Update to scarcity pricing settings

Consultation paper

1 November 2024

ELECTRICITY AUTHORITY
TE MANA HIKO

Executive summary

The Electricity Authority Te Mana Hiko (Authority) seeks your views on our proposal to update the scarcity pricing settings in the Electricity Industry Participation Code 2010 (Code).

Increasing electrification creates opportunities for consumers, but also creates challenges for security of electricity supply. At rare times, there may not be enough generation to meet short periods of peak demand on the power system. When this happens, the system operator can instruct demand to be reduced to ensure stability of the power system. Price signals for these periods are known as scarcity prices.

Scarcity prices in the wholesale market signal a theoretical cost to consumers of not having enough resource to meet their needs. This can be the cost of not having enough energy to meet their demand needs or enough instantaneous reserve to provide the level of security of supply they expect.

Scarcity prices are set high to incentivise a response from industry participants to avoid a shortfall of supply. Scarcity prices are expected to occur infrequently. Most consumers will not be affected by scarcity prices as they pay a fixed price for their electricity. Retailers or spot-exposed consumers may pay scarcity prices if they do not have sufficient risk management contracts in place to manage their spot price exposure if scarcity pricing occurs.

We propose to update the scarcity pricing settings to:

- better reflect consumer expectations that power cuts should not occur while there is generation capacity available for dispatch
- better reflect the high cost of involuntary demand reduction on consumers and businesses
- improve price signals during periods of potential scarcity to assist with resource coordination and to continue to provide robust signals for investment in flexible capacity.

Recent events and recommendations have highlighted the need to update scarcity pricing settings

The scarcity pricing settings were last fully examined in 2011, although the Authority updated the way the settings are applied in 2022. In 2023, the Market Development Advisory Group (MDAG) recommended an update to the scarcity pricing settings in the Code to ensure they properly reflect the value of reliability to consumers.

Recent power system events on 10 May 2024 and 5 July 2024 also highlighted how the current wholesale market settings can produce outcomes that:

- are inconsistent with consumer expectations that involuntary demand reduction should be an action of last resort
- increase risk to system security
- increase the likelihood of system operator discretionary action.[1]

[1] While discretionary action is an essential tool for the system operator to maintain power system stability, it can impact on price signals. It also does not provide real-time visibility of costs to spot price exposed consumers and retailers.

Updating the scarcity pricing settings will ensure that the correct pricing signals are set in the wholesale market to encourage investments in new generation and demand side flexibility. These investments will ensure that consumers receive the levels of security of supply they expect. This review is also consistent with the Government Policy Statement released in October 2024 which highlights the importance of accurate pricing signals.

We propose to update the values for energy and reserve scarcity and for controllable load

Given the time since the last full review, and recent recommendations and events, we have reviewed the scarcity pricing settings. We propose to:

- **Raise the energy scarcity values to be more reflective of the value of lost load**. The current energy scarcity values are $10,000/MWh for the first 5% of demand, $15,000/MWh for the next 15% of demand and $20,000/MWh for the remaining 80% of demand. We propose raising these values to $17,000/MWh, $25,000/MWh and $40,000/MWh respectively.
- **Reduce the number of reserve scarcity blocks** to simplify the interaction between reserve and energy scarcity. We propose to set the scarcity price for fast instantaneous reserve at $4,000/MWh and sustained instantaneous reserve at $3,500/MWh.
- **Raise the default value for controllable load** from $9,000/MWh to $16,000/MWh to align with the updated energy scarcity values.

Updating the scarcity pricing settings is one of several initiatives the Authority is implementing to support security of supply for winter 2025

We are moving at pace to implement initiatives to support security of supply for winter 2025. In addition to updating the scarcity pricing settings we are also:

- **improving market information** by increasing the transparency of thermal fuel availability
- **enhancing outage information and coordination** by developing and consulting on potential improvements to the outage coordination process[2]
- **improving the accuracy of intermittent generation forecasts** to support resource coordination and price signals.[3]

The update to scarcity pricing settings is part of our ongoing approach to improve and refine the market settings for security of supply to ensure they are fit-for-purpose through the transition, reflect consumer expectations and improve long-term outcomes for consumers.

Retailers can reward consumers and support security of supply

Retailers have an important role to support security of supply. They can price demand response into the market and directly reward consumers for their efforts. While controllable load is a useful tool for managing periods of tight supply, we want to see this controllable load shift from distributors to retailers and be signalled in the wholesale market. We support the continued development of retail offerings to incentivise and reward consumers for shifting demand away from peak periods.

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[2] First steps in improving outage coordination | Our consultations | Our projects | Electricity Authority

[3] Improving the accuracy of intermittent generation forecasts | Our projects | Electricity Authority

Have your say

We are consulting on this proposal for four weeks until 5pm on 29 November 2024. All feedback will be carefully considered and inform the Authority's decision making on updates to the settings for energy and reserve scarcity, and the default value for controllable load.

We will publish a decision by April 2025 so that the new settings can be applied in the market system before winter 2025.

Contents

1. Purpose

This paper seeks your feedback on updated scarcity pricing values

1.1. The purpose of this consultation paper is to seek feedback from interested parties on the Authority's proposal to update the values for scarcity pricing in the Electricity Industry Participation Code 2010 (Code). This is to ensure the values better reflect consumer expectations for security of electricity supply.

1.2. Section 39(1)(c) of the Electricity Industry Act 2010 requires the Authority to consult on any proposed amendment to the Code and corresponding regulatory statement. Section 39(2) provides that the regulatory statement must include a statement of the objectives of the proposed amendment, an evaluation of the costs and benefits of the proposed amendment, and an evaluation of alternative means of achieving the objectives of the proposed amendment. The regulatory statement is set out in section 6 of this paper.

2. How to make a submission

2.1. The Authority's preference is to receive submissions in Microsoft Word in the format shown in Appendix B to OperationsConsult@ea.govt.nz with "Consultation Paper – Scarcity pricing" in the subject line by 5pm on Friday 29 November 2024.

2.2. If you cannot send your submission electronically, please contact OperationsConsult@ea.govt.nz or 04 460 8860 to discuss alternative arrangements.

2.3. Authority staff will acknowledge receipt of all submissions electronically. Please contact the Authority at OperationsConsult@ea.govt.nz or 04 460 8860 if you do not receive electronic acknowledgement of your submission within two business days.

2.4. Please note the Authority intends to publish all submissions it receives. If you consider that the Authority should not publish any part of your submission, please:

(a) indicate which part should not be published

(b) explain why you consider we should not publish that part

(c) provide a version of your submission that the Authority can publish (if we agree not to publish your full submission).

2.5. If you indicate part of your submission should not be published, the Authority will discuss this with you before deciding whether to not publish that part of your submission.

2.6. However, please note that all submissions received by the Authority, including any parts that the Authority does not publish, can be requested under the Official Information Act 1982. This means the Authority would be required to release material not published unless good reason existed under the Official Information Act to withhold it. The Authority would normally consult with you before releasing any material that you said should not be published.

3. Background

3.1. Electricity supply and demand must always be in balance to maintain quality of supply to consumers.

3.2. The system operator instructs generators on when and how much electricity to generate to meet the level of demand on the power system. The system operator also procures instantaneous reserves to manage potential events that could cause the supply-demand balance to be disrupted.

> **What are instantaneous reserves?**
>
> Instantaneous reserves (reserves) are the generation capacity or demand reduction that is available to quickly respond to an unexpected event such as the sudden loss of a significant generator or transmission circuit. These events can cause a large drop in system frequency.
>
> Instantaneous reserve can be provided by generators (generator reserves) or by automatically disconnecting demand (interruptible load).
>
> There are two types of instantaneous reserve. Fast instantaneous reserve (FIR) is procured to quickly arrest the fall in frequency. FIR must respond within one second for interruptible load or within six seconds for generator reserves, and the response must be sustained for at least 60 seconds. FIR is sometimes referred to as six second reserve.
>
> Sustained instantaneous reserve (SIR) is procured to restore the frequency to its normal operating band. SIR must respond within 60 seconds and the response must be sustained for at least 15 minutes. SIR is sometimes referred to as 60 second reserve.

