Transpower's proposal for the GP2 measure below.

What the Verifier said and Transpower's response

4.47. The Verifier supported retaining the GP2 measure, but suggested that in future, Transpower should consider setting targets that are not linked to historical averages, as there is a risk that this method can result in deteriorating targets over time.[31]

4.48. In its proposal, Transpower acknowledged the verifier view that poor historical performance may result in deteriorating targets over time, and that minimum standards may be more appropriate, by stating that it had consulted on its proposed settings and that stakeholders were satisfied with the current levels of reliability on the grid.[32]

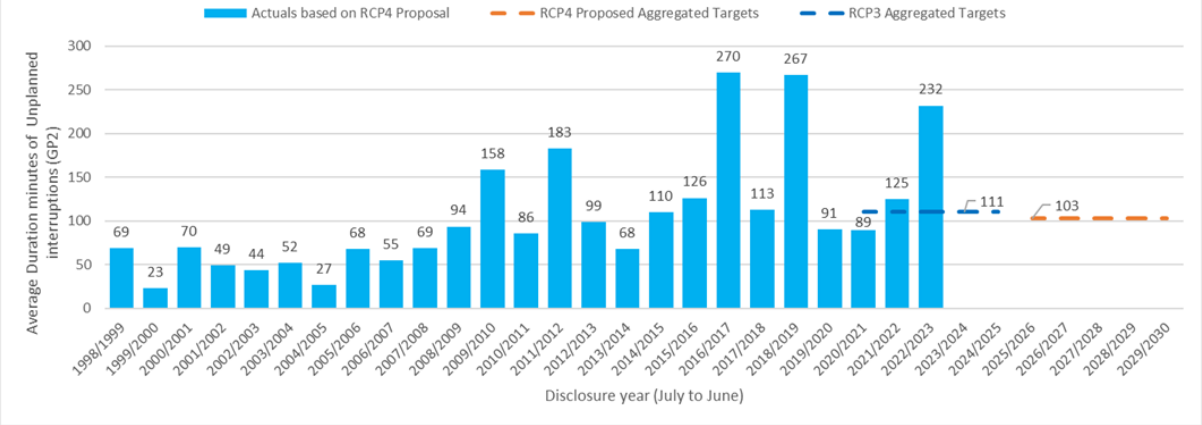
Our review of Transpower's proposed settings

Grid output target

4.49. Figure 4.2 shows historical GP2 performance since 1998/1999.

[31] GHD Advisory and Castalia, IV Report, p 469.
[32] Transpower, Service Measures Report, p 39.

Figure 4.2 Historical performance for GP2, RCP3 target and Transpower's proposed target[33]



4.50. Figure 3 illustrates that, in contrast to the improving trend on the number of interruptions (GP1), the average duration of interruptions has been increasing.

4.51. Table 4.8 summarises the key outage incidents that occurred for years with the highest average duration of unplanned interruptions in 2016/2017, 2018/2019 and 2022/2023.[34]

Table 4.8 Key outage incidents in disclosure years with highest average duration of unplanned interruptions since RCP2

Disclosure year	Key outage incidents
2016/2017 – highest average duration of unplanned interruptions since 1998/1999	• Longest average duration was due to abnormally long outage of 14,275 minutes at Black Point caused by an internal fault on a transformer at Waitaki.
2018/2019 – second highest average duration of unplanned interruptions since 1998/1999.	• Long duration outages were due to failure of protection relays at Maraetai, explosive failure of current transformers (**CT**) at McKee (both were type failures), and disconnector insulator failure at Castle Hill. • Wairakei supply transformers tripped out causing a major outage in Taupo.
2022/2023 – third highest average duration of unplanned interruptions since 1998/1999.	• An interruption at Manapouri (24,276 minutes capped at 10,080 minutes) due to failure of a bus coupler after planned maintenance.

[33] Transpower, Service Measures Report, p 37, figure 2.
[34] Transpower IPP information disclosure information.

4.52. While the major outage events set out in Table 4.8 provide some explanation for the average outage durations exceeding 200 minutes in the 2016/2017, 2018/2019 and 2022/2023 disclosure years, we note that the average outage duration trend appears to be increasing over time.

4.53. We agree with the Verifier that using historic average outage duration data may not be appropriate for calculating future GP2 settings. This is because increasing outage durations over time will increase the average outage duration used to set aggregate targets, and reward poor past performance.

4.54. We acknowledge that not all outages will lead to loss of supply or loss of generation events, and the GP2 measure covers both N-1 and N security sites. We don't have information explaining the apparent increase in the aggregate average outage duration since 1998/1999.

4.55. We reviewed the submissions on Transpower's draft IPP proposal and Meridian submitted that it agreed with Transpower's proposed GP2 targets.[35] While it appears that stakeholders are comfortable with the grid performance they are experiencing, we are interested to hear from submitters if they have concerns about or are experiencing increasing outage durations and what impact that this has.

4.56. In its proposal, Transpower has proposed using a 25-year historical dataset to calculate the GP2 settings and targets. This has resulted in a proposed GP2 aggregated target of 103 minutes, which is lower than the RCP3 setting of 111 minutes.

4.57. In our draft decision, we have accepted Transpower's approach of using 25-year historical dataset to calculate settings and have agreed with Transpower's proposed targets, which are in aggregate more stringent than the RCP3 settings.

4.58. This includes a seven-day cap on the duration of interruptions, as is the case in the RCP3 GP2 settings. This cap will moderate the effect of long-duration interruptions that have distorted the GP2 results in the 2016/2017, 2018/2019 and 2022/2023 disclosure years.

4.59. We considered setting minimum GP2 targets in line with the Verifier suggestions to Transpower, especially given that outage duration trend appears to be increasing over time. We do not share Transpower's view that stakeholder acceptance mitigates this increasing trend. Further analysis is required by Transpower to determine the causes of these interruptions.

[35] Transpower, "Meridian submission on RCP4 Consultation Document" (3 November 2022) p 6.

4.60. From a practical perspective, we consider making the target more stringent will drive the outcome needed (improving quality of service as per Part 4) regardless of the reasons behind recent poor performance. The alternative is to significantly alter the system thus reducing consistency and removing the ability to assess historical trends.

4.61. We also considered calculating GP2 settings using 8 years of historical data, similar to the approach taken for GP1. However, our view is that this approach is not appropriate as it would lower quality targets given the last 8 years of GP2 performance as seen from Figure 3.

Cap, collar and quality standard

4.62. Our considerations of the GP2 cap, collar, incentives, and quality standard are the same as those we made for GP1.

4.63. Our draft decision is to set the grid output target using the 25-year average for all causes and set the cap and collar at +/- 1% standard deviation from the target except for the 'Material Economic Consequences' sub-categories, where a 1.5 standard deviation was applied.

4.64. The quality standard is set at the collar and will be met if four or more of the six POS sub-category quality limits for each measure are met for the disclosure year or in the previous two disclosure years.

Asset Performance measure 1 (AP1)

4.65. Our draft decision is to retain the AP1 measure for RCP4 with some updates and modifications to the specific AP1 settings.

4.66. AP1 measures the available annual available capacity as a percentage of the total annual capacity of the HVDC system using monopole and bipole outages.

4.67. Outages of HVDC link assets (such as the transmission line) reduce the HVDC link's operational capacity, which affects its annual available capacity. AP1 does not measure the impact of HVDC ancillary asset outages (such as reactive power devices and harmonic filters), and outages of adjacent HVAC transmission lines, both of which affect HVDC availability.[36]

4.68. Table 4.9 summarises Transpower proposal and our draft decision for the AP1 measure.

[36] We have proposed a new reporting measure, AP1.2 to measure the reduction in HVDC capacity due to outages any associated assets. See chapter 5 below.

Table 4.9 Summary of Transpower proposal and draft decision for AP1[37]

Element	Transpower proposal	Draft decision
Revenue at risk ($ 000)	**$500**	**$1,000**

Grid output target	• **98%** target
	  ○ **1.25%** unavailability for maintenance planned outage;
	  ○ **0.25%** for unplanned unavailability; and
	  ○ **0.5%** for tower painting and attachment point replacement project.
	• Project specific allowances:
	  ○ **1.26%** for Pole 2 refurbishment;
	  ○ **3.84%** for TCU and HMI software upgrade; and
	  ○ **0.80%** yearly for maintenance.
		• **98%** target
		  ○ **1.25%** unavailability for maintenance planned outage;
		  ○ **0.25%** for unplanned unavailability; and
		  ○ **0.5%** for tower painting and attachment point replacement project.
		• Project specific allowances:
		  ○ **1.26%** for Pole 2 refurbishment;
		  ○ **3.84%** for TCU and HMI software upgrade; and
		  ○ **0.80%** yearly for maintenance.

Cap and collar	• **99%** cap. • **97%** collar. •	• **99%** cap. • **97%** collar.
Quality standard	• **96%** quality limit (**dead band**). • Introduce **pooling across years** for quality limits.	• **96%** quality limit (**dead band**). • No **pooling across years**. Require compliance with quality limit in all disclosure years of RCP4.
Threshold for major outages	• **Threshold** limit set at **0.5%** of the total annual availability for major unplanned outages.[38]	• **No threshold** limit.
Exclusions of the impact of planned outages	• major capex projects (**MCP**s); • listed projects involving the HVDC Pole 2 and Pole 3; and • new resilience workstreams to harden HVDC towers against wind and flood damage.	• MCPs; • listed projects involving the HVDC Pole 2 and Pole 3; and • new resilience workstreams to harden HVDC towers against wind and flood damage.

[37] Transpower advised that it considered a range of scenarios for target development (best, prudent, and worst cases). The proposed target is based on the prudent outage estimates and assumptions, and project-specific allowances are based on the worst-case outage estimates. The worst-case outage estimates are also used as a high-level check for the suitability of the proposed quality limit and quality standard. See Transpower, Service Measures Report, p 43.

[38] The threshold means that if a single event causes an outage(s) that exceeded the threshold, its impact on AP1 would be capped at 0.5%. Transpower advised that in the previous 25 years, there have been three events above this threshold limit. Refer note 34 in the Transpower, Service Measures Report.

4.69. Below we set out the Verifier and stakeholder's views and our analysis.

What the Verifier said

4.70. The Verifier supports all of Transpower's proposed changes except for limiting the impact of a single event:

> We do not support limiting the impact of a single event, instead recommend maintaining the full incentive for a single event. This is because major long duration HVDC events that have historically not been frequent but when they occur have a significant impact on the network. The HVDC network is also made up of a far smaller population of assets compared to the HVAC network, which in our view differentiates the need to maintain an incentive after a single major event.[39]

Approach raised in the Issues paper

4.71. In the issues paper we signalled that:

4.71.1. excluding the impact of planned outages resulting from major capex projects, listed projects, and new resilience workstreams, may mean there are lower incentives for Transpower to conclude these works in a timely manner, as there are no incentives to limit the duration of outages; and

4.71.2. introducing pooling across disclosure years for the quality standards may mean there is duplication in mitigating tools for atypical years. We note that Transpower is proposing a 1% "deadband" in its proposal, that provides a similar benefit to multi-year pooling.

Response in submissions

4.72. In response to our Issues paper, we received three relevant submissions.

4.73. Major Electricity Users Group (MEUG) disagreed with removing capex projects from quality standard:

> MEUG is unclear whether removing data that relates to availability affected by major capex or listed projects will provide the most accurate picture of HVDC performance (AP1). While these project-related outages (or reduction in HVDC capacity) are well-signalled and planned works, it is still beneficial to understand the systems total performance (even if this is presented a's a grid output measure, but not linked to quality standard).[40]

[39] GHD Advisory and Castalia, IV Report, p 475.

[40] Commerce Commission, Major Electricity Users' Group (MEUG) "Submission on RCP4 Issues paper" (21 February 2024) (**MEUG's submission on Issues paper**), p 4, para 20.

