

BEFORE The Electricity Rulings Panel
No: C-2022-002

BETWEEN The Electricity Authority
Complainant

AND Transpower New Zealand Limited
Respondent

UNDER The Electricity Industry Act 2010, The Electricity Industry (Enforcement) Regulations 2010, The Rulings Panel Procedures 2017 and The Electricity Industry Participation Code 2010 (the Code)

IN THE MATTER OF A complaint made of breaches of Clause 3 of Technical Code B of the Code, Clause 80 of the System Operator's Policy Statement, Clause 5(1A) of Technical Code B of the Code, and Clause 7.1A(1) of the Code.

Rulings Panel Decision C-2022-002

Counsel: R S May and T G Bain, Luke Cunningham Clere, for the Authority
T D Smith and SE Quilliam, Chapman Tripp, for Transpower

Finding: Transpower breached:

- Clause 80 of the System Operator's Policy Statement; and
- Clause 7.1A(1) of the Code.

Orders: Transpower is ordered to pay a pecuniary penalty of \$150,000; and
Transpower is to pay costs of \$6,207.50.

Rulings Panel Members:

Mel Orange	Chair
Geraldine Baumann	Deputy Chair
Lee Wilson	Panel Member

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Summary of the Panel’s Decision

- [1] A grid emergency¹ occurred on the night of 9 August 2021 when New Zealand experienced its highest demand peak on record of 7,157 MW. Transpower, as the System Operator,² and tasked with the real-time coordination of the electricity system, was responsible for managing the grid emergency.
- [2] Following the event, Transpower self-reported breaches of:³
- (a) clause 7.1A(1) of the Code – the reasonable and prudent system operator standard;
 - (b) clause 7A(7) of Technical Code B of Schedule 8.3 – equitable disconnection of demand; and
 - (c) clause 80.2 of the Policy Statement – demand allocation methodology for dealing with an energy capacity constraint.

¹ The Code defines a grid emergency as:

(a) in the reasonable opinion of the System Operator, 1 or more of the events set out in clause 5(1) of Technical Code B of Schedule 8.3 has occurred, or is reasonably expected to occur and urgent action is required of the System Operator or participants to alleviate the situation; or
(b) independent action (as set out in clause 9 of Technical Code B of Schedule 8.3) is required of a participant to alleviate the situation.

² Section 8(1) of the Electricity Industry Act 2010.

³ Notice of the Authority’s decision under regulation 29 of the Electricity Industry (Enforcement) Regulations 2010.

- [3] The Electricity Industry (Enforcement) Regulations require mandatory reporting where an industry participant believes on reasonable grounds that it may have breached a provision of Part 7⁴ or Part 8⁵ of the Code.⁶
- [4] The Authority commenced an investigation⁷ which led to it laying a formal complaint with the Rulings Panel.⁸ The Notice of Commencement alleged breaches of:
- (a) Clause 3 of Technical Code B of the Code, which provides that the System Operator must plan and act quickly and safely during a grid emergency so that the actual and potential impacts of any grid emergency are minimised;
 - (b) Clause 80 of the System Operator’s Policy Statement, as per the self-reported breach;
 - (c) Clause 5(1A) of Technical Code B, which deals with System Operator notices during a grid emergency; and
 - (d) Clause 7.1A(1) of the Code, as per the self-reported breach.
- [5] After the complaint was made, and following discussions between the Authority and Transpower, they agreed that Transpower, as System Operator, had breached:
- (a) Clause 80 of the System Operator’s Policy Statement; and
 - (b) Clause 7.1A(1) of the Code.
- [6] The Authority withdrew the remaining allegations. In doing so, the Authority acknowledged that Transpower’s admissions covered the substance of the allegations in the complaint and that the alternative Code breaches did not have to be pursued.
- [7] The Authority and Transpower jointly submitted that the Panel should deal with the complaint on the papers. No other party to the investigation⁹ made any submissions or sought a hearing. The Panel proceeded to make an on the papers decision.
- [8] The Rulings Panel decided that the System Operator will be ordered to pay a pecuniary penalty of \$150,000 and costs of \$6,207.50.

⁴ System Operator

⁵ Common Quality

⁶ Regulation 7(1). Regulation 7(4) makes it an offence if an industry participant fails to comply with the obligation to self-report. A failure to comply can result in a a fine not exceeding \$20,000.

⁷ The Authority must investigate an alleged breach except where it decides to take no action under regulation 11 of the Electricity Industry (Enforcement) Regulations.

