Meeting Date: 27 May 2021

FIT-FOR-PURPOSE REVIEW: REGULATION AND MONITORING - TRANSMISSION

SECURITY AND RELIABILITY COUNCIL

This paper summarises the current regulatory arrangements relating to transmission reliability and assesses whether current regulatory arrangements provide effective controls on the risk of unplanned transmission outages that result in an economic loss of more than $10 million. The paper suggests that some of the regulatory arrangements in the Code, particularly in Part 12, could be amended to provide more effective controls on the risk of unplanned transmission outages.

Note: This paper has been prepared for the purpose of enabling the Security and Reliability Council to formulate advice to the Authority on whether regulatory arrangements provide effective controls on the risk of unplanned transmission failures that result in an economic loss of more than $10 million. Content should not be interpreted as representing the views or policy of the Electricity Authority.

Contents

1 Review of whether regulatory arrangements provide effective controls on the risk of transmission outages

1.1.1 The Security and Reliability Council's (SRC) functions under the Electricity Industry Act 2010 (Act) include providing advice to the Electricity Authority (Authority) on:

a) the performance of the electricity system and the system operator, and

b) reliability of supply issues.

1.1.2 In pursuit of its purpose, the SRC developed a risk management framework to identify key arrangements for managing risks to reliability of supply. The framework identified the regulatory arrangements for electricity transmission as warranting the SRC's attention periodically.

1.1.3 The purpose of this paper is to enable the SRC to formulate advice to the Authority on whether regulatory arrangements relating to transmission provide effective controls on the risk of unplanned transmission outages that result in an economic loss of more than $10 million.

1.1.4 To inform that advice, the paper:

a) summarises the current regulatory arrangements pertaining to transmission reliability

b) assesses whether current regulatory arrangements provide effective controls on the risk of unplanned transmission outages that result in an economic loss of more than $10 million.

2 Regulatory arrangements for electricity transmission reliability

2.1.1 This section describes the current regulatory arrangements governing the reliability of electricity transmission lines services (transmission) in New Zealand.

2.1.2 The Authority as the industry regulator for transmission, the Commerce Commission as the economic regulator for transmission, and Worksafe New Zealand (WorkSafe) as the safety regulator for transmission, each have statutory obligations in relation to the reliability of transmission.

2.1.3 The second limb of the Authority's statutory objective says the Authority is to promote reliable supply by the New Zealand electricity industry for the long-term benefit of consumers.

2.1.4 Part 4 of the Commerce Act 1986 provides for the Commerce Commission to regulate the price and quality of transmission in a way that promotes the long-term benefit of consumers.

2.1.5 The Electricity Act 1992 provides for Worksafe to take all lawful steps that may be necessary to ensure the safe supply and use of electricity.

2.2 The Authority's regulation of transmission reliability

2.2.1 Under the Electricity Industry Act 2010 (Act), the Authority's main responsibilities around regulating the reliability of transmission are:[1]

a) to establish performance obligations and technical standards for transmission assets (including in relation to commissioning and testing) that assist the system operator to comply with its principal performance obligations (PPOs) in relation to common quality and dispatch[2]

b) to prescribe default terms and conditions to be included in agreements for connection to, use of, and (where relevant) investment in, the grid (transmission agreements)[3]

c) to set quality standards for Transpower (grid reliability standards)[4]

d) to set the transmission pricing methodology[5]

e) to regulate services provided by interconnection assets (interconnection asset services), including specifying service measures (eg, capacity measures, availability measures and reliability measures)[6]

f) to regulate the management of planned and unplanned transmission asset outages, including

i. specifying the circumstances in which Transpower may temporarily remove any assets forming part of the grid from service or reduce the capacity of assets to efficiently manage the operation of the grid

ii. specifying procedures and policies for Transpower to plan for outages and for carrying out such outages

iii. specifying procedures and policies for dealing with unplanned outages of the grid.[7]

Part 8 of the Code contains provisions that act as controls on the risk of unplanned transmission outages

2.2.2 Part 8 of the Code specifies performance obligations and technical standards for grid owners[8] (including in relation to commissioning and testing), which assist the system operator to comply with its principal performance obligations (PPOs) in relation to common quality and dispatch.

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1 Refer to section 34 and section 44 of the Electricity Industry Act.

2 Refer to subpart 2 of Part 8 of the Code and Schedule 8.3 of the Code.

3 Refer to subpart 2 of Part 12 of the Code.

4 Refer to subpart 3 of Part 12 of the Code.

5 Refer to subpart 4 of Part 12 of the Code.

6 Refer to subpart 6 of Part 12 of the Code.

7 Refer to subpart 7 of Part 12 of the Code.

8 Transpower is not the only grid owner. Westpower owns some of the West Coast transmission network that forms part of the grid. Waipa Networks owns the 110 kV line between the Te Awamutu and Hangatiki substations, which also forms part of the grid.

Performance obligations and technical standards for grid owners act as controls on the risk of unplanned transmission outages

2.2.3 Performance obligations and technical standards that act as controls on the risk of unplanned transmission outages include:

a) the HVDC link must support frequency, including during an under-frequency event[9]

b) grid assets must operate within a range of voltages,[10] and voltage imbalance levels must be maintained below a certain limit[11]

c) grid assets in the South Island must be able to perform load shedding to prevent the collapse of network voltage[12]

d) the design and configuration of grid assets and associated protection arrangements must be consistent with maintaining the system operator's ability to comply with the PPOs[13]

e) grid assets must be tested periodically—typically every 4–10 years—to ensure they comply with the asset owner performance obligations set out in Part 8 and Technical Code A of Schedule 8.3.[14]

The 'event charge' for under-frequency events is intended to promote reliable transmission but may provide no meaningful incentive

2.2.4 Under Part 8 of the Code, the primary causer of an under-frequency event must pay an administered charge for power lost at grid connection points because of the under-frequency event. The administered charge is known as an 'event charge'.[15]

2.2.5 The event charge seeks to provide generators and grid owners with an incentive to have reliable assets by requiring them to pay an administered charge if their assets trip and cause an under-frequency event.[16]

2.2.6 However, after completing a broad 'first principles' review of the event charge and the approach to allocating the cost of instantaneous reserves, the former Wholesale Advisory Group concluded that the regime provides no meaningful incentive for asset owners to be more reliable.[17] The Authority is still to decide if it will initiate a review of this regime.

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9 Clause 8.17 and clauses 8.19–8.20 of the Code.

10 Clause 8.22 of the Code.

11 Refer to clause 4.9 of the Connection Code.

12 Clause 8.24 of the Code.

13 Clause 8.25 of the Code.

14 Clause 8(1) of Technical Code A of Schedule 8.3 of the Code and appendix B of Technical Code A of Schedule 8.3.

15 The event charge is $1,250 / MW for every MW of power lost above a 60 MW de minimis threshold applied across all connection points affected by the under-frequency event. Refer to clause 8.64 of the Code.

16 Wholesale Advisory Group, 11 October 2016, Instantaneous Reserve Event Charge and Cost Allocation – WAG discussion paper, p. 13.

17 Wholesale Advisory Group, 4 April 2017, Instantaneous Reserve Event Charge and Cost Allocation: Recommendations of the Wholesale Advisory Group, p. 5.

