

# Extended Reserve Code amendment

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## Consultation paper

Submissions close: 5pm 11 May 2021

13 April 2021



## Executive summary

This paper seeks feedback on the Electricity Authority's (the Authority) proposed amendment to the Electricity Industry Participation Code (the Code) to transition Automatic under-frequency load shedding (AUFLS) provision in the North Island to the system operator's proposed 4-block scheme.

### What is AUFLS?

AUFLS is the 'last resort' mechanism by which large blocks of load are shed to prevent system collapse in the event of a failure of major parts of the supply system.

Under current Code arrangements, North Island distributors, and Transpower as grid owner in the South Island, must arm two blocks of load for AUFLS provision. The total load armed in each block must be at least 16% of the provider's total network demand. Each of these blocks is comprised of a varying number of individual relays, the exact number of relays will depend upon the physical network and the distribution of residential, commercial and industrial load within it. Each relay is configured to disconnect the consumer load attached to it should the grid frequency drop below a pre-determined trigger level.

In the event of a rapid significant loss of supply, each provider's AUFLS block will disconnect simultaneously as grid frequency reaches the respective AUFLS block trigger frequency. This disconnection of load, combined with market procured instantaneous reserve, is intended to match the loss in supply and restore grid frequency towards 50Hz.

### A more reliable AUFLS regime

In a letter to the Authority (Appendix A), The system operator has confirmed that the current 2-block AUFLS scheme:

- (a) is fit for purpose
- (b) has appropriate mitigations in place to manage any potential deficiencies (assuming that providers have appropriately armed relays).

The system operator previously held concerns regarding under and over provision of AUFLS, but these have largely been addressed following post event analysis of both the 2011 Huntly station and 2013 HVDC AUFLS events. Additionally, process and tool improvements implemented since 2010 give the system operator confidence that the current 2-block scheme is fit for purpose for managing the power system risks of today.

Notwithstanding this, there are reliability benefits to be gained in moving to the 4-block scheme. Increasing the number of AUFLS blocks provides a more managed response to falling grid frequency. Raising the trip frequency of block 1 AUFLS, from 47.8Hz to 47.9Hz, and reducing the maximum disconnection time from 0.4s to 0.3s, the AUFLS scheme will be better able to respond to significant system events where frequency will fall very rapidly. This response will be further augmented by the inclusion of the rate-of-change-of-frequency trip settings on AUFLS block 4. These changes will reduce the risk of failure of the AUFLS system to prevent cascade failure and justify the transition to the 4-block AUFLS scheme.

### A changing power system

Over the past five years New Zealand has seen a reduction in the number of high-inertia generating plants (large thermal generating units) on the power system and an increase in low-inertia, renewable generators such as wind farms. This trend is signalled to continue for the

foreseeable future with the likely retirement of both the Stratford combined-cycle gas generator and the Huntly Rankine units within the next 5 years. Significant investment in new wind generators has been signalled to start over the next 2 to 3 years with some already under construction. This provides further impetus to enhance the AUFLS scheme.

As the New Zealand economy moves towards greater de-carbonisation and electrification, and the government climate change targets encourage further renewable generation investments, the ability of the grid to withstand a sudden, significant loss of supply will likely diminish. The AUFLS scheme plays a critical role in preventing cascade failure following a significant loss of supply. It is therefore essential that the scheme is flexible and reliable now, and in the future to enable New Zealand to meet its climate change targets without adversely impacting security of supply.

### **This amendment aims to realise the security benefits of the 4-block AUFLS scheme**

The object of this amendment is to deliver an enhanced common obligation 4-block scheme in a way that would not preclude future enhancements. Specifically, the Authority is proposing that the North Island AUFLS system will be transitioned from its current 2-block scheme to a 4-block scheme with rate-of-change-of-frequency (RoCoF) trip settings on the fourth AUFLS block.

The preferred option would:

- (a) deliver the enhanced system security benefits of the proposed 4-block AUFLS scheme as quickly as practicable
- (b) provide a compliance regime that targets an aggregate, Island-wide AUFLS provision
- (c) allow the system operator and individual AUFLS providers to agree an AUFLS provision proposal that maintains overall system security whilst acknowledging the physical limitations of the provider's network
- (d) provide parties that hold current AUFLS provision exemptions with a path to compliance with their AUFLS obligations
- (e) provide a secure technical basis for any enhancements to the AUFLS scheme that may be identified in the future.

The present value of the expected net benefit of this proposal is between \$67.5 million and \$142.9 million, assessed over a period of 15 years.

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# What you need to know to make a submission

## What this consultation paper is about

- 1.1 The purpose of this paper is to consult with interested parties on the Authority's proposal to review the changes brought in by the Electricity Industry Participation Code Amendment (Extended Reserve) 2014 and 2016. These amendments aimed to transition the North Island AUFLS system to a 4-block scheme using market mechanisms to compensate AUFLS providers. Following a re-focus of the project in 2019, the Authority is now consulting on transitioning the North Island AUFLS scheme to the 4-block scheme using a revised common obligation for AUFLS.
- 1.2 Transitioning from the current 2-block AUFLS scheme, with 16% of a provider's load armed in each block, to a 4-block scheme, with 10%/10%/6%/6% of a provider's load armed in blocks 1 to 4 respectively, in the North Island will provide a more resilient electricity system in the face of increased renewable penetration. Changes to the provision monitoring tools and processes will allow providers and the system operator to more efficiently manage their AUFLS arming levels. These changes will promote the reliability and efficiency limbs of the Authority's statutory objective.
- 1.3 The amendment would require North Island providers to submit their current 2-block AUFLS load data to the system operator to baseline the current scheme's arming levels. This data would then be used to inform transition planning for the 4-block scheme on an Island-wide basis. Participants would then be required to work with the system operator to transition their network to the 4-block AUFLS scheme. The data portal proposed for this purpose would also allow providers to submit their load data on an annual basis for periodic review by the system operator.
- 1.4 Section 39(1)(c) of the Act 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 part 3 of this paper.

## How to make a submission

- 1.5 Our preference is to receive submissions in electronic format (Microsoft Word) in the format shown in Appendix B. Submissions in electronic form should be emailed to [WholesaleConsultation@ea.govt.nz](mailto:WholesaleConsultation@ea.govt.nz) with "Extended reserve code amendment" in the subject line.
- 1.6 If you cannot send your submission electronically, post one hard copy to either of the addresses below, or fax it to 04 460 8879.

Postal address

Submissions  
Electricity Authority  
PO Box 10041  
Wellington 6143

Physical address

Submissions  
Electricity Authority  
Level 7, Harbour Tower  
2 Hunter Street  
Wellington

- 1.7 Please note the Authority wants to publish all submissions it receives. If you consider that we 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 we can publish (if we agree not to publish your full submission).
- 1.8 If you indicate there is part of your submission that should not be published, we will discuss with you before deciding whether to not publish that part of your submission.
- 1.9 However, please note that all submissions we receive, including any parts that we do not publish, can be requested under the Official Information Act 1982. This means we would be required to release material that we did not publish unless good reason existed under the Official Information Act to withhold it. We would normally consult with you before releasing any material that you said should not be published.

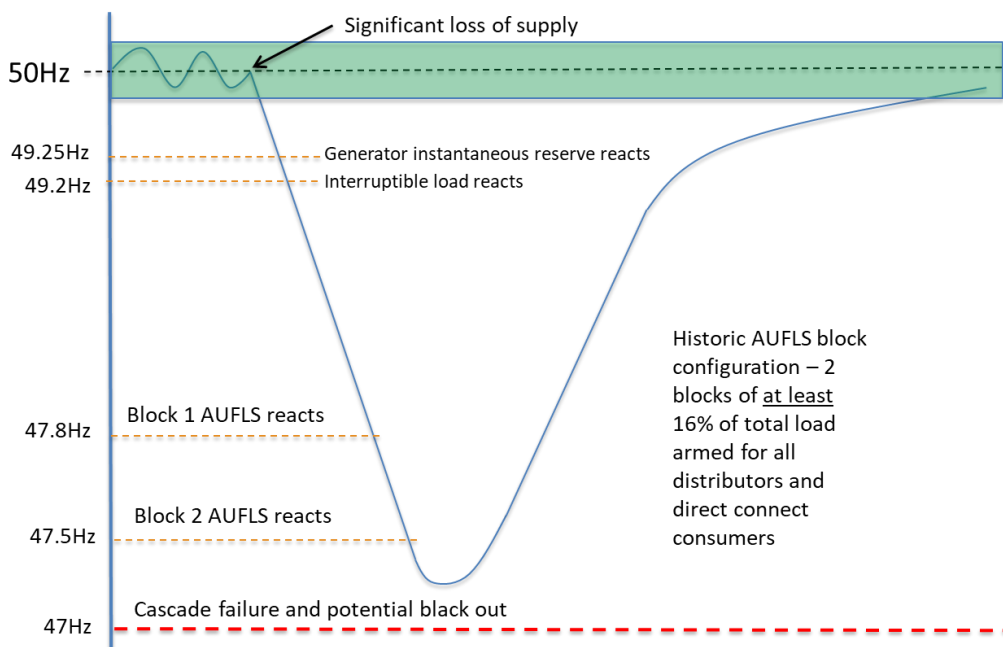
**When to make a submission**

- 1.10 Please deliver your submissions by **5pm** on Tuesday **11 May 2021**.
- 1.11 We will acknowledge receipt of all submissions electronically. Please contact the Authority [WholesaleConsultation@ea.govt.nz](mailto:WholesaleConsultation@ea.govt.nz) or 04 460 8860 if you don't receive electronic acknowledgement of your submission within two business days.

## 2 Issue the Authority would like to address

### AUFLS prevents blackouts due to significant loss of supply

- 2.1 The only purpose of AUFLS is to prevent system blackout in the event of a significant loss of supply. It achieves this by automatically disconnecting enough load to compensate for the lost supply.
- 2.2 In the South Island, Transpower as grid owner is required to arm two load blocks for AUFLS provision. Each block must comprise at least 16% of the total South Island load and be shared across all South Island grid exit points (GXPs).
- 2.3 In the North Island, each distributor is required to arm two blocks of their load, which collectively form the two-block AUFLS provision. Each block is required to comprise “at least” 16% of the distributor’s total network load. The two AUFLS blocks are differentiated by their trip frequencies: block one is armed to trip when the grid frequency drops to 47.8Hz and block two at 47.5Hz.



**Figure 1: North Island 2-block AUFLS activation**

- 2.4 Should the AUFLS system fail and grid frequency fall below 47Hz in the North Island (or 45Hz in the South Island) there is a risk that under-frequency protection relays will disconnect more generating plant. This will further reduce grid frequency and could lead to cascade failure and an Island-wide or national black out.