⁸ The Rulings Panel is an independent body that assists in enforcing the Electricity Industry Participation Code by dealing with complaints about breaches of the Code. It is established under Electricity Industry Act 2010.

⁹ Genesis Energy Limited; Haast Energy Trading Limited; Nova Energy Limited; Unison Networks Limited; and WEL Networks Limited.

The Agreed Facts

- [9] On 9 August 2021, the System Operator’s demand forecast predicted record evening peak demand. The forecast initially indicated that there was sufficient generation capacity offered to meet demand, as well as to provide a normal reserve margin to cover for a possible loss of generation. By late afternoon, the situation worsened as wind generation declined, and one hydroelectric generating station experienced ongoing trouble, resulting in sudden generation reductions. It became apparent that the total available generation would only just meet peak demand. Accordingly, a grid emergency was declared at 5:10 pm.
- [10] The grid emergency was caused by a peak capacity constraint rather than an energy capacity constraint. In short, energy for conversion into electricity was relatively plentiful, but insufficient generation capacity was available to the System Operator to dispatch to meet the record high evening peak demand. The situation met the definition of a grid emergency as defined by the Code.¹⁰ A key aspect of a grid emergency is that the System Operator and/or industry participants need to take urgent action to alleviate the situation, in particular by maintaining frequency within the normal band so as to avoid cascade failure of assets resulting in a loss of electricity to consumers arising from a supply and demand imbalance.
- [11] The specific events on which this decision is based, as agreed by the Authority and Transpower, are contained in Appendix A. In summary, however, during the grid emergency, the System Operator made a series of formal communications with industry participants that resulted in the matters that were investigated and complained about. In particular:
- (a) at 6.47 pm, the System Operator issued a grid emergency notice requesting all network companies to reduce load by one per cent until further notice. Following this, national demand reduced by one percent by 6:53 pm and three percent by 7.07 pm;
 - (b) at 7.09 pm, the System Operator issued a grid emergency notice with more specific information for network companies, to which the companies were requested to manage load (the demand allocation notice or DAN). The demand allocation had been calculated using a Load Shed Restore tool (the LSR tool). The LSR tool did not produce correct or accurate demand allocations. While the DAN indicated that some network companies could increase load, the incorrect DAN caused unnecessary customer disconnections by other network companies, as those companies sought to manage load in accordance with the 7.09 DAN;

¹⁰ Part 1 of the Code defines a grid emergency and clause 5(1) of Technical Code B sets out triggering events.

- (c) at 9.01 pm, the System Operator advised that the grid emergency had ended and that all participants could restore all load; and
- (d) at 11.54 pm, the System Operator issued an Island Shortage Situation Notice (ISS Notice) to the pricing manager and market participants.

[12] The Authority and Transpower agreed that the combined effects of the demand reductions requested by the System Operator successfully allowed control of system frequency to be maintained. If demand had not been reduced in response to the 5:10 pm GEN and the 6:47 pm GEN, the system frequency could have fallen below 49.25 Hz, which could ultimately have triggered Automatic Under Frequency Load Shedding.

[13] Transpower did, however, admit, for the purpose of resolving this complaint, that it had breached:

- (a) clause 80 of the Policy Statement, in that the LSR tool did not comply with the methodology set out in the Policy Statement;
- (b) clause 7.1A(1) of the Code (the “reasonable and prudent” operator standard) in respect of:
 - the numerous deficiencies in the preparation and use of the LSR tool;
 - the failure to follow the Policy Statement in relation to the use of the LSR tool; and
 - issuing the Island Shortfall Situation Notice (ISS Notice), despite the fact that it had only issued a national request to reduce load rather than an island-wide instruction to disconnect demand, and the ISS Notice was therefore not required to be issued; and
- (c) communications on 9 August that:
 - requested distributors to reduce demand further than was necessary in the 7.09 DAN;
 - wrongly confirmed the demand allocations in the 7.09 DAN;
 - more generally, failed to state what Code clauses they were issued under; and
 - more generally, referred to network companies only rather than also referring to directly connected purchasers.

Market Impact

- [14] The Authority and Transpower also agreed that the System Operator’s breaches exacerbated the impact of the grid emergency and caused some customers to be unnecessarily disconnected. They agreed that the market impact was significant.
- [15] The Authority and Transpower noted that the effect of the System Operator’s breaches of the Code relating to the LSR tool, and the breach of Policy Statement and communications, had not been precisely quantified but that the value of lost load was likely to be at least \$496,000. They noted the ISS Notice did not have a quantifiable market impact and that an Undesirable Trading Situation (UTS) claim was not upheld.

