

Meeting Date: 26 October 2022

SECURITY AND RELIABILITY
IMPLICATIONS FOR THE
TRANSMISSION GRID OF THE NEW
TPM, AND OF COMMERCE
COMMISSION REGULATION

SECURITY
AND
RELIABILITY
COUNCIL

This paper introduces presentations from the Authority and the Commerce Commission on regulatory arrangements for the transmission grid, as part of the SRC's transmission theme for the October meeting.

Note: This paper has been prepared for the purpose of the Security and Reliability Council (SRC). Content should not be interpreted as representing the views or policy of the Electricity Authority except where specifically noted.

Regulatory arrangements for the transmission grid

- 1.1.1 The SRC has asked the secretariat to provide information on regulatory arrangements for the transmission grid, as part of its transmission theme for the October meeting.
- 1.1.2 The SRC has particularly asked to better understand the security and reliability implications of the new transmission pricing methodology (TPM). The secretariat has arranged a presentation from the Authority's Network Pricing team on the TPM changes.
- 1.1.3 Representatives from the Authority's Network Pricing team will present, and be available for questions. Representatives from the Commerce Commission will also attend and present on relevant themes from the Part 4 Commerce Act 1986 regime.

Questions for the SRC to consider

The SRC is asked to consider the following general questions.

Q1. What further information, if any, does the SRC wish to have provided to it:

- a. About ongoing peak grid demand trends?
- b. About the Authority's package of market reforms to create the necessary market conditions to efficiently manage grid congestion?
- c. About the potential for introducing a transitional congestion charge under the TPM?

Q2. What advice, if any, does the SRC wish to provide to the Authority?

Appendix A: Security and reliability implications of the Electricity Authority's changes to the transmission pricing methodology (TPM)

Purpose

1. The purpose of this appendix is to explain the implications of the new TPM, which commences on 1 April 2023, for electricity system security and reliability. The appendix particularly addresses whether system reliability will be compromised by the removal of the peak charge (the regional coincident peak demand or RCPD charge) that is core to the current TPM.

Recommendation

2. The Authority recommends that the SRC notes that:
 - a. The Authority considers that wholesale electricity market nodal prices provide the best signal of the cost of using the transmission grid
 - b. The removal of the RCPD peak signal from the TPM has not in any material way impacted on system security and reliability to date
 - c. Transpower retains the option within the new TPM to implement a transitional congestion charge (TCC) if it considers that a targeted pricing signal would be the most effective way to respond to specific areas of grid congestion
 - d. The development of flexibility markets, and better demand side participation in the wholesale market, will play a critical role in efficiently maintaining system security and reliability (much more so than transmission pricing).

Background

3. After a significant period of policy development and consultation, the new TPM has been incorporated into the Electricity Industry Participation Code 2010, and commences on 1 April 2023.
4. The new TPM will provide significant benefits to New Zealand consumers, primarily because it encourages more efficient use of the grid, and more efficient investment in transmission and generation assets. This will:
 - a. Reduce the cost of electricity at peak times when New Zealanders want to use it most
 - b. Over time lead to a lower cost for delivered electricity.¹
5. One of the core aspects of the TPM reform package was removing the peak charge in the current TPM – the RCPD charge. This charge was set substantially higher than the economic cost of congestion in the peak periods that were measured for the charge,² essentially over-signalling to consumers, and was therefore highly distortionary:
 - a. Discouraging consumers from using the grid at the times they value it the most, even when there is no congestion

¹ In this case, electricity delivered to the edge of the grid. The cost of delivered electricity is the wholesale price, plus the transmission price, less any settlement residual.

² "The RCPD signal is also very strong relative to the wholesale price of electricity. It can be up to \$2,180/MWh depending on how many peak periods the customer is taking into account." Electricity Authority, 2019 Issues paper, Transmission pricing review.