Part 12 of the Code contains provisions that act as controls on the risk of unplanned transmission outages

2.2.7 Part 12 of the Code regulates Transpower, as a grid owner. Part 12 contains a number of provisions that act as controls on the risk of unplanned transmission outages. These include:

a) the grid reliability standards

b) interconnection asset service measures

c) outage management obligations

d) the transmission pricing methodology (TPM).

The grid reliability standards provide a basis for appraising investments in the grid and grid alternatives

2.2.8 Part 12 of the Code requires the Authority to determine one or more standards for reliability of the grid (grid reliability standards). The purpose of these is to provide a basis for Transpower and other parties to appraise opportunities for transmission investments and transmission alternatives.[18]

2.2.9 The Code says the grid satisfies the grid reliability standards if:

a) the power system is reasonably expected to achieve a level of reliability at or above the level that would be achieved if all economic reliability investments were to be implemented (*the economic limb of the grid reliability standards*), and

b) with all assets that are reasonably expected to be in service, the power system would remain in a satisfactory state[19] during and following a single credible contingency event occurring on the core grid (*the deterministic limb of the grid reliability standards*).[20]

2.2.10 Generally speaking, the core grid was defined so as to include any transmission assets servicing over 150 MW of load.

2.2.11 Consistent with their purpose, the grid reliability standards are used in the Commerce Commission's decision-making process for major capital expenditure transmission investment proposals put forward by Transpower. (Refer to the section below summarising the economic regulatory framework that provides controls on the risk of unplanned transmission outages.)

Interconnection asset measures

2.2.12 Part 12 of the Code sets out a framework for the regulation of transmission interconnection services.[21] Under this framework:

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18 Clause 12.56 of the Code.

19 Clause 1.1(1) defines 'satisfactory state' to mean that none of the following occur on the power system:

a) insufficient supply of electricity to satisfy demand for electricity at any grid exit point,

b) unacceptable overloading of any primary transmission equipment,

c) unacceptable voltage conditions,

d) system instability.

20 Clause 2 of Schedule 12.2 of the Code.

21 Refer to subpart 6 of Part 12 of the Code.

a) Transpower must identify and provide interconnection assets

b) the Code specifies the capacity/service measures and levels for interconnection assets and requires Transpower to report against them

c) the Authority monitors Transpower's performance and, if necessary, enforces performance through the Code breach processes.

2.2.13 The categories of service measures for interconnection asset services under this asset availability approach comprise measures of capacity, availability and reliability.

2.2.14 The capacity measures for interconnection asset services involve Transpower making its interconnection assets available to the system operator for dispatch at the capacity levels and configurations set out in the Code.

2.2.15 Availability measures identify the proportion of time that interconnection assets are not available for service. They include:

a) annual interconnection circuit unavailability due to planned outages[22]

b) annual interconnection circuit unavailability due to unplanned outages.[23]

2.2.16 Reliability measures record the number of transmission outages leading to power supply interruptions. Reliability measures are:

a) the number of planned and unplanned interruptions to supply due to interconnection assets[24]

b) the estimated unserved energy resulting from transmission system outages.[25]

Transpower has outage management obligations

2.2.17 Under Part 12 of the Code, Transpower must prepare an outage protocol, which:

a) specifies the circumstances in which Transpower may temporarily remove any assets forming part of the grid from service, or reduce the capacity of assets, to efficiently manage the operation of the grid

b) specifies procedures and policies for Transpower to plan for outages and for carrying out outages to:

i. ensure Transpower involves its customers in making decisions on planned outages as much as possible

ii. ensure coordination between Transpower and its customers

iii. enable Transpower to efficiently manage the operation of the grid

c) specifies procedures and policies for dealing with unplanned outages of the grid.

22 Calculated as the total hours a circuit is unavailable because of planned outages divided by the number of hours per year.

23 Calculated as the total hours a circuit is unavailable because of unplanned outages divided by the number of hours per year.

24 Calculated as the 'number of events' per year.

25 Calculated as the estimated volume (MWh) of unserved energy per year.

The Transmission Pricing Methodology (TPM) influences reliability

2.2.18 The TPM in Part 12[26] influences transmission reliability via price signals.

2.2.19 Under the current TPM, the regional coincident peak demand (RCPD) charge provides a strong incentive on Transpower's customers to reduce peak demand. This is often done through demand response initiatives (eg, load control using ripple relays). Meanwhile, the HVDC link charge dampens the incentive for investment in generation in the South Island.

2.2.20 Under the forthcoming TPM, benefit-based charges will replace the RCPD charge and the HVDC charge. Benefit-based charges are expected to promote efficient levels of grid reliability, because parties will seek a level of reliability they are willing to pay for.[27] Consumers will receive better signals of the costs and benefits of transmission investments and non-grid alternatives, that increase the security and reliability of grid-supplied energy.[28]

2.3 The Commerce Commission's regulation of transmission reliability

2.3.1 The Commerce Commission's main responsibilities under Part 4 of the Commerce Act in relation to regulating the reliability of transmission are:

a) determining input methodologies that set out the rules, requirements and processes applicable to:
   i. Transpower's individual price-quality regulation
   ii. Transpower's capital expenditure proposals, including the Commerce Commission's assessment of these proposals[29]
   iii. information disclosure by Transpower, with the purpose of such disclosure being to ensure that sufficient information is readily available to interested persons to assess whether the purpose of Part 4 of the Commerce Act is being met[30]

b) monitoring Transpower's compliance with its price-quality path

c) publishing a summary and analysis of Transpower's disclosed information, for the purpose of promoting greater understanding of Transpower's performance, relative performance, and the changes in Transpower's performance over time.[31]

The Transpower input methodologies determination 2010

2.3.2 The Transpower input methodologies determination 2010 contains input methodologies for Transpower's individual price-quality path and Transpower's

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26 Schedule 12.4 of the Code.

27 Electricity Authority, 23 July 2019, 2019 issues paper: Transmission pricing review consultation paper, p. 56.

28 Electricity Authority, 10 June 2020, Transmission pricing methodology: 2020 Guidelines and process for development of a proposed TPM – Decision, p. 15.

29 Section 54S of the Commerce Act.

30 Section 53A of the Commerce Act.

31 Section 53B of the Commerce Act.

information disclosure. Input methodologies relevant to a consideration of the reliability of transmission include:

a) how Transpower's prices are specified

b) how a rolling incentive mechanism operates under Transpower's individual price-quality path

c) circumstances in which Transpower's individual price-quality path may be reconsidered within a regulatory period.[32]

The Transpower capital expenditure input methodology determination 2012

2.3.3 The input methodology for Transpower's capital expenditure applies to all capital expenditure intended to enter Transpower's regulatory asset base. Capital expenditure is categorised as base capital expenditure (base capex) or major capital expenditure (major capex).

2.3.4 Base capex represents the largest portion of Transpower's capital expenditure. It is subject to ex-ante approval by the Commerce Commission, prior to a regulatory control period (RCP). It is intended to cover all capital expenditure, except for large projects that, given their nature (eg, grid enhancement projects) and magnitude, warrant individual scrutiny and public consultation. Base capex includes:

a) asset replacement / refurbishment

b) business support, and information system and technology assets

c) capital expenditure that is not forecast to:

i. exceed the base capex project threshold, or

ii. be included in a programme whose aggregate forecast capital expenditure exceeds the base capex programme threshold.[33]

2.3.5 Transpower can move its base capex between years and across categories of base capex—eg, if Transpower wants to reprioritise expenditure between projects.[34]

2.3.6 For capital expenditure to be categorised as major capex, it must be incurred:

a) to meet the grid reliability standards set out in Part 12 of the Code, or

b) to provide a net electricity market benefit.