Remedial Orders – Pecuniary Penalty

- [16] Where a complaint is upheld, the Rulings Panel may, under section 54 of the Electricity Industry Act, order a range of actions including ordering pecuniary penalties or compensation. A pecuniary penalty under section 54(d) can only be ordered if one is sought by the Authority.¹¹ A pecuniary penalty was sought. No party to the investigation or complaint sought compensation.
- [17] Section 54(d) was amended on 1 September 2022. The amendment increased the maximum penalty from \$200,000 to one not exceeding \$2 million and a further amount not exceeding \$10,000 for every day or part of a day during which a breach continues. The breaches predated the amendment coming into force. As such, the earlier \$200,000 maximum penalty applies.
- [18] The Panel notes that whilst the maximum pecuniary penalty has been increased, the Electricity Industry (Enforcement) Regulations 2010, which contain limits on liability for breaches by some industry participants in Subpart 2, have not been amended to reflect the amendment to the Act. In particular, in relation to this matter, the Regulations limit the System Operator’s liability to \$200,000 in respect of any one event or series of closely related events arising from the same cause or circumstance.¹² Because the event predated the pecuniary penalty increase, the apparent conflict between the Act and the Regulations, the Panel does not have to deal with it. The Panel will, however, make a recommendation under section (54)(1)(i) of the Electricity Industry Act that the Electricity Industry (Enforcement) Regulations 2010 be amended to reflect the increase in the pecuniary penalty provision in the Act.

¹¹ Section 56(1) of the Electricity Industry Act.

¹² Regulation 53 of the Electricity Industry (Enforcement) Regulations.

[19] Returning to the appropriate pecuniary penalty order to be made, the Electricity Industry Act prescribes various factors that the Panel must consider when making a pecuniary penalty order.¹³ The list includes aggravating and mitigating factors the Panel should take into consideration. Overall, however, the Panel must consider the seriousness of the breach. The Panel received submissions on what the Authority and Transpower considered was an appropriate order.

Remedial Order Submissions

[20] The Authority and Transpower submitted that the Panel should adopt principles applied by the High Court where there has been a procedure allowing for a negotiated settlement. They referred to various legal authorities, which noted that it is in the interests of the parties and the community to allow negotiated settlements. The authorities also noted that when seeking approval for a negotiated penalty, it is appropriate for the parties to advise the process which they have followed in reaching the recommendation, and when presented with an agreed recommended penalty, the Panel's role is not to embark on its own inquiry of what would be appropriate but to consider whether the proposed penalty is within the proper range.¹⁴ The Panel accepts that the approach is the correct one.

[21] In a decision of 27 March 2020, the Panel set out a framework for arriving at the appropriate pecuniary penalty based on the seriousness of the breach and by reference to four bands (low, medium, high and very high) prior to it considering any mitigating and aggravating factors and stepping back and making an overall assessment.

[22] Using that framework, the Authority and Transpower agreed that the overall seriousness of the breaches was very high because the System Operator's negligence caused multiple breaches, and the market impact of the breaches was significant. In terms of market impact, the submissions noted the value of the lost load, the fact that the breaches exacerbated the effect of the grid emergency and that five distributors were significantly impacted in that they were required to carry out unnecessary load shedding and their customers were unnecessarily disconnected.

[23] The Authority and Transpower agreed that a starting point of \$175,000 would reflect the overall seriousness of the breach.

¹³ Section 56(2) of the Electricity Industry Act.

¹⁴ *Commerce Commission v New Zealand Milk Corporation* [1994] 2 NZLR 730 (HC) at p 553.

Commerce Commission v Koppers Arch Wood Protection (NZ) Limited & Ors HC Auckland, CIV 2005-404-2080, 6 April 2006 at [37].

Commerce Commission v Alstom Holdings SA [2009] NZCCLR 22 (HC) at [18] (Commerce Act 1986); *Chief Executive of Land Information New Zealand v Clevedon-Kawakawa Road Ltd* (2021) NZHC 1831 at (28) (Overseas Investment Act 2005); *Financial Markets Authority v ANZ Bank New Zealand Ltd* [2021] NZHC 399 at [32] (Financial Markets Conduct Act 2013); *Takeovers Panel v New Image Group Ltd* (2022) NZHC 1504 at [44] (Takeovers Act 1993); *Reserve Bank of New Zealand v TSB Bank Ltd* [2021] NZHC 2241, [2021] NZCCLR 27 at [2] (Anti-Money Laundering and Countering Financing of Terrorism Act 2009).