### Common obligation regime can lead to over provision of AUFLS

- 2.5 The current compliance regime for AUFLS provision focusses on an individual provider’s ability to arm 2 blocks of AUFLS load of at least 16% each at each GXP in their network. In a distribution network, most of the AUFLS relays are installed at individual load feeders or at zone substations.
- 2.6 The remote nature of a number of these assets, coupled with a lack of real-time control systems, has led to a “set and forget” approach to relay arming.

- 2.7 To ensure that they meet their obligations, providers will calculate their provision requirements at their lowest demand times – typically between 2am and 4am. Where possible, providers select load feeders that predominantly serve domestic load.
- 2.8 Domestic load tends to peak significantly in the morning and evenings, whereas industrial and commercial load remains more stable during working hours. This can lead to over provision of AUFLS at high load times. Anecdotally, some providers have indicated that their arming percentages could be as high as 25% for each block at these times.
- 2.9 Whilst AUFLS providers are required to report annually on their AUFLS provision, the data requested has only included seasonal average arming levels. Provision monitoring focusses on the individual provider's performance. This, combined with the coarse nature of the data requirements, makes an accurate Island-wide assessment of AUFLS provision at any given point in time impossible.
- 2.10 This situation has led the system operator to make a conservative assessment of the expected levels of AUFLS provision in their security tools. This reduced AUFLS estimate can impact HVDC transfer levels at times of high northward transfer.

### **Some large industrial consumers are exempted from providing AUFLS**

- 2.11 AUFLS provision requirements are predicated on a provider's ability to manage their load as discrete elements – usually feeders in the case of distribution companies. Large direct connect consumers generally do not have this ability.
- 2.12 Their industrial site will be comprised of several inter-related processes. This will make separating two blocks of at least 16% of their load impossible without shutting down the entire plant. With this limitation in mind, six North Island direct connect consumers have been granted exemptions from AUFLS provision.

### **Thermal unit retirement**

- 2.13 The resilience of the electricity system to sudden supply loss, in part, depends upon automatic governor response<sup>1</sup> from connected generators. This response entails the generators automatically increasing their output to compensate for some of the lost supply. This action slows the initial rate of fall of grid frequency and provides time for the market contracted instantaneous reserves to respond and arrest the frequency fall.
- 2.14 Governor response can only be provided by hydro and thermal fuel generators with some un-dispatched capacity available at the time. A wind or solar generators' output is limited to the maximum level their energy source permits – there is not usually un-dispatched capacity available. Similarly, geothermal generators are typically run to their maximum output levels.
- 2.15 The recent trend in thermal unit retirements (Otahuhu, Southdown and Huntly Rankine units) and the increased build of wind farms is reducing the amount of governor response available at a time when overall demand for electricity is increasing.
- 2.16 This reduction in available governor response will mean that, for a given scale of supply loss, the grid frequency will fall faster during future events. All automated response

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<sup>1</sup> Governors monitor grid frequency as a measure of the load/generation balance of the grid and adjust the generator output to maintain frequency at 50Hz. If grid load increases relative to the connected generation for example, grid frequency drops and the governor responds by increasing the generator output to help restore the balance.



systems require a finite time to activate. If grid frequency falls too quickly during a significant loss of supply, frequency could fall past the AUFLS block 2 trip frequency before the block 1 load has physically responded. This could lead to a failure of the AUFLS scheme to arrest frequency before the system enters cascade failure.

### **Existing arrangements are inefficient and not enduring**

- 2.17 The Authority has formed the view that the current AUFLS settings are inefficient and not enduring in the face of a changing electricity generation mix and increased electrification of the economy.

### **Why the Authority is addressing these issues now**

- 2.18 The system operator has confirmed that the current 2-block arrangements are fit for purpose for now and the near future. However, the current trend for increasing renewable generation and retiring large thermal units is likely to reduce system resilience. This will lead to the electricity system being more sensitive to sudden changes in the load – generation balance.
- 2.19 This sensitivity may result in the grid frequency falling faster or further for a given scale of supply loss. Moving to a 4-block AUFLS scheme will provide a scheme better able to disconnect the appropriate quantity of load for a given loss of supply. The RoCoF relay setting on the fourth AUFLS block will provide a timely response to rapid falls in grid frequency.
- 2.20 The Authority proposes moving to a 4-block scheme using an amended version of the common obligation requirements of the current scheme. Once implemented, this will provide a sound technical basis on which future enhancements may be considered.
- 2.21 This amendment will not change the AUFLS obligations of South Island grid owners.

**Q1. Do you agree the issues identified by the Authority are worthy of attention?**

### 3 Regulatory Statement for the proposed amendment

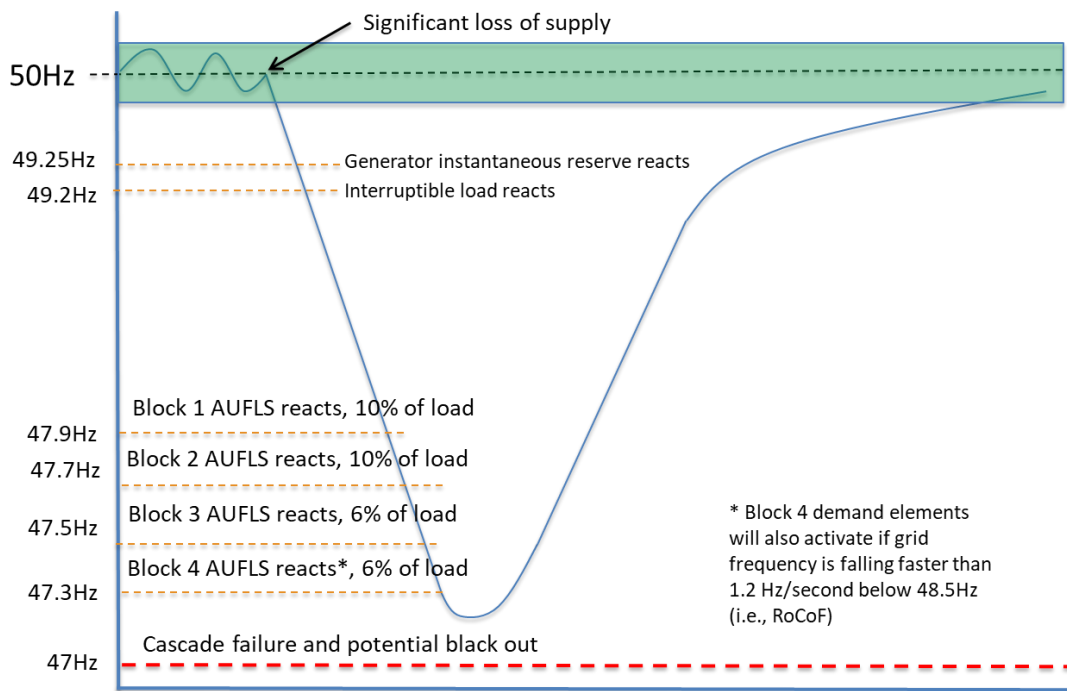
#### Objectives of the proposed amendment

- 3.1 The Authority is proposing that the North Island AUFLS system will be transitioned from its current 2-block scheme to a 4-block scheme with RoCoF trip settings on the fourth AUFLS block. Provider arming levels will be monitored by the system operator on an annual basis to ensure the appropriate amount of load is armed in each block to maintain system security.
- 3.2 The objectives of the proposed amendment are to improve the efficiency and reliability of the North Island AUFLS system. The Authority expects the transition to 4-block AUFLS to achieve this by:
- (a) delivering the enhanced system security benefits of the proposed 4-block AUFLS scheme as quickly as practicable,
  - (b) providing a compliance regime that targets an aggregate, Island-wide AUFLS provision,
  - (c) allowing the system operator and individual AUFLS provider to agree a modified AUFLS provision proposal that maintains overall system security whilst acknowledging the physical limitations of the provider's network,
  - (d) providing parties that hold current AUFLS provision exemptions with a path to compliance with the AUFLS provision obligations where possible,
  - (e) providing a secure technical basis for any enhancements to the AUFLS scheme that may be identified in the future.

**Q2. Do you agree with the objectives of the proposed amendment? If not, why not?**

#### The proposed amendment

- 3.3 The system operator has previously proposed a move to a 4-block AUFLS scheme in the North Island with an additional RoCoF trigger setting on AUFLS block 4 load relays. This proposal was included in the Authority's 2014 Extended Reserve consultations.



**Figure 2: proposed North Island 4-block AUFLS activation**

3.4 In addition to the primary trip settings illustrated, AUFLS blocks 2 to 4 will also include a backup trigger setting. The backup settings will ensure that should the combination of instantaneous reserve and the preceding AUFLS blocks not be enough to restore grid frequency back towards the normal band, the next AUFLS block will disconnect to assist in that restoration.

**AUFLS Technical requirements report will be incorporated by reference**

3.5 The technical specifications and compliance requirements for AUFLS provision will be described by the system operator in the AUFLS Technical Requirements (ATR).

3.6 Section 32 of the Electricity Industry Act empowers the Authority to incorporate by reference a wide range of material, including standards, requirements, recommended practices of international bodies, codes of practice issued under the Electricity Act 1992, or any other written material that deals with technical matters and, in the opinion of the Authority, is either too long or impracticable to be published as part of the Code.

3.7 While the power to incorporate material by reference under section 32 gives that material legislative effect, even where material is not authored by the Authority itself, the decision to incorporate ultimately lies with the Authority, as the entity that has been given the delegated authority to make and administer the Code.

3.8 The content of the ATR document is not dissimilar to that of the specific materials that could be incorporated into the Code under section 32(3), or the wider materials already incorporated into the Code, given the specialist nature of the ATR document and practical protocols relating to shedding demand. In that sense, we consider that the current form of ATR document likely complies with the requirement to “deal with technical matters”.

3.9 Further, only the system operator has the requisite technical expertise and system knowledge to author the ATR. On that basis, it would be impracticable for the Authority

to author the ATR and authorship should remain with Transpower, subject to the Authority's ultimate approval for inclusion in the Code.

- 3.10 Process for amending and consulting on those amendments is included in schedule 8.6 of the proposed Code amendment.
- 3.11 Given the technical nature of the ATR and the expected high threshold for change that would necessitate a change to the 4-block AUFLS scheme, the Authority has not set a periodic requirement for the system operator to review the ATR. The system operator may, at any time, propose a change to the ATR.
- 3.12 Changes considered technical and non-controversial would require invitation to comment from participants prior to approval by the Authority.
- 3.13 Changes considered to have more than a minor impact on participants would require the system operator to consult with participants it considers affected by the changes prior to seeking approval from the Authority. Notwithstanding the consultation undertaken by Transpower, the Authority may undertake a wider consultation on the proposed changes prior to making a final decision as to whether to accept Transpower's proposal.
- 3.14 A draft of the proposed ATR is included for reference in this consultation (Appendix B).
- 3.15 The system operator will consult separately on the contents of the ATR, following the completion of this consultation.