What is scarcity?

3.3. At rare times, there may not be enough generation to meet the level of demand on the power system, even after some parties have voluntarily reduced demand.

3.4. A shortfall of electricity supply is known as energy scarcity. When this happens, the system operator can instruct demand to be reduced to a level that can be supplied to ensure stability of the power system.[4] This is known as emergency load shedding.

3.5. Reserve scarcity refers to rare situations where there is a shortfall of either FIR or SIR to cover the largest risk on the power system. When this happens, the system operator will dispatch the system with reduced security.

3.6. Reduced system security does not directly impact consumers. However, it does increase the likelihood of a potential interruption to the supply of electricity to consumers if there is a large, unexpected, event on the power system.

[4] The system operator gains the powers to instruct the disconnection of some consumer demand in an emergency situation.

3.7. Energy scarcity, FIR scarcity and SIR scarcity each has an associated scarcity price.

What is scarcity pricing?

3.8. Scarcity pricing signals the point where it is theoretically more economically efficient to reduce demand or reserve requirements rather than to dispatch more expensive generation to keep the supply-demand balance. It may also signal that demand will need to be reduced if there is no more generation in the supply stack.

3.9. Scarcity prices provide important signals. These are:

(a) short term: for industry participants to make more resource[5] available to meet demand in real time and to avoid the need for emergency load shedding. The application of scarcity prices also provides revenue certainty to providers of last-resort resources

(b) long term: for industry participants to invest in flexible capacity such as demand response, batteries and fast-start generation.

3.10. An unintended consequence of emergency load shedding is a reduction of the spot price. In normal situations, a reduction in demand should result in a decrease in prices.[6] However, when emergency load shedding occurs, electricity prices should remain high to reflect the impact on consumers and the adverse state of the power system.

3.11. These high prices, or energy scarcity prices, are achieved by applying an administered price to the wholesale electricity price when emergency load shedding occurs.

3.12. Most consumers will not be affected by scarcity prices as they pay a fixed price for their electricity. Retailers or spot-exposed consumers may pay scarcity prices if they do not have sufficient risk management contracts in place to manage their spot price exposure if scarcity pricing occurs.

3.13. The value of lost load (VoLL) can be used to determine the appropriate administered price for energy scarcity.

3.14. VoLL is primarily used for investment and reliability assessments when deciding how and where to improve the electricity transmission network. The scarcity pricing values used in the wholesale market are intended to provide an investment and coordination signal for investment in flexible resource. Scarcity prices are related to the concept of VoLL but cannot take into account the full range of factors that influence VoLL.[7] Therefore, scarcity prices used in the wholesale market should reference VoLL but must be careful to provide a clear and consistent price signal to coordinate responses to potential shortfall situations.

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[5] Such as generation, reserves or demand response.

[6] According to the economic law of supply and demand.

[7] See paragraph 4.31 for more description of the factors that influence VoLL.

What is the value of lost load (VoLL)?

VoLL represents the economic value, in dollars per MWh, that a consumer places on electricity they plan to consume but do not receive because of a power interruption.

The Code links VoLL, used for the purposes of reliability benefit-based investment assessments, to the concept of the value of expected unserved energy. Subclause 4(1) of Schedule 12.2 of the Code specifies a value of expected unserved energy of $20,000/MWh.

3.15. Without the application of scarcity prices, market prices would fall to more ‘normal’ levels when emergency load shedding occurs. This removes the price signal and incentives for participants to provide all available resource, which increases the likelihood of further emergency load shedding. It also removes the signal to participants to invest in new resources to meet the increased level of demand in the future.

3.16. Reserve scarcity pricing refers to the price of reserves when there is a shortfall of FIR or SIR to cover the largest risk on the power system.

3.17. Reserve scarcity prices are achieved by applying an administered price to the FIR and SIR price when there is a shortfall of FIR or SIR respectively.

3.18. The administered prices for FIR and SIR scarcity are set at levels lower than the energy scarcity price. This is so that emergency load shedding is prioritised as an action of last resort. Other factors such as energy and reserve offer prices can also help to determine the appropriate settings for reserve scarcity prices.

3.19. While scarcity prices are high, we do not expect them to occur very often. Energy and reserve scarcity prices in the forward market schedules provide a strong signal for resource providers to commit more resource ahead of when it is required.

3.20. The final price for a trading period is calculated as a time-weighted average of the published dispatch prices over the half-hour trading period. Scarcity prices can apply for a short time during a trading period, but their effect will be averaged out over the non-scarcity prices published. As a result, the spot price is often lower when final prices are calculated. This is shown in the case study for 5 July 2024 below.

Case Study: SIR prices for 5 July 2024

On 5 July, the system was dispatched with SIR scarcity for part of the 08.00 trading period. The table below shows the North Island SIR price for each five-minute dispatch schedule:

Dispatch Schedule	North Island SIR price ($/MWh)
08.00am	92.99
08.05am	92.99
08.10am	3,000
08.15am	3,000
08.20am	92.99
Final price	1,139

The final price is calculated as the time-weighted average of prices for the trading period.

This case study demonstrates how scarcity prices can occur for short periods within a 30-minute trading period, and how the final price is averaged out over the trading period.

Scarcity pricing is automatically applied when there is not enough electricity or reserves to meet demand

3.21. Scarcity pricing is automatically applied in the market schedules by the Scheduling, Pricing and Dispatch (SPD) tool. SPD determines the overall least-cost allocation of energy and reserves.

3.22. Scarcity prices are set as constraint violation penalties for use by SPD. SPD is a linear optimisation model and seeks to optimise outcomes by attempting to minimise total cost given the physical limitations (constraints) of the power system. It needs to have a constraint violation penalty for each scenario where it may need to 'break' or 'violate' a constraint to ensure the model can return a solution.[8]

3.23. To minimise total cost, SPD will break constraints with a cheaper or lower price before breaking higher priced constraints.

3.24. The Code specifies the constraint violation penalties for energy scarcity, FIR scarcity and SIR scarcity.

[8] In the case of energy scarcity, the constraint broken is that dispatched supply must equal expected demand.

The perfect combination of energy and reserve scarcity prices is difficult to achieve

3.25. The complex interaction between energy and reserves in the electricity market makes it difficult to achieve a perfect combination of energy and reserve scarcity prices.

3.26. If the reserve scarcity price is set too low relative to energy offer prices, then available expensive supply may not be used and SPD may determine that it is cheaper to reduce system security (reserve scarcity), particularly if there are multiple risk setters.[9]

3.27. However, if the reserve scarcity price is set too high relative to energy scarcity prices, then SPD may select load shedding (energy scarcity) instead of reducing reserve requirements and keeping the lights on (reserve scarcity).

Scarcity pricing is intended to apply in specific circumstances

3.28. Scarcity pricing is designed to address the risk to security of supply incentives when demand is instructed to be disconnected.

3.29. Therefore, it is intended that scarcity pricing for energy should only apply when:

(a) an island-wide[10] or national scarcity situation results in the need for the system operator to instruct demand management

(b) the safe operation of transmission assets in real time can only be managed through instructed demand management.

3.30. Scarcity pricing is not intended to apply for unplanned outages where a demand limit is applied to assist with the restoration of supply.