Aggravating and Mitigating Factors

- [24] The submissions noted that a previous breach by the System Operator¹⁵ was an aggravating factor under section 56(2)(e) of the Act.
- [25] In mitigation, the submissions noted the following factors as they related to provisions in section 56(2) of the Act:
- (a) Section 56(2)(d): the System Operator was operating in a dynamic and complex situation, and its staff took immediate action under difficult circumstances to avert a potentially more widespread and longer duration;¹⁶
 - (b) Section 56(2)(f): Transpower self-reported the incident to the Authority, co-operated with the Authority's investigations and subsequently reached an agreement with the Authority on the relevant Code breaches; and
 - (c) Section 56(2)(h): Transpower has subsequently taken numerous remedial steps to address both the breaches and the wider set of contributing factors to the events of 9 August and its impacts, including consultation with the Authority and with other industry participants. The Panel was provided with a summary of the actions taken.
- [26] The Authority and Transpower agreed that a net reduction of \$25,000 was appropriate and submitted that the reduction was comparable to other discounts applied for mitigating factors in previous decisions.¹⁷ Further, they submitted that standing back, an overall penalty of \$150,000 was appropriate as it recognised the severity of the breach whilst making appropriate allowance for the circumstances of the breach and the system operator's remedial actions following the event.

Ruling Panel's Remedial Order Decision

Pecuniary Penalty Order

- [27] The Rulings Panel notes the limits on its considerations as outlined in paragraph [20] above to consideration of whether the proposed penalty is within the proper range. The Panel, having reviewed the agreed facts, and noting that the Authority and Transpower agreed that the breaches were in the very high band (\$150,000 to \$200,000), has decided that the starting point of \$175,000 is within the proper range. Further, the Panel accepts that a net reduction of \$25,000 is appropriate and

¹⁵ On 2 March 2017, the system operator breached the reasonable and prudent operator standard: *Electricity Authority v Transpower New Zealand Ltd and others*. The breach was one of a number of breaches admitted following the creation of Grid Islands causing significant frequency disturbances outside the normal band throughout the grid in both the south and north islands.

¹⁶ The Panel recognised this as a mitigating factor in *Electricity Authority v Transpower New Zealand Ltd and ors* Rulings Panel 2 March 2017

¹⁷ *Electricity Authority v Transpower New Zealand Ltd* Rulings Panel Decision C-2022-001, *Electricity Authority v Transpower New Zealand Ltd & ors* Rulings Panel 2 March 2017, and *Electricity Authority v Transpower New Zealand Ltd* Rulings Panel, 27 March 2020

consistent with previous Panel decisions.¹⁸ Accordingly, pursuant to section 154(1)(d) of the Act, Transpower is ordered to pay a pecuniary penalty of \$150,000.

- [28] Whilst the Panel notes the steps and actions taken since the breaches occurred to mitigate against future breaches and to generally enhance information and communications, System Operator preparedness and demand management, it also notes that, to date, a replacement Load Shed Restore tool (LSR tool) has not been developed. Whilst it is not within the scope of the Panel's powers to require the development of an LSR tool, the Panel does encourage the prompt development and deployment of one as it might be an essential tool for the management of future or potential grid emergencies.

Costs

- [29] The Authority and Transpower agreed that it would be appropriate for Transpower to pay the Authority's reasonable costs in pursuing the formal complaint, calculated by reference to the District Court 2B scale. They quantified the costs payable as \$6,207.50. Pursuant to section 54(1)(g) of the Electricity Industry Act, Transpower is ordered to pay the Authority the sum of \$6,207.50 for its reasonable costs associated with the complaint.
- [30] Neither the Authority nor Transpower sought an order in respect of the Panel's Costs. No order for the Panel's costs is made.

Orders

- [31] The Rulings Panel declares the System Operator breached:
- (a) Clause 80 of the System Operator's Policy Statement; and
 - (b) Clause 7.1A(1) of the Code.
- [32] The Rulings Panel orders:
- (a) Transpower is required to pay the Crown a pecuniary penalty of \$150,000; and
 - (b) Transpower is to pay costs to the Electricity Authority of \$6,207.50.
- [33] This decision is, in accordance with regulation 44 of the Electricity (Industry) Regulations, to be published by the Electricity Authority within ten (10) working days of receipt.