2.3.7 Major capex is required to be consulted on, assessed and approved on a project-by-project basis using the requirements set out in the capital expenditure input methodology. Transpower must consider transmission alternatives in its development of all major capex proposals.[35]

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32 Refer to:
- Commerce Commission, 29 January 2020, Transpower input methodologies determination 2010 (consolidated determination).
- Commerce Commission, 22 December 2010, Input methodologies (Transpower): Reasons paper.

33 Commerce Commission, 31 January 2012, Transpower capital expenditure input methodology: Reasons paper, pp. 21–22.

34 Commerce Commission, 31 January 2012, Transpower capital expenditure input methodology: Reasons paper, pp. 17–18.

35 Commerce Commission, 31 January 2012, Transpower capital expenditure input methodology: Reasons paper, p. vi.

2.3.8 Transpower must report annually on base capex and approved major capex projects. The purpose of this is to transparently demonstrate actual performance and delivery of outputs against Transpower's forecasts of base capex and major capex.[36]

Quality incentive measures (grid output measures) and quality standards

2.3.9 The capital expenditure input methodology requires Transpower to propose specified types of quality incentive measures (known as grid output measures), as well as allowing Transpower to propose other such measures. The Commerce Commission then decides what grid output measures will apply to Transpower—the Commission may set different grid output measures from those proposed by Transpower.[37]

2.3.10 Grid output measures quantify the output or benefit (where 'benefit' may include reduction in risk) delivered by the grid, investment in the grid, or expenditure facilitating or enabling future grid investment.[38] Grid output measures relate to:

a) the capability or utilisation of the grid ('asset capability grid output measure')

b) the condition / fitness for service of the grid ('asset health grid output measure')

c) the performance of the grid, particularly in relation to availability, reliability, and how grid performance affects the electricity market ('grid performance measure'[39]).[40]

2.3.11 The capital expenditure input methodology provides for two types of grid output measures—revenue-linked and non-revenue-linked. Under a revenue-linked grid output measure, Transpower is financially rewarded for outperforming performance targets and financially penalised for underperforming performance targets. Non-revenue-linked grid output measures may be used to better understand Transpower's performance.[41]

2.3.12 The Commerce Commission decides what quality standards are to be associated with (or independent of) the grid output measures it determines.[42] Quality standards may include:

a) responsiveness to customers

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36 Commerce Commission, 31 January 2012, Transpower capital expenditure input methodology: Reasons paper, p. ix.

37 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 136.

38 Commerce Commission, 29 January 2020, Transpower Capital Expenditure Input Methodology Determination 2012 (Principal Determination) (consolidated version), p. 14.

39 Also referred to as 'service performance measure' and 'asset performance measure'.

40 Refer to:

- Commerce Commission, 29 January 2020, Transpower Capital Expenditure Input Methodology Determination 2012 (Principal Determination) (consolidated version), p. 14.
- Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 44.

41 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 41.

42 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 42. (Refer to section 53M(3) of the Commerce Act.

b) in relation to electricity lines services:

i. reliability of supply

ii. reduction in energy losses

iii. voltage stability or other technical requirements.

2.3.13 Requirements relating to quality standards for Transpower must be based on, and be consistent with, quality standards for Transpower that are set by the Authority (under Part 12 of the Code).[43]

2.3.14 The Commerce Commission may prescribe quality standards in any way it considers appropriate (eg, targets, bands, or formulae).[44] The Commission may set a quality standard for a grid output measure that Transpower did not propose.[45]

Transpower individual price-quality path determinations

2.3.15 Transpower's individual price-quality path (IPP) determinations set, for each year of an RCP:

a) the maximum revenues Transpower may recover from its customers for its electricity lines transmission services

b) the minimum quality standards Transpower must meet for its electricity lines transmission services.

2.3.16 Transpower's price-quality path relates to the transmission lines services provided by Transpower. It excludes system operator revenues and revenues from new investment contracts.[46]

2.3.17 The grid output measures and quality standards for Transpower that the Commerce Commission determines are intended to balance incentives for Transpower to reduce expenditure while providing services at the quality demanded by consumers. A key factor underpinning the realisation of this intention is that Transpower follows good electricity industry practice.[47]

2.3.18 Under Transpower's current IPP determination, the Commerce Commission has set quality standards in combination with revenue-linked grid output incentive measures, which provide Transpower with financial incentives to maintain or improve quality.

The Transpower information disclosure determination 2014

2.3.19 The Transpower information disclosure determination 2014 sets out information disclosure requirements for both the electricity transmission lines services and system operator functions provided by Transpower.

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43 Section 54V(6) of the Commerce Act.

44 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 123.

45 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 42.

46 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 5.

47 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 43.

2.3.20 The purpose of requiring Transpower to disclose the information set out in the information disclosure determination is to ensure that sufficient information is readily available to interested persons to assess whether the purpose of Part 4 of the Commerce Act is being met.[48]

2.4 Worksafe regulates reliable electricity supply by grid owners by regulating electrical safety

2.4.1 Worksafe is a crown agency established by section 5 of the WorkSafe New Zealand Act 2013. Worksafe has the following functions under the Electricity Act:

a) to carry out inquiries, tests, audits, or investigations that may be necessary to determine whether a person is complying with the Electricity Act

b) to take all lawful steps that may be necessary to ensure the safe supply and use of electricity

c) to perform other functions provided for under the Electricity Act.[49]

2.4.2 Worksafe is responsible for administering the Electricity (Safety) Regulations 2010, which regulate electrical safety and related matters.[50] These regulations have a relatively small influence on transmission reliability (eg, by requiring persons carrying out construction, building, excavation, or other work on or near an electric line to maintain safe distances[51]).

3 Are regulatory arrangements for transmission providing effective controls on the risk of unplanned transmission outages?

3.1 Overview

3.1.1 This section:

a) identifies risks that could result in unplanned transmission outages that cause an economic loss of more than $10 million

b) assesses whether current regulatory arrangements for transmission provide effective controls on the risk of unplanned transmission outages.

3.1.2 It is suggested that some of the regulatory arrangements in the Code, particularly in Part 12, could be amended to provide more effective controls on the risk of unplanned transmission outages.

48 Section 53A of the Commerce Act.

49 Section 5 of the Electricity Act.

50 Sections 169, section 169A, section 169B, and section 169C of the Electricity Act.

51 Section 17 of the Electricity Safety Regulations.

Table 1: Initial evaluation of whether regulatory arrangements provide effective controls on the risk of unplanned transmission outages

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
1	Inaccurate longer-term demand forecasts result in insufficient transmission being built to ensure that demand never exceeds transmission capacity.	If demand were to exceed transmission capacity, then demand response / load shedding would be needed.	**Impact threshold met** Demand response / load shedding in response to a transmission constraint would be expected to have a material adverse impact on reliability and cause significant economic loss.	**Low likelihood of risk becoming an issue** Transpower and other grid owners build conservatism into the demand forecasts they use for any proposals to increase the capacity of their networks. Transpower and other grid owners have an incentive to over-forecast demand for at least a couple of key reasons: • they earn a return on any demand-driven network investment • they face reputational damage if they under-forecast demand and consequently need to use measures such as demand response or load shedding to manage capacity constraints.	**The effectiveness of regulatory arrangements needs to be improved** The Transpower capital expenditure input methodology provides for Transpower to propose major capital expenditure transmission investments to accommodate expected demand growth. Demand-driven investment proposals are overlaid on the grid reliability standards in the Code. However, these use an out-of-date definition of the core grid. (Refer to the next identified risk area.)