- b. Creating incentives for distributors and directly connected industrial customers to invest in batteries and/or generation (including diesel generation) simply to avoid transmission charges, which other transmission customers then had to pay for.
- 6. An enduring peak TPM charge is in any case unnecessary as wholesale electricity market nodal prices already provide a market-based signal of the cost of *using* the grid,³ so there is no requirement for a transmission peak charge to signal the same thing.
- 7. While the new TPM was not specifically designed to increase network reliability, by efficient signalling of congestion and the cost of grid investments it does result in a reliable grid at a relatively lower cost of delivered electricity, and promotes a greater level of user choice about how to respond to congestion.
- 8. A number of stakeholders nonetheless raised concerns with the Authority about whether system reliability would be compromised by the removal of the RCPD charge, noting the uncertainty about the extent of demand that the RCPD signal could be suppressing, and surmising that specific unidentified areas of the grid could quickly become congested without that strong signal.⁴

The Authority's March 2020 response

- 9. In response to stakeholder feedback, the Authority reconsidered the role of a peak transmission charge, and published an information paper setting out its view in March 2020.⁵ In that paper the Authority:
 - a. Acknowledged that removing the TPM peak signal was a significant change
 - b. Confirmed its view, having considered submissions, that the logic behind the change – not double signalling the cost of using the grid through both the nodal price and the TPM – was sound
 - c. Worked through the various reliability-based arguments from 2019 TPM submissions. The Authority particularly acknowledged the transitional risk posed by TPM reform, ie, that regardless of the theory, the proposed new TPM might not result in congestion being effectively and efficiently controlled on day one of its implementation because other necessary conditions might not be in place, such as:
 - i. Appropriate scarcity price signals when the wholesale electricity market auction fails to clear
 - ii. Enough demand side participation to ensure that low value load is curtailed rather than high value load
 - iii. Better price risk management options reflecting the risk of nodal prices becoming more volatile
 - iv. Amended grid reliability standards such that grid investments are not triggered before nodal prices can rise.
 - d. Responded to these arguments, primarily by noting that the TPM reform sat beside other significant market reforms that as a package would work to create the

³ The difference in prices between the node at which electricity is injected into the grid, and where it exits the grid, reflects a combination of losses and congestion.

⁴ The Authority accepted that these concerns were genuinely held, but noted that a number of the parties also had a significant financial incentive for the RCPD charge to remain.

⁵ [Peak charges under proposed TPM guidelines information paper \(ea.govt.nz\)](https://www.ea.govt.nz/publications/peak-charges-under-proposed-tpm-guidelines-information-paper/)

necessary market conditions to efficiently manage congestion (primarily through developing flexibility markets, better demand side participation in the wholesale market, and better risk management arrangements).⁶

- e. Acknowledged the timing uncertainty inherent in reform/transition, eg, how quickly load customers will respond to the RTP reforms in their first year; how quickly aggregators will scale up.
 - f. Acknowledged that the Authority could not be 100% sure about how different participants would react to changed incentives, including in terms of the impact of the change on the gross level of demand in year one of the new TPM, or the response of distributors that operate ripple control to the removal of the RCPD signal (which impacts the incentive to operate ripple control, and therefore to reduce net demand at times when it might matter for the grid).⁷
10. Given this transitional uncertainty, the Authority's final TPM Guidelines decision in June 2020 offered Transpower the option of being able to apply a transitional congestion charge (TCC) to specific constraints. The TCC was essentially another tool for Transpower for managing congestion, along with demand response, administrative load control, and grid support contracts. Critically, any TCC must respond to actual congested circuits on the grid, rather than to peaks (which may or may not correlate to any actual network congestion).
11. The Authority considered that Transpower was best placed to know whether this extra tool was needed – Transpower best knows its own network and the reliability risks to that network – but noted that the TCC would likely be a more targeted and effective response to congestion than a blunt enduring peak price.