¹⁸ Section 54(2) of the Electricity Industry Act states that the Rulings Panel must take into account its own previous decisions in respect of any similar situations previously dealt with by the Authority or any predecessor of the Authority.

Recommendation to Amend the Regulations

- [34] Section 54(1)(i) of the Electricity Industry Act states that, on determining a complaint, the Rulings Panel may recommend to the Minister that a change should be made to the regulations or the Act.
- [35] The Panel, having made a decision on this matter, recommends that Subpart 2 of the Electricity Industry (Enforcement) Regulations 2010, which provides for limitations of liability when the Panel makes a remedial order for a breach under section 54 of the Electricity Industry Act, be amended to reflect the increase in the maximum pecuniary penalty under section 54(1)(d) from \$200,000 to \$2 million.
- [36] By way of background, in April 2018, an advisory panel was established and was tasked with considering the entire electricity supply chain, including consumer interests, prices, energy hardship, affordability, technology and the regulatory framework. Dubbed the Electricity Price Review, a Final Report was presented in May 2019. Following this, in March 2021, the Ministry of Business Innovation and Employment issued a consultation paper titled Compliance Framework: Electricity. The consultation paper recommended changes to the Electricity Industry Act to increase the maximum penalty in section 54 of the Act. The paper noted:

24. *It is important in any regulatory regime that penalties are material enough to incentivise compliance and deter non-compliance.*

- [37] The Electricity Price Review resulted in an Electricity Industry Amendment Bill being presented in Parliament in March 2022. The Bill adopted many of the recommendations made in the Final Report. During the legislative process, at the Select Committee stage, the Economic Development, Science and Innovation Committee recommended that the Compliance Framework recommendation as regards maximum penalties be included in the Bill. It stated:

We recommend introducing several new clauses, 22A to 22C, to implement some recommendations from the recent review of the compliance framework by the Ministry of Business, Innovation and Employment. That review resulted from the 2021 Electricity Price Review, and was still under way when we invited the public to submit on the bill.

We believe these changes would improve the Act's regulatory regime.

Clause 22A would:

- *increase the maximum penalty that the Rulings Panel may impose on an industry participant for breaching the Code from \$200,000 to \$2 million*
- *allow the Rulings Panel to impose an additional \$10,000 penalty for every day (or part-day) that a breach continues*

- *require the Rulings Panel to consider two or more Code breaches, relating to the same event or a series of closely related events arising from the same cause, as a single breach.*

We recommend this change to ensure that the possible penalty deters industry participants from breaching the Code (for example, where a breach could net them revenue far in excess of the \$200,000 penalty). It would incentivise parties to remedy breaches in a timely fashion, especially in situations where the breach is extended and uninterrupted.

We note that these are maximum penalties and we expect the Rulings Panel to exercise its judgement appropriately. However, to make this clear, clause 22B would insert a requirement into section 56(2) requiring the Rulings Panel to consider the impact of the penalty on the participant, and on the electricity industry.

[38] The Bill was amended and passed, and the increased penalties came into effect on 1 September 2022. Provisions in Subpart 2 of the Electricity Industry (Enforcement) Regulations 2010, which refer to section 54 of the Electricity Industry Act, have not, however, been amended to reflect the change of the maximum pecuniary penalty from \$200,000 to \$2 million. For example:

50 Limits apply to Rulings Panel orders

The limits on liability set out in this subpart apply only to orders made by the Rulings Panel under section 54 of the Act.

53 Limit of liability of system operator

The system operator is not liable for a sum in excess of—

- (a) *\$200,000 in respect of any one event or series of closely related events arising from the same cause or circumstance; or*
- (b) *\$2 million in respect of all events occurring in any financial year.*

54 Limit on liability in relation to metering

- (1) *This regulation applies to any breach of the Code relating to metering standards or metering information (including failing to provide accurate information).*
- (2) *No industry participant is liable for a sum in excess of \$200,000 in respect of any one event or series of closely related events arising from the same cause or circumstance.*

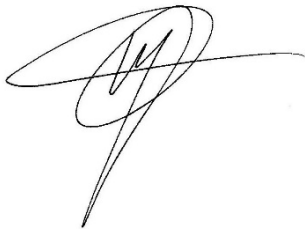
[39] The intention of the increased maximum pecuniary penalty was to incentivise compliance and deter non-compliance. The Rulings Panel considers that the incentives and deterrents that now apply to industry participants generally should

also apply to the system operator and to breaches of the Code relating to metering standards and metering information and that, more generally, the liability limits in Subpart 2 should be reviewed in light of the amendment to the enabling Act. Accordingly, the Panel recommends that the Minister of Energy and Resources review and amend Subpart 2 of the Electricity Industry (Enforcement) Regulations 2010 to reflect the increased maximum pecuniary orders that the Rulings Panel can now impose.