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
				To the extent that Transpower and other grid owners factor into their longer-term demand forecasts feedback from their customers, this is likely to result in demand being over-forecast. Experience shows that (at least) Transpower's load customers also tend to over-forecast demand.	
2	The defined core grid used in the grid reliability standards is out-of-date.	The definition of the core grid excludes changes to the grid, changes in grid demand, and generation investments over the past 15 years. If the outdated core grid defined in the Code were to result in the under-build of transmission or delays in the replacement of aging assets, then this could lead to a transmission capacity shortfall.	**Impact threshold met** If transmission under-build were to cause a shortfall in transmission capacity, resulting in the need for demand response / load shedding, then this would be expected to have a material adverse impact on reliability and cause significant economic loss.	**Low likelihood of risk becoming an issue** It is anticipated that, when considering possible grid investments, Transpower and other grid owners would factor in major changes to the grid and its usage since the core grid was defined in 2005.	**Effectiveness of regulatory arrangements needs to be improved** Currently, when assessing whether the grid satisfies the grid reliability standards, Transpower and other industry stakeholders are meant to ignore the various changes to the grid and its usage over the past 15 years. At a minimum, the current regulatory arrangements need updating to ensure the second (deterministic) limb of the grid reliability

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
					standards refers to all relevant grid assets. The Authority may wish to place back onto its work programme a review of the grid reliability standards. This review could encompass: • a review of the second limb of the grid reliability standards and the core grid definition • a review of the consistency of the grid reliability standards and investment triggers attached to the grid reliability standards with the Transpower capital expenditure input methodology determination, and the system operator's operational standards • a review of the effect of emerging technologies on the grid reliability standards.

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
3	The benefits and costs of proposed transmission investments are estimated inaccurately.	If a proposed transmission investment's net benefit were underestimated,[52] resulting in the investment not being made, this could mean an under-build of transmission or delays in the replacement of aging assets. This could lead to a transmission capacity shortfall.	**Impact threshold met** If transmission under-build were to cause a shortfall in transmission capacity, resulting in the need for demand response / load shedding, then this would be expected to have a material adverse impact on reliability and cause significant economic loss.	**Low likelihood of risk becoming an issue** Transpower and other grid owners have an inherent incentive to not underestimate the net benefit of a proposed transmission investment, since they earn a return on any such investment.	**Effectiveness of regulatory arrangements could be improved** Although the value of expected unserved energy in Schedule 12.2 of the Code has not been reviewed for several years, the Transpower capital expenditure input methodology provides for Transpower to use another appropriate value per MWh instead of the value in the Code.[53] However, the value of expected unserved energy is used as a default value for other initiatives that affect reliability of supply (eg, when Transpower applies the net benefits test specified in the outage protocol to assess proposed planned outages,

52 The Commerce Commission has advised the secretariat that an under-estimation of a proposed transmission investment's net benefit due to an over-estimation of project costs is a reasonable risk.

53 Refer to the definition of 'value of expected unserved energy' in Part 1 of the Transpower capital expenditure input methodology, p. 21.

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
					connection asset variations, and interconnection asset variations). Therefore, it would seem prudent to review the value of expected unserved energy in the Code.
4	Unplanned network interruptions.	The transmission network may have unplanned outages, despite network redundancy. Reasons might include: • asset failure • environmental causes (eg, seismic activity, flooding) • third party activity (eg, helicopter contacts).	**Impact threshold met** Due to the volume of electricity conveyed across it, an unplanned outage of the transmission network is likely to have a material adverse impact on reliability and cause significant economic loss.	**High likelihood of risk becoming an issue** Unplanned outages of the grid are expected. To avoid these would be uneconomic.	**Regulatory arrangements appear effective** The outage protocol requires Transpower to deal with an unplanned outage as quickly as reasonably possible and in accordance with good electricity industry practice. The IPP determination for Transpower sets quality standards for Transpower to meet in combination with financial incentives, which provide Transpower with an incentive to maintain or improve quality of supply.

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
5	Inadequate security for information and internet-connected network and non-network systems.	A 'bad actor' disrupts network operation and/or destroys network equipment by accessing: • transmission network information physically or electronically (cyber attack), • transmission network infrastructure electronically (cyber attack). Successful cyber attacks on non-network IT systems may afford access to critical network business systems.	**Impact threshold met** A cyber attack on transmission equipment, supervisory control and data acquisition (SCADA) systems and/or network protection systems, could disrupt the transmission network in a way that has a material adverse impact on reliability and causes significant economic loss.	**Low-medium likelihood of risk becoming an issue** A 2018 Deloitte report stated that cyber attacks on utilities are moving from stealing data or launching ransomware for financial gain, to seeking to potentially disrupt or destroy critical physical assets such as transmission networks and substations.[54]	**Effectiveness of regulatory arrangements could be improved** Information security and cyber security for grid owners are not regulated in a prescriptive manner. Legislation or regulation that prescribes in detail how information must be protected, or sets outcome-based performance standards will quickly become outdated.[55] However, it may be worth exploring the benefits and costs of requiring grid owners to adopt an internationally recognised cyber security maturity framework, such as the Electricity Subsector Cybersecurity Capability Maturity Model (C2M2)[56].

54 Deloitte, 2018, Managing cyber risk in the electric power sector: Emerging threats to supply chain and industrial control systems, pp. 3–4.

55 Refer to the SRC paper 'Industry arrangements for information security: An overview of arrangements relating to cyber and physical security of information', 22 October 2015, p. 11.

56 EMCa, May 2019. Transpower Regulatory Control Period 3 Proposal: Review of aspects of the proposed ICT expenditure, Report to New Zealand Commerce Commission.

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
6	A lack of transparency of reduced grid security.	If consumers and generators are unaware of reduced grid security, they cannot take actions to reduce the adverse effects on themselves of any grid outage that occurs during the period of reduced grid security.	**Impact threshold met** A lack of transparency of reduced grid security could have a material adverse impact on reliability and cause significant economic loss if a grid outage occurred during the period of reduced security.	**Low likelihood of risk becoming an issue** A grid outage occurring during a period of reduced grid security is an infrequent occurrence.	**Effectiveness of regulatory arrangements could be improved** The outage protocol specifies policies and procedures to ensure Transpower involves its customers in decision-making and coordination around planned outages. However, the outage protocol has not been reviewed since it came into effect in January 2008. It would appear timely for a review of the outage protocol to occur, so that learnings from outages over the past 13 years can be incorporated in it (eg, re-planning of outages at short notice). This review could explore benefits and drawbacks of arrangements for larger distribution-connected consumers and generators to be made aware of a forthcoming reduction in grid security in a timely

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
					manner (eg, thereby providing time for consumers to hire back-up generators or schedule plant maintenance). It is worth noting that the Commerce Commission requires disclosure on the extent that Transpower has placed customers on N-security, including: • when it has occurred • how much notice Transpower provided to customers • the point of service affected by a reduction to N-security.[57]
7	Underfrequency events exacerbated by inverters.	Distributed energy resources (DER) connected to distribution networks through DC/AC power inverters (inverters) may not 'ride through' a major generation failure,	**Impact threshold met** An AUFLS event caused by inverters within DER not riding through major generation failures would have a material adverse impact on reliability and	**Low likelihood of risk becoming an issue in the short term** The likelihood of this risk becoming an issue in the short term is low. This is due to the relatively small	**Effectiveness of regulatory arrangements needs to be improved** The system operator has recognised this identified risk and has undertaken relevant investigative work.