The current scarcity price settings for energy and reserves

Energy scarcity has three price blocks ranging between $10,000/MWh to $20,000/MWh

3.31. Energy scarcity prices should generally reflect the cost of involuntary demand reduction to consumers.

3.32. Table 1 summarises the current energy scarcity price settings in the Code:

Table 1: Current constraint violation penalties for energy scarcity situations

Tranche	Energy contingent risk violation ($/MWh)	Quantity
1	10,000	For the first 5% of demand
2	15,000	For the next 15% of demand
3	20,000	For the remaining 80% of demand

[9] The generating unit or transmission circuit requiring the largest amount of reserve cover is known as the risk setter. The risk setter can change between market schedules and depends on the system conditions. There can be multiple risk setters. This happens when more than one plant is dispatched to an output that requires the same level of reserve cover, and they are the highest risks on the system.

[10] North Island or South Island but could include an electrical island.

3.33. The current three-block regime for energy scarcity was introduced in November 2022 as part of real-time pricing (RTP) implementation. The three blocks represent escalating need for emergency load shedding.

3.34. The first $10,000/MWh block and the third $20,000/MWh block are based on the floor and cap prices from the original scarcity pricing regime. These values were set in 2011 after extensive analysis and consultation.

3.35. The price blocks are broken down as follows:

(a) The initial $10,000/MWh block is set at 5% of load. It is intended to reflect the bottom end of the scarcity value range. Although this 5% block is a modest fraction of load, it is likely to be enough to address many emergency situations.

(b) The second $15,000/MWh block is set at 15% of load. Together with the initial 5% block, this is designed to estimate the level of demand reduction at the comfortable limit of load management within distribution networks. These two blocks are intended to be enough to address most emergency situations. This incremental block of load is expected to have a substantially higher cost of curtailment because it has a much larger impact on demand. In the absence of more specific data, the price has been set at the mid-point of the scarcity pricing range.

(c) The third $20,000/MWh block contains the remaining 80% of load. Emergency load shedding of this extent should only be required in extreme situations, and affected consumers would be expected to incur significant costs from this curtailment. This block has been priced at the higher scarcity value from the original scarcity pricing regime and is aligned with the value of unserved energy specified in the Code.

3.36. Prices would typically be set by last-resort generation or by dispatchable demand before energy scarcity occurs. The highest energy offer price is normally around $6,000/MWh.[11]

3.37. For more detail on the rationale for the current energy scarcity values and volumes, see Appendix D of the RTP proposal consultation paper.[12]

There are three reserve scarcity price blocks each for fast and sustained instantaneous reserves, ranging between $3,000/MWh to $4,500/MWh

3.38. Table 2 below summarises the current reserve scarcity price settings in the Code:

[11] See paragraph 5.14 for more information.

[12] Electricity Authority, Real-time pricing proposal consultation paper, October 2017.

Table 2: Current constraint violation penalties for reserve scarcity situations

Tranche	Fast instantaneous reserve contingent risk violation ($/MWh)	Sustained instantaneous reserve contingent risk violation ($/MWh)	Quantity (MWh)
1	3,500	3,000	50
2	4,000	3,500	100
3	4,500	4,000	No limit

3.39. When reserves are scarce, high prices are intended to signal the need for additional capacity to maintain system reliability.

3.40. The current settings for reserve scarcity were introduced as part of RTP implementation in 2022.[13] These values were selected based on:

(a) the system operator's shortfall management policies

(b) submissions on the 2019 RTP Code amendment

(c) operational reviews of the 9 August 2021 demand management event.[14]

3.41. The current settings are intended to prioritise a reduction in system security (reserve requirements) before reducing demand (energy requirements). This priority in settings was informed by the events of 9 August 2021. These events made it clear that there is no appetite for forced demand reduction while there are other resources available to maintain electricity supply for consumers. This prioritisation is achieved by setting the price of the FIR and SIR scarcity tranches (blocks) below the bottom tranche of energy scarcity ($10,000/MWh).

3.42. The current settings are also intended to prioritise a reduction in SIR before a reduction in FIR. This is because, in the event of the unexpected loss of generation or transmission, it is more important to quickly arrest the fall in frequency through FIR. While SIR is an important tool to restore system frequency, the system operator has more time to take action to maintain system security. This prioritisation is achieved by setting the price of the SIR scarcity tranche below the FIR scarcity tranches.

The system operator can use discretion to override the scarcity price settings

3.43. The scarcity price settings determine the priorities for reducing demand and/or system security. However, the system operator can override these settings by taking discretionary action to maintain system security.[15]

[13] For more detail on the rationale behind the reserve scarcity values, see Electricity Authority, Real-time pricing proposal consultation paper, October 2017.

[14] Review of 9 August 2021 event | Our projects | Electricity Authority (ea.govt.nz)

[15] This video provides a useful illustration of the application of scarcity pricing in the market system and scenarios where the system operator may apply discretionary action: Scarcity Pricing (youtube.com)

3.44. The system operator may apply discretion to the dispatch solution to maintain compliance with their principal performance obligations.[16] For example, if the SPD tool schedules reserve scarcity and the system operator determines that a high-priced last resort generator is required to preserve system security, they can apply a discretionary constraint in SPD to dispatch that generator.

3.45. Dispatching a generator out of merit order for security purposes is known as 'constraining on' generation. When a generator is constrained on, it does not have the ability to set the spot price for electricity. The generator is compensated for any costs incurred by generating at a final spot price that was lower than their offer price via a constrained-on payment calculated at the end of each month.[17] Purchasers incur the cost of constrained-on payments which are ultimately passed on to consumers.

3.46. It is up to the system operator to determine whether demand management or reduced reserve requirements is an appropriate step or whether it is instead required to constrain on generation for system security. The system operator must do so in accordance with its obligations in the Code and its overall responsibility to act as a reasonable and prudent system operator.

3.47. It is important that the system operator has sufficient flexibility to maintain system security via discretionary action as the Code and SPD cannot account for all potential power system scenarios.

There is a trade-off if discretion is used because the cost of constraining on generation is not reflected in the spot price

3.48. Applying discretion results in a trade-off where the cost of constraining on generation is not reflected in the spot price for electricity. This can result in a situation where a generator of last resort is constrained on for a high price, eg, $6,000/MWh, while market prices remain significantly lower.

3.49. This has the potential impact of removing the high price signal and incentives for participants to provide all available resource, which exacerbates the scarcity situation.

The use of controllable load is closely linked to scarcity prices

3.50. Controllable load is electricity demand that distributors can quickly reduce without affecting consumers, if required to do so by the system operator under a grid emergency. Hot water heating or 'ripple control' is an example of controllable load.

3.51. For winter 2023, the Authority proposed a suite of potential options to address security of supply concerns.[18] One of the options, known as Option E, proposed to provide the system operator and market participants with visibility of the available level of controllable load in grid emergency situations.

[16] Clause 13.70 of the Code allows the system operator to exercise discretion to depart from the dispatch schedule if it is necessary to meet the dispatch objective or to meet the requirements of clause 8.5 in relation to restoration of the power system.

[17] This video provides a useful illustration of when the system operator may exercise discretion to meet system conditions, the impact on the spot price and how constrained on costs are calculated: https://www.youtube.com/watch?v=umG7k38XSlU&list=PLXUccGn4ptEMpoQzNKy2zVUHoI7zoa6j6&index=2

[18] Driving_efficient_solutions_to_promote_consumer_interests_through_winter_2023.pdf (ea.govt.nz)

3.52. Following the success of an urgent Code amendment,[19] the Authority decided to permanently amend the Code to implement Option E.[20] The amendment came into force on 1 May 2024.

3.53. This Code amendment requires distributors to bid controllable load if requested by the system operator and to price it at $9,000/MWh. This price was chosen to provide a strong scarcity-like price signal in the forecast schedules. When controllable load is requested or required to be curtailed, it should provide a strong signal to market participants that the system is close to an energy scarcity situation.

Retailers can reward consumers and support security of supply

3.54. While controllable load is a useful tool for managing periods of tight supply, we want to see consumers directly rewarded for their demand response efforts. To achieve this, we want to see controllable load shift from distributors to retailers so that retailers can price this demand response in the market to support the management of potential scarcity situations.