Subsequent developments

12. As part of developing a proposed TPM (after the Authority's Guidelines decisions), Transpower considered whether it needed a TCC, and consulted with stakeholders. In January 2021 Transpower ultimately decided that its current tools for managing grid congestion were adequate, so did not propose a TCC.⁸ The Authority accepted Transpower's judgement, but noted that Transpower could subsequently seek a TCC if Transpower changed its view.⁹
13. At the end of August 2021 the RCPD signal effectively ceased – this was the end of the measurement period for the RCPD charge in the 2022/23 pricing year.¹⁰ Based on a survey of transmission customers, and its own analysis, Transpower adjusted its peak demand growth assumption at that point,¹¹ assuming that the ending of the RCPD

⁶ Such as the introduction of real-time pricing (including scarcity pricing, dispatch notification); wholesale market reforms (eg, better information disclosure; the introduction of a commercial market maker); the review of distribution network regulatory settings (barriers to development of demand side participation/flexibility markets).

⁷ Noting that Concept Consulting's February 2020 winter capacity margin work found that removing the RCPD charge was not likely to cause general operational difficulties: [Winter capacity margin – potential effect of possible changes to transmission pricing \(ea.govt.nz\)](#).

⁸ Transpower had earlier considered a TCC based on coincident peak demand, and targeted at areas or circuits where Transpower expected there to be a significant likelihood of congestion occurring – Transpower, November 2020, [TPM Development Checkpoint 1 submission: Transitional Congestion Charge \(transpower.co.nz\)](#).

⁹ Subject to clause 12.85 of the Code, which prevents Transpower from submitting a proposed TPM variation within 12 months of the last Authority approval of the TPM.

¹⁰ We note that some stakeholders initially suggested that the removal of the RCPD signal through TPM reform had contributed to the outages of 9 August 2021, but the RCPD signal was in fact still in place at that time.

¹¹ Transpower Customer Advice Notice, 19 July 2021, [CAN Impacts on System Operator with the potential removal of regional coincident peak demand \(transpower.co.nz\)](#).

signal would add an extra 2% to peak demand the following year, ie, peak demand would increase by 4% in that specific year.

14. Winter 2022 was the first winter without the RCPD signal. It is difficult to isolate the impact of that signal being removed from other potential sources of increased demand.¹² However, the Authority observed the following in relation to that period:

- a. The generation balance was tight, with a significant number of CANs, WRNs, GENs issued by Transpower. Amongst other things these reflected the disconnect between the timeframe during which it became obvious that generation was needed, and the timeframes to start the marginal generation plant (which tended to be slower start).¹³ The generation balance is not indicative of specific grid reliability issues.
- b. With the exception of 9 August 2021, which has been extensively investigated, Transpower has generally managed grid security and reliability well through this period – the system is working as it should when generation is tight. On only two days (23 June and 7 October) this year did the System Operator specifically request demand response from transmission customers.
- c. Distribution networks with load control infrastructure have continued to make that infrastructure available in response to Transpower requests. Many of those networks expect to continue to invest in load control, including exploring more flexible load control solutions through better technology. We would expect affected customers to continue to pay a lower tariff in return for someone else (distributor, retailer, third party) controlling their water heating or EV charging.¹⁴
- d. To date, year on year there has only been a limited increase in peak demand. The trend line in Figure 1 below suggests peak demand is increasing at 28MW per year which is about 0.4% per year. Transpower, in its Transmission Planning Report 2022, is forecasting a higher average growth rate, and notes that “[w]hile overall peak demand growth is increasing, regions of higher demand growth – particularly step load changes – and changes in generation are likely to require grid investment.”¹⁵

¹² Housing growth, and new commercial and industrial loads (including due to electrification), are driving accelerating rates of growth at some GXPs – see Transpower’s [2022 Transmission Planning Report.pdf \(transpower.co.nz\)](https://www.transpower.co.nz/2022-Transmission-Planning-Report.pdf).