[57] Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020, Decisions and reasons paper, p. 193.

#	Risk area	Risk to security of supply	Initial evaluation: Impact threshold met?	Initial evaluation: Likelihood	Initial evaluation: Effectiveness of current regulatory arrangements
		thereby exacerbating under-frequency events, and potentially triggering automatic under-frequency load shedding (AUFLS).	cause significant economic loss.	number, and aggregate capacity, of inverters within DER, and the rate at which specialists can install these smaller capacity systems. However, international experience is that the risk likelihood can increase quite quickly to material levels. DER system costs are decreasing rapidly, which will accelerate the number, and aggregate capacity, of installed inverters.	In cooperation with the system operator, the Authority is scoping a work programme to review the performance aspects of the inverter standards for distributed generation.[58] At the transmission level, the Authority is well underway with a review of Parts 8 and 13 of the Code that has as its objective the enablement of grid-scale (battery) energy storage systems (BESS) to provide instantaneous reserves. The Authority is also formally requesting WorkSafe update the Electricity (Safety) Regulations 2010, so they refer to the correct inverter standard.[59]

58 Although WorkSafe is the safety regulator for inverter standards, the Authority can make regulations relating to the performance of network-connected equipment.

59 AS/NZS 4777.2:2015.

Appendix A Further detail on Code arrangements that provide controls on transmission outages

A.1 This appendix provides further detail on the arrangements in Part 12 of the Code that provide controls on transmission outages.

The grid reliability standards

A.2 The grid reliability standards are set out in Schedule 12.2 of the Code. They consist of an economic standard for the whole grid, underpinned by the 'safety net' of an 'N-1' deterministic standard for contingent events on the core grid (eg, the loss of a transmission circuit, the loss of an HVDC link pole, the loss of a generating unit[60]).

A.3 As noted in the main body of this document, the grid satisfies the grid reliability standards if:

(a) the power system is reasonably expected to achieve a level of reliability at or above the level that would be achieved if all economic reliability investments were to be implemented (*the economic limb of the grid reliability standards*), and

(b) with all assets that are reasonably expected to be in service, the power system would remain in a satisfactory state[61] during and following a single credible contingency event occurring on the core grid (*the deterministic limb of the grid reliability standards*).[62]

A.4 Economic reliability investments are investments in the grid and transmission alternatives that provide a net electricity market benefit,[63] having regard to the desirability of Parts 7, 8[64] and 12 of the Code operating in an integrated and consistent manner. In this way, the grid reliability standards recognise that the frequency, depth and duration of outages on the grid are affected by how the system is operated in real time.

A.5 The core grid includes:

(a) at a minimum, those assets that comprise the main elements of the grid

(b) at most, all assets that form part of the grid and operate at nominal voltages of 66 kV and above.[65]

A.6 The grid reliability standards may include a primary reliability standard and other reliability standards.[66]

A.7 It is worth noting two key premises inherent in the grid reliability standards:

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60 Refer to the definition of 'single credible contingency' in Part 1 of the Code.

61 Clause 1.1(1) defines 'satisfactory state' to mean that none of the following occur on the power system:

a) insufficient supply of electricity to satisfy demand for electricity at any grid exit point,

b) unacceptable overloading of any primary transmission equipment,

c) unacceptable voltage conditions,

d) system instability.

62 Clause 2 of Schedule 12.2 of the Code.

63 This is the economic test for a grid investment proposal that the Commerce Commission applies under the Transpower capital expenditure input methodology determination 2012.

64 Including the policy statement.

65 Clause 12.65 of the Code. The core grid determination is in Schedule 12.3 of the Code.

66 Clause 12.58 of the Code.

(a) the economic limb is premised on all economic reliability investments being implemented

(b) the deterministic limb is premised on all assets that are reasonably expected to be in service being so (in service).

A.8 The implication is that planned transmission outages do not affect whether the grid meets the grid reliability standards. This acknowledges that the cost of providing security through additional transmission investment to cover for planned outages, which are for a relatively small percentage of time, would be uneconomic.

Transpower must publish a grid reliability report

A.9 Transpower must publish a grid reliability report, which sets out:

(a) a 10-year forecast of demand at each grid exit point and supply at each grid injection point

(b) whether the power system is reasonably expected to meet the N-1 criterion, including in particular whether the power system would, at all times over the next 10 years, be in a secure state at each grid exit point

(c) proposals for addressing any matters identified in accordance with (b).[67]

A.10 If a grid reliability report identifies that the power system is not reasonably expected to meet the N-1 criterion at a grid exit point at all times over the five years following the report's publication and this is due to an interconnection asset, Transpower must:

(a) as soon as practicable, investigate whether the interconnection asset meets the grid reliability standards, and if the asset does not, consider reasonably practicable options for ensuring that the grid reliability standards can be met in respect of that asset

(b) if Transpower considers that one or more investments are required in respect of the interconnection asset in order to meet the grid reliability standards, submit an investment proposal to the Commerce Commission

(c) if Transpower considers that an investment is not necessary, publish the reasons for this and any alternative measures it proposes to undertake.

Transpower must publish a grid economic investment report

A.11 Transpower must publish a grid economic investment report on whether there are investments that it considers could be made in respect of the interconnection assets, other than the investments identified under the grid reliability report.[68]

A.12 If a grid economic investment report identifies investments that could be made, Transpower must publish a report setting out a proposed timetable for it to consider whether to submit one or more investment proposals to the Commerce Commission in respect of those possible investments.[69]

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67 Clause 12.76 of the Code.

68 Refer to clause 12.115 of the Code.

69 *Ibid*

Interconnection asset measures

A.13 Interconnection services are services provided by interconnection assets, being transmission assets for which it is too difficult to attribute services to a single party because of 'loop-flow' effects.[70]

A.14 Part 12 adopts an 'asset availability' approach to the interconnection rules. Essentially this approach defines the services provided by Transpower as grid owner to be:

(a) making interconnection assets available in accordance with specified service measures, and

(b) maintaining the grid in a specified configuration.

Capacity service measures are set out in the interconnection asset capacity and grid configuration

A.15 The interconnection asset capacity and grid configuration information incorporated by reference in the Code sets out the capacity of individual interconnection assets, and their configuration. It thereby sets the capability of the interconnected grid and establishes the capacity levels for interconnection assets.

A.16 Transpower must publish an annual report on its performance against the interconnection asset capacity and grid configuration.[71] Participants may allege a breach of the Code if Transpower does not make the specified interconnection assets available in accordance with the Code.

Availability and reliability measures are set out in Schedule 12.5 of the Code

A.17 The Code requires Transpower to comply with a set of service levels for availability and reliability of interconnection assets. These service levels are the index measures set out in Schedule 12.5 of the Code.

A.18 Reliability measures are measured at the circuit level, but higher-level aggregate information by asset class (eg, all 110 kV single circuit tower lines) and for the total system, is also provided. This higher-level information is intended to be useful since reliability events (planned and unplanned outages) are relatively rare on the grid.