3.55. Retailers should reflect the value of this response in the way that they reward their consumers. This could be in the form of reduced prices for flexible load or an incentive payment for being available to respond or for actually responding to an event.

3.56. We support the continued development of retail offerings to incentivise and reward consumers for shifting demand away from peak periods.

4. Issues the Authority would like to address

Issues with existing arrangements

4.1. The Authority considers that the current scarcity price settings require updating to better reflect consumer expectations that power cuts should not occur while there is spare generation capacity available. Spare generation capacity is often referred to as ‘residual’.[21]

4.2. The events of 10 May 2024 and 5 July 2024 provide us with real-world examples of how the scarcity price settings can operate in practice, since the current settings were implemented on 1 November 2022.

4.3. On 10 May 2024, New Zealand faced a challenge with tight electricity supply. An unseasonal cold snap for the country coincided with low wind generation and planned outages at several power stations. The system operator reported forecast residual generation as low as 77MW for the morning peak.[22]

4.4. There were two different examples on this day where the SPD tool calculated an outcome that would have resulted in involuntary load shedding, despite the

[19] Implemented in May 2023. See: Decision paper - Clarify the availability and use of discretionary demand control

[20] Code amendment omnibus two

[21] Residual is a measure of physical capacity and provides an indication of the headroom in the supply stack after taking into account energy, reserve and frequency keeping requirements.

[22] This included an energy shortfall of 22MW. This report provides more information on the changes to the residual and the shortfalls observed in the market schedules for 10 May 2024: Market Operations - Weekly Market Movements - 12 May 2024.pdf (transpower.co.nz)

availability of spare generation. This can happen if SPD determines this solution to be the overall cheapest economic outcome.

4.5. It is important to note that the system operator applied discretionary action on 10 May 2024 to dispatch generation that SPD did not clear. This was done to reduce the energy and reserve shortfall. Involuntary load shedding was avoided due to the actions of the system operator, market participants and the public.

4.6. The following three scenarios explain the operational issues that emerged on 10 May 2024 and 5 July 2024 in more detail.

Scenario 1: Energy offers priced just below the energy scarcity price

4.7. Scenario 1 shows how the current settings can prioritise load shedding over dispatching high-priced generation.

4.8. On 10 May 2024, for trading periods 06.00 to 09.30, the residual generation was priced at $9,999.05/MWh. This offer price is very close to the price of the first energy scarcity price ($10,000/MWh).

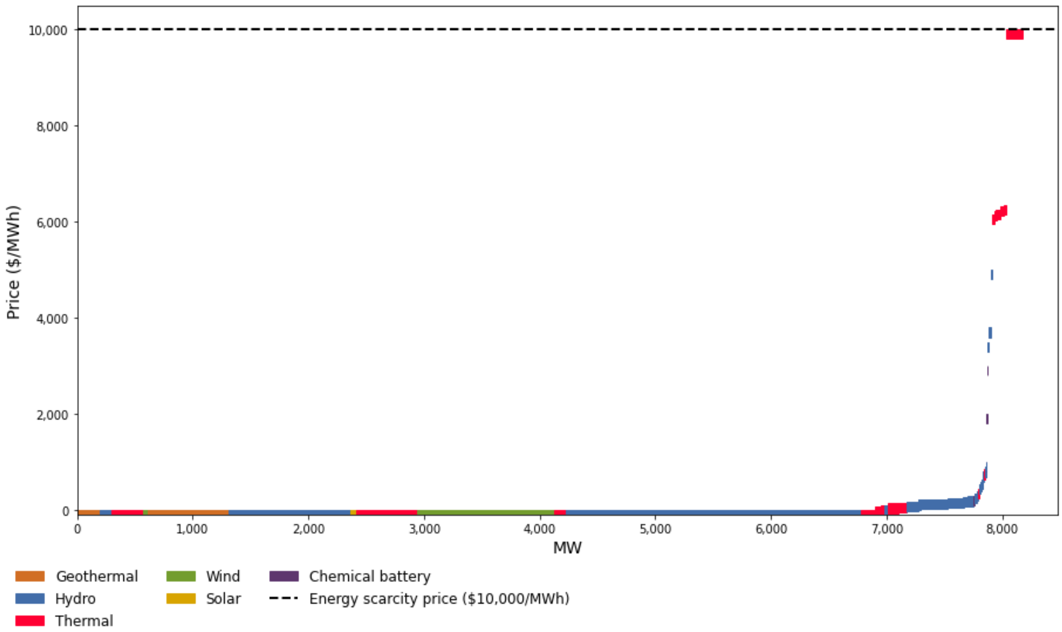
4.9. In this scenario, SPD did not clear this high-priced generation as, after accounting for losses,[23] the marginal cost[24] of providing energy from this generator to where it was needed on the transmission grid exceeded $10,000/MWh. In other words, it was cheaper for SPD to shed load at $10,000/MWh rather than dispatch the residual generation.

4.10. Figure 1 shows the energy offer stack for the 07.30 trading period on 10 May 2024. It demonstrates the steepness of the offer curve at the end of the stack and how close the maximum priced offers were in relation to energy scarcity prices.

[23] As electricity travels through power lines, a proportion of energy is lost as heat, due to the resistance of the lines. This lost energy is known as 'losses.' The losses are higher the greater the distance the electricity travels and the lower the voltage of the line.

[24] Marginal cost refers to the change in total production cost that comes from producing one additional unit of electricity.

Figure 1: Energy offer stack for 07.30 trading period on 10 May 2024



4.11. This scenario highlights to market participants the potential impact of offering energy close to or above energy scarcity prices. This type of offer strategy has the potential to trigger energy and/or reserve shortfalls. The Authority monitors offer behaviour of this type when it occurs as part of our trading conduct monitoring. We aim to ensure that the offer price is justified and that participants understand the outcomes of this offer behaviour.

Scenario 2: Residual generation from the risk setter

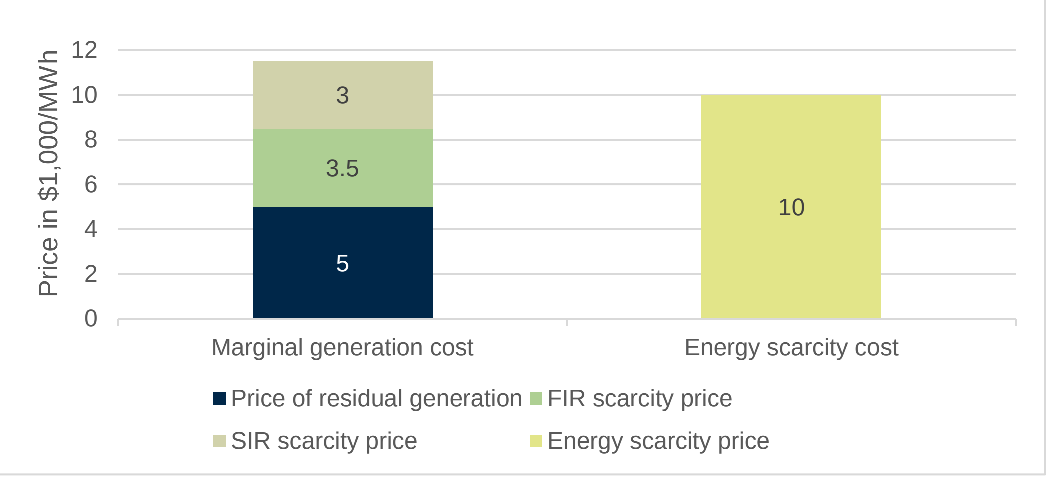
4.12. Scenario 2 provides another example of how the current settings can prioritise load shedding over dispatching high-priced generation.

4.13. On 10 May 2024, residual generation was available from a generator that was also the risk setter. The residual generation was priced at $5,000/MWh. To access additional generation from the risk setter, SPD needed to clear additional FIR and SIR to cover the increased risk.