Block description	Relay performance		Relay Setting	
	Trigger setting	Maximum demand disconnection time (s)	Relay hold time (s)	Guard frequency (Hz)
1 Primary	47.9 Hz	0.3	0.1	
2 Primary	47.7 Hz	0.3	0.1	
2 Backup	47.9 Hz	15	14	
3 Primary	47.5 Hz	0.3	0.1	
3 Backup	47.7 Hz	15	14	
4 Primary	47.3 Hz	0.3	0.1	
4 Backup	47.5 Hz	15	14	
4 RoCoF	-1.2 Hz/s	0.3	0.1	48.5

**Table 1: Proposed 4-block AUFLS relay settings**

**Shorter maximum disconnection time already achievable**

- 3.16 The current 2-block AUFLS regime requires a minimum 0.4 second maximum disconnection time. Data supplied under the previous implementation of the Extended Reserve project, and the results of the technical interviews conducted by the system operator and the Authority in mid-2018, suggest that over 60% of the then current AUFLS systems can respond in a much shorter timeframe.
- 3.17 Those systems that cannot respond within 0.3s are likely to be older systems that would need to be replaced to comply with other technical requirements of the 4-block AUFLS scheme.
- 3.18 By reducing the maximum disconnection time to 0.3s, the AUFLS system will be better able to respond to rapid falls in grid frequency, better suiting New Zealand's small, isolated power system.

### **Modified common obligation and compliance monitoring**

- 3.19 The Authority is proposing to implement this scheme using a modified common obligation approach. Whilst every distributor and direct connect consumer will be obligated to provide AUFLS, individual provision will be assessed based on the provider's contribution to the overall AUFLS scheme.

### **Establishing a data portal for AUFLS load data**

- 3.20 To aid in this, a data portal will be implemented that will allow distributors to submit load data for their proposed scheme and assess their compliance. The system operator will require distributors to submit load data for each of their AUFLS feeders on an annual basis for monitoring purposes. Direct connect consumers will not be required to submit load data via the portal for the purposes of assessing and monitoring equivalence arrangements.
- 3.21 This data will be required to include the half hour average load for each AUFLS feeders over the course of the previous calendar year. This is a significant increase in the resolution required by the current monitoring process.
- 3.22 This increased resolution and annual submission requirements will allow the system operator to more closely monitor AUFLS provision as the electrification of the economy gains pace. This will allow distributors to make changes their AUFLS arming patterns in a timelier fashion and the system operator to maintain their system security models.
- 3.23 The data specification will be included as part of the system operator's asset capability statement requirements. The submission frequency and deadlines for data submission will be included in the ATR.

### **Minimum provision levels for block sizes**

- 3.24 The proposed block sizes will remain as minimum provision levels however, the improvement in monitoring data resolution will allow the system operator to consider the physical constraints of a provider's network when assessing compliance.
- 3.25 The system operator will be able to review an individual distributor's arming levels in the context of improved data resolution for the whole North Island scheme. The data portal provides the system operator the flexibility to accept a distributor's AUFLS scheme that meets or exceeds the minimum block size requirements if the scheme allows for better AUFLS management in the North Island.

### **Enhanced data for compliance**

- 3.26 The system operator will be able to use the enhanced compliance data to determine whether, when considered as a part of the Island-wide AUFLS scheme, the provider would be better adjusting its AUFLS arming scheme to provide less than the stated minimum at certain times of the day to reduce the over-arming potential at other times.
- 3.27 This more nuanced approach will have benefits for grid security as it will avoid possible over provision and the need for additional over-frequency arming during high HVDC transfer periods.
- 3.28 The Authority will require the system operator to provide the raw relay testing and load profile data to the Authority on request. This will enable the Authority's independent monitoring of the powers system and market settings.

- 3.29 In addition to providing the raw data, The Authority may request the system operator to provide an assessment, based on the information provided by AUFLS providers, as to whether the AUFLS scheme is secure.

### **2-Block to 4-Block AUFLS transition**

- 3.30 The initial data load, for calendar year 2021, will be used to baseline the current 2-block AUFLS scheme provision. Adjustments to some provider's 2-block arming schemes may be requested should any issues be identified.
- 3.31 The 2-block data will then be used to inform a transition plan for providers to move to the 4-block scheme. Providers will work with the system operator to develop a plan that completes the transition as quickly as practicable but does not adversely impact system security.
- 3.32 In May 2018, staff from the system operator and the Authority interviewed 14 North Island AUFLS providers to determine their technical readiness to implement the 4-block AUFLS scheme.
- 3.33 At that time a small number of providers had, through maintenance schedules and network upgrades, already replaced their legacy AUFLS relay with system capable of supporting the 4-block AUFLS settings, though the majority had not. All but two providers relied on grid owner owned relays to provide at least some of their AUFLS capability. Transpower as grid owner has already indicated to some providers that these relays will need to be replaced, at the provider's expense, once the transition to the 4-block AUFLS scheme starts.
- 3.34 The efficient procurement of extended reserve project proposed an 18-month transition period for AUFLS providers to update or replace relays as necessary. However, this time period was based on a reduced number of relays needing replacement.
- 3.35 With the need for most providers to initiate capital works projects to replace a proportion of their relays, the Authority proposes that providers aim to complete their transition work before **30 June 2025**. This extended timeframe is intended to allow providers to update their capital expenditure plans during their normal planning processes and have enough time to complete the necessary work.

### **Equivalence arrangements and exemptions**

- 3.36 Direct connect consumers unable to isolate appropriate proportions of their load to provide AUFLS will be encouraged to seek equivalence arrangements for their AUFLS provision obligations.
- 3.37 The 2018 technical review interviews revealed that some large industrial sites may already have under-frequency relays installed to protect sensitive plant. These relays are likely to be set to disconnect the entire site should grid frequency fall to 47Hz or lower.
- 3.38 Subject to agreement with the system operator, the consumer may be able to adjust their protection relays to trip at one of the later AUFLS blocks. Any load armed in excess of their aggregate 32% obligation would be available to contract out to other providers to satisfy their obligation.
- 3.39 The system operator would review the proposed arrangements in accordance with the Code. Based on the evidence provided, the system operator would form an opinion on compliance with the Technical Code, even if the assets or configuration of assets do not strictly comply, before approving or declining it. Direct connect consumers are strongly

encouraged to engage with the system operator as soon as possible with equivalence proposals.

- 3.40 The Authority would expect current exemption holders to make a reasonable effort to secure equivalence arrangements before applying for a further exemption to the Code.
- 3.41 Current exemptions will expire when this Code amendment comes into force. The Authority is proposing to use a transitional arrangement to extend the current exemptions until **30 June 2022**. This will allow time for exemption holders to put new arrangements in place.

**AUFLS system testing**

- 3.42 The efficient procurement of extended reserve 2014 Code amendment removed the provisional Code clauses for routine AUFLS system testing. Whilst the clauses were no longer in print, participants were still required to comply with them until such time as the system operator produced the first procurement schedule under the efficient procurement of extended reserve code clauses.
- 3.43 This amendment seeks to re-instate the original Code clauses, Schedule 8.3, technical Code A, Appendix B Clauses 1, 6 and 7.
- 3.44 The drafting of the proposed amendment is contained in Appendix C.

<b>Q3. Do you agree with the proposed changes to the monitoring data resolution and requirements? If you disagree, what monitoring regime do you think would be more efficient?</b>
<b>Q4. Do you agree with the incorporation by reference of the ATR and the proposed process for amending the ATR?</b>
<b>Q5. Do you agree that a 30 June 2025 deadline will provide enough time for providers to transition their systems to the 4-block AUFLS scheme?</b>
<b>Q6. Do you agree with the use of equivalence arrangements to allow previously exempted parties to work towards compliant AUFLS provision?</b>

**The proposed amendment’s benefits are expected to outweigh the costs**

- 3.45 The only purpose for AUFLS is to prevent system black out in the event of a significant loss of supply. With the re-focus of the project to provide a technical transition to a 4-block AUFLS scheme, the benefits of the 4-block scheme have been quantified based on the 4-block scheme’s enhanced reliability over the 2-block scheme, should an AUFLS event occur,
- 3.46 The costs and benefits of the scheme have been calculated as:

<b>Costs and benefits</b>	<b>Net present value over 15 years</b>
<b>Benefits</b>	
Reduced probability of blackouts due to increased reliability of the 4-block scheme	\$75.4m to \$150.8m

<b>Costs</b>	
Upgrade and install relays	(\$7.4m)
AUFLS monitoring information systems	(\$0.5m)
<b>Net benefits (costs)</b>	<b>\$67.5m to \$142.9m</b>

- 3.47 On the basis of this analysis, it should be noted that the transition to a 4-block AUFLS scheme can be justified solely on the basis of the improved reliability of the scheme.
- 3.48 While the system operator’s modelling suggests a reliability improvement of 43% for the 4-block scheme over the 2-block scheme, an improvement of greater 4.5% would be sufficient to provide a net benefit for the change.
- 3.49 The full cost benefit analysis is provided in Appendix D.

**Q7. Do you agree the benefits of the proposed amendment outweigh its costs?**

**The technical solution has previously been presented to the industry**

- 3.50 In October 2013, the Authority and the system operator held a series of workshops where the system operator’s technical design was presented. Submission received on subsequent consultations agreed that the proposed 4-block scheme was an improvement over the current 2-block scheme. This was supported by the cost benefit analysis provided with these consultations.

**The proposed amendment is preferred to other options**

- 3.51 The Authority has evaluated the other means for addressing the objectives and prefers the proposal. An evaluation of these options and an assessment against the proposal follows.

**4-block provision on an “at least” basis with no change to the monitoring regime**

- 3.52 A continuation of the “at least” provision requirement of the 2-block scheme into the 4-block scheme would provide for the technically simplest transition. However, the continuation of the current over arming practice would mean that load may be assigned to AUFLS that could otherwise have been assigned to other uses, such as interruptible load.

- 3.53 Further, the system operator would still likely require the additional over frequency arming contracts that it procured in December 2017 to manage potential over-tripping issues at times with high HVDC northwards transfer.

**4-block provision on an “as close as practicable” basis with dynamic arming management**

- 3.54 Dynamic management would always provide optimum AUFLS coverage and make load management resources available for other uses. However, implementing the scheme would require significant investment in new AUFLS relays and communications infrastructure for a large proportion of the North Island providers, this would significantly increase both the transition cost and timeframe for the 4-block scheme.



- 3.55 Adding a dynamic management as a part of the transition to the 4-block scheme increases the system risk associated with the transition planning. The AUFLS scheme's only purpose is to protect the New Zealand power system from black out in the event of a significant loss of supply.
- 3.56 Enhancements to the scheme, particularly those that increase the complexity of the scheme, should be carefully considered and only implemented on a stable scheme design.