A.19 Transpower must publish information annually on the availability and reliability of interconnection assets.

Connection asset service measures

A.20 The interconnection rules in subpart 6 of Part 12 of the Code do not include customer service and reporting measures. This is because these are covered by the service measures contained in the default transmission agreement specified under subpart 2 of Part 12 (the benchmark agreement).

A.21 The benchmark agreement places the following service standards on Transpower:

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70 The absence of 'loop-flow' effects means that power is unidirectional in its flow, making it possible to identify the causers/users of an asset. In the case of interconnection assets, where 'loop-flow' effects are present, all grid users benefit from the assets. Therefore, it is not possible to unambiguously specify the causers/users of the assets.

71 Refer to clause 12.118 of the Code.

(a) capacity service levels—these relate to the capacity of connection branches (circuits and transformers)[72]

(b) availability and reliability service levels—provided to transmission customers for information only[73]

(c) reporting and response service levels—these relate to the length of time Transpower takes to report service level breaches, investigate and respond to complaints by designated transmission customers, and provide a report following an unplanned interruption to, or degradation of, its transmission service.[74]

Transpower's obligations around unplanned outages

What is an outage?

A.22 Clause 12.130 of the Code defines an "outage" as follows:

(a) An outage exists when interconnection assets or connection assets are temporarily not provided in accordance with:

i. the requirements of a transmission agreement, or

ii. the requirements of subpart 6 of Part 12 of the Code.

(b) Without limiting paragraph a), an outage includes any situation in which:

i. Transpower removes assets from service temporarily, or

ii. assets are not able to be provided due to grid emergencies, in order to deal with health and safety issues, or due to circumstances beyond the reasonable control of Transpower, or

iii. Transpower reduces the capacity of branches below the capacity required by a transmission agreement or clause 12.111 of the Code, or

iv. Transpower changes the configuration of the grid, or

v. Transpower is required by law to carry out an outage.

Steps and measures Transpower must take to be prepared for unplanned outages

A.23 The steps and measures that Transpower must take to be prepared for unplanned outages are as follows:

(a) use all reasonable endeavours to ensure that it is aware of and able to comply with relevant statutory requirements

(b) ensure that it is aware of and able to comply with good electricity industry practice

(c) develop and maintain standards and services specifications that Transpower and its contractors endeavour to observe in the event of an unplanned outage, and ensure that necessary contractual arrangements are in place to meet these standards and service specifications

72 Refer to schedule 5 of the benchmark agreement.

73 Refer to clause 36 of the benchmark agreement.

74 Refer to schedule 5 of the benchmark agreement.

(d) ensure that Transpower personnel and its contractors are given notice of, trained in, and have experience of, the processes and plans maintained so that they can endeavour to observe them in the event of an unplanned outage

(e) have contracts in place with qualified and experienced contractors to ensure those contractors are available to assist Transpower in dealing with an unplanned outage on terms and within timelines determined by Transpower acting in accordance with good electricity industry practice

(f) ensure that Transpower maintains, in accordance with good electricity industry practice, inventories of spares and consumables of types and at locations which, in Transpower's judgment, are most likely to best assist Transpower in restoring the power system in the event of an unplanned outage

(g) ensure that Transpower has resources to manage and implement the procedures for dealing with unplanned outages

(h) in regional or local areas, conduct such trials of the use of the above steps and measures as Transpower considers appropriate to test its preparation for unplanned outages.[75]

How Transpower is to deal with unplanned outages

A.24 The outage protocol requires Transpower to deal with an unplanned outage as quickly as reasonably possible:

(a) in accordance with the policies and procedures set out below, and otherwise

(b) in accordance with good electricity industry practice.[76]

A.25 Under the outage protocol, Transpower's *policies* for dealing with unplanned outages, with the objective of minimising the costs and, if relevant, maximising the benefits arising from an unplanned outage, are as follows:

(a) to comply with relevant statutory requirements

(b) to act in accordance with good electricity industry practice

(c) to publish standards or service specifications which Transpower personnel and its contractors are to endeavour to observe in the event of an unplanned outage

(d) to maintain processes and plans which Transpower personnel and its contractors are to endeavour to observe in the event of an unplanned outage

(e) to maintain, in accordance with good electricity industry practice, access to qualified and experienced personnel to assist Transpower in dealing with an unplanned outage

(f) to maintain, in accordance with good electricity industry practice, inventories of spares and consumables, which are available in the event of an unplanned outage for use in the restoration of the power system.[77]

75 Outage protocol, 1 November 2010, p. 34, clause 9.3.4.

76 Clause 9.3.1 of the outage protocol.

77 Clause 9.3.2 of the outage protocol.

A.26 Under the outage protocol, Transpower's *procedures* for dealing with unplanned outages, with the objective of minimising the costs and, if relevant, maximising the benefits arising from an unplanned outage, are as follows:

(a) communicate with the system operator, fault response personnel and affected designated transmission customers to manage the restoration of system equipment and the management of demand to control frequency and voltage

(b) assess the likely causes of the unplanned outage, what equipment should not be returned to service, plan the restoration of equipment and keep affected designated transmission customers advised of progress

(c) communicate with affected designated transmission customers as soon as practical following the start of an unplanned outage

(d) if normal communications are lost, use reasonable endeavours to contact affected designated transmission customers

(e) maintain systems and processes for the following:

i. document management of system operator standing instructions

ii. personnel training and competency assessment and certification

iii. demand management

iv. communications management

v. equipment restoration planning management

vi. reporting and recording management

vii. transmission island control management

viii. loss of communications situation management.[78]

[78] Clause 9.3.3 of the outage protocol.

Appendix B Further detail on arrangements under Part 4 of the Commerce Act that provide controls on transmission outages

B.1 This appendix provides further detail on the arrangements under Part 4 of the Commerce Act that provide controls on transmission outages.

The purpose of Part 4 of the Commerce Act

3.1.3 Under Part 4 of the Commerce Act, the Commerce Commission may regulate the price and quality of goods or services in markets where there is little or no competition and little or no likelihood of a substantial increase in competition. The purpose of Part 4 is to promote the long-term benefit of consumers in these markets by promoting outcomes that are consistent with outcomes produced in competitive markets, such that suppliers of regulated goods or services:

a) have incentives to innovate and to invest, including in replacement, upgraded, and new assets

b) have incentives to improve efficiency and provide services at a quality that reflects consumer demands

c) share with consumers the benefits of efficiency gains in the supply of the regulated goods or services, including through lower prices

d) are limited in their ability to extract excessive profits.[79]

The Transpower input methodologies determination 2010

B.2 The input methodologies for Transpower's individual price-quality path are for:

(a) the allocation of costs to regulated services supplied by Transpower

(b) the valuation of assets used to supply transmission lines services

(c) the treatment of tax costs for regulatory purposes

(d) estimating the cost of capital

(e) how Transpower's prices are specified

(f) how a rolling incentive mechanism operates under Transpower's individual price-quality path

(g) circumstances in which Transpower's individual price-quality path may be reconsidered within a regulatory period.[80]

B.3 The input methodologies for Transpower's information disclosure are for:

(a) the allocation of costs to regulated services supplied by Transpower

79 Section 52A of the Commerce Act.

80 Refer to:

- Commerce Commission, 29 January 2020, Transpower input methodologies determination 2010 (consolidated determination).
- Commerce Commission, 22 December 2010, Input methodologies (Transpower): Reasons paper.