4.74. Meridian did not support having both a threshold limit and pooling across years:

> […] will in aggregate not provide any meaningful indication of the performance of Transpower in respect of HVDC and HVAC asset availability.[41]

4.75. Transpower disagreed with keeping outages resulting from MCPs, listed projects, and new resilience workstreams within measure as this could create an incentive to delay work to meet the quality standard:

> In paragraph 7.69, the Commission suggests that excluding the impact of planned HVDC outages resulting from MCPs, listed projects, and new resilience workstreams could reduce the incentive for Transpower to manage these events. Our proposal aims to remove these events to prevent unintended consequences, such as Transpower delaying work to avoid breaching quality standards.[42]

Our draft decision and reasons

Grid output target

4.76. Transpower provided data on planned and unplanned availability of the HVDC and we are satisfied with Transpower's proposal of 1.5% unavailability for planned maintenance and unplanned outages, as it is the average of the historic unavailability since 2013.[43]

4.77. The allowance enables Transpower to undertake work necessary for the provision of the service while ensuring customers are not overly negatively impacted by excessive outages.[44]

4.78. Transpower also included an estimated 0.5% of planned outage for tower painting and attachment point replacement project, which Transpower based on a worst-case outage estimate. The outage duration can vary depending on the scope of work, which is not identified until the delivery phase.

4.79. The duration of outages for each tower depends on its condition and the consequential preparation work and difficulty of access to the tower, among other factors.

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41 Meridian, "Meridian "Submission on RCP4 Issues paper" (21 February 2024) (**Meridian's submission on Issues paper**)", (21 February 2024), p 3.

42 Commerce Commission, Transpower "Submission on RCP4 Issues paper" (21 February 2024) (**Transpower's submission on Issues paper**), p 6, para 23.

43 Data before 2013 is inconsistent with data after 2013 and cannot be used to analyse trends. Pole 3 was commissioned in May 2013 and prior to 2013 Pole 1 was in service and was of a different type.

44 This is in line with the purpose of Part 4 as per s 52A(1)(a) and s 52A(1)(b) of the Act.

4.80. For these reasons outages duration can vary widely for different towers. Given the high degree of uncertainty on the duration of outage for tower painting for each tower and small the number of HVDC towers that would be painted in RCP4, our draft decision is to accept Transpower's worst case estimate of outage duration.[45]

Project specific allowances

4.81. Transpower has proposed excluding from the target and quality standard some specified projects for defined outage durations (%). This is so it can carry out investments in the grid without being penalised for doing so.

4.82. Table 4.10 shows Transpower's estimated unavailability due to three project-specific allowances.[46]

Table 4.10 Unavailability allowance for identified projects

Identified project	Maximum unavailability allowance
Pole 2 refurbishment	1.26% for RCP4
HVDC control system and HMI software upgrade	3.84% for RCP4
HVDC cable maintenance	0.8% annually

4.83. Our draft decision is to treat these three projects in a manner similar to our approach for the Pole 2 replacement programme in RCP3. We excluded the impact of this project on AP1 from the target but required Transpower to include in the AP1 assessed value any reduction in capacity greater than the maximum unavailability allowance for that project.

4.84. As in RCP3, we consider that reducing the target (and associated caps and collars) for total unavailability for the years affected by the projects mentioned above could lead to potential incentive issues. We decided not to take this approach because it could lead to a perverse outcome where Transpower could make windfall gains if the actual outage duration for the project is lower than the estimated value of the project outage.

[45] If there were a lot of towers to be painted, then we could have used a prudent or mean estimate of outage duration.

[46] Transpower, Service Measures Report, p 42.

4.85. Our assessment shows that including the impact of these projects in the target will significantly distort the incentive scheme. This is because the unavailability due to projects is high compared to the target, and the timing of the projects is uncertain. To include the above projects in the settings, we will need to add the corresponding unavailability allowance to the AP1 target. This would significantly distort the intent of the incentive rate due to the relatively small number of base capex projects and their significant outage requirements.[47]

4.86. We consider that a decision not to provide target allowances for these projects would not be optimal either. These are important projects for the long-term benefit of customers. If we decided not to provide any allowances, we are disincentivising Transpower from undertaking the projects, providing an incentive to defer needed work to comply with the quality standard.

4.87. In response to our Issues paper, in relation to projects on the HVDC, Transpower submitted that its proposal aims to remove these events to prevent unintended consequences, such as Transpower delaying work to avoid breaching quality standards.

4.88. MEUG on the other hand, submitted that it is beneficial to understand the system total performance and disagreed with removing these from AP1. We consider that there are disadvantages in completely ignoring the impact of these projects on AP1 and, as discussed above, there are some downsides in incorporating allowance for these outages in the target of AP1.

4.89. Our draft decision is to allow Transpower a maximum adjustment for unavailability due to the identified projects, as set out in Table 4.9 above. These adjustments will allow Transpower to net out the actual outages due to these projects, up to the specified project allowances, from the assessed values.[48] Transpower has based the project allowances on the worst-case outage estimates, meaning that actual project outages are not likely to be more than Transpower's estimates.[49]

4.90. By providing a fixed allowance for these projects we consider we are striking the right balance between enabling Transpower to deliver the projects efficiently, without impacting too negatively the quality of the service provided to customers.

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47 Clause A7 of the Capex IM requires us to consider strength of the relationship between base capex and the grid output both within the regulatory period and the long term.

48 In RCP3, we used this approach for the Pole 2 refurbishment project. Commerce Commission, "Transpower's individual price-quality path from 1 April 2020 Decisions and reasons paper" (29 August 2019) **(RCP3 Decisions paper)**, p 178, para F180.

49 Transpower, Service Measures Report, p 43.

4.91. Transpower has an incentive to operate efficiently without negatively impacting quality of service, while not being penalised for undertaking projects. Our approach provides a consistent incentive rate setting throughout RCP4.

4.92. We consider that the proposed target, adequately reflects the quality of service that Transpower should deliver under a normal operating environment. This provides a more meaningful incentive scheme because the unavailability target is based on expected planned outages. We consider that the draft decision target provides a better alignment between planned base capex projects and the AP1 measure as per A7(b) of the Capex IM.

Cap and collar settings

4.93. Our draft decision is to set a +/-1% offset for cap and collar as Transpower proposed, which is the same approach used in RCP3.

4.94. Our draft decision is to set the caps and collars at 1% offset from the target, as proposed by Transpower. A 1% offset is more than one standard deviation, which is the approximate value at which we tend to set collars and caps for the other measures. The range of 2% around the target for revenue at risk provides a plausible range of relevant grid outputs likely to be delivered, and therefore meets condition A7(e) of the Capex IM.

The quality standard settings

4.95. Transpower has proposed a dead band and pooling across years, for assessing compliance with the AP1 quality standard. The idea is to mitigate the impact of one abnormal year by considering the performance of multiple years.

4.96. We are not satisfied that Transpower's proposal to apply both pooling across disclosure years and a dead band for the quality standard better promotes our ability to measure Transpower's performance in accordance with clause A5(a)(ii) of the Capex IM. Both tools independently provide similar results, and only one is needed to meet our objectives of reducing false positive instances of the quality standard not being met.

4.97. In RCP3, we introduced pooling or dead bands to mitigate the effect of a natural spread in performance, causing quality standards not being met across different measures. We decided to use dead bands (consisting of a gap between collar and quality limit) for the asset performance measures, and pooling for the grid performance measures.[50]

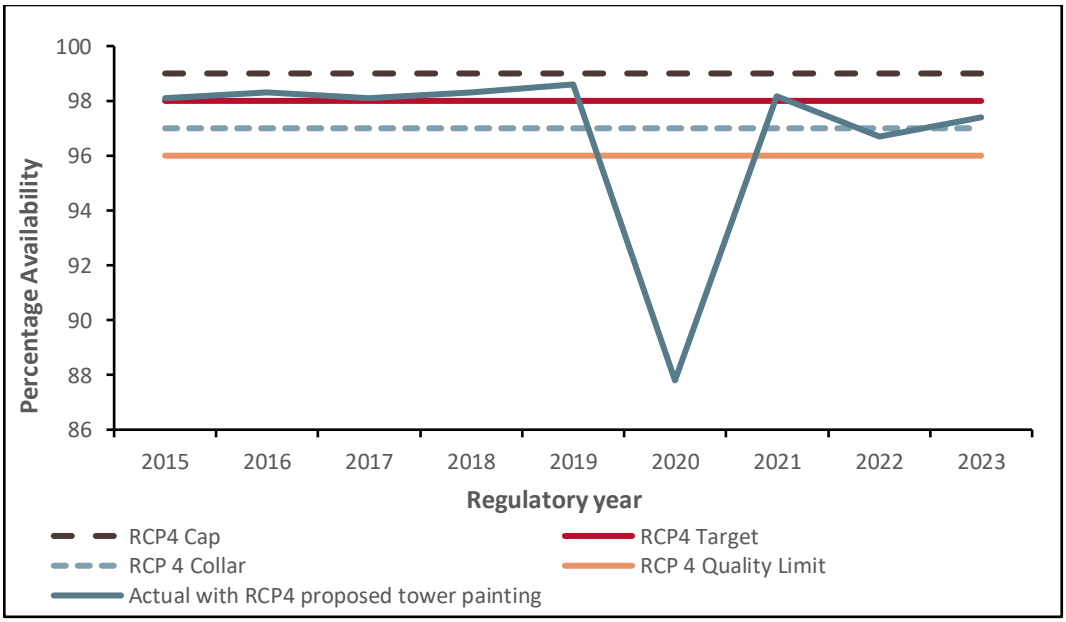
[50] Commerce Commission, "Commerce Commission Transpower IPP RCP3 Decisions and reasons paper (29 August 2019) **(RCP3 Decisions paper)**", (29 August 2019), para F198-F199, F227.

4.98. Our draft decision is to set the quality limit at 2% below the target, which is about two standard deviations of historical performance since 2015. Mathematically this results in a less than 3% likelihood of Transpower's actual performance to be below the quality limit. We consider occasional performance below the quality limit does not necessarily signal worsening performance.

4.99. For compliance with the quality standard, the performance should be above the quality limit in the disclosure year.

4.100. Figure 4.3 below shows Transpower's most recent performance against our draft decision settings, which include the 0.5% unavailability due to tower painting.[51] Under these proposed settings, Transpower would have only failed to meet the quality limit once, in 2020, due to the HVDC Pole 2 replacement project. In RCP4, projects of this nature are excluded from the assessment of AP1 by design of the measure (part of exclusions).

Figure 4.3 RCP4 AP1 draft decision settings versus historical HVDC performance



Threshold for major outages

4.101. Transpower has proposed a threshold limit of 0.5% of the total annual availability for the duration of all major unplanned outages. This means that if a single event caused an outage(s) that exceeded this threshold, its impact on AP1 would be capped at 0.5%.

[51] RCP4 draft decision settings include the additional 0.5% unavailability, which was not included in RCP3 and RCP2 settings.

4.102. Transpower argues that thresholds are used in other jurisdictions and are also used by us in the GP2 measures as well as performance measures for distribution businesses.

4.103. Transpower states that the threshold:

> mitigates the impact of major unplanned outages by ensuring that no single unplanned event can have a disproportionate impact on the overall performance against the measure in a year. This concept has been introduced in other jurisdictions and a similar threshold exists for duration in GP2.
>
> The threshold limit is proposed to be set at a relatively large value, 0.5 per cent of the total annual capacity availability. If a single event caused an outage(s) that exceeded this threshold, its impact on AP1 would be capped at 0.5 per cent. We would continue to have a significant incentive to avoid unplanned outages, and the revenue incentive to meet the measure would not be extinguished by a single event.[52]

4.104. We do not agree with the introduction of a threshold for the asset performance measures. We consider a threshold could mask the impact of long outages that are within Transpower's reasonable control. Therefore, it does not provide a suitable measure of Transpower's performance in terms of the Part 4 purpose.