**Q8. 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 objective in section 15 of the Electricity Industry Act 2010.**

**The proposed amendment complies with section 32(1) of the Act**

- 3.57 The Authority's objective under section 15 of the Act is to promote competition in, reliable supply by, and efficient operation of, the electricity industry for the long-term benefit of consumers.
- 3.58 Section 32(1) of the Act says that the Code may contain any provisions that are consistent with the Authority's objective and is necessary or desirable to promote one or all of the following:

**Table 2: How proposal complies with section 32(1) of the Act**

(a) competition in the electricity industry;	The amendment will allow for the efficient allocation of demand response resources.
(b) the reliable supply of electricity to consumers;	The amendment will improve the resilience of the electricity system to sudden, significant, loss of supply
(c) the efficient operation of the electricity industry;	The amendment will ensure that the appropriate amount of demand is disconnected in response to a given loss of supply. This will allow the efficient level of over frequency arming is procured and that demand response resources can be allocated to more efficient uses where appropriate
(d) the performance by the Authority of its functions;	The proposed amendment will not materially affect the performance of the Authority
(e) any other matter specifically referred to in this Act as a matter for inclusion in the Code.	The proposed amendment will not materially affect any other matter specifically referred to in the Act for inclusion in the Code

**Q9. Do you agree the Authority’s proposed amendment complies with section 32(1) of the Act?**

**The Authority has given regard to the Code amendment principles**

3.59 When considering amendments to the Code, the Authority is required by its Consultation Charter<sup>2</sup> to have regard to the following Code amendment principles, to the extent that the Authority considers that they are applicable. Table 3 (below) describes the Authority’s regard for the Code amendment principles in the preparation of the proposal.

**Table 3: Regard for Code amendment principles**

Principle	Comment
1. Lawful	The proposal is lawful, and is consistent with the statutory objective (see section 3) and with the empowering provisions of the Act.
2. Provides clearly identified efficiency gains or addresses market or regulatory failure	The efficiency gains are set out in the evaluation of the costs and benefits in Appendix D.
3. Net benefits are quantified	The extent to which the Authority has been able to estimate the efficiency gains is set out in the evaluation of the costs and benefits (section 3).

<sup>2</sup> The consultation charter is one of the Authority’s foundation document and is available at: <http://www.ea.govt.nz/about-us/documents-publications/foundation-documents/>

## Appendix A The system operator's 2-block AUFLS status letter

## Appendix B Draft AUFLS technical requirements report

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## Version Control Data

Version	Date	Change
1	20 Oct 2020	Draft for Authority Review
2	19 Nov 2020	Addressed Authority feedback and added Sample Calculation section
3	19 Nov 2020	Interim Draft
4	27 Nov 2020	Final Draft
5	18 Feb 2021	Revised absolute block percentages to greater than or equal to block sizes unless agreed otherwise with the system operator

## DEFINITIONS

In this schedule, unless the context otherwise requires,

**AUFLS demand** is the electrical load measured in MW which will be shed upon an **AUFLS system** operation. It comprises of an AUFLS load component and an IL load component (if any IL is connected downstream).

**automatic under-frequency load shedding** means automatic shedding of **AUFLS demand** when frequency falls below the relevant pre-set frequency, or falls at a rate, specified by the system operator in this report or in clause 7(6) and 7(6A) of Technical Code B of Schedule 8.3

**AUFLS Provider** means a **Distributor** in the North Island and **Grid Owners** in the South Island

**AUFLS requirement** means the summation of the AUFLS load components of **AUFLS demand** that must be able to be disconnected by the operation of all **AUFLS systems**, expressed as a percentage of the total **pre-event demand** of an **AUFLS provider**

**AUFLS scheme** means the settings including AUFLS blocks making up the **AUFLS requirement**, relay settings, and response times, as set by the **system operator** in accordance with this report

**AUFLS system** means assets used to automatically respond to an under-frequency event and accomplish the disconnection of demand in order to meet the requirements of the **AUFLS scheme**

**calculated frequency** means the value of frequency that results from the filtering or calculation method employed by most frequency relays to address the effects of voltage waveform distortion on the **instantaneous frequency**

**guard frequency** means a frequency **set point** above which frequency relay functions are inhibited

**hold delay** means a timer used for the purpose of delaying the propagation of a trip signal following the activation of the **under-frequency element** in a frequency relay. Time delays are usually set in terms of 'seconds', however some relays use 'cycles' to specify a delay

**instantaneous frequency** is the actual frequency derived from a voltage waveform at any given time

**pre-event demand** is the **total AUFLS Provider demand** measured immediately before a system event that triggers, or should trigger, an AUFLS scheme

**rate of change of frequency (ROCOF)** means the rate, measured in Hz per second, at which frequency is changing

**set point** means a user-adjustable setting at which a frequency relay will detect that an event has occurred, as applied to any frequency relay function, including under-frequency and rate of change of frequency

**Total AUFLS Provider demand** is the summation of demand at each point of connection as calculated in Section 6 of this document

**under-frequency element** means internal logic inside a frequency relay that is activated when the **set point** has been breached.

## TECHNICAL REQUIREMENTS

The **AUFLS** system must disconnect demand-

for the primary either:

under-frequency settings within 300 ms of either the **instantaneous frequency**, or the **rate of change of frequency** reaching the **set points** whilst below the **guard frequency** as shown in A to E in figure 1; and

for the secondary under-frequency settings within 15 s of the **instantaneous frequency** reaching the **set points** as shown in A to E in figure 1; and

in accordance with the relay setting requirements outlined in clause 3 of this AUFLS Technical Report.

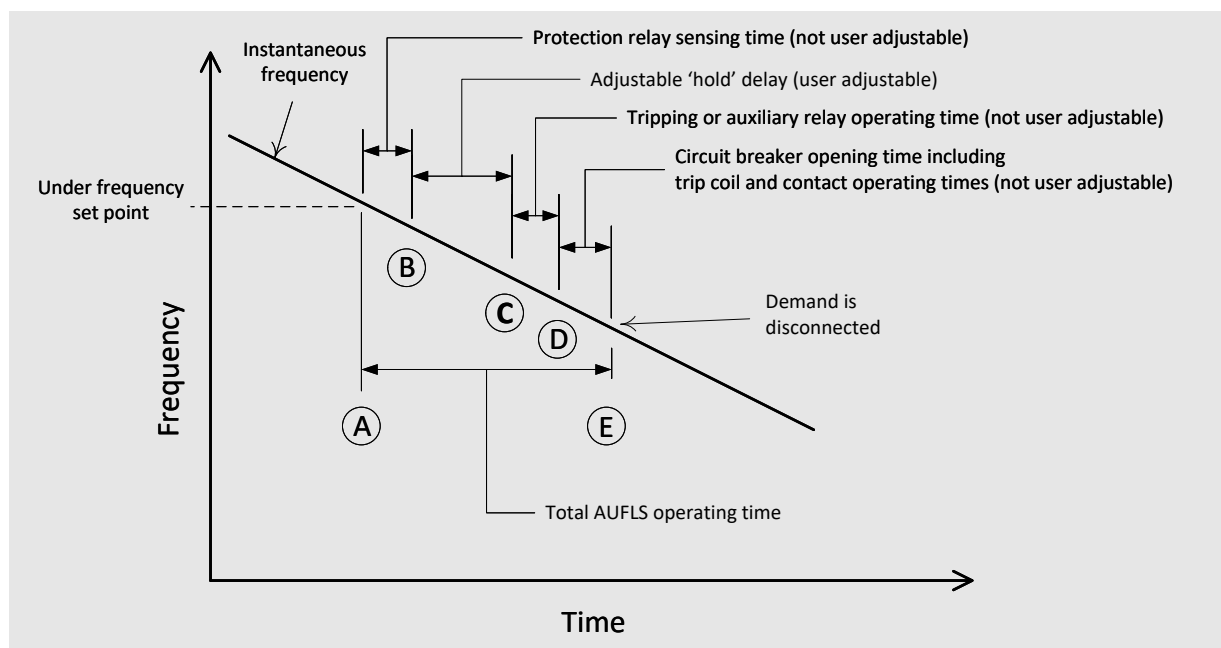


Figure 3. Under-frequency trip timing diagram (typical)

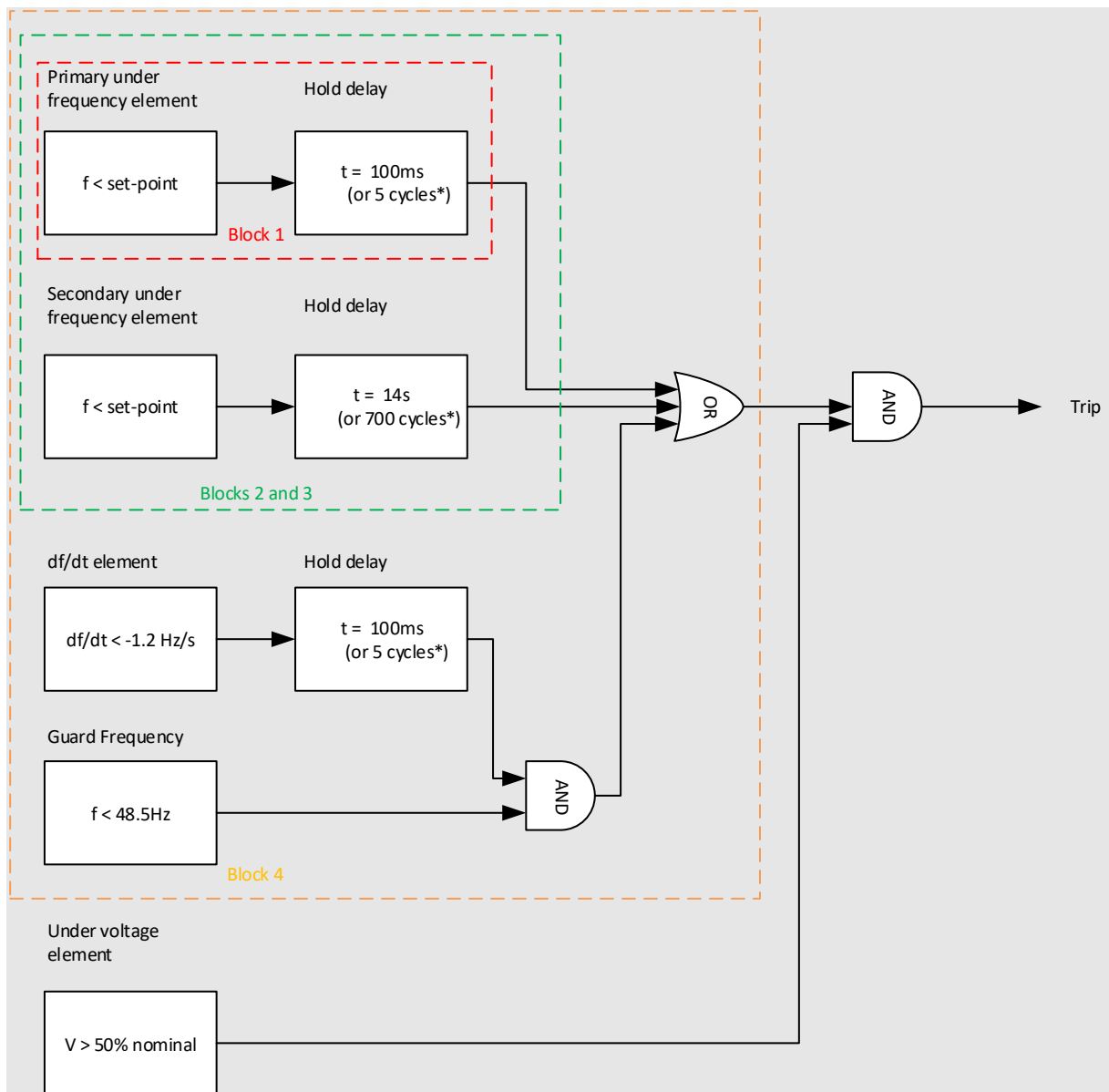


Figure 4. Logic diagram for AUFLS Blocks

\* This is included for relays that use 'cycles' instead of seconds for their timers.