(b) the valuation of assets used to supply transmission lines services

(c) the treatment of tax costs for regulatory purposes

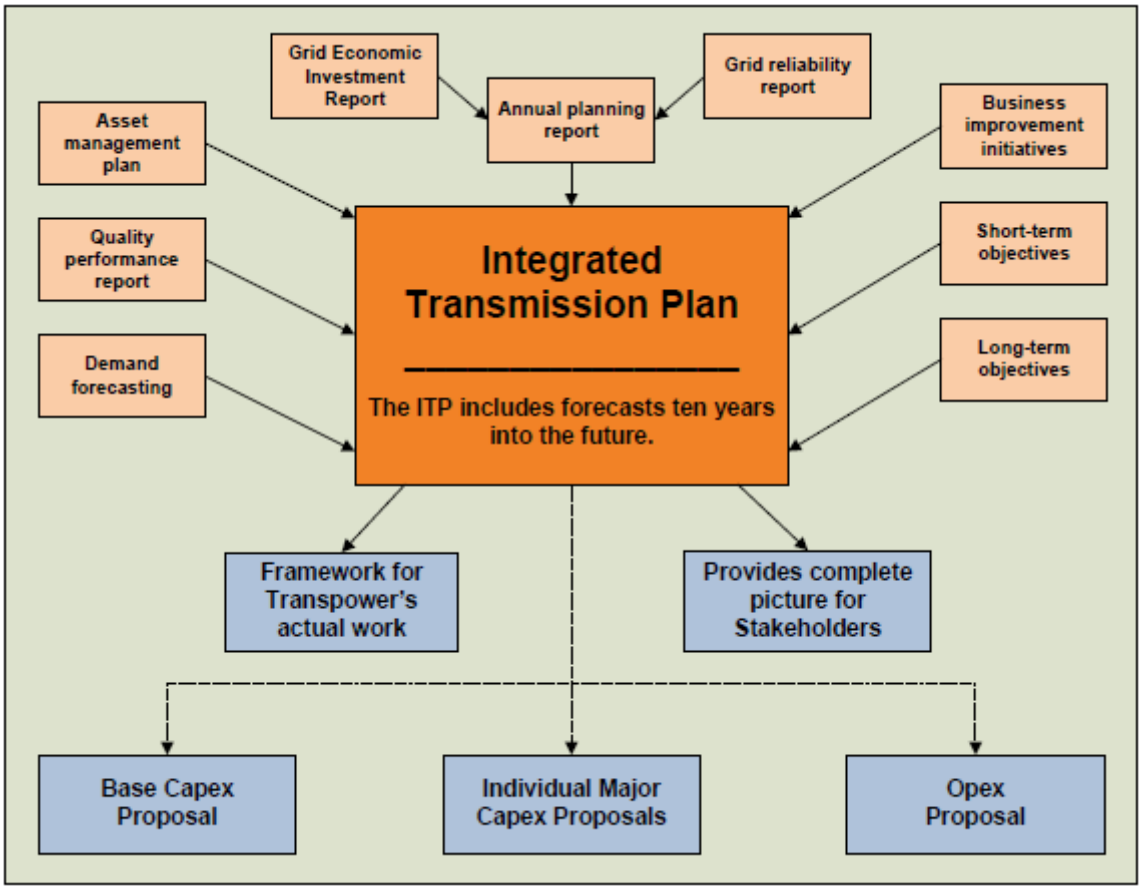
(d) estimating the cost of capital.[81]

The Transpower capital expenditure input methodology determination 2012

B.4 Under the capital expenditure input methodology Transpower must publish an 'integrated transmission plan'. The purpose of this plan is to provide an integrated overview of the long-term development of, and activities on, the grid. It is to provide detail on Transpower's stated long-term quality and performance objectives, and to summarise the expenditure requirements of the grid and the outputs or benefits this expenditure will deliver.[82]

B.5 Figure 1 illustrates this.

Figure 1: Function of the integrated transmission plan[83]



B.6 The integrated transmission plan contains the suite of documents shown in Table 2.

81 *Ibid*

82 Commerce Commission, 31 January 2012, Transpower capital expenditure input methodology: Reasons paper, p. 24.

83 *Ibid*

Table 2: Transpower's integrated transmission plan[84]

Title	Description
ITP narrative	Concise, accessible overview of Transpower's plans
Grid outputs report	Defines Transpower's service offering and performance targets, and explains how Transpower uses these in its business (formerly called the 'Services report')
Asset management plan	Explains Transpower's asset management framework and Transpower's management of each asset class, and includes a summary of planned works
Transmission planning report	Identifies backbone grid and regional development plans (formerly called the 'Annual planning report')
ITP schedules	Sets out Transpower's forecast capital and operating expenditure to the end of RCP4
ITP compliance report	Explains how the integrated transmission plan meets Transpower's regulatory requirements
ITP glossary	Accompanies the reports contained within the integrated transmission plan

Transpower individual price-quality path determinations

B.7 As noted in the main body of this paper, the Transpower IPP determinations set Transpower's maximum revenues and minimum quality standards.

Transpower's financial incentives in relation to RCP3 grid output measures

B.8 Table 3 sets out the revenue-linked asset performance measures and associated financial incentive rates that apply to Transpower during RCP3.

Table 3: RCP3 revenue-linked asset performance measures and associated incentive rates[85]

Asset performance measure	Cap	Grid output target	Collar	Quality standard	Grid output Incentive rate (amount that Transpower may recover or must bear)
AP1: HVDC availability (%)					$ per 1%
HVDC availability	99.75	98.75	97.75	96.75	500,000
AP2: HVAC availability (%)					$ per 1%
HVAC availability (71 selected assets)	99.2	99.0	98.8	98.6	5,000,000

84 Transpower's 2020 integrated transmission plan is available at https://www.transpower.co.nz/keeping-you-connected/industry/rcp3/rcp3-updates-and-disclosures.

85 Commerce Commission, 14 November 2019, Transpower individual price-quality path determination 2020, p. 30.

B.9 Table 4 sets out the revenue-linked grid performance measures and associated financial incentive rates that apply to Transpower during RCP3.

Table 4: RCP3 revenue-linked grid performance measures and associated incentive rates[86]

Point of service sub-category	Cap	Grid output target	Collar	Point of service sub-category limit	Grid output Incentive rate (amount that Transpower may recover or must bear)
GP1: number of interruptions (per annum)					$ per interruption
GP1A: N-1 security high economic consequence	0	7	14	14	335,714
GP1B: N-1 security material economic consequence	7	24	41	41	40,294
GP1C: N security high economic consequence	4	6	8	8	250,000
GP1D: N security material economic consequence	9	23	37	37	41,786
GP1E: N-1 security generator	5	9	13	13	62,500
GP1F: N security generator	6	12	18	18	41,667
GP2: average duration of interruption (min)					$ per minute
GP2A: N-1 security high economic consequence	30	92	154	154	37,903
GP2B: N-1 security material economic consequence	36	61	86	86	27,400
GP2C: N security high economic consequence	0	103	206	206	4,854
GP2D: N security material economic consequence	0	140	280	280	4,179
GP2E: N-1 security generator	50	174	298	298	2,016
GP2F: N security generator	11	93	175	175	3,049

The Transpower information disclosure determination 2014

B.10 Under the Transpower information disclosure determination 2014, Transpower must disclose financial, grid management and system operator information, as shown in Table 5.