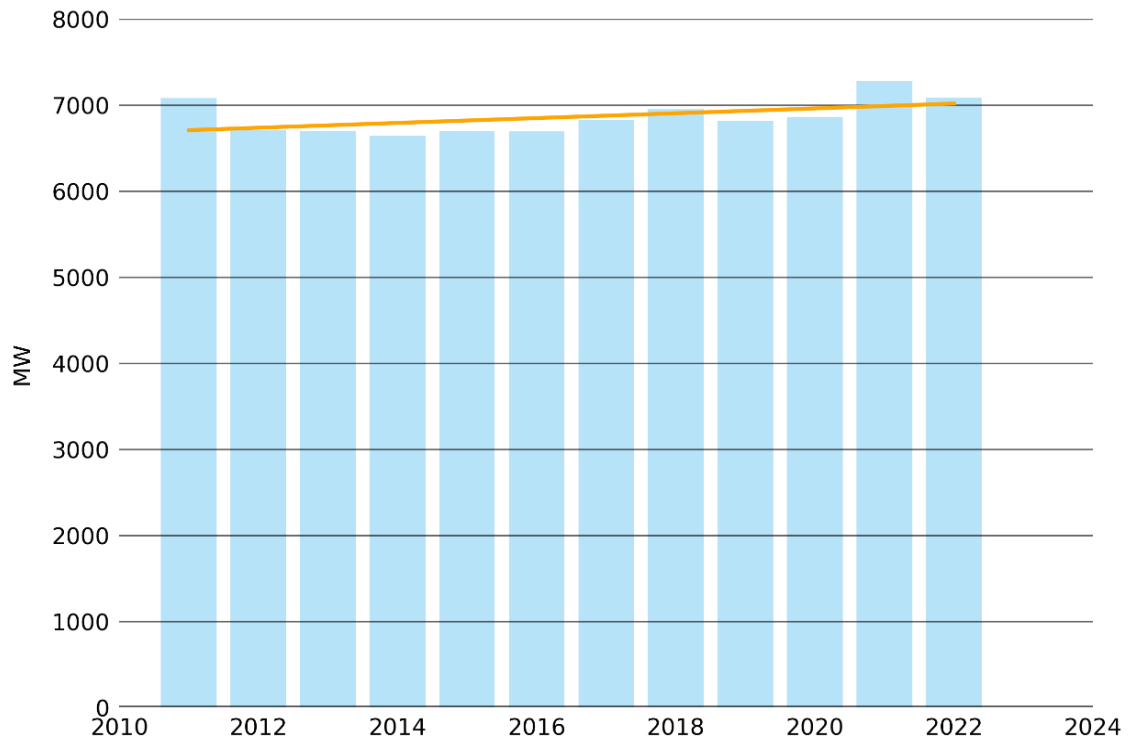
¹³ We note also the broader context of the need to build more generation as New Zealand aims to both increase electrification and decrease its reliance on fossil fuelled electricity generation for peaking and managing dry years.

¹⁴ In their 2022 Transmission Planning Report, Transpower says:

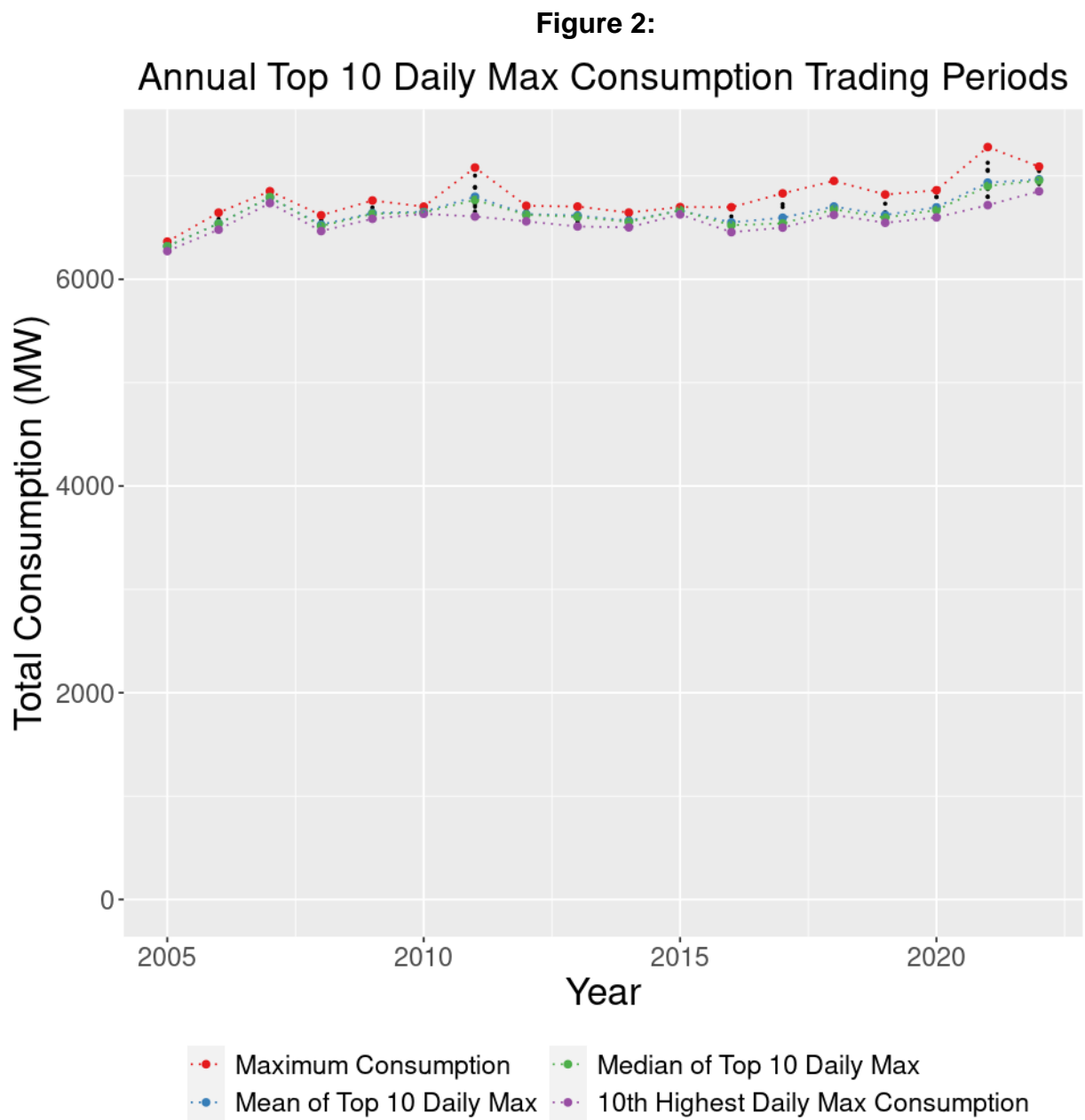
“Transpower is currently implementing the new Transmission Pricing Methodology (TPM) and amongst the changes this brings is the removal of the Interconnection Charge and its use of the regional coincident peak demand (RCPD) allocation method. This change seems likely to lead to a relaxation in the management of regional peaks. A number of network companies have indicated to us that they expect to continue load control for the own network management purposes, however the system operator has noted that in addition to 2021’s record peak that by mid-July, 2022 has already seen a further 4 of the 10 highest national peaks ever recorded.”

¹⁵ Transpower, Transmission Planning Report 2022, section 4.6. As an example of region growth, Transpower states at section 8.2.1 that “The Auckland regional peak demand is forecast to grow by an average 2.4 per cent per annum over the next 15 years, from 2,050 MW in 2022 to 2,914 MW by 2037. This is greater than the national average growth rate of 2.1 per cent per annum.”