The relays used to provide the **AUFLS scheme** must send a trip signal to disconnect demand—

for the primary and secondary (where applicable) frequency settings—

when the **calculated frequency** has remained below the frequency **set point** for the duration of the **hold delay**; and

the **under-voltage element** remains greater than 50% of nominal system voltage

for the rate of change of frequency detection (where applicable) setting —

when the **calculated rate of change of frequency** has remained below the rate of change of frequency **set point** for the duration of the **hold delay**; and

the calculated frequency is less than the guard frequency **set point**; and



the **under-voltage element** remains greater than 50% of nominal system voltage;

The relays used to provide the AUFLS scheme must set the hold delay with the value specified in—  
 milliseconds where the relay uses seconds to set its timers; or  
 cycles where the relay uses cycles to set its timers.

The relays used to provide rate of change of frequency detection (where applicable) must have—  
 at least 1 rate of change of frequency element; and  
 a setting range that is capable of being set between -1 to -2.0 Hertz/second; and  
 a setting resolution of at least 0.1 Hertz/second; and  
 an adjustable time delay of 0 to 500 ms; and  
 customisable logic capable of achieving the settings specified in Section 3 below; and  
 capability to remote enable/disable the rate of change of frequency element without the need for  
 expert technical assistance.

## PERFORMANCE REQUIREMENTS AND SETTINGS

Block Description	Relay Performance		Relay Setting	
	Trigger Setting	Maximum Demand Disconnection time (s) <sup>3</sup>	Relay hold time (s) <sup>4</sup>	Guard Frequency (Hz)
1 primary	47.9 Hz	0.3	0.1	
2 primary	47.7 Hz	0.3	0.1	
2 backup	47.9 Hz	15	14	
3 primary	47.5 Hz	0.3	0.1	
3 backup	47.7 Hz	15	14	
4 primary	47.3 Hz	0.3	0.1	
4 backup	47.5 Hz	15	14	
4 ROCOF	-1.2 Hz / second	0.3	0.1	48.5

<sup>3</sup> Shown graphically as A to E in Figure 1 (includes circuit breaker opening time)

<sup>4</sup> Shown graphically as B to C in Figure 1

#### 4-BLOCK AUFLS RELAY SETTINGS

In the North Island an **automatic under-frequency load shedding** system required to be provided must enable, at all times, automatic disconnection of demand as follows:

4 blocks of **demand** (with each block disconnecting no less than the specified percentage of the **distributor's** total pre-event demand in the North Island (MW), unless agreed otherwise with the system operator), with:

block one disconnecting 10% of demand—

- A. within 0.3 seconds after the frequency reduces to, and remains at or below, 47.9 Hertz; and

block two disconnecting 10% **demand**—

- B. within 0.3 seconds after the frequency reduces to, and remains at or below, 47.7 Hertz; or
- C. 15 seconds after the frequency reduces to, and remains at or below, 47.9 Hertz and

block three disconnecting 6% **demand**—

- D. within 0.3 seconds after the frequency reduces to, and remains at or below, 47.5 Hertz; or
- E. 15 seconds after the frequency reduces to, and remains at or below, 47.7 Hertz and

block four disconnecting 6% **demand**—

- F. within 0.3 seconds after the frequency reduces to, and remains at or below, 47.3 Hertz; or
- G. 15 seconds after the frequency reduces to, and remains at or below, 47.5 Hertz; or
- H. within 0.3 seconds after the frequency falls, and remains falling at 1.2 Hertz/second, and the frequency is below 48.5Hz

#### DATA REQUIREMENTS – NORTH ISLAND AUFLS PROFILE INFORMAITON

The final version of AUFLS feeder data for each calendar year (1<sup>st</sup> January to 31<sup>st</sup> December) must be submitted into the system operator's data portal on or before 1<sup>st</sup> April in the following year

## DATA REQUIREMENTS POST-AUFLS OPERATION

### Overview

NI Distributors and SI Grid Owners should gather AUFLS data as soon as possible after any AUFLS operation to make it available to the system operator without delay. Initial contact should be made to [compliance@transpower.co.nz](mailto:compliance@transpower.co.nz), if file sizes are too large alternative arrangements for delivery will be made.

Data must be available within 3 business days.

### Delivery

Data must be made available to the system operator within 3 business days of any AUFLS operation.

### Data description

For each **AUFLS System** 3 time series .csv files are required. These are:

Measured MW, which should include a text comment indicating if any interruptible load or downstream generation is thought to have been connected

Measured frequency (Hz)

AUFLS scheme trigger signal (binary 0,1)

### Data quality

Pre-trigger 5 – 10 seconds

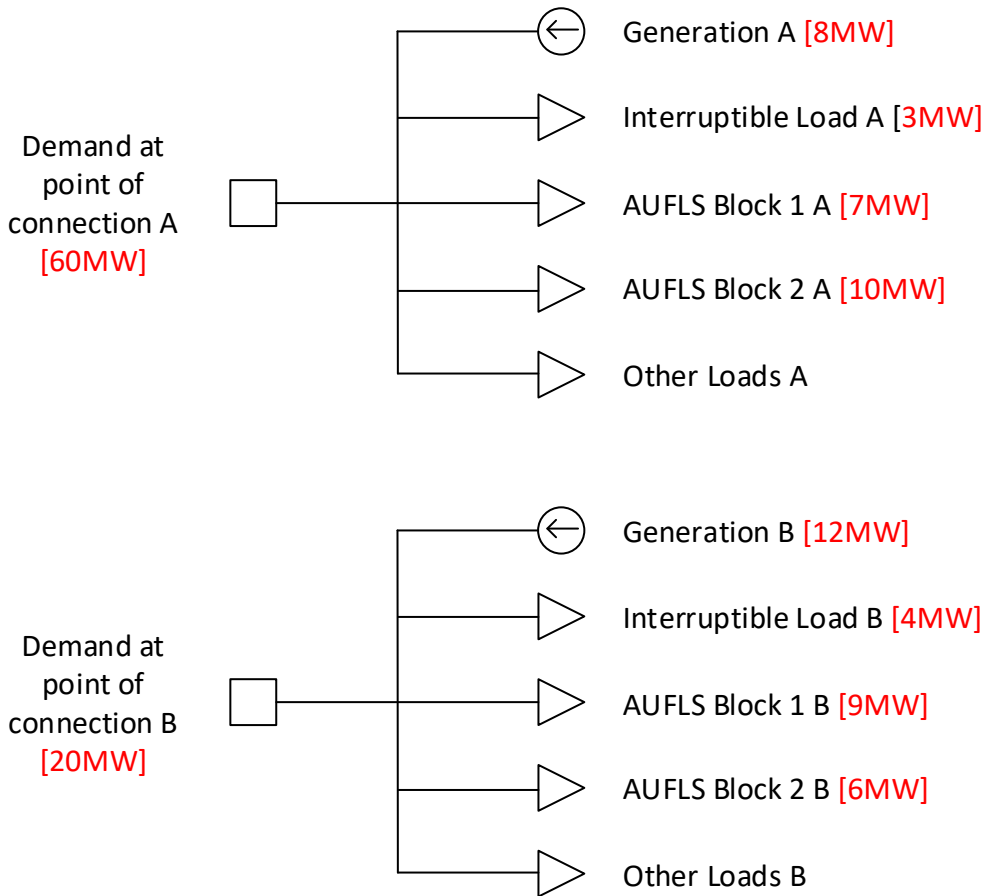
Post-trigger 60 seconds

Resolution 100ms or better

GPS time-stamped

### SAMPLE CALCULATION OF AUFLS BLOCK PERCENTAGES BY CUSTOMER

A simplified representation of a customer with two points of connection is:



Downstream of these points of connection there can be various combinations of:

- generation,
- load that can trip on an under-frequency (interruptible load or AUFLS blocks), and
- other loads that remain connected to the power system.