4.14. However, there was already a shortfall of FIR and SIR, so the reserve was priced at reserve scarcity, $3,500/MWh and $3,000/MWh respectively. Therefore, the marginal cost of generation was $11,500/MWh.[25] It was cheaper for SPD to shed load at $10,000/MWh rather than dispatch the residual generation from the risk setter at $11,500/MWh, as shown in figure 2.

[25] This is the cost of the energy offer price ($5,000/MWh) plus the cost of FIR ($3,500/MWh) plus the cost of SIR ($3,000/MWh).

Figure 2: Comparison of the marginal cost of generation against the energy scarcity price



4.15. High energy offer prices can be a result of short-term increases in generator fuel costs or the signalling to conserve fuel for a later period.

4.16. This scenario demonstrates how there needs to be enough 'room' between the reserve scarcity prices and energy scarcity prices so that reserve scarcity can occur and provide market signals to increase available resources before SPD resorts to load shedding.

Scenario 3: High priced offers relative to reserve scarcity

4.17. Scenario 3 demonstrates how the current settings can prioritise reduced system security even when there is resource available to cover the risk.

4.18. On 5 July 2024, the system was dispatched with SIR scarcity for part of the 08.00 trading period. A key factor was the low quantity of SIR offered into the market for this period. Other contributing factors included low wind generation, planned generator outages and higher demand than expected.

4.19. There was approximately 370MW of residual generation available.[26] However, SPD found it cheaper to reduce system security and dispatch SIR scarcity rather than dispatching high-priced generation.[27]

4.20. There were uncleared SIR offers available priced at around $2,000/MWh. These SIR offers were for partly loaded spinning reserves (PLSR). PLSR can only be provided from a generator that is currently operating. To provide these reserves, a generator of last resort would need to be dispatched for energy at a high cost of around $6,000/MWh. SPD found it cheaper to dispatch SIR scarcity at $3,000/MWh rather than incur the higher cost of dispatching $6,000/MWh energy offers to clear the additional SIR.

4.21. Alternatively, SPD could have dispatched the risk setter to a lower level. Dispatching the risk setter down would reduce both the FIR and SIR requirement. However, this would mean that additional energy would need to be dispatched from higher up in the offer stack. This generation was priced around $4,999/MWh which is higher than the

[26] Residual generation was priced between $4,999.06/MWh to $6,500/MWh.

[27] To either reduce the risk setter or increase reserves in the market to cover the risk.

combined cost of FIR (around $980/MWh at the time) and the cost of SIR scarcity at $3,000/MWh.

4.22. The system operator saw the situation improving (demand reducing) and decided not to constrain on additional reserves.

4.23. This scenario highlights how SPD can prioritise reduced system security when energy offers are high, and SPD needs to clear high-priced generation to clear additional reserve to cover the risk.

Why the Authority is looking to address these scarcity pricing issues now

4.24. Given the time since the last full review and recent recommendations and events, we are reviewing the scarcity price settings to ensure they continue to be fit for purpose.

4.25. Although the scarcity values were last reviewed in 2011, the way they apply was updated in 2022 with the introduction of RTP. The Authority is required to review the scarcity prices and quantities every five years.[28]

4.26. In 2023, the Market Development Advisory Group (MDAG) recommended an update to the scarcity pricing parameters (including the VoLL) in the Code (recommendation 16).[29] Submitters supported the recommendation with one submitter noting that "accurate scarcity prices will be critical to making the business case for flexible capacity like batteries and some demand response".

4.27. The events of 10 May 2024 and 5 July 2024 also highlighted how the current market settings can result in outcomes that:

(a) are inconsistent with consumer expectations that involuntary load shedding should be an action of last resort

(b) increase system security risk while there is resource available to cover the risk

(c) increase the likelihood for the need for system operator discretion which impacts price signals and does not provide real-time visibility of costs to consumers.[30]

4.28. The Authority's review of the 20 June 2024 Northland transmission tower collapse[31] highlighted the need to review VoLL. This was primarily for the purposes of grid investment and reliability assessments as well as for use in consumer impact assessments of actual loss of supply events.

4.29. The Authority is not updating the winter energy and capacity margins, the Security Standards Assumptions Document (SSAD)[32] or VoLL in the Code[33] as part of this review. These form part of the overall market settings for security of supply and are being prioritised for review in 2025.

[28] See clause 13.58AB of the Code. The Authority may review the scarcity price settings at any time and no later than every five years.

[29] Price discovery in a renewables-based electricity system: Final Recommendations PAPER 2023 (ea.govt.nz)

[30] Constrained-on costs are calculated at month end.

[31] Electricity Authority Report Northland tower collapse 20 June 2024

[32] Security Standards Asssumptions Document (ea.govt.nz)

[33] This value dates from late 2004.

4.30. A full update of VoLL is complex and it would take considerable time and effort to conduct a full study. We have identified a quick method to update VoLL solely for the purposes of determining suitable energy scarcity pricing values in the wholesale market.

4.31. A review of VoLL would need to consider a number of factors. These factors could include, but are not limited to:

(a) the type of consumer – residential consumers will place a different value on a loss of supply to large industrial users

(b) the time of day – continuity of supply in the small hours of the morning will have a lower value to most consumers than the morning or evening demand peaks

(c) duration of the supply loss – the inconvenience of a short duration outage will have a lower impact on most consumers than the same quantity of supply loss extended for several hours or days.

4.32. These complex factors would be appropriate for inclusion in a static analysis, such as a grid investment test or when assessing the energy and capacity margins in the SSAD. The complexity of these factors could lead to unpredictable market outcomes if they were applied to a dynamic market scheduling calculation.

4.33. Trying to incorporate all these factors into the wholesale market would lead to price signals that do not allow the right resources to be coordinated to maintain supply to consumers. The scarcity prices used in the market should reference VoLL but must be careful to provide a clear and consistent price signal to coordinate response to potential shortfall situations.

4.34. For this reason, the scarcity pricing values used in the market system are intended to be related to the concept of VoLL but are separate to the concept of true VoLL. Scarcity pricing is a tool to signal the supply and demand balance in the wholesale market in periods of tight supply, whereas VoLL is used for investment and reliability assessments.

4.35. We are focusing on scarcity pricing settings to allow the Authority to act with pace and implement the new settings before winter 2025. Updated settings will assist with resource coordination during peak demand periods and will reduce the likelihood for the public to unnecessarily suffer disruptions to supply.

4.36. In addition to updating the scarcity pricing settings, we are also supporting security of supply for winter 2025 by:

(a) improving market information by improving transparency of thermal fuel information

(b) enhancing outage information and coordination by developing and consulting on potential improvements to the outage coordination process[34]

(c) improving the accuracy of intermittent generation forecasts to support resource coordination and price signals.[35]

[34] First steps in improving outage coordination | Our consultations | Our projects | Electricity Authority

[35] Improving the accuracy of intermittent generation forecasts | Our projects | Electricity Authority

5. Proposal

The proposed amendment

5.1. The Authority proposes to amend the Code to better reflect consumer expectations for security of electricity supply. Our proposal has three parts:

(a) raise the energy scarcity values as specified in clause 13.58AA(2) to be more reflective of VoLL

(b) reduce the number of reserve scarcity tranches as specified in clauses 13.58AA(3) and 13.58AA(4) to simplify the interaction between reserve and energy scarcity

(c) raise the default value for controllable load as specified in clause 5A(4)(a)(iii) of Schedule 8.3, Technical Code B to align with the updated energy scarcity value.

5.2. When determining the appropriate values for energy scarcity and reserve scarcity, it is important to consider the desired outcomes from scarcity pricing. With this proposal, the Authority seeks to:

(a) better reflect consumer expectations that power cuts should not occur while there is generation available to be dispatched

(b) better reflect the cost of involuntary demand reduction on consumers and businesses

(c) improve price signals during periods of potential scarcity to assist with resource coordination and to continue to provide robust signals for investment in flexible capacity.