Figure 1: highest electricity demand peak per calendar year

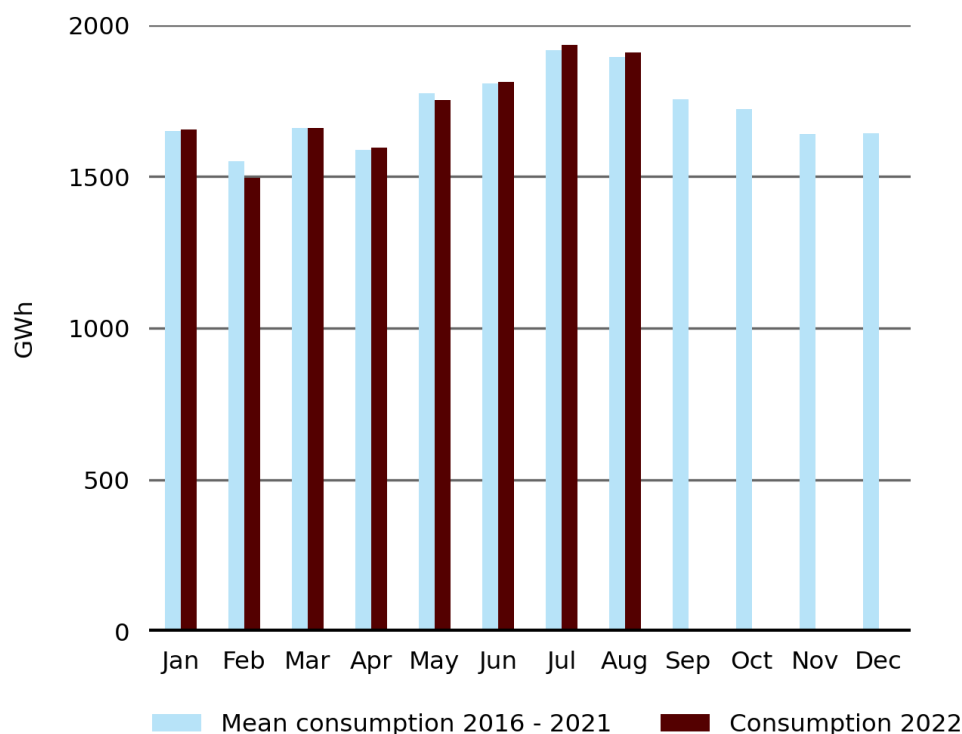


e. Figure 2 below provides further peak demand detail for the top ten peaks each year.



- f. As set out in Figure 3 below, the total monthly consumption trend also does not indicate a significant increase in 2022.

Figure 3: monthly aggregate electricity demand



15. We note that the Authority is currently consulting on the removal of the regulatory requirement to make avoided cost of transmission (ACOT) payments to distributed generation. While the Authority considers that there are good reasons to remove this requirement (given the significant cost to consumers of these payments for, generally, little benefit), the impacts of doing so cannot be perfectly predicted: ultimately the Authority's proposal would remove a payment to distributed generators that may in specific circumstances have an impact on their operational response to localised congestion/reliability issues. For this reason the Authority is consulting on a phase out option for ACOT, and also continuing to seek views from Transpower on any reliability concerns it might have.

What should the SRC take from this?

16. It is important that the SRC understands that material changes are occurring to the transmission-related regulatory settings and incentives for the electricity sector – TPM, RTP, ACOT (decision still to be made).
17. Added to these regulatory changes is the wider context of significant sectoral shifts being driven by technology changes and New Zealand's transition to a low-emissions economy.
18. In this context we expect transmission pricing to "do its bit" – operate efficiently and effectively, providing appropriate use and investment incentives, to best serve New

Zealanders (including by reducing the overall cost of electricity) through this transition period. Transmission pricing must also ensure that it addresses any potential distortionary issues arising from its own structure, eg, first mover disadvantage.

19. However, transmission pricing is just one part of the total picture, and in the case of system security and reliability it is not the key lever. We see no evidence that the removal of the RCPD charge has had or will likely have any significant negative impact on reliability. Rather, TPM reform has removed a key barrier/distortion that stood in the way of achieving an efficient and reliable system.

Appendix B: Commerce Commission – explanation of the process for planning and approving grid investment