Data Point	Definition	Example	Comment
Total AUFLS Provider (MW)	Demand at point of connection A + Demand at point of connection B + Generation A + Generation B	$60 + 20 + 8 + 12 = 100\text{MW}$	Generation below a Distributor's point of connection offsets true consumer load
AUFLS Block 1 (MW)	AUFLS Block 1 A + AUFLS Block 1 B	$7 + 9 = 16\text{MW}$	Summation of MW at each point of connection
AUFLS Block 2 (MW)	AUFLS Block 2 A + AUFLS Block 2 B	$10 + 6 = 16\text{MW}$	Summation of MW at each point of connection
AUFLS Block 1 %	(AUFLS Block 1 MW) / (Total Customer Demand MW)	$16 / 100 = 16\%$	Used to check compliance of each block

Notes:

AUFLS Block MW must be net of any downstream Interruptible Load. The Data Portal will have the facility to note expected Interruptible Load on AUFLS feeders to deduct it prior to the compliance calculation for block percentages

# Appendix C Proposed amendment

## Explanation of the amendment

### Part 1

**AUFLS technical requirements report** means the AUFLS technical requirements report that is incorporated by reference in this Code under clause 2 of Schedule 8.6

**automatic under-frequency load shedding** means a form of extended reserve in which electrical load is automatically shed **automatic shedding of electrical load** when frequency falls below a ~~the relevant~~ pre-set frequency, or falls at a rate, specified by the **system operator** in the relevant extended reserve provider's statement of extended reserve obligations **AUFLS technical requirements report** or in clause 7(6) and 7(6A) of **Technical Code B** of Schedule 8.3

~~**extended reserve** means services provided to restore frequency to the **normal band** after disturbances of a magnitude that make it impracticable or uneconomic to restore frequency using **ancillary services**~~

~~**extended reserve manager** means the **market operation service provider** that is for the time being appointed as the **extended reserve manager** for the purposes of this Code, or if no regulations have been made establishing the **extended reserve manager** as a **market operation service provider**, the **Authority**~~

~~**extended reserve procurement notice** means the notice given to an **asset owner** by the **extended reserve manager** under clause 8.54L~~

~~**extended reserve procurement schedule** means the schedule **published** by the **extended reserve manager** under clause 8.54J~~

~~**extended reserve provider** means an **asset owner** required to provide **extended reserve** under Schedule 8.3, **Technical Code B**, clause 7~~

~~**extended reserve selection methodology** means the methodology **published** by the **extended reserve manager** under clause 8.54G~~

~~**extended reserve schedule** means the schedule **published** by the **system operator** under clause 8.54Q~~

~~**extended reserve technical requirements report** means the report **published** by the **system operator** under clause 8.54D~~

~~**extended reserve technical requirements schedule** means the schedule of requirements **published** by the **system operator** under clause 8.54D~~

~~**statement of extended reserve obligation**, in relation to an **asset owner**, means the latest statement of obligation given to the **asset owner** by the **system operator** under clause 8.54P~~

**loss of communication** means a sustained disruption of communications between the **system**

operator and 1 or more **generators, ancillary service agents, ~~extended reserve providers,~~ North Island distributors, South Island grid owners** or **dispatchable load purchasers** such that operation of the **grid** is affected or is likely to be affected

### Part 3

#### 3.1 Appointment of market operation service providers

- (1) The **Authority** must appoint a person or persons to perform each of the following **market operation service provider** roles:
- (a) **registry manager**;
  - (b) **reconciliation manager**;
  - (c) **pricing manager**;
  - (d) **clearing manager**;
  - (e) **FTR manager**;
  - (f) **WITS manager**;
  - ~~(g) **extended reserve manager**;~~

### Part 8

#### 8.1 Contents of this Part

This Part relates to **common quality**. In particular, this Part concerns the performance obligations of the **system operator**, the performance obligations of **asset owners**, arrangements concerning **ancillary services, extended reserve, and technical codes**.

##### 8.1A Requirement to provide complete and accurate information

- (1) A **participant** must take all practicable steps to ensure that information that it provides to the **extended reserve manager** under this Part is—
- (a) complete and accurate; and
  - (b) not misleading or deceptive; and
  - (c) not likely to mislead or deceive.
- (2) If a **participant** provides information to the **extended reserve manager** under this Part, and subsequently becomes aware that the information is incomplete, inaccurate, misleading or deceptive, or likely to mislead or deceive, the **participant** must provide revised information as soon as practicable.
- (3) For the purpose of this clause, information provided by an **asset owner** to the **extended reserve manager** is deemed to be accurate if it complies with a data specification **published** by the **extended reserve manager**.

~~Clause 8.1A: inserted, on 19 January 2017, by clause 4 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.~~

#### 8.4 System operator may rely on information provided

For the purposes of this Code, the **system operator** may—

- (a) rely on the **assets** and information about the **assets** made available to the **system operator** by **asset owners**; and
- (b) assume that **asset owners** are complying with the **asset owner performance obligations** and the **technical codes**, or complying with a valid **dispensation** or **equivalence arrangement**; and
- ~~(c) rely on information provided to the **system operator** by the **extended reserve manager**.~~

#### 8.5 Restoration

- (1) If an event disrupts the **system operator's** ability to comply with the **principal performance obligations**, the **system operator** must act as a **reasonable and prudent**

**system operator** to re-establish normal operation of the power system as soon as possible, given—

- (a) the capability of **generation**, **and ancillary services**, ~~and extended reserve~~; and
  - (b) the configuration and capacity of the **grid**; and
  - (c) the information made available by **asset owners**.
- (2) When re-establishing normal operation of the power system under subclause (1), the **system operator** must have regard to the following priorities:
- (a) first, the safety of natural persons;
  - (b) second, the avoidance of damage to **assets**;
  - (c) third, the restoration of **offtake**;
  - (d) fourth, conformance with the **principal performance obligations**;
  - (e) fifth, full conformance with the **dispatch objective**.

### 8.19 Contributions to frequency support in under-frequency events

- (1) Subject to subclause (3), each **generator** must at all times **ensure** that, while connected, its **assets**, other than any **excluded generating stations**, contribute to supporting frequency by remaining **synchronised**, ensuring that each of its **generating units** can and does, at a minimum, sustain pre-event output—
  - (a) at all times when the frequency is above 47.5 Hertz; and
  - (b) for at least 120 seconds when the frequency is 47.5 Hertz; and
  - (c) for at least 20 seconds when the frequency is 47.3 Hertz; and
  - (d) for at least 5 seconds when the frequency is 47.1 Hertz; and
  - (e) for at least 0.1 seconds when the frequency is 47.0 Hertz; and
  - (f) at any frequencies between those specified in paragraphs (b) to (e) for times derived by linear interpolation.
- (2) If the **inherent characteristics** and design of a **generator's generating unit** are such that it is reasonably able to operate beyond the above requirements, the **generator** must declare such capabilities in accordance with clause 2(5) of **Technical Code A** of Schedule 8.3.
- (3) Each South Island **generator** must ensure that each of its **assets**, other than excluded **generating units**, remains **synchronised**, and can and do, at a minimum, sustain pre-event output—
  - (a) at all times when the frequency is above 47 Hertz; and
  - (b) for 30 seconds if the frequency falls below 47 Hertz but not below 45 Hertz.
- (4) The **HVDC owner** must at all times ensure that, while connected, its **assets** contribute to supporting frequency during an **under-frequency event** in either **island** by—
  - (a) remaining connected to those **assets** making up the **grid** in the North Island and South Island while the frequency in both **islands** remains above 48 Hertz; and
  - (b) remaining connected to those **assets** making up the **grid** in the North Island and South Island while the frequency in both **islands** remains below 48 Hertz and above 47 Hertz for 90 seconds; and
  - (c) remaining connected to those **assets** making up the **grid** in the North Island and South Island while the frequency in both **islands** remains above 45 Hertz for 35 seconds, unless the frequency in either **island** is less than 46.5 Hertz and the frequency is falling at a rate of 7 Hertz per second or greater; and
  - (d) subject to the level of transfer and the **HVDC link** configuration at the beginning of the **under-frequency event**, if the **HVDC link** itself is not the cause of the **under-**

**frequency event**, modifying the instantaneous transfer on the **HVDC link** by up to 250 MW with the objective of limiting the difference between the North Island and South Island frequencies to no greater than 0.2 Hertz.

- (5) Each **North Island distributor** and each **South Island grid owner** must ensure that it has **established and maintained automatic under-frequency load shedding** in block sizes and with relay settings in accordance with the **technical codes**. ~~**extended reserve provider**~~ must ~~provide **extended reserve**~~ in accordance with Schedule 8.3, **Technical Code B**.

#### *Equivalence arrangements and dispensations*

### **8.29 Right to apply for approval of equivalence arrangement or grant of dispensation**

- (1) Subject to subclause (2), if an **asset owner** cannot comply with an **AOPO** or a **technical code** obligation in respect of a particular **asset** or configuration of **assets**, being an existing, new or proposed **asset**, the **asset owner** may apply for an **equivalence arrangement** to be approved or **dispensation** to be granted in accordance with Schedule 8.1.
- (2) The **system operator** may not grant a dispensation in relation to an obligation to provide ~~**extended reserve**~~ **automatic under-frequency load shedding** under clause 8.19(5) or Schedule 8.3, **Technical Code B**, clause 7.

#### **Subpart 5—Extended reserve**

### **8.54C Contents of this subpart**

This subpart provides for the procurement of ~~**extended reserve**~~.

Clause 8.54C: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

### **8.54D System operator to review extended reserve**

- (1) ~~The **system operator** must review the technical requirements for **extended reserve** in accordance with this clause.~~
- (2) ~~The **Authority** may, at any time, give the **system operator** principles outlining the **Authority's** expectations for the objectives of the review.~~
- (3) ~~As part of the review, the **system operator** must consider any principles given to the **system operator** by the **Authority** under subclause (2).~~
- (4) ~~On the basis of the review, the **system operator** must prepare and **publish**—~~  
(a) ~~an **extended reserve technical requirements report**; and~~  
(b) ~~an **extended reserve technical requirements schedule**.~~
- (5) ~~The **extended reserve technical requirements report** must reflect the **system operator's** analysis of the technical requirements for **extended reserve** on which the **extended reserve technical requirements schedule** is based.~~
- (6) ~~The **extended reserve technical requirements schedule** must—~~  
(a) ~~specify the technical specifications for **extended reserve** that the **system operator** requires in order to be able to comply with the **principal performance obligations**; and~~  
(b) ~~specify requirements for periodic testing that each **extended reserve provider** will be required to carry out in relation to the relevant **assets**.~~



~~(7) The consultation requirements in Part 1 of Schedule 8.5 apply to the preparation and **publication** of the **extended reserve technical requirements schedule**.~~

~~Clause 8.54D: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

#### **8.54E Review of extended reserve technical requirements schedule**

~~(1) The **system operator** must —~~

- ~~(a) review the **extended reserve technical requirements schedule** under this clause; and~~
- ~~(b) as soon as practicable after completing the review, decide whether to propose a change to the schedule; and~~
- ~~(c) advise the **Authority** of its decision.~~

~~(2) The review must be conducted so that the **system operator** advises the **Authority** of its decision no later than 60 months after the date on which the **system operator** advised the **Authority** of its decision on the previous review.~~

~~(3) The **Authority** may direct the **system operator** to review the **extended reserve technical requirements schedule** at a time that is sooner than required under subclause (2).~~

~~(4) If the **system operator** decides to propose a change to the **extended reserve technical requirements schedule** as a result of a review, the **system operator** must —~~

~~(a) prepare and **publish** —~~

- ~~(i) an **extended reserve technical requirements report**; and~~
- ~~(ii) an **extended reserve technical requirements schedule**; and~~

~~(b) provide the following additional information when giving a draft of the revised schedule to the **Authority** under clause 2(2) of Schedule 8.5:~~

- ~~(i) an explanation of the proposed change and a statement of the objectives of the proposed change;~~
- ~~(ii) an evaluation of the costs and benefits of the proposed change;~~
- ~~(iii) an evaluation of alternative means of achieving the objectives of the proposed change.~~

~~(5) Clause 8.54D(2), (3) and (5) to (7) applies to each review of the **extended reserve technical requirements schedule**.~~