86 Commerce Commission, 14 November 2019, Transpower individual price-quality path determination 2020, p. 29.

Table 5: Summary of Transpower's information disclosure requirements[87]

Information category	Information disclosure requirements
Financial information	**Financial performance**: Return on investment, regulatory profit, regulatory asset base, related party transactions **Expenditure**: Operating expenditure, base capital expenditure, major capital expenditure, incentive mechanisms **Revenues**: Total revenue, customer charges, investment contracts
Grid management information	**Quality:** Grid outputs, interconnection quality **Asset management information:** Asset management maturity assessment tool, grid demand and capacity, additional disclosures in the Integrated Transmission Plan **Grid composition information:** System statistics, asset health, age and changes
System operator information	**Financial performance:** return on investment, regulatory profit, fixed assets **Expenditure:** Operating expenditure, capital expenditure, forecast expenditure **Revenue:** System Operator Service Provide Agreement revenue, Technical Advisory Services Contract revenue

B.11 Transpower makes this information available primarily via:

(a) Transpower's annual regulatory report, which is the document containing Transpower's annual compliance monitoring statement and associated information in fulfilment of its IPP determination reporting requirements[88]

(b) Transpower's integrated transmission plan, which is a collection of documents describing Transpower's forecast expenditure and outputs.[89]

B.12 Transpower also discloses certain information separately to the above reports, due to the timing of data availability or the nature of the information.[90] For example, Transpower discloses information on the availability and reliability of interconnection assets through the publication of its interconnection asset capacity and grid configuration report, which is an annual requirement under clause 12.118 of the Code.

Information disclosed under the information disclosure determination is to enable interested persons to assess whether the Part 4 purpose is being met

B.13 The Commerce Commission's key consideration in determining Transpower's information disclosure requirements was what information is needed to determine whether Transpower's performance is consistent with the performance outcomes one would expect in a workably competitive market.[91]

87 Commerce Commission, 28 February 2014, Information disclosure requirements for Transpower: Reasons paper, p. 10.

88 Commerce Commission, 3 April 2018, Transpower information disclosure determination 2014 (consolidated version), p. 6.

89 Commerce Commission, 29 January 2020, Transpower Capital Expenditure Input Methodology Determination 2012 (Principal Determination) (consolidated version), schedule E.

90 Commerce Commission, 28 February 2014, Information disclosure requirements for Transpower: Reasons paper, p. 10.

91 Commerce Commission, 28 February 2014, Information disclosure requirements for Transpower: Reasons paper, p. 16.

B.14 The Commerce Commission considers that interested persons need to be able to answer several key questions on different aspects of Transpower's performance to assess whether the Part 4 purpose is being met. These questions relate to historical, current ,and expected future performance.[92] Table 6 sets out these questions and the elements of the Part 4 purpose that each question addresses.

Table 6: Key performance questions to assess if the Part 4 purpose is being met[93]

Question No.	Key performance questions	Relevance to the Part 4 purpose (s 52A(1))
1	Is Transpower operating and investing in its assets efficiently?	(a) and (b)
2	Is Transpower innovating where appropriate?	(a)
3	Is Transpower providing services at a quality that reflects consumer demands?	(b)
4	Is Transpower sharing the benefits of efficiency gains with consumers, including through lower prices?	(c)
5	Do the prices set by Transpower promote efficiency?	(a) and (b)
6	Is Transpower earning an appropriate economic return over time?	(d)

B.15 In Transpower's information disclosure determination, the Commerce Commission has categorised as 'grid management information' the information it considers is needed to assess whether Transpower provides services at a quality reflecting consumer demand. This information comprises:

(a) information on the grid and how it is being managed, including:

i. the composition, age, and condition of grid assets

ii. key factors that explain differences in expenditure over time (eg, demand, capacity, the size, age and condition of the grid)

iii. Transpower's approach to asset management (eg, the level of grid quality and risk that Transpower is currently operating at, and planning to achieve in the future and how this relates to expenditure)

(b) information on quality outcomes, including:

i. whether Transpower is meeting its quality targets

ii. the quality of service currently provided by Transpower

iii. the link between Transpower's service levels, planned investment and therefore future quality

iv. the steps Transpower has taken to elicit feedback from consultation on the quality that consumers expect.[94]

92 Commerce Commission, 28 February 2014, Information disclosure requirements for Transpower: Reasons paper, p. 17.

93 *Ibid*

94 Commerce Commission, 28 February 2014, Information disclosure requirements for Transpower: Reasons paper, pp. 23–24.

Transpower is also required to disclose information in accordance with IPP determinations

B.16 In addition to disclosing information for the purpose set out in section 53A of the Commerce Act, Transpower is required to provide the following information to the Commerce Commission:

(a) for asset management:

i. a development roadmap setting out plans for developing its asset health and risk models, asset life-extension models, and risk-based decision-making frameworks in preparation for Transpower's proposal for its individual price-quality path for RCP4

ii. a progress update on Transpower's progress in developing asset health and risk models, asset life-extension models, and risk-based decision-making frameworks

iii. an independent expert opinion on Transpower's progress in developing its asset health and risk models, asset life-extension models, and risk-based decision-making frameworks[95]

(b) for customer consultation:

i. a proposed high-level scope for Transpower's customer engagement plan for RCP3

ii. Transpower's customer engagement plan for RCP3

iii. information on the extent and effectiveness of Transpower's consultation with its customers in relation to how Transpower intends to spend its base capex in RCP3

iv. an annual review in relation to post-project reviews for significant capital expenditure projects

v. an independent expert opinion on Transpower's proposed process for customer engagement leading up to its individual price-quality path proposal for RCP4

vi. a post-interruption survey report summarising the post-interruption survey results of affected customers to assist the Commerce Commission's investigation into the timeliness of Transpower's information provision to customers following an unplanned interruption[96]

(c) for cost estimation:

i. prepare and provide a cost tracking methodology to allow the Commerce Commission to have a line of sight (ie, to trace specific project or programme costs) between the proposal cost estimates, delivery business case cost estimates, and the actual costs of commissioned assets.[97]

B.17 The purpose of this further information is to assist the Commerce Commission in its evaluations of various capital expenditure approvals during RCP3 and to give the

95 Commerce Commission, 11 December 2019, Notice to supply information to the Commerce Commission under section 53ZD(1)(d)(i), (e)(i), and (f) of the Commerce Act 1986 – Requirements for asset health and risk modelling information.

96 Commerce Commission, 14 November 2019, Notice to supply information to the Commerce Commission under section 53ZD(1)(d)(i), (e)(i), and (f) of the Commerce Act 1986 – Customer consultation information.

97 Commerce Commission, 24 February 2020, Notice to supply information to the Commerce Commission under section 53ZD(1)(d)(i), (e)(i) and (e)(ii) of the Commerce Act 1986 – Cost estimation information.

Commission confidence in the evaluation process for RCP4. The Commission is looking beyond RCP3 because Transpower has signalled a scenario for RCP4 and RCP5 that would require a noticeable increase in the replacement of transmission assets, particularly transmission line conductors, based on their condition.[98]

98 Commerce Commission, 29 August 2019, Transpower's individual price-quality path from 1 April 2020: Decisions and reasons paper, p. 13.