4.105. We consider there is a difference between AP1 and GP2 measures, where we apply a threshold on the duration of interruptions. For AP1, major outages within the HVDC system are rare, and it will be useful for us to have visibility of their full impact, and to have the subsequent ability to investigate.[53]

4.106. We consider that introducing a threshold would not provide a material benefit in terms of measuring TP's performance because normalisation of outages is already in place. Normalisation allows Transpower to apply to remove from the assessed value of AP1 the impact of major outages that are due to events outside Transpower's reasonable control.

4.107. Our draft decision is not to introduce thresholds for this measure. We consider this decision does not materially reduce Transpower's incentives to reduce unplanned outages. This is because unplanned outages are caused by external factors or sustained under-investment and therefore need to be managed through long term investment planning. Accordingly, short term actions cannot have a significant impact on unplanned outages and therefore a threshold cannot provide a significant incentive to alter the chances of unplanned outages.

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[52] Transpower, Service Measures Report, p 41.

[53] Transpower states that there have been three events in the previous 25 years above its proposed threshold limit - insulator attachment point failure at Weka Pass in 2022; 2013 storm damage to T10 converter transformer housing, and 2011 P2 capacity reduction. Transpower, Service Measures Report, p 41, note 34.

4.108. We also consider that Transpower will have the incentives to continue to manage further unplanned and planned outages effectively, according to its established processes. In our assessment of the three normalisation applications in RCP3, we concluded that Transpower effectively managed the outages/interruptions and displayed good electricity industry practice (GEIP).

4.109. The Verifier and stakeholders support our view not to add a threshold and did not agree with limiting the impact of a single event.[54, 55]

Exclusion of impact of planned outages

4.110. Transpower has excluded the impact of resilience projects, major capex projects, and listed projects from the proposed target. The main reason for excluding the impact of these projects is the uncertainty in their outage requirements or scope and timing.

4.111. In response to Transpower's consultation, stakeholders did support Transpower removing project outages from the AP1 settings.[56] Having considered those submissions and Transpower's reasons, we consider that, on balance, it is appropriate to exclude the impact of these outages from the target. This is because the timing of these projects and the duration of the resulting outages is uncertain.[57]

4.112. Transpower states that its planned resilience projects have significant outage requirements, and there is uncertainty in scope and timing. Similarly, the scope and timing of any major capex projects and listed projects are uncertain at this stage. It is also not possible to know if the projects will go ahead, and which disclosure years they will take place.

4.113. Given the uncertainties in scope and timing, it is challenging for Transpower and for us to provide estimates for the impact of these projects and we agree with Transpower that it is not reasonable to include the impacts of these in the AP1 measures.

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54 GHD Advisory and Castalia, IV Report, p 473 and 477.

55 Meridian, Meridian's submission on Issues paper, p 2.

56 "Both Contact Energy and Meridian Energy support the exclusion of impacts from major capex projects, however Meridian Energy wouldn't support the removal of listed projects from the measure without some process put in place to ensure that those projects are treated in a similar way to major capex projects." Our draft decision is to treat listed projects and MCPs in the same manner. See Transpower, "Submission Summary - Grid Service Engagement Paper 1" (August 2022) (**Submission Summary**), p 3, para 13.

57 When we exclude or include any event in the calculation of the target it results in the "measured performance" being changed for the year. In simple terms, cap, target, collar, and quality limit stay the same, the performance level is "moved" up or down within the scale.

4.114. Our draft decision is to exclude these projects from the AP1 measures. For completeness, we note that we have the ability to amend the measure in case we approve a listed project or MCP.[58]

Asset Performance measure 2 (AP2)

4.115. Our draft decision is to retain the AP2 measure for RCP4 with some updates and modifications to the specific AP2 settings.

4.116. AP2 measures the average percentage of time selected HVAC assets are available for service.

4.117. Table 4.11 summarises our proposed settings for the AP2 measure.

[58] Commerce Commission, Capex IM Amendment Determination 2023, clause 3.7.12.

Table 4.11 Summary of Transpower proposal and draft decision for AP2

Element	Transpower proposal	Draft decision
Revenue at risk ($ 000)	**$1,000**	**$2,000**
HVAC assets	• Updating the list of selected HVAC assets to 62 circuits based on outages forecasts	• Updating the list of selected HVAC assets to 62 circuits based on outages forecasts
Grid output target	• **98.25%** target based on a forecasted model of unavailability based on capex expenditure plus an allowance for unplanned unavailability based on historic average.	• **98.25%** target based on a forecasted model of unavailability based on capex expenditure plus an allowance for unplanned unavailability based on historic average.
Cap and collar	• **98.62%** cap • **97.87%** collar	• **98.62%** cap • **97.87%** collar
Quality standard	• **Remove** the quality standard (preferred option)[59] • **97.45%** quality limit (**dead band**) • Introduce **pooling across years** for quality limits	• Retain the quality standard • **97.45%** quality limit (**dead band**) • No **pooling across years**. Require compliance with quality limit in all disclosure years of RCP4
Threshold for major outages	• **Threshold** limit set at **150** hours of duration for major unplanned outages.[60]	• **No threshold** limit.
Exclusions of the impact of planned outages	• MCPs; • customer-funded work; • listed projects; • enhancement and development projects (**E&D**)	• MCPs; • customer-funded work; • listed projects; • E&D.

4.118. Below we set out the Verifier and stakeholders' views and our analysis.

[59] Transpower in their submission to our issues paper [Commerce Commission, Transpower's submission on Issues paper, p 6, para 27] pointed out that in our Issues paper we incorrectly stated that Transpower proposed to "or using forecast model to set targets using forecast expenditure", while they proposed to remove quality standards and if those are to stay then Transpower is proposing to use the forecast model to set quality limits.

[60] The threshold means that if a single event causes an outage(s) that exceeded the threshold, its impact on AP1 would be capped to 150 hours. Transpower advised that in the previous 25 years, there have been three events above this threshold limit. Refer note 34 in Transpower, Service Measures Report.

What the Verifier said

4.119. The Verifier supported all of Transpower's proposed changes except for removing the quality standard, stating:

> For AP2, we consider the method proposed to set the target, caps and collars, and incentive rates are appropriate and support the adoption of the proposed quality standard. We support the adoption of a linear regression-based approach for setting the target for unavailability due to planned outages as this allows alignment with the planned outages needed to deliver the RCP4 programme and should reduce the risk of quality standard breaches.

Approach raised in the Issues paper

4.120. In the Issues paper we discussed an option to remove the effect of major project works and modify the settings when Transpower applies for a listed project and major capex project. There are downsides to this approach. Once a project is approved and goes ahead, there would be lower incentives for Transpower to conclude works in a timely manner, as there are no regulatory incentives to limit the duration of outages.

4.121. Keeping the quality standard may mean that Transpower's focus is maintained on the asset performance, enabling us to investigate when the standard is not met. The existence of quality standards implies a requirement on Transpower to actively work on improving or maintaining performance and asset availability.

4.122. Pooling may also mean there is a duplication in mitigating tools for atypical years as explained for the AP1 measure in the section The quality standard settings.

Response in submissions

4.123. Three stakeholders supported maintaining the quality standard.[61] MEUG stated:

> We believe there is merit in monitoring the availability of key HVAC transmission assets, which support a reliable and secure market.[62]

4.124. Meridian argued:

> We also agree with the independent verifier that the AP2 quality standard should be retained and that there is no sufficient reason for its removal.[63]

4.125. Meridian also did not support having both a threshold limit and pooling across years:

> […] will in aggregate not provide any meaningful indication of the performance of Transpower in respect of HVDC and HVAC asset availability.[64]

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61 One stakeholder did not provide a justification.
62 Major Electricity Users Group, MEUG's submission on Issues paper, p 4, para 20.
63 Meridian, Meridian's submission on Issues paper, p 3.
64 Meridian, Meridian's submission on Issues paper, p 3.

4.126. Transpower disagreed with our initial views:

> […] the Commission asserts that keeping the quality standard for AP2 implies a requirement for Transpower to actively work on improving or maintaining performance and asset availability. We disagree that a quality standard is required to incentivise Transpower to maintain or improve availability performance. While we agree that a quality standard provides a clear threshold for the Commission to initiate an investigation, there is nothing preventing the Commission from investigating if it believes we systematically fail to meet good electricity industry practice. Additionally, we emphasise that we still have financial incentives and information disclosure requirements to encourage effective and efficient outages management with regard to asset unavailability.[65]

Our reasons and draft decision

Analysis of Transpower's historical performance since RCP2

4.127. We consider the AP2 measure is not working as intended. Transpower's assessed values have failed to meet the target and quality standard in every year since 2016 except over 2022/2023. This has been driven by:

4.127.1. under-estimating availability due to planned work;

4.127.2. the impact of the Clutha Upper Waitaki Lines (**CUWLP**) line upgrade MCP that Transpower did not expect to undertake in RCP3; and

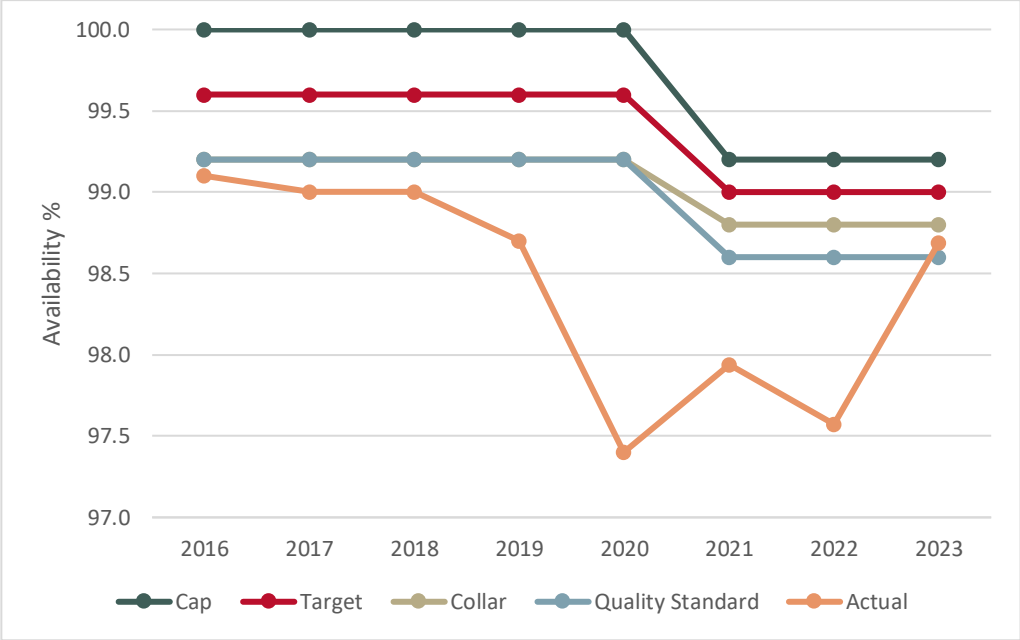
4.127.3. the impact of a significant unplanned outage of the Pakuranga-Brownhill (**PAK-WKM**) cable.

4.128. We have considered these issues in our approach to setting the AP2 measure for RCP4.

4.129. Figure 4.4 shows Transpower's AP2 performance against the target and quality standards. Note that in RCP2, the quality standard coincided with the collar.

[65] Commerce Commission, Transpower's submission on Issues paper), p 6, para 25.

Figure 4.4 AP2 performance against target and quality standard



4.130. In our RCP3 decision we concluded that the RCP2 exceedances were caused by inaccurate forecasting of the duration of planned outages. We lowered the cap, collar, and target, and introduced a dead band between the collar and quality standard to address these issues (see Figure 5).

Our review of Transpower's proposed settings and draft decision

4.131. To better design AP2 for RCP4, in light of the experience in RCP3, Transpower also proposed a few additional instruments to address potential non-compliance in RCP4. These include removing unapproved work from quality measures, thresholds for major unplanned outages, along with normalisation and dead band, and pooling across years for quality standard.