5.3. Our proposal intends to address the operational issues described in section 4 while upholding the overall objectives for scarcity pricing.

Energy scarcity

5.4. We propose to raise the energy scarcity prices in the Code to allow more room for reserve scarcity to emerge before energy scarcity and to be more reflective of VoLL.

5.5. The market schedules should reflect reserve scarcity first before moving to energy scarcity. As noted in section 4, the current lower bound of $10,000/MWh does not provide enough room for reserve scarcity prices to apply before energy scarcity.

5.6. We have referenced Transpower's 2018 VoLL study[36] to determine appropriate values for energy scarcity. These values are shown in Table 3. They represent the approximate range and mean of points of supply across the country and across different types of consumers at the time of the study.

5.7. Transpower's VoLL results ranged from around $17,000/MWh to $40,000/MWh, and centre around $25,000/MWh. The results are consistent with inflating the 2004 VoLL figure of $20,000/MWh to 2018 values.

[36] Value of Lost Load (VoLL) Study - June 2018.pdf (transpower.co.nz)

Table 3: Comparison of proposed violation settings for energy scarcity situations

	Energy contingent risk violation ($/MWh)		
	Tranche 1	**Tranche 2**	**Tranche 3**
Current scarcity values	10,000	15,000	20,000
2018 VoLL (no index)	17,000	25,000	40,000
2024 VoLL (price index applied	21,000	31,000	50,000

5.8. We applied a price index to the 2018 VoLL figures to inflate them to 2024 values. The indexed values have been calculated using New Zealand's producer price index (PPI)[37] and then rounded to the nearest $1,000. A rounded value helps the market clearly identify when scarcity pricing has been applied. A rounded value is appropriate because they are intended to be an indicative benchmark for VoLL and are not intended to be accurate to the nearest dollar.[38]

5.9. We propose to raise the energy scarcity values to align with the values from the 2018 VoLL study (non-indexed values).

5.10. Applying a price index may create an energy scarcity price that is over-estimated given the far higher than usual rate of inflation during the Covid-19 period due to global supply chain shocks. Given the risk of overinflating the energy scarcity value and analysis of recent energy offer prices, we consider the non-indexed prices at $17,000/MWh, $25,000/MWh and $40,000/MWh to be appropriate prices.

5.11. We do not expect energy scarcity prices to occur often. Energy scarcity prices in the forward market schedules provide a strong signal for resource providers to commit more resource ahead of when it is required. As a result, the spot price is often lower when final prices are calculated.

5.12. The market has not had any instances of energy scarcity since the introduction of RTP. However, low residual situation notices issued by the system operator provide an indication of when the system is heading close to a scarcity situation. The system operator has issued 18 low residual situation notices since the introduction of RTP.[39] Only one of these situations escalated to a more serious Warning Notice (WRN).[40]

5.13. We also note that if energy scarcity does occur, the system operator is highly unlikely to require emergency load shedding beyond the first 5% tranche of demand. For the events of 9 August 2021, the system operator instructed load reduction of 1%.

[37] We also applied the consumer price index (CPI) to the non-indexed values and the rounded values were the same as applying the PPI.

[38] Furthermore, estimates of VoLL are complex and vary by time of day, consumer type and the length of disruption. As VoLL can vary depending on the method of estimation, providing rounded values for scarcity does not introduce any real inaccuracy in relation to underlying VoLL.

[39] Based on analysis from 1 November 2022 to 30 September 2024. The notice sent on 13 June 2023 covered both the morning and evening peaks for 14 June 2023.

[40] WRN issued for morning of 10 May 2024.

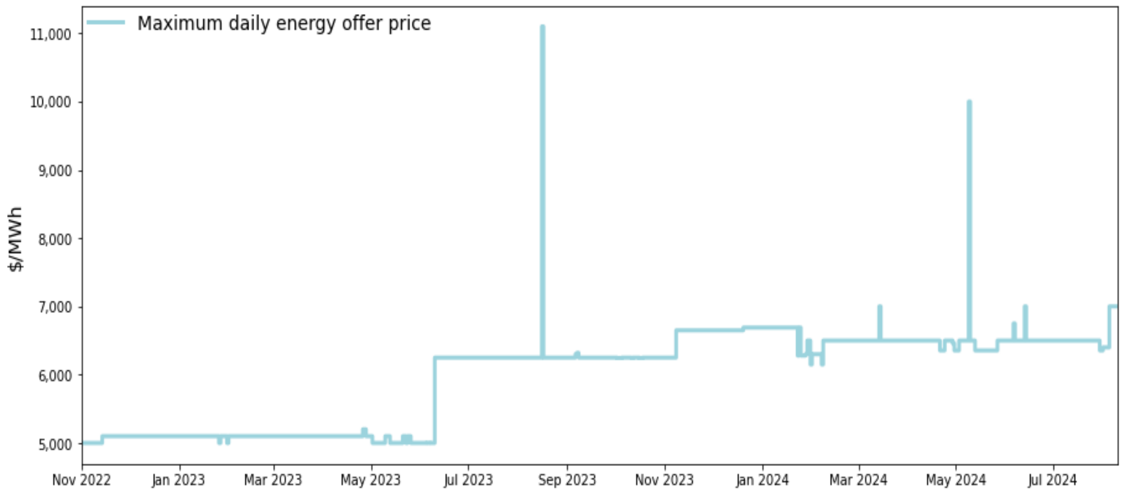
5.14. Figure 3 shows the maximum daily energy offer price since the current energy scarcity pricing settings were implemented in November 2022. The chart shows that the highest energy offer price (the price of last-resort generation) is normally around $6,000/MWh. This high price reflects the high cost of electricity generation using diesel as a fuel.

5.15. The offer price spikes on 17 August 2023 and 10 May 2024 are not sustained behaviour and likely reflect experimentation with offer strategies.

5.16. The lowest energy scarcity value of $17,000/MWh should provide sufficient room for reserve scarcity to emerge before energy scarcity.[41]

5.17. We report on trading conduct on a weekly basis to monitor market behaviour.[42] Any unusual results are highlighted for further analysis by the Authority.

Figure 3: Maximum daily energy offer price since RTP implementation



Q1. Do you support the proposal to raise energy scarcity prices? Please explain your answer.

Q2. Do you support the proposal to set energy scarcity prices at values consistent with 2018 VoLL ($17,000/MWh, $25,000/MWh and $40,000/MWh)? Please explain your answer.

Reserve scarcity

5.18. We propose to reduce the number of reserve scarcity tranches from three tranches to one tranche. We consider it is appropriate to reduce the number of reserve scarcity blocks to reduce complexity in the market and to make price signals easier to understand.

[41] For example, the highest energy offer price (around $6k/MWh) plus the proposed new price of FIR scarcity ($4k/MWh) plus the proposed new price of SIR scarcity ($3.5k/MWh) is around $13.5k/MWh and is well below the proposed new energy scarcity price of $17k/MWh.

[42] Data and insights | Electricity Authority (ea.govt.nz)

5.19. Reserve scarcity settings are complicated in nature due to the potential for multiple risk setting plant and simultaneous FIR and SIR scarcity.

5.20. A single price for all reserve tranches will simplify the interaction between energy scarcity and reserve scarcity. The original design (from RTP) intended that the solution would alternate between energy and reserve scarcity tranches.[43] However, the events of 9 August 2021 showed that there is no tolerance for this sort of outcome. Subsequently, the energy scarcity prices were lifted as part of RTP implementation. However, the reserve scarcity tranches remained unchanged.