Right to Appeal

[40] The right to appeal Panel decisions is set out in sections 64 and 65 of the Act.

Issued this 2nd day of May 2023

A handwritten signature in black ink, consisting of a large, stylized 'M' followed by a horizontal line that extends to the right and then curves downwards.

M.J. Orange
Rulings Panel Chair

Appendix A: Relevant events as agreed between the Authority and Transpower

11. At 6:42 am, in response to the record demand forecast for the evening peak, the System Operator issued a customer advice notice (CAN) to industry participants:
 - 11.1. advising that North Island residual generation was forecast to be less than 200 MW for trading periods 36–41 (5:30 pm – 8:00 pm); and
 - 11.2. stating that industry participants “should ensure energy and reserve offers and load bids are accurate”.
12. At 1:02 pm, the System Operator issued a warning notice (WRN) to industry participants:
 - 12.1. advising that there was a risk of insufficient generation and reserve offers nation-wide from 5:30 pm to 8:30 pm; and
 - 12.2. under the heading “Participants are Requested to” listed the following actions:
 - (a) increase energy offers,
 - (b) increase instantaneous reserve offers, and
 - (c) decrease demand.
13. By late afternoon, generation offers decreased below the System Operator’s predictions, because:
 - 13.1. wind generation had declined due to weather conditions; and
 - 13.2. one hydroelectric generating station (Tokaanu) experienced ongoing trouble with weed blocking its inlet screens.
14. At 5:10 pm, the System Operator issued a grid emergency notice (5:10 GEN) to industry participants:
 - 14.1. advising of an anticipated New Zealand-wide grid emergency between 6:00 pm and 7:00 pm, arising from insufficient generation offers to meet demand and provide for N-1 security for a contingent event; and
 - 14.2. requesting that industry participants increase energy offers, increase instantaneous reserve offers, and decrease demand.
15. At 6:00 pm the system began to run with deficit reserves, indicating that if Huntly Unit 5 were to trip then Automatic Under Frequency Load Shedding (AUFLS) would be required to stabilise the system.
16. Further generation (179MW) was lost between 6:00 pm and 6:35 pm due to with a reduction in wind generation and the loss of hydro generation at Tokaanu.
17. Demand peaked at 6:23 pm at 7,157 MW. This was the highest instantaneous peak electricity demand in New Zealand’s history.

18. At 6:47 pm, the System Operator updated the grid emergency notice (6:47 GEN):
 - 18.1. advising of a New Zealand-wide grid emergency that had begun at 6:00 pm and was now anticipated to last until 8:00 pm, arising from insufficient generation offers to meet demand and provide for N-1 security for a contingent event; and
 - 18.2. under the heading “Participants are Requested to”, listing the following actions:
 - (a) increase energy offers, increase instantaneous reserve offers
 - (b) decrease demand; and
 - (c) “All network companies to reduce load by 1% until further notice. A demand allocation notice will follow shortly” ;and
 - 18.3. under the heading “Consequences if insufficient responses by participants” stating that where participant response was insufficient, the System Operator would manage demand to alleviate the Grid Emergency.
19. Following the 6:47 GEN:
 - 19.1. by 6:53 pm, national demand had reduced by one per cent (compared to 6:47 pm levels).
 - 19.2. by 7:07 pm, national demand had reduced by three per cent.
20. This reflected both the natural demand reduction over the course of the evening and distributors’ response to the 6:47 GEN.
21. At 7:09 pm, the System Operator provided a further updated grid emergency notice to industry participants (7:09 DAN):
 - 21.1. advising of a New Zealand-wide grid emergency that had begun at 6:00 pm and was anticipated to last until 8:00 pm, arising from insufficient generation offers to meet demand and provide for N-1 security for a contingent event;
 - 21.2. under the heading “Participants are Requested to” listing the following actions:
 - (a) increase energy offers,
 - (b) increase instantaneous reserve offers,
 - (c) decrease demand; and
 - (d) “all network companies to control load to the limits specified under the heading “Demand Allocations.”