4.132. We do not consider all the proposed instruments are necessary. We have made our draft decision based on what is required to provide a balanced measure that avoids the quality standard not being met for reasons outside Transpower's control, as well as providing services at a quality demanded by consumers in promotion of the Part 4 purpose. We discuss our reasons below.

HVAC assets

4.133. We have accepted Transpower's revised number of circuits included in the AP2 measure. Transpower advises it identified the circuits using its latest System Security Forecast.

4.134. The System Security Forecast forecasts Transpower's ability to achieve the Principal Performance Obligations that Transpower and the Electricity Authority agree to.[66]

4.135. We are satisfied that Transpower's approach identified the relevant circuits for AP2.

Grid output target

4.136. For RCP4, Transpower has proposed setting the target by using a forecast model of planned unavailability based on capex expenditure and adding an allowance for unplanned unavailability based on historic averages.

4.137. We have assessed Transpower's calculations and are generally satisfied with its approach to setting the target for RCP4. We are also satisfied with Transpower adopting a linear regression-based approach for setting the target for unavailability due to planned outages based on the estimated outages required to deliver the RCP4 capex programme.

4.138. We have assessed Transpower's calculations and are generally satisfied with its approach to setting the target for planned outages. We are satisfied that Transpower's approach provides a reasonable estimate of the planned outages required to deliver the proposed RCP4 expenditure.

4.139. Having a direct link between the target and capex provides strength to the measure and is a key criteria for considering matters relating to revenue-linked grid output measures as per cl. A7(b) of the Capex IM.

4.140. We conducted a sensitivity analysis to test the proposed cap, collar, and target of AP2. Transpower provided us with the linear regression model it used to calculate the settings based on the proposed capex expenditure.

4.141. We used a 98% proportion of approved base capex as per our draft decision and the settings obtained were less than 1% different from the ones proposed by Transpower as per Table 4.12.[67] We decided to keep Transpower's proposed setting as the difference in availability between the proposed base capex and approved base capex is immaterial.

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[66] Details on the System Security Forecast are available at Transpower website https://www.transpower.co.nz/system-operator/planning-future/system-security-forecast.

[67] Commerce Commission, *Transpower's individual price-quality path for the regulatory control period commencing 1 April 2025* (29 May 2024), para 3.16.

Table 4.12 Settings calculated using Transpower's model using different Capex amounts

Scenario – settings	Cap	Target	Collar	Quality Limit
AP2 settings using draft decision base capex total (98% of proposed base capex)	98.62%	98.25%	97.87%	97.45%
AP2 draft decision settings using Transpower's proposed base capex	98.67%	98.32%	97.97%	97.58%

Cap and collar settings

4.142. Transpower proposed to set the caps and collars based on one standard deviation from predicted mean of planned unavailability and add a 300-hours deduction for unplanned unavailability, which is largely in line with the RCP3 approach.

4.143. Our draft decision is to accept Transpower's proposed caps and collars. We consider these are reasonable and consistent with how we have set them in RCP3, where we used a revenue at risk range of 2 standard deviations around the target as they provide a plausible range of relevant grid outputs likely to be delivered as per A7(e) of the Capex IM.

Quality standard

4.144. Transpower has proposed to either remove the quality standard for AP2 or set the quality standard with a dead band and use pooling across regulatory years.

4.145. Given our previous experience with this measure, we considered the effectiveness of the proposed RCP4 settings in mitigating any 'false positives' of the standard not being met.

4.146. When considering the design of this measure for RCP4, we have taken measures to improve the design of AP2 by removing unapproved projects and the effect of improved planned outage estimation from the measure.

4.147. Transpower has proposed a dead band and pooling across years, for assessing compliance with the quality standard. The idea is to mitigate the impact of one abnormal year by considering the performance of multiple years. In RCP3, we decided to use dead bands for the asset performance measures and pooling for the grid performance measures.

4.148. We do not support Transpower's proposal of introducing both pooling across disclosure years, and dead band for quality standards as they provide similar benefits and including both would result in a double up, as explained under AP1 quality standard settings section.

4.149. Both pooling and deadbands independently provide similar results and only one is needed to meet our objectives of reducing 'false positives' of the quality standard not being met. We consider that applying both will mask deteriorating performance and would not be consistent with the requirements of cl. A5(a)(ii) of the Capex IM.

Removal of the quality standard

4.150. In its IPP Proposal, Transpower suggested removing AP2 for RCP4 because of the increase in planned outages, weak relationship between market outcomes and AP2, potentially providing unwanted incentives, and the regulatory burden due to breaches.[68]

4.151. The Verifier did not support removing the quality standard for AP2.[69] Stakeholders did not support removing the quality standards for AP2 in response to both Transpower's proposal and our Issues paper.[70] [71] [72]

4.152. We considered Transpower's proposal to remove the quality standard for AP2. The reasons for introducing a quality standard in RCP3 for this measure remain valid. There has been no significant change to justify removing it:

4.152.1. Transpower has pointed out the significant time and effort involved in investigating breaches of quality standards. It argues that we have the power to investigate poor performance without a quality standard being triggered.[73] If there is no quality standard, we cannot investigate or seek a pecuniary penalty for any contravention of the quality standard. Therefore this reduces the incentive and fails to meet the purpose of price-quality regulation, providing incentives for Transpower to provide services at a quality that reflects consumer demands; and

4.152.2. we are maintaining our approach to measuring quality because, while Transpower has made a valid argument about being investigated for events outside of its control, this risk can be mitigated by properly setting the quality standard and we consider maintaining the quality standard ensures the purpose of Part 4 is met by having a minimum level of acceptable quality for customers.

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[68] Transpower, Service Measures Report, p 49.
[69] GHD Advisory and Castalia, IV Report, p 479.
[70] Commerce Commission, MEUG's submission on Issues paper, p 4.
[71] Commerce Commission, Meridian's submission on Issues paper, p 2.
[72] Commerce Commission, Consumer Advocacy Council "Submission on RCP4 Issues paper" (21 February 2024) (**CAC's submission on Issues paper**), p 2, para 9.
[73] Commerce Commission, Transpower "Cross-submission on RCP4 Issues paper comparison of indexation approaches" (13 March 2024) (**Transpower's cross-submission on Issues paper – comparing indexation approaches**), p 2, para 11.

4.153. Our draft decision is to maintain the quality standard settings as set out in the table above, without pooling and without a threshold for major outages.

Threshold for major outages

4.154. For the same reasons discussed under the AP1- section, we do not support introducing a threshold for major outages to mitigate the impact of major unplanned outages. Transpower states:

> This would help to ensure the revenue incentive remains throughout the year to efficiently manage other planned works and avoid the situation where the target for AP2 is continually beyond reach.

4.155. Under Transpower's proposal to exclude major projects and introduce a 150-hour threshold, Transpower would have achieved the cap in 2021 and 2022 DYs despite performance that we assess to be below the minimum level set by the quality limit.[74]

4.156. This means Transpower would have gained the maximum reward for performance that falls below the necessary standard. We do not consider this is consistent with s 52A(b) of the Act.

4.157. In our view, a threshold may mask the impact of long outages that are within Transpower's reasonable control. We consider that outages having a significant impact on consumers should trigger an investigation into potential non-compliance.

4.158. Investigations enable us to determine whether there are systemic issues. Among those, through investigation we can determine if Transpower followed GEIP. A threshold may mask the impact of long outages that are within Transpower's reasonable control.

4.159. There are many other factors such as scheduling planned work, managing resourcing and costs and market constraints on availability of planned outages that incentivise Transpower to effectively manage outages.

4.160. As discussed below, our draft decision excludes many factors that contributed to Transpower not meeting its AP2 quality standard in the past. These factors are excluding all E&D, resilience and unapproved work from the measure and allowing normalisation of major events outside Transpower's reasonable control.

4.161. This results in Transpower having the ability to potentially gain a higher reward than in the past when those factors hindered its performance.

[74] By having a reasonably low limit on events, one major outage across years would have been practically excluded (except for 150 hours each year) meaning we would have been unable to investigate it and Transpower would have been rewarded the maximum revenue by achieving the cap in both years.

4.162. To the extent that the events are outside of Transpower's control, the normalisation provision exists, and enables us to ascertain if best practice was followed.

4.163. Our draft decision is to reject Transpower's proposal to introduce a threshold to the AP2 measure, excluding the effect of unplanned measures within Transpower's control. We make this decision on the basis that normalisation can apply to exclude the effect of events outside Transpower's control from the measure. We consider this approach provides a better measure of Transpower's performance.

Exclusion of the impact of planned outages

4.164. For the reasons discussed under AP1 section Exclusion of the impact of planned outages, we consider it is appropriate to exclude the impact of base capex E&D, customer-funded projects, major capex projects, and listed projects from the target, cap, and collar and quality standard of AP2.

4.165. The scope and timing of such projects are uncertain and cannot be meaningfully included in the settings. We have the ability to amend the measure if and when we approve a MCP or listed project application as discussed in the AP1 section.

4.166. If we did not exclude the effect of these projects, Transpower may forego grid investment to avoid not meeting the quality standard. Transpower states:[75]

> In its current form, AP2 can create unintended situations. For example, projects previously not planned for RCP3 can make it impossible for Transpower to meet the quality standard for AP2, even though those projects are creating long-term benefits for consumers and are, in some cases, approved by the Commission. Where customer or grid enhancement projects impact the measure, we are incentivised to consider whether maintenance, replacement, and refurbishment work should be deferred to manage unavailability – such deferrals can reduce the reliability of the grid and impact other measures and our supply to customers over time.

4.167. We consider that there is a risk that Transpower will not have the incentive to manage the outage duration of such projects. The Consumer Advocacy Council submitted against removing the effect of MCPs from the AP2 measure.[76] However, we do not consider that this is a material risk relative to Transpower's revenue, because we have the ability to amend the measure when we approve a MCP.[77]

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[75] Transpower, Service Measures Report, p 46.

[76] Commerce Commission, CAC's submission on Issues paper, p 2, para 9.

[77] We refer you to our proposed amendment to clause 3.7.12(3)(ab) in the Commerce Commission, *Transpower Input Methodology Determination 2010 (Principal determination)*, (23 April 2024), which we have published alongside this paper.

4.168. Our draft decision is to allow Transpower to exclude projects which have not been approved yet, and it is not currently known if they will take place, and what outages they will result in.

Asset Health measure (AH)

4.169. Our draft decision is to retain the AH measure for RCP4 with some updates and modifications to the specific AH settings.

4.170. The asset health setting measures the percentage of assets with an asset health indicator (**AHI**) of eight or above, for all assets in an asset class.[78] Transpower considers that when AHI is at or above eight, the asset is in poor or very poor health and that an intervention may be necessary depending on asset criticality.[79]

4.171. Table 4.13 summarises the quality limits set out in our draft decision for the AH measures, and Table 4.14 compares our draft decision settings to those proposed by Transpower for the AH measure quality standards.

Table 4.13 RCP4 Asset Health draft decision – quality limits by regulatory year

Asset Class quality limits (% of assets with AHI >=8)	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030
Conductors	1.76	1.97	2.18	2.37	2.61
Insulators	2.79	3.14	3.85	4.76	5.98
Outdoor Circuit Breakers	1.24	1.45	2.46	3.19	4.27
Power Transformers	5.17	9.15	11.53	12.18	13.35
Protection Relays	7.56	6.92	6.37	8.12	8.61
Tower Grillage Foundations	4.26	3.51	3.90	4.04	3.99
Tower Protective Coatings	13.98	15.89	17.79	20.02	22.09

[78] An AHI represents an asset's proximity to the end of its useful life. When combined with other information and decision frameworks, an AHI can inform the optimal time for various asset interventions or replacement when combined with engineering judgement.

[79] Transpower, Service Measures Report, p 16, section 3.3 and p 53 section 5.7.1.