~~(6) If the **system operator** advises the **Authority** that it does not intend to propose a change to the **extended reserve technical requirements schedule**, the **system operator** must give the **Authority** the findings of its review of the schedule.~~

~~Clause 8.54E: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

~~Clause 8.54E(2): amended, on 19 December 2014, by clause 10 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.~~

#### **8.54F Authority may require system operator to reconsider**

~~(1) The **Authority** may require the **system operator** to reconsider a decision made under clause 8.54E(1)(c) not to propose a change to the **extended reserve technical requirements schedule**.~~

~~(2) If the **Authority** requires the **system operator** to reconsider, the **Authority** must advise the **system operator** of —~~

- ~~(a) the **Authority**'s reasons for requiring the **system operator** to reconsider; and~~
- ~~(b) the date, determined after consulting with the **system operator**, by which the **system operator** must —~~
  - ~~(i) confirm its decision under clause 8.54E(1)(c); or~~
  - ~~(ii) provide a draft of the revised schedule to the **Authority** under clause 2(2) of Schedule 8.5.~~

- (3) ~~The Authority must as soon as practicable publish the advice received from the system operator under clause 8.54E(1)(e) and any advice given by the Authority to the system operator under subclause (2):~~

~~Clause 8.54F: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

~~Clause 8.54F(3): amended, on 5 October 2017, by clause 103 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

### **8.54G Preparation and publication of extended reserve selection methodology**

- (1) ~~The extended reserve manager must prepare and publish an extended reserve selection methodology.~~
- (2) ~~The methodology must specify how the extended reserve manager will procure extended reserve according to the extended reserve technical requirements schedule.~~
- (3) ~~The methodology must—~~
- ~~(a) be based on the principles specified in clause 8.54H; and~~
  - ~~(b) specify how the methodology applies to each island, including, if appropriate, specifying that the methodology does not apply to an island; and~~
  - ~~(c) identify the asset owners that are required to provide information during an extended reserve selection process; and~~
  - ~~(d) specify the information that the asset owners are required to provide; and~~
  - ~~(e) specify the time frame within which asset owners are required to provide the information; and~~
  - ~~(f) specify the basis on which the extended reserve manager selects asset owners to be extended reserve providers; and~~
  - ~~(g) include default terms and conditions specifying the basis on which extended reserve must be provided, including requirements for periodic testing of assets.~~
- (3A) ~~If the extended reserve manager decides that asset owners will receive payment for providing extended reserve, the methodology must specify how payments are set.~~
- (4) ~~The consultation and approval requirements in Part 2 of Schedule 8.5 apply to the preparation and publication of the extended reserve selection methodology.~~

~~Clause 8.54G: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

~~Clause 8.54G(3)(g): amended, on 5 October 2017, by clause 104(1) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

~~Clause 8.54G(3)(h): revoked, on 5 October 2017, by clause 104(2) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

~~Clause 8.54G(3A): inserted, on 5 October 2017, by clause 104(3) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

### **8.54H Principles for extended reserve selection methodology**

- (1) ~~The extended reserve selection methodology must give effect to the principles specified in subclause (2).~~
- (2) ~~The extended reserve selection methodology must—~~
- ~~(a) reflect a balance of interests between potential extended reserve providers, and between such providers and the system operator; and~~
  - ~~(b) enable extended reserve to be procured cost-effectively, by setting out how to evaluate—~~
    - ~~(i) the expected cost of providing the extended reserve (including capital and operating costs); and~~

- (ii) in the case of **extended reserve** that involves the interruption of load, the expected cost of an interruption during an event that calls on **extended reserve**, taking into account opportunity cost and the performance characteristics of the relevant load; and
- (iii) the likely transaction costs associated with administering **extended reserve** and in providing **extended reserve**; and
- (e) seek an appropriate balance between certainty in the provision of **extended reserve** products and flexibility to accommodate changes in circumstances and technologies.

Clause 8.54H: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

#### **8.54I Review of extended reserve selection methodology**

- (1) The **Authority** may direct the **extended reserve manager** to review the **extended reserve selection methodology**.
- (2) Clause 8.54G applies to each review of the **extended reserve selection methodology**, except that the **extended reserve manager** must give a draft of the revised methodology to the **Authority** and the **system operator** under clause 5(2) of Schedule 8.5 no later than 40 **business days** after the date of the direction under subclause (1).

Clause 8.54I: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

#### **8.54J Extended reserve manager to undertake extended reserve selection process**

- (1) The **extended reserve manager** must undertake an **extended reserve** selection process in accordance with the **extended reserve selection methodology** when directed to do so by the **Authority**.
- (2) The **Authority** must make a direction under subclause (1) no later than 60 months after the **publication** of the current **extended reserve procurement schedule**.
- (3) The **Authority** may direct the **extended reserve manager** as to the scope of a selection process.
- (4) If the **Authority** directs the **extended reserve manager** to undertake a limited selection process under subclause (3), the **Authority** must give reasons for the direction.
- (5) After completing a selection process, the **extended reserve manager** must prepare and **publish** an **extended reserve procurement schedule**.
- (6) Subclause (5) does not require the **extended reserve manager** to **publish** any information the **publication** of which would be likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information.
- (7) The **extended reserve procurement schedule** must—
  - (a) set out the results of the selection process; and
  - (b) identify the **asset owners** that are required to be **extended reserve providers**; and
  - (c) specify the **extended reserve** to be provided; and
  - (d) include information as to how the amounts payable (if any) to each **extended reserve provider** will be calculated; and
  - (e) identify **asset owners** that have not been selected to be **extended reserve providers**.
- (8) The consultation and approval requirements in Part 3 of Schedule 8.5 apply to the preparation and **publication** of the **extended reserve procurement schedule**.
- (9) The **extended reserve manager** may undertake consultation additional to that required by Part 3 of Schedule 8.5 if the **extended reserve manager** considers it necessary to do so.
- (10) As soon as practicable after receiving a direction from the **Authority** under subclause (2), the **extended reserve manager** must **publish** an indicative time frame within which the **extended reserve manager** expects to complete the selection process.

- (11) ~~The publication of an extended reserve procurement schedule relating to the provision of extended reserve for only part of an island must be disregarded for the purposes of determining the date by which the Authority must give a direction under subclause (2).~~
- (12) ~~Despite subclause (6), the extended reserve manager must, within 2 business days after publishing the extended reserve procurement schedule under subclause (5), provide a copy of the extended reserve procurement schedule to the clearing manager.~~
- Clause 8.54J: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.
- Clause 8.54J(2): amended, on 19 December 2014, by clause 11 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.
- Clause 8.54J(12): inserted, on 19 January 2017, by clause 6 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

#### **8.54K Information required for extended reserve selection process**

- (1) ~~During an extended reserve selection process, each asset owner identified in the extended reserve selection methodology, other than a generator that is directly connected to the grid, must comply with a request from the extended reserve manager to provide any information described in the methodology.~~
- (2) ~~Each asset owner required to give information to the extended reserve manager, must do so —~~
- ~~(a) within the time frame specified in the extended reserve selection methodology; and~~
- ~~(b) in accordance with the extended reserve selection methodology, data specification and extended reserve manager calendar published by the extended reserve manager.~~
- (3) ~~If the extended reserve manager considers that any information provided by an asset owner is incomplete or insufficient, the extended reserve manager may require that the asset owner provide further information.~~
- (4) ~~An asset owner must comply with a requirement under subclause (3) within the time frame specified by the extended reserve manager.~~
- Clause 8.54K: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.
- Clause 8.54K(1): amended, on 19 January 2017, by clause 7(1) of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.
- Clause 8.54K(2): replaced, on 19 January 2017, by clause 7(2) of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

#### **8.54L Extended reserve manager to issue extended reserve procurement notices**

- (1) ~~The extended reserve manager must issue an extended reserve procurement notice to each asset owner specified in the extended reserve procurement schedule.~~
- ~~(2) Each extended reserve procurement notice must —~~
- ~~(a) specify the information in the extended reserve procurement schedule relating to the asset owner; and~~
- ~~(b) if an asset owner has been selected to be an extended reserve provider, —~~
- ~~(i) specify the default terms and conditions (as specified in the extended reserve selection methodology) that apply to the provision of extended reserve by the asset owner; and~~
- ~~(ii) include information as to how the amounts payable (if any) to each extended reserve provider will be calculated.~~
- (3) ~~The extended reserve manager must give each asset owner its extended reserve procurement notice no later than 5 business days after publishing the extended reserve procurement schedule.~~

Clause 8.54L: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

#### **8.54M Asset owners to prepare implementation plans**

- (1) Each **asset owner** identified in an **extended reserve procurement schedule** must prepare an implementation plan specifying how the **asset owner** will implement the obligations allocated to it.
- (2) Each **asset owner** must give its implementation plan to the **system operator** for approval no later than 40 **business days** after receiving its **extended reserve procurement notice**, or by such later date as may be agreed between the **asset owner** and the **system operator**.
- (3) Each implementation plan must specify how the **asset owner** will implement the transition to complying with its obligations (if any) under its most recent **extended reserve procurement notice** from complying with its obligations (if any) under its previous **extended reserve procurement notice**.
- (4) Each implementation plan must specify 1 or more dates on which payments (if any) to the **asset owner** will commence or cease for all or part of the provision of **extended reserve** under the **asset owner's extended reserve procurement notice**.
- (5) Each date specified in an implementation plan under subclause (4) must be the date on which provision of the **extended reserve** to which the payment (if any) relates will commence or cease, as the case may be.
- (6) An **asset owner** may amend an implementation plan after giving it to the **system operator** under subclause (2) with the agreement of the **system operator**.
- (7) If the **system operator** requires that an **asset owner** make changes to an implementation plan given to the **system operator** under subclause (2), the **asset owner** must comply with the requirement.
- (8) The **system operator** must approve an implementation plan given to it by an **asset owner** under subclause (2) if the plan meets the requirements of this clause.

Clause 8.54M: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

#### **8.54N Terms and conditions applying to the provision of extended reserve**

In the case of an **asset owner** that has been selected to be an **extended reserve provider**, the default terms and conditions in the **asset owner's extended reserve procurement notice** apply to the provision of **extended reserve** by the **asset owner** but may be amended by agreement in writing between the **asset owner** and the **system operator**.

Clause 8.54N: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

Clause 8.54N: amended, on 19 January 2017, by clause 8 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

#### **8.54O System operator to publish and maintain extended reserve schedule**

- (1) The **system operator** must **publish** an **extended reserve schedule**.
- (2) Subclause (1) does not require the **system operator** to **publish** any information the **publication** of which would be likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information.
- (3) The **extended reserve schedule** must specify the obligations of each **asset owner** identified in the **extended reserve procurement schedule**, based on information from—
  - (a) the latest **extended reserve procurement schedule**; and
  - (b) each approved implementation plan; and
  - (c) any amendment to default terms and conditions applying to an **extended reserve provider** agreed under clause 8.54N; and
  - (d) any other information held by the **system operator** that describes the obligations of an **extended reserve provider** to provide **extended reserve**.