- 21.3. The table of demand allocations contained demand allocations for both network companies (distributors) and other offtake users directly connected to the grid.¹⁹
22. The 7:09 DAN was issued by the System Operator to supersede the blanket one per cent demand reduction requested by the 6:47 GEN and replace it with a participant-specific maximum demand reduction request that was intended to more equitably allocate the aggregate one per cent demand reduction target amongst distributors and large consumers directly connected to the grid. The 7:09 DAN was sent to 27 distributors and eight directly connected consumers.
23. The 7:09 DAN contained erroneous allocations that meant that some recipients could increase demand above their current demand from the grid at the time the 6:47 GEN was issued, but requested that eight recipients further decrease demand.
24. Several distributors suspected the DAN contained incorrect allocations. Some queried their regional Transpower National Grid Operations Centre (NGOC) or the System Operator’s National Control Centre (NCC).²⁰ Some queries were passed on to NCC by the relevant NGOC, alerting coordinators to problems with the DAN. Those distributors were asked to hold-off following the DAN.
25. However, five distributors queried the NGOC operators and had the DAN allocations confirmed. Of these, two distributors (WEL Networks and Electra) complied with the requests by effecting (further) ²¹ disconnections of consumers, equivalent to approximately 37 MW in total.
26. At 8:20 pm, the System Operator provided a further updated grid emergency notice to industry participants (8:20 GEN):
- 26.1. advising of a New Zealand-wide grid emergency that had begun at 6:00 pm and was anticipated to last until 9:00 pm, arising from insufficient generation offers to meet demand and provide for N-1 security for a contingent event; and
- 26.2. under the heading “Participants are Requested to”, listing the following actions:
- (a) increase energy offers,
 - (b) increase instantaneous reserve offers; and
 - (c) “all network companies can increase load by five per cent on current load.”

¹⁹ These other offtake users being Methanex, NZAS, Origin Energy, Rayonia, Todd, Todd Generation Taranaki Limited, Tranz Rail, Whareroa Power and Winstones.

²⁰ The NCC is the national dispatch and market scheduling control centre. It is responsible for determining the appropriate operational actions needed to ensure grid stability and communicating those actions to relevant parties. The NGOC is the grid owner’s grid switching control centres.

²¹ These were two of the five distributors who had already disconnected customers in order to achieve the one per cent demand reduction requested by the 6:47 GEN (the other three being Unison Networks, Marlborough Lines, and North Power).

27. At 9:01 pm, the System Operator issued a final revised grid emergency notice to industry participants advising that the grid emergency had ended and that all participants could restore all load.
28. By approximately 9:15 pm, distributors had fully restored load.
29. At 11:54 pm, the System Operator issued an Island Shortage Situation Notice (ISS Notice) to the pricing manager and market participants.
30. The combined effects of the demand reductions called for by the System Operator allowed the System Operator to maintain control of system frequency.
31. If demand had not been reduced in response to the 5:10 pm GEN and the 6:47 pm GEN, the system frequency could have fallen below 49.25 Hz (resulting in an under-frequency event), which could ultimately have triggered AUFLS.
32. Copies of all the above notices are annexed as Appendix A.

THE SYSTEM OPERATOR'S SYSTEMS AND PROCESSES

The Policy Statement and the LSR tool

33. The System Operator has prepared a policy statement setting out how it will meet its obligations under the Code, including its obligations under Technical Code B (Policy Statement). The Authority has approved the Policy Statement and published it under cl 8.12B of the Code.
34. Clauses 8.8 and 8.10 of the Code provide that the Policy Statement is part of the Code and binds the System Operator.
35. Clause 80 of the Policy Statement prescribes the methodology that the System Operator must use when it judges it appropriate to re-allocate demand in a grid emergency:
 - 35.1. Where there is an energy capacity constraint, demand allocations are to be pro-rated based on the proportion of energy consumed at each offtake point, compared to the total energy consumed in the affected region (after adjusting for seasonal variation).
 - 35.2. Where there is a peak capacity constraint, demand allocations are to be pro-rated based on the ratio of the average annual peaks of each offtake point's demand, and the total demand in the affected region.
36. The 7:09 DAN was generated by the System Operator using its Load Shed Restore (LSR) tool. The purpose of the LSR decision support tool is to calculate and equitably allocate maximum demand limits to participants that take electricity from the grid – that is, distributors and other offtake users directly connected to the grid.
37. This tool is a decision support tool used by the System Operator coordinators when managing a grid emergency requiring load shedding in real time. The tool is not fully automated and requires manual setup to define the magnitude and location of the load management required.