Table 4.14 RCP4 Asset Health draft decision - settings

Element	Transpower proposal	Draft decision
Asset classes	• **7** asset classes.[80]	• **7** asset classes
Target, cap, and collar	• None, **not revenue linked**.	• None, **not revenue linked**.

Quality standard	• **Removing the quality standard** (preferred option), or
	  ○ Introduce **pooling across years and asset classes** for quality standard
	  ○ Quality limit set at a **25% benefit** from the 'with intervention' improvement for each asset class.[81]
		• **Retain the quality standard**
		• Introduce **pooling across years and asset classes** for quality standard
		• Quality limit set at an **80% benefit** from the 'with intervention' improvement for each asset class.

4.172. The Verifier conclusions about what Transpower proposed, stakeholder's views on our Issues paper, and our analysis is set out below.

Approach raised in the Issues paper

4.173. In our Issues paper we discussed the history of asset health modelling and the progress made by Transpower, linking this to possibly enhancing the asset health quality measures we set in RCP3:[82]

> Our early view is that the number of asset classes that are subject to the asset health quality standards should be extended, based on the maturity of the modelling that has been reviewed by both the expert opinion during RCP3, but also the RCP4 Verifier. We will be guided by these reviews if we decide to extend the asset health measures.

What the Verifier said

4.174. The Verifier supported all proposed changes proposed by Transpower except removing the quality standard, stating that:

> We do not support removing the quality standard for this measure as AH can be an effective leading indicator of the future performance of the network.[83]

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[80] Retaining the two existing asset classes and introduce five new asset classes following a redevelopment of Transpower's asset health models. The seven asset classes are set out in Transpower, Service Measures Report, table 24 p 53.

[81] The measure is computed by using the forecasted asset health index score for each asset, in all seven asset classes, with and without intervention based on the proposed investment plan for RCP4. Quality limits are relating to the proportion of assets in poor health (ie, those which have an asset health index score of eight or above) are calculated assuming a 25% benefit from the 'with intervention' improvement. See Transpower, Service Measures Report, p. 56.

[82] Commerce Commission, "Transpower's individual price-quality path for the next regulatory control period – Issues paper" (25 January 2024) (**RCP4 Issues paper**), p 87-88, para 7.96-7.101

[83] GHD Advisory and Castalia, IV Report, p 487.

4.175. The Verifier also noted it is worth considering revenue linking AH measures in the future, stating that:

> Critical consideration should also be given to this measure becoming an incentivised measure in the future. Incentivising this measure would not 'double count' the current incentivisation of GP1 or GP2. The measurement of AH convers a broad spectrum of business tool and systems not concurrent to GP1 or GP2.[84]

4.176. In its Issues Paper submission Transpower noted that:

> …the Commission expresses an early view that the number of asset classes with asset health quality standards should increase. We disagree with this view. While asset health metrics serve as leading indicators, setting quality standards reduces our flexibility to reprioritise work and may hinder the development of asset health models. Given that it is a leading measure, having a quality standard against it does not seem beneficial. Monitoring asset health metrics alone provides the Commission with sufficient information on our investments during an RCP to inform its assessment for the next RCP.[85]

Our reasons and draft decision

4.177. Our draft decision is to introduce 5 new asset classes as proposed by Transpower, maintain the quality standard and make it more stringent while introducing pooling across years and classes.

4.178. In RCP3 we introduced an asset health measure in two asset classes (power transformers and outdoor circuit breakers) to monitor the proportion of assets with poor asset health to very poor asset health (eg, an asset health score of eight or greater). We focused on these two asset classes as Transpower had relatively mature asset health models for these.

4.179. We set a quality standard for each asset class to act as a safety net to ensure that asset health would not degrade significantly over RCP3 and to act as a proxy for network risk.[86]

4.180. For RCP4 Transpower proposed to expand the asset health measure by including an additional five asset classes but that the quality standard be removed or, if we decided to retain it, use pooling across years and asset classes.

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[84] GHD Advisory and Castalia, IV Report, p 487.

[85] Commerce Commission, Transpower's submission on Issues paper, p 6, para 26.

[86] The standards were set, for each year of RCP3, and in each asset class, between the "no investment" percentage of assets with an asset health index >8 and the "forecast investment" percentage of assets with an asset health index >8. The quality standard levels were set at 25% of the range between the two investment outcomes.

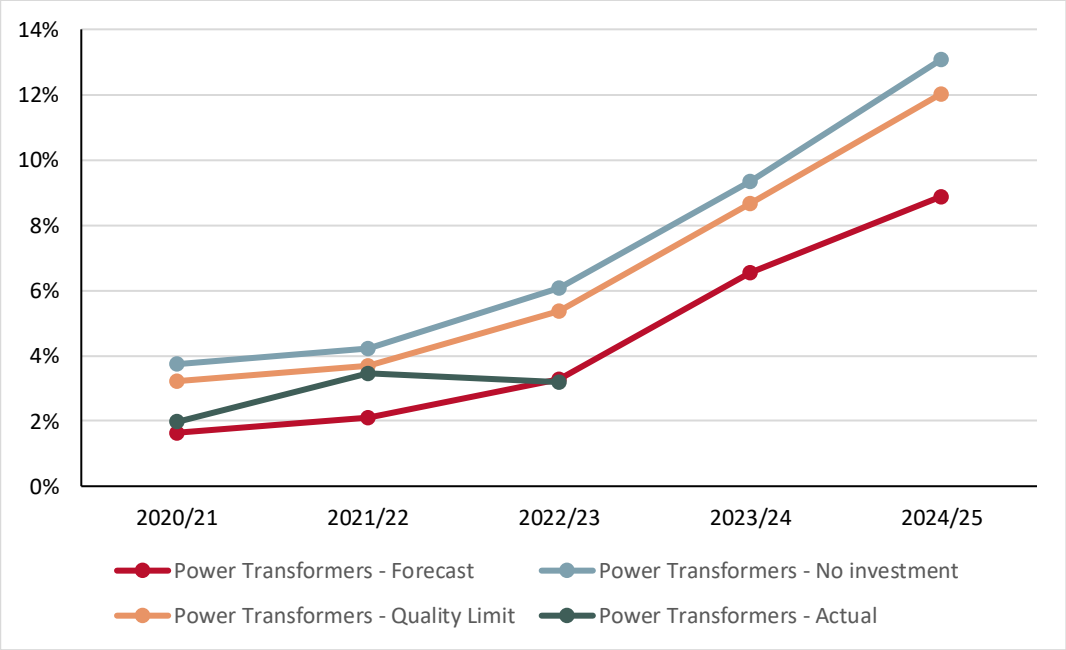
4.181. We received two submissions on the AH quality standard. Transpower re-iterated that setting quality standards reduces their flexibility to reprioritise work.[87] The Consumer Advocacy Council (**CAC**) disagreed with removing the quality standard and supported our preliminary view of retaining it.[88]

Historical performance and RCP3

4.182. The quality standard for RCP3 in practice meant that Transpower would meet the standard if it delivered on 25% of the expected benefit of its forecast interventions in the asset class. Transpower has so far achieved this quality standard in the first three years of RCP3 by a large margin.

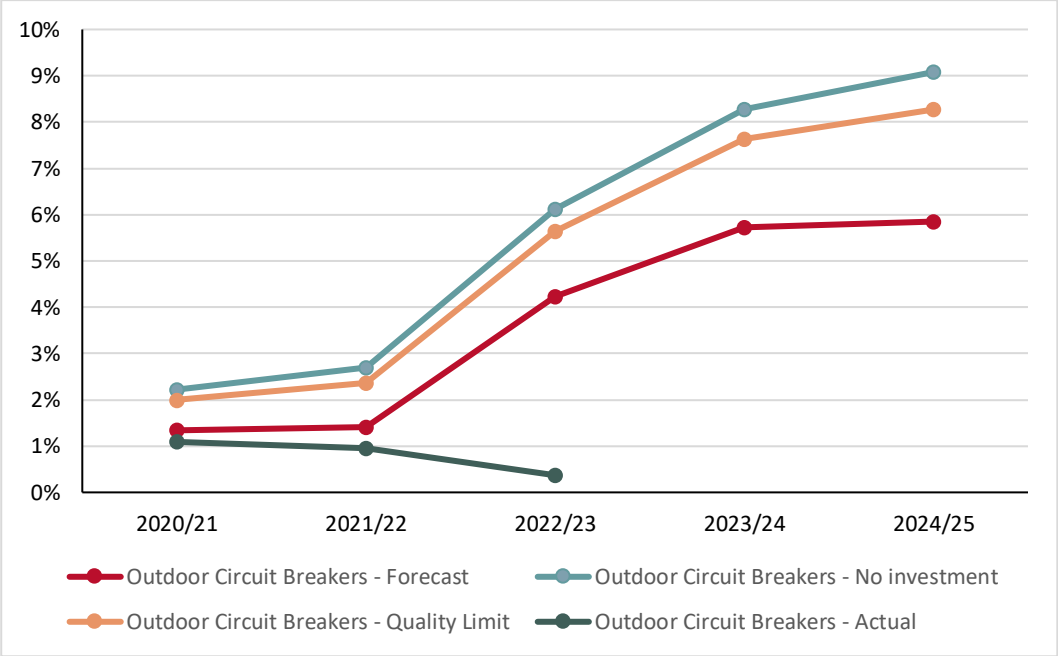
4.183. Figure 4.5 and Figure 4.6 show actual performance, together with the quality limit, and expected asset health without any intervention, in the power transformers and outdoor circuit breaker asset classes respectively.

Figure 4.5 AH RCP3 performance for power transformers (% of assets with AHI>8)



[87] Commerce Commission, (Transpower's submission on Issues paper), p 6, para 26.
[88] Commerce Commission, (CAC's submission on Issues paper), p 2, para 10.

Figure 4.6 AH RCP3 performance for outdoor circuit breakers (% of assets with AHI>8)



4.184. Figures 4.5 and 4.6 illustrate that Transpower actual asset health scores are below the quality limits in these asset classes for the first three years of RCP3. The results suggest, with the exception of the 2021/2022 regulatory year for power transformers, that the RCP3 asset health quality standards are set too low. We assessed this approach was appropriate at the time given that TP was in the early stages of its asset health and risk model development.

Quality standard

4.185. Since the RCP3 decision was made, Transpower has made considerable progress in developing its asset health and risk models.

4.186. Our view is that implementing asset health quality standards is reasonable and provides an incentive for Transpower to supply electricity transmission services at a quality demanded by consumers consistent with s 52(A)(1)(b) of the Act and cl. A5(a) of the Capex IM.

4.187. Transpower has indicated it is confident in its ability to deliver its proposed RCP4 work programme, which should ensure that asset health is maintained to the levels Transpower has planned for.[89] While we do have RCP4 programme deliverability concerns, Transpower fully delivering its proposal would result in 100% of the outcome from the 'with intervention' asset health improvements it has modelled.

4.188. Transpower did not favour asset health quality standards suggesting that "asset health is a leading indicator for reliability, which is captured under the GP1 and GP2 quality standards".[90] While we agree that asset health is a leading indicator of reliability, we disagree that this is the case with the GP1 and GP2 measures. Grid performance measures GP1 and GP2 are a lagging outcome of asset maintenance and investments years prior. As explained in the section Grid Performance 2 measure (GP2) Grid output target, we have seen an increase in the duration of interruptions. By setting minimum asset health quality standards, we are incentivising Transpower to make timely asset investments and carry out prudent maintenance before quality of service is impacted.

4.189. Asset health quality standards will help ensure that timely investment decisions are made and expenditure that has been approved is delivered.

4.190. We consider that quality standards need to set the minimum performance level we expect from Transpower. However, we want to make sure that the quality standard is stringent enough that Transpower has an incentive to ensure asset health does not significantly degrade. At the same time, we want to ensure the quality standard is not triggered by a single atypical year.