5.21. We propose to apply a single scarcity price of $4,000/MWh for FIR and $3,500/MWh for SIR.

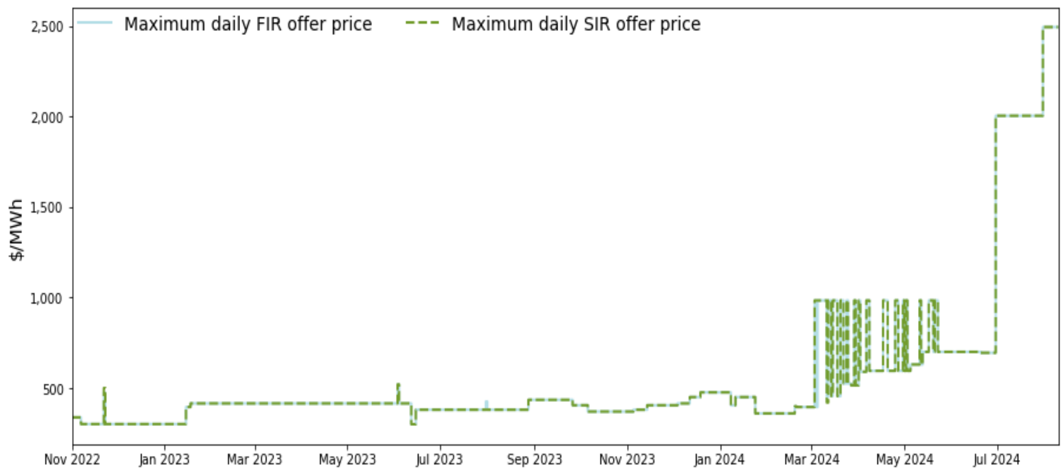
5.22. These values are consistent with the current middle block for reserve scarcity. We consider the middle block is appropriate because reserve offers prices have not exceeded $2,495/MWh since RTP was implemented.[44]

5.23. We do not expect reserve scarcity to occur often, but SIR scarcity is more likely to occur than energy scarcity and FIR scarcity.

5.24. The market has not had any instances FIR scarcity since the introduction of RTP. There have been 18 instances of five-minute SIR scarcity prices in the North Island across nine trading periods since RTP was introduced.

5.25. Figure 4 below shows the maximum daily FIR and SIR price since the current reserve scarcity pricing setting were implemented in November 2022. Figure 4 shows that the highest reserve offer price until 29 February 2024 was around $400/MWh.[45] Note that this has risen significantly in recent months, which is likely a reflection of the low hydro storage situation in winter 2024.

Figure 4: maximum daily FIR offer price and SIR offer price since RTP implementation



5.26. Analysis shows that despite tight market conditions, the maximum reserve offer price of $2,495/MWh is still below the current lowest scarcity reserve price of $3,000/MWh.

5.27. Lifting the price to the middle block will reduce the likelihood of SPD reducing system security when there is still reserve available to cover the risk. It will also provide sufficient room for reserve scarcity to emerge before the proposed first tranche of

[43] The original design is explained in the videos available on Scarcity pricing | Electricity Authority (ea.govt.nz)

[44] For both FIR and SIR. Based on analysis between 1 November 2022 to 10 August 2024.

[45] The mean maximum offer price for FIR and SIR between 1 November 2022 and 29 February 2024 was $389/MWh. The median was $405/MWh for both FIR and SIR for the same time period.

energy scarcity ($17,000/MWh). This is the case even when there are multiple risk setters.[46]

Q3. Do you support the proposal to reduce the number of reserve scarcity prices from three tranches to one tranche? Please explain your answer.

Q4. Do you support the proposal to set reserve scarcity prices at $4,000/MWh for FIR and $3,500/MWh for SIR? Please explain your answer.

Controllable load

5.28. We propose to raise the value of controllable load in the Code from $9,000/MWh to $16,000/MWh. We consider this value appropriate as it aligns with the new proposed energy scarcity price of $17,000/MWh (lowest block).

5.29. Controllable load is intended to be priced at just below energy scarcity to provide a strong scarcity-like price signal in the forecast market schedules. A scarcity-like price for controllable load improves information for participants by:

(a) clearly signalling in the forecast schedules that controllable load management is likely to be needed

(b) providing a strong signal that other resources need to be committed to manage security

(c) providing information on when controllable load management may not be enough to maintain security.[47]

5.30. We are not proposing any other changes to the process for controllable load in this consultation paper.

Q5. Do you support the proposal to raise the price of controllable load to $16,000/MWh? Please explain your answer.

Drafting of the proposed amendment

5.31. The drafting of the proposed amendment is contained in Appendix A.

Q6. Do you have any comments on the drafting of the proposed amendment?

[46] When there are multiple risk setters during a reserve deficit, then the reserve price is multiplied by the number of risk setters, but the energy price will only have a single multiplier of the reserve price added.

[47] Prices in the price-responsive schedule will reflect energy scarcity rather than the price of controllable load when reducing controllable load will not be enough to maintain security.

6. Regulatory statement for the proposed amendment

Objectives of the proposed amendment

6.1. As noted in section 5, the objective of our proposed amendment is to:

(a) better reflect consumer expectations that system security is reduced (reserve scarcity) before requiring involuntary load shedding (energy scarcity)[48]

(b) better reflect the costs of interruption to consumers and businesses

(c) send the right signals operationally and for investment.[49]

The proposed amendment's benefits are expected to outweigh the costs

6.2. The Authority's preliminary view is that the proposed Code amendment would have a positive net benefit for the reasons set out below.

Costs

6.3. The Authority considers the proposed amendments would place little, if any, additional costs on participants. The changes are primarily updates to settings in the market system and we do not expect these new settings to impose any implementation costs on participants.

6.4. We expect that there will be some costs imposed on the system operator to implement the changes to the market system and minor operational process updates. The system operator has advised implementation costs of around $25,000. We consider these costs to be minor when compared to the potential cost of disconnecting consumers due to poor coordination of available resources.

6.5. Discussions with the system operator have indicated that these tool and process changes are minor in nature and can be implemented ahead of winter 2025.

Benefits

6.6. The Authority's preliminary view is that the proposal presents a net benefit to consumers and participants. We see the key benefits as:

(a) increased confidence in the electricity market by better reflecting the value of reliability to consumers

(b) improved short-term security of supply through better price signals for resource coordination at times of potential scarcity. Reducing the need for system operator discretionary action also contributes to this benefit

(c) improved long-term security of supply through better price signals for investment in flexible resources

(d) reduced operational risk to the system operator through reducing the need to apply discretionary action during tight system conditions.

Counterfactual

6.7. The counterfactual to this proposal is to retain the existing scarcity pricing settings.

[48] Reserve scarcity prices are set below energy scarcity prices to allow SPD to dispatch generation in a manner that prioritises energy over reserve, while sending clear market pricing signals.

[49] The energy scarcity values are intended to clearly signal to the market that a response is required.

6.8. This would mean that we could see similar outcomes to the events of 10 May 2024 and 5 July 2024. This could make resource commitment decisions more difficult for participants and could hinder the ability of the system operator to maintain power system security.

6.9. The Authority considers that this would be detrimental to the management of tight capacity situations and does not meet the stated objectives. We note that this approach would also not align with the recommendations from MDAG's report[50] to update the scarcity values.

The Authority has identified other scarcity price settings for addressing the objectives

6.10. The Authority considered several alternative scarcity price settings.

6.11. The implementation cost of these alternatives would be similar to the implementation costs for the proposed option.

Alternatives for energy scarcity

6.12. An alternative for energy scarcity prices could be to set prices at the price-indexed values of $21,000/MWh, $31,000/MWh and $50,000/MWh highlighted in section 5.

6.13. It would also be possible to raise energy scarcity prices to levels higher than VoLL. For example, the lowest block of energy scarcity prices could be set at $30,000/MWh to ensure that SPD never prioritises load shedding when there is available energy in the offer stack.

6.14. However, in the Authority's view this would not result in efficient outcomes and could incentivise generators to submit energy offer prices that are higher than the value to consumers. As VoLL represents the value that consumers put on electricity consumption, it does not make sense to imply that consumers will continue to use electricity at prices higher than VoLL.