38. The use of the LSR decision support tool is intended to meet two aims:
 - 38.1. ensure that demand management is allocated equitably across all parties; and
 - 38.2. provide specific maximum demand levels for each participant that takes electricity from the grid to actively manage to. This is intended to ensure that the power system is stabilised during the triggering event.
39. When used in an island-wide or national event, the tool is designed to use the annual energy consumption of the affected parties to apportion demand management targets equitably between them.
40. The output of the LSR decision support tool is a demand allocation notice such as the 7:09 DAN.
41. The LSR tool was designed in 2007, but 9 August 2021 was the first time it was used in a national event outside of annual System Operator staff training. When it has been used previously, it has been for localised events involving a limited number of grid users in the same geographical region, which did not give rise to concerns about the methodology in the tool.
42. The methodology in the Policy Statement and the LSR tool were not fit for purpose in a grid emergency of the kind that occurred on 9 August 2021:
 - 42.1. The methodology in the Policy Statement relies on the annual energy consumption figures to allocate demand, which created distortions. Localised increases in summertime demand for irrigation purposes will distort this relationship between regions with and without heavy irrigation load.
 - 42.2. The inclusion of industrial load in the LSR decision support tool would further distort any load allocation based on annual energy consumption.
 - 42.3. Moreover, the System Operator's procedure for managing demand did not describe how the LSR tool was to be used to reallocate demand for a nationwide peak capacity constraint. The System Operator instead used the tool as if managing a nation-wide energy capacity constraint.
43. Functional testing of the LSR decision support tool was conducted by the System Operator following every market system software release that has impacted the tool. However, this testing focussed on whether the tool was still producing results, not whether those results were correct.
44. Given the risk factors that were apparent on 9 August 2021, there was sufficient warning to carry out a trial run of the LSR decision support tool before the evening peak commenced. However, this opportunity was not taken up.
45. Following an initial run of the LSR decision support tool on 9 August 2021, at 6:49 pm, System Operator staff did realise that the inclusion of the industrial loads in the LSR tool was causing discrepancies in the demand allocation. Staff endeavoured to correct the issue but the industrial load contribution was not completely removed from the allocation calculation in the 7:09 DAN.

46. Specifically, industrial consumers were removed from the list of parties to be allocated a demand management limit but their expected demand was not removed from the control total. This resulted in their portion of the demand reduction being shared among the remaining participants on the demand allocation notice. This error, and its impact on the individual demand allocations included in the 7:09 DAN, was not apparent to the System Operator's coordinator using the LSR tool. The 7:09 DAN therefore contained allocation errors of which the coordinator was unaware.
47. Operational processes and training of System Operator staff has focussed on identifying the need for the use of the tool, producing a demand management result with the tool and issuing the demand allocation notice. The associated operation process documentation includes a single "sanity check results" step but includes no guidance as to what to look for in the results.
48. On 9 August 2021, the System Operator did not "sanity check" the results of the LSR tool run before issuing the 7:09 DAN. Done properly, a final sanity check before publication to participants could have picked up the materially incorrect peak demand allocations and ensured the erroneous DAN was not sent, minimising the impact of the grid emergency.
49. The process to load historical data into the tool was a manually triggered script overseen by the System Operator's IT support teams. The System Operator discovered earlier in 2021 that this process had not been run since 2017. A manual update script was developed and run. Date formatting errors in the 2021 update script meant that the data load was not successful. This went unnoticed as no checks were performed to confirm that the data update was successful.

The ISS Notice

50. Clause 5(1A) of Technical Code B provides as follows:

The System Operator must issue a notice in writing to all participants whenever, or as soon as practicable after, under clause 6, the System Operator has issued, amended, or revoked an island wide instruction to electrically disconnect demand.
51. On 9 August 2021, the System Operator requested only that industry participants reduce demand, and did not require the electrical disconnection of demand. Consequently no ISS Notice was required under the Code.
52. As a result of the ISS Notice, the pricing manager applied the scarcity pricing provisions in Part 13 of the Code.