4.191. Transpower suggested that if we were to retain asset health quality measures, that we introduce "a pooling method for the quality standard that factors in the number of AH quality limits that were exceeded in a year, this result would then be pooled across disclosure years". Transpower argues that pooling allows for some "variance to our delivery plan due to unforeseen changes, reprioritisation, or optimisation of our workplan for delivery within RCP4".

4.192. We consider that Transpower's suggested approach is sensible and agree with its view. We have introduced the pooling mechanism proposed by Transpower that pools "four out of the seven asset classes to have met their respective quality limits in the previous two disclosure years". This pooling approach was also supported by the Verifier.[91]

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89 Commerce Commission, RCP4 Draft Decision: Attachment B – Capex (29 May 2024) can be found *here*

90 Transpower, Service Measures Report, p 54, section 5.7.2.

91 GHD Advisory and Castalia, IV Report, p viii.

4.193. Pooling across asset classes and years allows Transpower to re-prioritise and re-phase its base capex and opex, and will enable it to optimise the timing and type of intervention. It also helps ensure that year on year variations in investment do not unnecessarily affect compliance with the quality standards we have set. We consider that this pooling approach is consistent with the Part 4 purpose and meets the requirements of the Capex IM.

4.194. Given the RCP3 asset health quality standard performance so far, we have decided to raise the quality standard limit to 80% of the outcome from the 'with intervention' improvement. This is more consistent with the investment programme Transpower has been delivering over RCP3 and is proposing for RCP4.

4.195. Our view is that the raised quality standard threshold will incentivise Transpower to continue to deliver its base capex programme and maintenance activities, and to maintain and improve its asset health modelling.

Alternatives considered

Removing the quality standard

4.196. We considered Transpower's proposal to remove the quality standards for asset health. However, we have formed the view that the reasons for introducing asset health quality standards in RCP3 remain valid for RCP4.

4.197. We formed this view because:

4.197.1. asset health is a proxy for asset and network risk and a leading indicator of reliability that is not captured by other measures we have introduced;

4.197.2. asset health provides investment signals for Transpower and so incentivises timely investment decision making; and

4.197.3. we are maintaining our approach to measuring quality because Transpower did not provide us with sufficient evidence to justify removing them. While Transpower argued that it should not be penalised for events outside of its control we consider that pooling mitigates this effect.

4.198. We introduced the asset health quality measures in RCP3 reasoning that:[92]

4.198.1. these will act as a safety net in order that asset health will not degrade significantly over RCP3 for the asset classes in the measures; and

4.198.2. in the absence of a fully functional risk model that can be used to set forward-looking quality standards, setting these based on asset health provides timely investment signals. This is because asset investment decisions made now may not manifest as quality outcomes for years. Asset health as a feedback mechanism is almost a feed-forward signal in the overall investment/quality framework.

4.199. Our view is that these reasons are still valid given Transpower is not yet able to set asset and grid performance quality targets based on forward looking risk-based investment decisions, and that asset health model outputs are forward looking measures Transpower has developed to a mature level.

Revenue at risk

4.200. Our draft decision is to retain the revenue at risk settings for RCP4 with minor modifications.

4.201. Revenue at risk is the total amount of additional revenue Transpower can obtain as reward, or pay as penalty, over the course of RCP4 across measures GP1, GP2, AP1, and AP2.

[92] Commerce Commission, RCP3 Decisions paper, p 205, para F309.

4.202. The updates and modifications we have made in setting revenue at risk are:

4.202.1. retain the revenue at risk at 1.4% of the forecast Maximum Allowable Revenue (**MAR**); and

4.202.2. modify the allocation of revenue at risk across the revenue linked measures to put more weight on AP1 and AP2.

4.203. Table 4.15 summarises our proposed revenue at risk settings.

Table 4.15 Summary of incentive rates and $ at risk for service performance measures – our draft decision

Measure and category	Cap	Target	Collar	Incentive rate	$ at risk
GP1: number of interruptions (per annum)				$ per event	
N-1 security high economic consequence	0	4	8	789,666	3,158,663
N-1 security material economic consequence	4	21	38	170,537	2,899,122
N security high economic consequence	0	2	4	185,592	371,184
N security material economic consequence	4	15	26	57,795	635,741
N-1 security generator	4	9	14	50,000	250,000
N security generator	4	7	10	83,333	250,000
GP2: average duration of interruption (min)				$ per min	
N-1 security high economic consequence	23	73	123	63,173	3,158,663
N-1 security material economic consequence	27	74	121	61,683	2,899,122
N security high economic consequence	15	66	117	7,278	371,184
N security material economic consequence	0	104	208	6,113	635,741
N-1 security generator	30	225	420	1,282	250,000
N security generator	0	123	246	2,033	250,000
AP1: HVDC availability (%)				$ per 1%	
HVDC availability	99.00%	98.00%	97.00%	1,000,000	1,000,000
AP2: HVAC availability (%)				$ per 1%	
HVAC availability (62 selected assets)	98.62%	98.25%	97.87%	5,320,564	2,000,000

Note: Revenue amounts are in nominal $s and not referenced to any particular year

What Transpower proposed

4.204. Transpower proposed a total revenue at risk for all measures across the five years of 1.4% of the MAR. This is the same percentage we set in our RCP3 decision.

4.205. A revenue at risk of 1.4% with a higher forecast average MAR results in a revenue at risk of $18 million for each year of RCP4, up from $11 million in RCP3.[93]

4.206. Transpower also proposed to increase the allocation of the revenue at risk to the GP measures and to reduce the allocation of revenue at risk to the AP measures.

4.207. Overall, this means that for GP1 and GP2 the possible maximum reward and penalty nearly doubles in nominal dollar terms while for AP1 and AP2 it stays constant.[94]

What the Verifier and stakeholders said

4.208. We considered the following views from stakeholders and the Verifier:

4.208.1. Stakeholders were engaged by Transpower regarding the revenue at risk during the draft proposal consultation but did not provide any major comment.[95]

4.208.2. The Verifier considered the proposed revenue at risk (%) provided a sufficiently strong financial incentive, calculating that a 1.4% revenue at risk would have a 50-basis point impact on Transpower's return to equity. [96,97]

[93] In RCP3, a tax adjustment was made to 'gross up' the economic value at risk of $10,740,000 to the 'revenue at risk' of $14,916,667. The grossed-up figure was used to calculate the revenue at risk (%) of 1.75%, which was then capped at 1.4%. In RCP4, this tax adjustment is not required.

[94] See Table 22 for a side-to-side comparison of allocation of dollars at risk per measure.

[95] Transpower, "RCP4 Consultation" (September 2022), p 52.

[96] GHD Advisory and Castalia, IV Report, p 471.

[97] Return to equity is a financial performance measure. It is calculated as the ratio of a company's net income to shareholders equity.

Our draft decision is to maintain the RCP3 percentage of revenue at risk

4.209. Our draft decision is to retain the asset revenue at risk at 1.4% of MAR for two reasons:

4.209.1. If the revenue at risk (%) was to be lower in RCP4 compared to RCP3, the incentive to improve or maintain quality would be diluted compared to RCP3. This consideration aligns with objective s 52A(1)(a) of the Act. The potential maximum positive or negative revenue adjustment from the quality incentive scheme (**QIS**) would lose its significance in relation to a higher MAR. This consideration also aligns with s 52A(1)(b) of the Act. A dilution of incentives could result in a level of quality that would be too low compared to what consumers are willing to pay for.

4.209.2. If we set the revenue at risk (%) higher in RCP4, this would provide an incentive for Transpower to increase the quality to consumers compared to RCP3. However, we have no evidence at this stage that consumers are willing to pay for a higher quality of supply in RCP4 compared to RCP3. It is possible that consumers willingness to pay for a higher quality of supply could be even lower in RCP4 given the expected increase in charges. These considerations align with s 52A(1)(b) of the Act.

4.210. We consider that retaining the revenue at risk at 1.4% promotes the long-term benefit of consumers under s 52A of the Act. It effectively balances between preventing consumers from having to pay for a quality of supply they are not willing to pay for and providing an incentive to Transpower to improve the quality of supply that consumers are willing to pay for.

4.211. Table 4.16 shows the overall difference in dollar terms and share of revenue at risk between the RCP3 settings, the RCP4 settings proposed by Transpower, and our draft decision.

Table 4.16 Total revenue at risk summary ($ million)

Revenue incentives	RCP3	RCP4 – Proposed by Transpower	RCP4 – Our Draft Decision
Annual revenue at risk	$10.7	$18.1	$18.1
5-year revenue at risk	$53.7	$90.6	$90.6
Percentage of revenue	1.4%	1.4%	1.4%

Determining the revenue at risk

4.212. Revenue-linked quality incentive measures provide Transpower with incentives to:

4.212.1. seek to supply a level of quality that consumers are willing to pay for as per s 52A(1); and

4.212.2. deliver quality improvements at a lower cost than would otherwise would have been the case as per s 52A(1)(a) and (b).

4.213. The total revenue at risk from the revenue-linked measures indicates the maximum/minimum revenue adjustment that Transpower can experience over RCP4, from performance against the quality targets.

4.214. To gain the maximum revenue, Transpower would need to perform in the top 16% percentile of historic performance under our draft decision settings. Therefore, the total revenue at risk will not necessarily reflect Transpower's actual revenue over RCP4.

4.215. The revenue at risk is already partly determined by our decision on caps, targets, and collars for the revenue-linked measures. This means the following decisions played a key role in determining the final revenue at risk for RCP4, namely:

4.215.1. how much revenue to allocate to the AP measures and; and

4.215.2. the level at which to set the GP measures incentive rate, which is informed by value of lost load (**VoLL**), to play a key role in 'calibrating' the final revenue at risk for RCP4.

4.216. In considering at what level to set the revenue at risk from the revenue-linked quality measures, we considered the following trade-offs, explained below, by considering two extreme cases:

4.216.1. A very high revenue at risk results in a high-powered incentive scheme. This may benefit consumers because it provides more opportunities for quality and revenue to adjust for what consumers are willing to pay, and for Transpower to seek cost efficiencies. However, this can penalise Transpower when its behaviour is efficient, as revenue can be clawed back from events outside its control. A high revenue at risk also limits the protection against regulatory errors that could lead to oversupply of quality to consumers (eg, if the incentive rate is set too high).

4.216.2. A very low revenue at risk results in a low-powered incentive scheme. This provides greater price certainty to consumers and protection against the risk of oversupply for quality. However, there is less opportunity for quality and revenue to adjust to meet consumer's willingness to pay. Transpower also has lower incentives to seek for cost efficiencies because of the lower pay-off to cost improvements to supply quality, and because revenue might not be clawed-back when Transpower's behaviour has been inefficient.

Allocation of revenue at risk between GP and AP measures

4.217. Transpower has proposed to change the allocation per measure as per Table 4.17 relative to RCP3. Transpower provided the following explanation:[98]

> We have allocated more of the incentive pool to the reliability measures (GP1 and GP2) than the availability measures, reflecting the higher economic impact of interruptions and the importance of grid reliability for connected customers and end-consumers.

4.218. Transpower's proposal allocates more of the revenue at risk to the GP measures and, consequently, allocates less to the AP measures. While we recognise that interruptions have a higher impact on consumers, we are conscious of the increasing importance of the HVDC and HVAC assets.

4.219. Transpower and stakeholders mentioned that the role of the HVDC would become critical for grid security as the thermal generating stations are decommissioned.[99] We consider that, as more renewable generation is built and demand increases are driven by electrification, the role of HVAC circuits will become more important.

4.220. Therefore, we consider that Transpower's proposed allocation which dilutes the incentive strength of asset performance measures would not be in the long-term best interest of consumers. We propose allocations which more closely align with RCP3 to preserve relative incentive strengths, as per Tables 4.17 and 4.18.

[98] Transpower, Service Measures Report, p 30.
[99] Transpower, "Examining the purpose and future role of our HVDC link" (7 March 2024), p 6-7.