6.15. We consider that aligning energy scarcity prices to VoLL maintains a suitable balance between reliability and efficiency.

Alternatives for reserve scarcity

6.16. An alternative for reserve scarcity prices could be to raise the scarcity prices for FIR and SIR to around $7,500/MWh and $7,000/MWh respectively. These values are suggested as they are higher than the price of last-resort generation (around $6,000/MWh). This would strengthen system security by allowing SPD to prioritise high-priced resources to cover the largest system risk.

6.17. Importantly, this approach would also require the energy scarcity price to be raised to allow enough room for reserve scarcity to emerge before energy scarcity.[51] The lowest energy scarcity price would need to be raised to around $21,000/MWh[52] to allow SPD to prioritise load shedding as an action of last resort.

6.18. As noted above, in the Authority's view, energy scarcity prices higher than VoLL would result in inefficient outcomes.

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[50] Price discovery in a renewables-based electricity system: Final Recommendations PAPER 2023 (ea.govt.nz)

[51] As discussed in sections 3 and 5.

[52] This value must be greater than $20.5k/MWh which is the offer price of last-resort generation ($6k/MWh) plus the alternative cost of FIR scarcity ($7.5k/MWh) plus the alternative cost of SIR scarcity($7k/MWh).

6.19. This approach could also over-value the price of reserves. As noted in section 5, the maximum offer price of reserves is below $3,000/MWh, even at times of system stress.

6.20. Another alternative could be to retain the existing three-blocks for FIR and SIR scarcity. Maintaining three blocks would provide a gentler signal and allow scarcity prices to ramp-up and provide more information on the level of reserve scarcity.

6.21. The original three block scheme for reserve scarcity was intended to provide intermediate steps between the three blocks of energy scarcity. However, this scheme was altered following the events of 9 August 2021. The scheme that was implemented as part of RTP lowered the reserve scarcity prices to allow these to clear before energy scarcity. However, three blocks of reserve scarcity were retained as this is what had been consulted on.

6.22. Operationally, experience now suggests that one reserve block of FIR and SIR will provide the desired scarcity signals.

Alternatives for controllable load

6.23. An alternative for controllable load is to leave it at $9,000/MWh as this is a suitable reflection of price of controllable load.

6.24. We do not consider this to be a viable alternative, as the use of controllable load is intended to provide a strong scarcity-like signal.

The proposed amendment is preferred to other options

6.25. The Authority has evaluated other means for addressing the objectives and prefers the proposal. We consider the proposal maintains a suitable balance of meeting consumer expectations for security of supply at appropriate costs.

6.26. The proposed Code amendment is consistent with the Authority's statutory objectives and with section 32(1) of the Act and the Code amendment principles as required by the Authority's Consultation Charter.[53]

6.27. The proposed Code amendment promotes all three limbs of the Authority's main statutory objective as follows:

(a) **competition** is supported through improved price signals to encourage investment in flexibility

(b) **reliability** is supported through updating the market settings to prioritise keeping the lights on and through improved price signals for resource coordination at times of potential scarcity of electricity supply

(c) **efficient** operation of the wholesale electricity market is supported through maintaining accurate price signals during times of potential scarcity.

The proposed amendment is aligned with the Government Policy Statement

6.28. In developing the proposed amendment, we have had regard to the Statement of Government Policy (GPS) to the electricity industry, issued in October 2024.[54] The Authority's proposal for scarcity pricing settings fully aligns with the GPS, including

[53] Electricity Authority Consultation Charter - February 2024

[54] Government Policy Statement on Electricity - October 2024.pdf (beehive.govt.nz)

the statement which calls for spot price signals to accurately reflect the supply and demand balance, recognising that efficient wholesale spot prices in periods of extremely tight supply will be very high.

Q7. Do you agree the proposed amendment is preferable to the other options? If you disagree, please explain your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.

Q8. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?

Appendix A Proposed Code amendment

Part 8 Common Quality

…

Schedule 8.3

Technical Code B - Emergencies

…

5A Request to inform the system operator of available controllable load

…

(4) If the **system operator** requests information regarding available **controllable load** under subclause (1), a **connected asset owner** who submits **difference bids** must, as soon as reasonably practicable following a request by the **system operator**—

(a) submit to the **system operator** for each **trading period** notified by the **system operator** a **difference bid** that represents a reasonable estimate of the available **controllable load** which the **connected asset owner** can use to decrease its **demand**—

(i) at each **conforming GXP** in the **connected asset owner's** network or at a **conforming GXP** nominated by the **system operator** and agreed with the **connected asset owner**; and

(ii) for the **trading period**; and

(iii) at a single price band of ~~$9,000~~ $16,000 per **MWh**; and

…

Part 13 Trading arrangements

…

13.58AA System operator to assign price and quantity values

(1) In preparing each **price-responsive schedule** and each **non-response schedule**, the **system operator** must assign the price and quantity values set out in subclause (2) to the following **demand:**

(a) in relation to a **price-responsive schedule**, forecast **demand** at a **conforming GXP** that is not the subject of a **bid:**

(b) in relation to a **non-response schedule,**—

(i) forecast **demand** at a **conforming GXP** that is not the subject of a **nominated bid;** and

(ii) **demand** at a **GXP** that is the subject of a **nominated non-dispatch bid.**

(2) The price and quantity values are as follows:

(a) ~~$10,000~~ $17,000 per **MWh** for the first 5% of the relevant **demand:**

(b) ~~$15,000~~ $25,000 per **MWh** for the next 15% of the relevant **demand:**

(c) ~~$20,000~~ $40,000 per **MWh** for the remaining 80% of the relevant **demand.**

(3) In preparing each **price-responsive schedule** and each **non-response schedule**, the **system operator** must assign the price and quantity values set out in the following table to the constraints specified in clause 12(5) of Schedule 13.3:

Tranche	Fast instantaneous reserve contingent risk violation ($/**MWh**)	Sustained instantaneous reserve contingent risk violation ($/**MWh**)	Quantity (**MWh**)
1	~~3,500~~ 4,000	~~3,000~~ 3,500	~~50~~ No limit
~~2~~	~~4,000~~	~~3,500~~	~~100~~
~~3~~	~~4,500~~	~~4,000~~	~~No limit~~

(4) In preparing each **price-responsive schedule** and each **non-response schedule**, the **system operator** must assign the price and quantity values set out in the following table to the model parameters specified in clause 1 of Schedule 13.2:

Tranche	6 second contingent risk violation ($/**MWh**)	60 second contingent risk violation ($/**MWh**)	Quantity (**MWh**)
1	~~3,500~~ 4,000	~~3,000~~ 3,500	~~50~~ No limit
~~2~~	~~4,000~~	~~3,500~~	~~100~~
~~3~~	~~4,500~~	~~4,000~~	~~No limit~~

Appendix B Format for submissions

Submitter	

Questions	Comments
Q1. Do you support the proposal to raise energy scarcity prices? Please explain your answer.	
Q2. Do you support the proposal to set energy scarcity prices at values consistent with 2018 VoLL ($17,000/MWh, $25,000/MWh and $40,000/MWh)? Please explain your answer.	
Q3. Do you support the proposal to reduce the number of reserve scarcity prices from three tranches to one tranche? Please explain your answer.	
Q4. Do you support the proposal to set reserve scarcity prices at $4,000/MWh for FIR and $3,500/MWh for SIR? Please explain your answer.	
Q5. Do you support the proposal to raise the price of controllable load to $16,000/MWh? Please explain your answer.	
Q6. Do you have any comments on the drafting of the proposed amendment?	
Q7. Do you agree the proposed amendment is preferable to the other options? If you disagree, please explain your preferred option in terms consistent with the Authority's statutory main objective in section 15 of the Electricity Industry Act 2010.	
Q8. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?	