Table 4.17 Allocation of revenue at risk between measures (%)

Grid service measure	Percentage of revenue at risk		
	RCP3	RCP4 (Transpower proposal)	RCP4 draft decision
GP1	~43	~46	~42
GP2	~43	~46	~42
AP1	~5	~3	~6
AP2	~9	~6	~11
Total	**100**	**100**	**100**

Table 4.18 Allocation of revenue at risk between measures ($)

Grid service measure	Revenue at risk allocation ($ million)		
	RCP3	RCP4 (Transpower proposal)	RCP4 draft decision
GP1	4.6	8.3	7.6
GP2	4.6	8.3	7.6
AP1	0.5	0.5	1.0
AP2	1.0	1.0	2.0
Total	**10.7**	**18.1**	**18.1**

Revenue at risk for asset performance measures

4.221. We have allocated revenue at risk to the AP measures to ensure incentives to invest in these assets are not diluted.

4.222. Transpower proposed to keep the dollar amounts allocated to AP1 and AP2 constant from RCP3, $0.5 million and $1 million respectively. Given that the same RCP3 total revenue at risk % is used, and not the same RCP3 total revenue at risk dollar amount, this has the effect of diluting the incentive strength on the AP measures. For example, revenue at risk from the AP measures is 3% for AP1 and 6% for AP2 in Transpower's RCP4 proposal, compared to 5% and 9% respectively in RCP3.

4.223. Considering the increased importance of the HVDC and HVAC assets, as well as the consistent below target performance of the AP2 measure in RCP2 and RCP3,[100] we consider that the allocation of revenue at risk to the AP measures needs to be equivalent to RCP3 in percentage terms. We have allocated $1 million to AP1 and $2 million to AP2, maintaining their importance within the incentive scheme as per Table 4.19.

Table 4.19 Allocation of revenue at risk for AP1 and AP2

AP measure	RCP4 – Transpower's proposed revenue at risk ($ million)	RCP4 – Draft decision revenue at risk ($ million)
AP1 - HVDC availability	0.5	1.0
AP2 – HVAC availability	1.0	2.0

Revenue at risk for grid performance measures

4.224. The revenue at risk for grid performance measures is, in principle, determined by the incentive rate and MWh for each POS category.

4.225. The incentive rate reflects the VoLL to ensure quality improvements are informed by the best available information we have on consumer preferences.[101]

4.226. The VoLL figure is informed by Transpower's 2018 VoLL study and is informed by both the consumers' willingness to pay to reduce the level of outages (more reliability), and the willingness to accept in terms of compensation increased level of outages (less reliability):[102]

4.226.1. We have calculated a VoLL of $35,374/MWh.[103] The VoLL figure used in RCP3 was $25,000/MWh. Transpower has used the RCP3 VoLL figure in its RCP4 proposal calculations. However, this figure was calculated in 2018. We have updated this figure to account for inflation to better reflect consumers' willingness to pay.[104]

[100] AP2 actual performance has been below target every year since 2016.
[101] This aligns with s 52A(1)(b) of the Act.
[102] Transpower, "Value of lost load study" (November 2018).
[103] VoLL($35,374/MWh) = VoLL($2004/MWh)*CPI (2027Q4)/CPI(2004Q4), where:
- VoLL($2004/MWh) = $20,000, this is the VoLL stated in the Electricity Industry Participation code 2010
- CPI(2027Q4) = 1369, this is the CPI figure as at Q4 2027 - the midpoint of RCP4
- CPI(2004Q4) = 774, this is the CPI figure as at Q4 2004 – the time of calculation of $20,000/MWh.
[104] This approach is also consistent with the approach we have adopted for the concurrent default price path for electricity distribution business (DPP4).

4.226.2. The VoLL of $35,374/MWh is then scaled back by the IRIS retention factor of 34%. This produces an incentive rate for the grid performance measures of $12,027/MWh. The reason for this is to account for the interactions with the IRIS mechanism. If VoLL is not scaled back, consumers may end up paying more for an improvement in reliability than what it is worth to them. Any quality improvement through opex or capex is only partially borne by Transpower. However, consumers pay the rest of the expenditure to improve quality, as well as the incentive payment to reward Transpower for the quality improvement.

4.226.3. In RCP3, the incentive rate was further reduced to approximately 50% to manage the risk of over-investment in the grid.[105] In RCP4, for similar reasons, Transpower's proposed to use an adjustment of 45% instead. We consider an adjustment is required for RCP4 to allow for a balanced overall quality incentive mechanism. Hence, we adjust the $12,027/MWh by using a scaling factor of ~49% to manage the risk of over-investment in the grid.

4.227. Table 4.20 summarises the adjustments made to produce the incentive rate of $5,910/MWh from the starting VoLL figure of $35,374/MWh.

Table 4.20 RCP4 incentive rate calculations

Variable	Calculated value ($)
VoLL	35,374
VoLL * incentive rate (34%)	12,027
VoLL * incentive rate (34%) * adjustment (~49%)	5,910

4.228. Table 4.21 shows how the incentive rate of $5,910/MWh is then applied across POS sub-categories. This provides the total revenue at risk for each POS sub-category as per below:

[105] Commerce Commission, RCP3 Decisions paper, p 216, para F367.

Table 4.21 Incentive rate by sub-category

GP sub-category	Hours (collar vs target)	Average load (MW)	MWh	Revenue at risk ($)	$/MWh	$/MWh as % of VoLL*IRIS
N-1 Security High Economic Consequence	11.5	92.7	1,069	6,317,327	5,910	0.49
N-1 Security Material Economic Consequence	50.7	19.3	981	5,798,243	5,910	0.49
N Security High Economic Consequence	5.6	22.4	126	742,367	5,910	0.49
N Security Material Economic Consequence	64.1	3.4	215	1,271,483	5,910	0.49
N-1 Security Generator	64.3	194.5	12,499	500,000	-	-
N Security Generator	26.7	59.6	1,588	500,000	-	-

4.229. Table 4.22 illustrates the 50/50 split of the revenue at risk calculated for each POS category in Table 25 between the GP1 and GP2 measures.

Table 4.22 Allocation of revenue at risk for GP1 and GP2

GP1 and GP2 sub-category	RCP4 – Our draft decision revenue at risk ($)
N-1 Security High Economic Consequence	3,158,663
N-1 Security Material Economic Consequence	2,899,122
N Security High Economic Consequence	371,184
N Security Material Economic Consequence	635,741
N-1 Security Generator	250,000
N Security Generator	250,000
Total	**7,564,710**

Alternatives considered

4.230. We considered the possibility of taking a more principle-based approach by setting the incentive rate at 100% of VoLL (after adjustment for the IRIS retention rate). This would result in a total revenue at risk of 2.9%.

4.231. We consider that increasing the revenue at risk to 2.9% would require improved evidence that consumers are willing to pay for increased levels of quality. In addition, we would also need to carefully consider any unintended consequences of using a higher VoLL incentive rate.

4.232. We note the VoLL used in Transpower's quality incentive scheme is an average valuation across different consumer groups, periods of time, and valuation methods. This means the incentive rate, even if set at a higher level, might not reflect consumers' marginal valuations at each point in the network. Therefore, using a higher VoLL incentive rate, will not necessarily bring the supply of quality closer to a 'social' optimum.

4.233. We recognise that a potential benefit of setting a higher VoLL incentive rate is to allow Transpower to retain a greater share of benefits of a quality improvement.

4.234. However, our current approach to setting the VoLL incentive rate and quality targets already intends to achieve a balance between:

4.234.1. providing incentives to Transpower to improve the supply quality to consumers; and

4.234.2. passing on the benefits of improved quality to consumers by setting credible but challenging quality targets.

4.235. For example, at each RCP we revise the levels of targets and quality limits to ensure that the wider investments and works are considered. Specifically, for GP1 and GP2, Transpower has been investing significantly into the grid.

4.236. Over RCP3 Transpower has performed consistently above target and has received the benefit of investment. To reflect this, we are making the levels more stringent for RCP4 to prevent the target and quality limit from losing meaning and becoming too easy to achieve. This will prevent Transpower from earning an 'excessive benefit' which will be passed-on to customers in the form of lower charges and improved levels of quality.

5. Reporting only grid output measures

5.1. Our draft decision for reporting only grid output measures are:

5.1.1. introduce new grid performance measure GP4;

5.1.2. introduce new customer service measures CS1 and CS2 as proposed;

5.1.3. retain existing asset performance measures AP3 and AP4 as proposed;

5.1.4. remove existing asset performance measure AP5 and GPM as proposed;

5.1.5. remove existing grid performance measure GPM as proposed; and

5.1.6. introduce new asset performance measure AP 1.2.

5.2. We discuss Transpower's proposal, the Verifier's views, and our assessment of these measures below.

Grid Performance 4 measure (GP4) (previously NR and GP3) - Energy not served

5.3. Transpower has proposed a new measure GP4 that will measure energy not served, which is the amount of energy demand that is not supplied due to a transmission interruption to supply.

5.4. Transpower is proposing to report against the same four supply POS sub-categories applied to GP1 and GP2 (excluding generators), ie, N-1 high economic consequence; N-1 material economic consequence; N high economic consequence and N material economic consequence.[106] For more information on POS and sub-categories, please see GP1 section Points of Service settings above.

5.5. The Verifier and stakeholders supported the introduction of this measure.[107, 108]

[106] Transpower, Service Measures Report, p 39, section 5.2.1.
[107] GHD Advisory and Castalia, IV Report, p 488, section 20.12.
[108] Transpower, Submission Summary - Grid Service Engagement Paper 1", (August 2022), p 6, para 30-31.

5.6. Our draft decision is to introduce this new measure because:

5.6.1. it provides a valuable new metric to determine quality of service provided, and provides a view on the economic impact of interruptions which follows the purpose of Part 4 to promote long-term benefits of consumers;

5.6.2. the impact of interruptions can vary widely even within the same POS subclass depending on when they take place. GP4 enables us to monitor the actual impact customers experience in case of an interruption;

5.6.3. it provides insight about whether to introduce quality standards and/or revenue linking in future RCPs once we have sufficient historic data;

5.6.4. Transpower previously reported on planned interruptions with a measure called GP3. To avoid confusion, we propose this measure to be called GP4; and

5.6.5. requiring Transpower to report both percentage and absolute values will provide more context to customers.

Customer Service 1 & 2 measures (CS1 and CS2)

5.7. Our draft decision is to introduce the CS1 and CS2 measures. For the latter our draft decision is to include additional details from the measure proposed by Transpower to provide more information around performance. Tables 5.1 and 5.2 summarise our draft decision.

Table 5.1: Customer Service measure 1 (CS1) – draft decision

Area	Detail
Customer feedback	Overall customer satisfaction in percentage terms based on Transpower's annual customer survey.

Table 5.2: Customer Service measure 2 CS2 – draft decision

Area	Detail
Enquiries	1. Number of connection enquiries. 2. Time to start of investigation or formal decline to investigate, in particular: a. average, b. minimum and c. maximum times in days.
Investigations	3. Number of investigations started. 4. Average time to deliver concept assessment in days. 5. Percentage and number of investigations projects delivered within contracted time.
Delivery	6. Number of connections delivered. 7. Value of connections delivered in dollars. 8. Median and mean time from TWA to commission – Load. 9. Median and mean time from TWA to commission – Generation. 10. Percentage and number of connections delivered within contracted time. 11. Average percent overrun compared to initial budget. 12. Percentage of on time project commencement. 13. Customer overall satisfaction with connection process rating based on exit surveys.

Transpower's proposal

5.8. Transpower has proposed the introduction of two pilot reporting-only customer service measures, CS1 and CS2:

5.8.1. CS1 to measure overall customer satisfaction, based on a question in Transpower's annual customer survey (average percentage); and

5.8.2. CS2 to measure how Transpower is delivering new or enhanced grid connections across five sub-categories, representing different elements of the connection process as per Table 5.3.

Table 5.3: Customer Service measure 2 (CS2) - Transpower proposal

Sub-category	Detail
Average time to deliver concept assessment [days]	Measures and reports average turnaround time for the initial feasibility assessment of new connection concepts in calendar days. Supporting efficient early triage of connection concepts helps our customers prioritise resource to their most viable projects.
Percentage of investigation projects delivered within contracted time	Measures and reports the percentage of connection investigations completed within the timeframe agreed in the associated Transpower Services Agreement (**TSA**).
Median time from Transpower Works Agreement (TWA) to commission – Load [days]	Measures and reports on the median time from the start date of the associated TWA to commissioning for all load connection projects commissioned within the reporting period.
Median time from TWA to commission – Generation [days]	Measures and reports on the median time from the start date of the associated TWA to commissioning for all generation connection projects commissioned within the reporting period.
Percentage of connection projects delivered within contracted time	Measures and reports the percentage of connection projects commissioned within the timeframe agreed in the associated TWA.

5.9. The Verifier and stakeholders supported the introduction of these measures.[109,110]

Our assessment and draft decision

5.10. Our draft decision is to introduce measures which provide information on customer service, which is an area not currently monitored through the grid output measures.

5.11. CS1 can provide an overall sense in direction of the performance of Transpower. While an aggregated indicator may not provide a tangible and concrete metric to measure performance, having visibility over the long-term trend in customer satisfaction provides an indication of long-term patterns in performance. This is consistent with the requirements of cl. A5 of the Capex IM.

5.12. Given the limited burden on Transpower to compile and report the data, and the potential use for trend analysis, we consider adding the measure can provide a beneficial indicator to customers.

[109] GHD Advisory and Castalia, IV Report, p 489-491.
[110] Transpower, Submission Summary, p 7, para 32.

5.13. CS2 provides detail on new and enhanced grid connections. By monitoring the operational delivery of connections, it is possible to analyse more closely whether Transpower is improving performance and efficiency, and enables Transpower and its customers to plan and deliver connections more efficiently.

5.14. While we agree with the introduction of the CS2 measure, we are proposing an expanded set of metrics including:

5.14.1. reporting on the mean and observed totals to provide a more useful view on actual performance as the median in isolation may not provide meaningful information; and

5.14.2. breaking down the measure to consider enquiries, investigations, and delivery separately to make it easier to isolate poor performance if it were to take place.

5.15. We consider that the additions we are making provide a more detailed measure which results in Transpower providing more information on the service delivered to enable customers to have a better picture of service delivery.

5.16. Our draft decision is to introduce the new annual reporting only measures on customer service CS2 set out in Table 27 and CS1 as proposed.

5.17. We will consider whether to introduce quality standards and/or revenue linking to this measure in later RCPs once we have sufficient historic data.

Asset Performance 3 & 4 measures (AP3 & AP4)

5.18. In RCP3 we introduced AP3 and AP4. These measures report on HVAC asset availability and are a reporting only requirement.

5.19. AP3 measures the number of planned outages of selected HVAC assets returned to service 2 or more hours after the original planned return-to-service time. AP3 assists customers by disclosing return to service durations of certain transmission assets, and whether this is increasing over time.

5.20. AP4 measures the number of outages where a delay to the planned, or extended, return-to-service time was communicated with 90 minutes or less notice, against the total number of planned outages. AP4 helps customers by requiring Transpower to provide timely communication about delays to those assets being returned to service.

5.21. In the RCP3 Reasons paper we explained the motivation behind the introduction of these measures. At that time, we identified that the measures had value to customers and stakeholders. Throughout RCP4 engagement the same feedback has been provided by customers. In our view, the same rationale remains relevant for RCP4.[111]

5.22. Transpower has proposed to keep the measures as they are. The Verifier and stakeholders have agreed with the proposal.[112] [113]

5.23. Our draft decision is to retain these measures unmodified as we consider they provide valuable information to customers.

Asset Performance 5 measure (AP5)

5.24. In RCP2 we introduced asset performance measure AP5 to measure the extent to which Transpower places customers on N-security.

5.25. We considered that time on reduced levels of security can have a significant impact on customers if they are not given adequate warning to prepare for this. In RCP3 when we decided to retain the measure.[114]

5.26. Transpower has proposed to remove the AP5 measure as it considers it does not provide valuable information to customers and is very labour intensive to collect the reporting data.[115] [116]

5.27. Transpower's view it that the AP5 measure does not assist customers in mitigating risks associated with outages.

5.28. The Verifier and stakeholders have agreed with the proposal to remove the AP5 measure.[117, 118]

5.29. We are satisfied that this measure no longer provides sufficient benefit to consumers to be worth retaining. Customers have indicated they do not find the information useful, and measuring the length of time customers are placed on N-security does not provide an indication on performance.

[111] Commerce Commission, RCP3 Decisions paper.
[112] Transpower, Submission Summary, p 4-5, para 20-21.
[113] GHD Advisory and Castalia, IV Report, p 482-483.
[114] Commerce Commission, RCP3 Decisions paper, p 192, para F258-F260.
[115] Transpower, "Regulatory control period 4 proposal April 2025 – March 2030", (21 November 2023) (**RCP4 Proposal**), section 7.6.1, p 86.
[116] Transpower, Service Measures Report, p 61.
[117] GHD Advisory and Castalia, IV Report, p 484.
[118] Transpower, Submission Summary, p 5, para 22-25.

5.30. Planned outages are required to enable investment in the grid, which is in the long-term benefit of consumers. These planned outages are likely to increase over RCP4. Putting customers on N-security may be necessary to maintain supply in certain circumstances and Transpower is best placed to make that judgement about when this is appropriate.

5.31. We have considered Transpower's proposal, stakeholder views and the Verifier conclusions. We agree that the asset performance measure AP5 is not providing value to consumers and that it is no longer necessary.

5.32. Our draft decision is to accept Transpower's proposal to remove the AP5 measure. Given the reporting burden on Transpower and lack of demand for the information, the costs outweigh the benefits of retaining it.

Grid Performance M measure (GPM)

5.33. In RCP3, we introduced grid performance measure GPM to report on momentary interruptions with a duration of less than one minute. We determined the metric could provide some valuable insight in terms of performance of the grid. In the RCP3 IPP Reasons and decisions paper, we stated:

> We agree with Transpower's submission that the number of momentary interruptions does not necessarily indicate deteriorating quality and can help prevent longer duration interruptions. Therefore, our decision is to remove the quality standard for the GP-M measure.
>
> However, we still consider that transparency over the number and cause of momentary interruptions should be available for interested parties to evaluate. In its submission on our draft decision, Transpower considered that reporting should be on trends, insights and notable events which will be more useful than granular reporting.[119]

5.34. Transpower has proposed removing the GPM measure as it considers it is not useful to customers, noting that "they do not use the GP-M reports but could see the benefit of specific data being available in their annual individual engagement plan.[120]

5.35. The Verifier agreed with Transpower that the GPM measure is not relevant to customers. Stakeholders submitting on Transpower's RCP4 service measures supported removing the measure conditional on Transpower incorporating the specific data in annual engagement plans.[121]

[119] Commerce Commission, RCP3 Decisions paper, p 190, para F250-F252.
[120] Transpower, RCP4 Proposal, section 7.6.2, p 87.
[121] GHD Advisory and Castalia, IV Report, section 20.5.2, p 472.

5.36. Our draft decision is to accept Transpower's proposal to remove the GPM measure and to incorporate its features into customer annual engagement plans.

Asset Performance 1.2 measure (AP1.2) - HVDC operational availability

5.37. Our draft decision is to introduce the reporting only AP1.2 measure to report on the actual transfer capacity in MW, and the availability (or transfer capacity) in percentage of total capacity of the HVDC link due to the outages of all assets that affect the transfer capacity of the HVDC link.

5.38. The asset performance measure AP1 measures the operational capacity in terms of availability of the HVDC, due to outages on both the bipole and monopoles of the HVDC link. In other words, it measures HVDC availability without considering the impact of other related assets that are necessary for the HVDC link to operate at full capacity. Outages of these related assets affect the operational capacity of the HVDC.

Approach raised in the Issues paper

5.39. One option we considered in the Issues paper is the introduction of a more encompassing reporting measure, with no quality standard and no revenue linking.[122] This measure would quantify the operational capacity of the HVDC due to outages of all ancillary and connected assets that affect its operational capability. Transpower uses this information in its major capex proposals (e.g, Net Zero Grid Pathways programme).[123]

Response in submissions

5.40. We received one submission on this topic from Transpower regarding AP1.2, explaining how calculating HVDC availability using operational transfer capacity presents challenges for Transpower.[124]

Our reasons and draft decision

5.41. When providing information to customers on HVDC availability Transpower uses either the AP1 parameters or the equivalent of our proposed AP1.2 parameters. The results of the two can be significantly different. For example, the AP1 performance measure provides an availability of around 98%. If we consider the impact of the outages of ancillary and connected assets, HVDC availability reduces to 89%.[125] AP1.2 would measure the impact of outages on the availability of the HVDC.

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[122] Commerce Commission, RCP4 Issues paper, p 90, para 7.112-7.114.
[123] Transpower, "NZGP1 Major capex proposal addendum" (13 June 2023) (**NZGP MCP 1**), p 6.
[124] Commerce Commission, Transpower's submission on Issues paper, p 7, para 31.
[125] Transpower, NZGP1, p 6. Transpower states that the 1070 MW transfer capability referred to in the addendum is the historical average availability of the HVDC link and associated AC assets.

5.42. This means that customers are likely to be confused by the availability figures, and when they see a figure around HDVC availability they may not be able to put this into perspective. For HVDC operational capability, customers have no clear reporting and would need to manually collate data and figures using reports. This is less than ideal and may result in masking poor performance. Reporting on AP1.2 will allow us to assess whether Transpower meets its outputs for the NZGP major capex project, and the base capex investments, on the synchronous condensers during RCP4.

5.43. We want to differentiate between the two types of capacity and ensure customers are well informed and clear on what the figures measure. This means that when Transpower reports on HDVC capacity in its investment decisions, customers will be able to understand historical HVDC capability and put the figure into context.

5.44. By having reporting on both AP1 and AP1.2, customers will be better informed on the actual performance of the HDVC link.

5.45. In future, we may consider making the two measures closely aligned by introducing quality standards and revenue linking AP1.2 as well.

5.46. Our draft decision is that the AP1.2 measure:

5.46.1. incorporates the reduction in capacity of the HVDC link due to the outages of the reactive support devices, harmonic filters, and the adjacent HVAC transmission lines; and

5.46.2. excludes the impact of Wellington load on the transfer capacity of the HVDC, and the impact of the outages in the bipole or monopoles, since this is reported under AP1.

Asset Performance 2 measure (AP2.2) - Market impact

5.47. In our Issues paper, we mentioned our intention to introduce a market impact measure, AP2.2. This would complement the availability measure AP2.[126] AP2 provides information on AC circuit availability but not on the impact unavailability has on the electricity market or supply. Linking AC circuit availability to electricity prices would better show the impact of unavailability on customers, more closely aligning it with the Part 4 purpose.

[126] Commerce Commission, RCP4 Issues paper, p 90-91, para 7.115-7.118.

5.48. One submitter responded that, despite the merit in looking at market impact measures, they would welcome further discussion on this option.[127] Transpower pointed out how the new measure would need good analysis and evidence before being introduced.[128]

5.49. Upon further analysis and discussion, we agree with the submissions that more work is required before creating reporting requirements. We intend to work with Transpower during RCP4 to determine what this measure could look like, and potentially introduce it in RCP5 if its design would meet the requirements of schedule A of the Capex IM.

127 Major Electricity Users Group, MEUG's submission on Issues paper, p 4, para 20.

128 Commerce Commission, Transpower's cross-submission on Issues paper – comparing indexation approaches, p 3, para 14-15.