- (4) ~~The system operator must amend the extended reserve schedule to reflect any change to any information described in subclause (3), so that the schedule is kept up to date.~~
- (5) ~~Despite subclause (2), the system operator must, within 2 business days of publishing the extended reserve schedule under subclause (1), provide a copy of the extended reserve schedule to the extended reserve manager.~~
- ~~Clause 8.54O: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~
- ~~Clause 8.54O(3)(c): amended, on 19 January 2017, by clause 9(1) of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.~~
- ~~Clause 8.54O(5): inserted, on 19 January 2017, by clause 9(2) of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.~~

#### **8.54P System operator to issue statements of extended reserve obligations**

- (1) ~~The system operator must issue to each asset owner identified in the extended reserve schedule a statement of extended reserve obligations under this clause.~~
- (2) ~~Each statement of extended reserve obligations must specify the obligations of the asset owner to which it relates, as specified in the extended reserve schedule as at the date on which it is issued.~~
- (3) ~~The system operator must issue a statement of extended reserve obligations to an asset owner at each of the following times:~~
- ~~(a) as soon as practicable after the asset owner's implementation plan is approved under clause 8.54M;~~
- ~~(b) as soon as practicable after it makes an amendment to the schedule under clause 8.54O(4) that relates to the asset owner's obligations under this subpart;~~
- ~~(c) as soon as practicable after the system operator becomes aware of any other information to which clause 8.54O(3)(d) applies that relates to the obligations of the asset owner.~~

~~Clause 8.54P: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

#### **8.54Q System operator to give written notice of dates**

- (1) ~~The system operator must give written notice to the Authority, the extended reserve manager, and the clearing manager of all dates on which extended reserve providers will provide, or cease to provide, extended reserve, as set out in the extended reserve schedule.~~
- (2) ~~If an amendment to an implementation plan made under clause 8.54M(6) or (7) results in an extended reserve provider providing, or ceasing to provide, any extended reserve on a date that is different from the relevant date specified in the implementation plan, in each case the system operator must—~~
- ~~(a) update the extended reserve schedule with the new date; and~~
- ~~(b) give written notice to the Authority, the extended reserve manager, and the clearing manager of the new date.~~

~~Clause 8.54Q: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

~~Clause 8.54Q heading: amended, on 19 December 2014, by clause 12(1) of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.~~

~~Clause 8.54Q heading: amended, on 19 January 2017, by clause 10(1) of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.~~

~~Clause 8.54Q heading: amended, on 5 October 2017, by clause 105(1) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

Clause 8.54Q(1) and (2)(b): amended, on 19 December 2014, by clause 12(2) of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.

Clause 8.54Q(1) and (2)(b): amended, on 19 January 2017, by clause 10(2) of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

Clause 8.54Q(1) and (2)(b): amended, on 5 October 2017, by clause 105(2) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

#### **8.54R System operator to report to Authority**

In its monthly report given to the **Authority** under clause 3.14, the **system operator** must include information about any use of **extended reserve**.

Clause 8.54R: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

Clause 8.54R heading: amended, on 19 December 2014, by clause 13 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.

#### **8.54S New connected asset owners and new grid owners to provide information**

(1) The purpose of this clause is to require new **connected asset owners** and new **grid owners** to provide information so that their obligations under this subpart can be determined.

(2) No later than 20 **business days** after a **connected asset owner** commences taking **electricity** from the **grid**, it must give the **Authority** either—

(a) historical records of the quantity of **electricity** consumed in the **connected asset owner's network** or by the **connected asset owner**; or

(b) if the **Authority** advises the **connected asset owner** that it is not satisfied with the records given under paragraph (a), or if there are no such records, a bona fide **business plan** that permits a realistic estimate to be made of the amount of **electricity** to be consumed in the **connected asset owner's network** or by the **connected asset owner**.

(3) No later than 20 **business days** after a **grid owner** starts to convey **electricity** on the **grid**, it must give the **Authority** either—

(a) historical records of the quantity of **electricity** conveyed by the **grid owner** on the **grid**; or

(b) if the **Authority** advises the **grid owner** that it is not satisfied with the records given under paragraph (a), or if there are no such records, a bona fide **business plan** that permits the **Authority** to make a realistic estimate of the amount of **electricity** to be conveyed by the **grid owner** on the **grid**.

Clause 8.54S: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

Clause 8.54S Heading: amended, on 1 February 2016, by clause 12(1) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2015.

Clause 8.54S(1) & (2): amended, on 1 February 2016, by clause 12(2) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2015.

#### **8.54T Assignment of extended reserve obligations**

(1) An **extended reserve provider** that proposes to assign **assets** that it uses to provide **extended reserve** may apply to the **Authority** by notice in writing for approval to assign its obligations to provide **extended reserve** that relate to those **assets**.

(2) The **Authority** may, on receiving an application under subclause (1),—

(a) approve the assignment; or

(b) approve the assignment with conditions; or

(c) decline to approve the assignment.

- (3) ~~Before giving an **extended reserve provider** approval to assign its obligations under subclause (2), the **Authority** must consult with the **system operator**.~~
- (4) ~~If the **Authority** gives an **extended reserve provider** approval to assign its obligations under subclause (2), the **Authority** must give written notice to the **system operator**.~~
- (5) ~~An assignment of an **extended reserve provider's** obligations is not effective except as approved by the **Authority** under subclause (2).~~

Clause 8.54T: inserted, on 7 August 2014, by clause 9 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

Clause 8.54T(4): amended, on 19 December 2014, by clause 14 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.

Clause 8.54T(4): amended, on 5 October 2017, by clause 106 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

#### **8.54TA Extended reserve manager may rely on information provided**

For the purposes of this Code, the ~~**extended reserve manager**~~ may rely on the information provided to the ~~**extended reserve manager**~~ by an **asset owner**.

Clause 8.54TA: inserted, on 19 January 2017, by clause 11 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

#### **8.54TB Extended reserve manager to consider new or revised information**

- (1) ~~If the **extended reserve manager** receives new or revised information from an **asset owner**, it must provide that information to the **Authority** if it considers that the information would change the outcome of the processes specified in clauses 8.54J, 8.54K, or 8.54L.~~

- (2) ~~If the **extended reserve manager** provides the information to the **Authority** under subclause (1), the **Authority** may direct the **extended reserve manager** to undertake the **extended reserve** selection process under clause 8.54J again.~~

Clause 8.54TB: inserted, on 19 January 2017, by clause 11 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

#### **8.54TC Extended reserve manager to produce periodic performance report**

- (1) ~~The **extended reserve manager** must —~~

~~(a) monitor the performance of **extended reserve**; and~~

~~(b) produce a periodic performance report that reports on the outcome of its monitoring of the performance of **extended reserve**.~~

- (2) ~~The time period to be covered in the periodic performance report must be agreed between the **extended reserve manager** and the **Authority**.~~

- (3) ~~The **extended reserve manager** must provide the periodic performance report to the **Authority** and the **system operator** no later than 30 **business days** after the end of each periodic performance reporting period.~~

- (4) ~~The **extended reserve manager** must, no later than 5 **business days** after finalising the periodic performance report, **publish** a copy of the report that excludes any information that, if **published**, would be likely unreasonably to prejudice the commercial position of the person who supplied, or who is the subject of, the information.~~

Clause 8.54TC: inserted, on 19 January 2017, by clause 11 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

#### *Information required for transitional purposes*

Cross heading: inserted, on 19 January 2017, by clause 11 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

#### **8.54TD Information required for transition**

- (1) ~~The **extended reserve manager** and the **system operator** may request an **asset owner**, other than a **generator** directly **connected** to the **grid**, to provide any information that the **extended reserve manager** or the **system operator** (as the case may be) considers is necessary to transition from the obligations that existed immediately prior to the Electricity~~



Industry Participation Code Amendment (Extended Reserve) 2014 coming into effect, to the obligations specified in that Code amendment.

- (2) An **asset owner** that receives a request under subclause (1) must comply with that request.
  - (3) If the ~~extended reserve manager~~ or the ~~system operator~~ (as the case may be) considers that information provided by an **asset owner** in accordance with subclause (2) is incomplete or insufficient, the ~~extended reserve manager~~ or the ~~system operator~~ (as the case may be) may require that the **asset owner** provide further information.
  - (4) Each **asset owner** required to provide information under this clause must do so within the time frame specified in the request.
  - (5) The ~~extended reserve manager~~ and the ~~system operator~~ may provide the information received from an **asset owner** under subclause (2) or (3) to each other.
- Clause 8.54TD: inserted, on 19 January 2017, by clause 11 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.

*Transitional provisions—extended reserve*

Cross heading: inserted, on 5 October 2017, by clause 107 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

**8.54TE Transitional provisions for extended reserve**

- (1) If the **system operator** took any action before clause 8.54D came into force that, if that clause had been in force at the time of the action, would have contributed to complying with that clause, the action is deemed to have been taken when that clause was in force.
- (2) The first implementation plan that an **asset owner** gives the **system operator** under clause 8.54M(2) must specify how the **asset owner** will implement the transition from complying with its obligations (if any) under Schedule 8.3, Technical Code B, clause 7 as it applied before clause 8.54M(2) came into force, to complying with its **extended reserve procurement notice**.
- (3) The first **statement of extended reserve obligations** that the **system operator** issues to each **asset owner** under clause 8.54P must specify the date on which it comes into force.
- (4) Despite the revocation of Schedule 8.3, **Technical Code A**, Appendix B, clause 6, and the replacement of Schedule 8.3, **Technical Code B**, clause 7 by the Electricity Industry Participation Code Amendment (Extended Reserve) 2014, each North Island **distributor** that was required to comply with those clauses before 7 August 2014 must continue to comply with those clauses as if the Electricity Industry Participation Code Amendment (Extended Reserve) 2014 had not been made until the earlier of—
  - (a) 7 August 2024; or
  - (b) the date on which the first **statement of extended reserve obligations** issued under clause 8.54P comes into force in respect of the **distributor**.
- (5) Despite the revocation of Schedule 8.3, **Technical Code A**, Appendix B, clause 7, and the replacement of Schedule 8.3, **Technical Code B**, clause 7 by the Electricity Industry Participation Code Amendment (Extended Reserve) 2014, each South Island **grid owner** that was required to comply with those clauses before 7 August 2014 must continue to comply with those clauses as if the Electricity Industry Participation Code Amendment (Extended Reserve) 2014 had not been made until the earlier of—
  - (a) 7 August 2024; or
  - (b) the date on which the first **statement of extended reserve obligations** issued under clause 8.54P comes into force in respect of the **grid owner**.
- (6) However, subclause (5) applies as if Schedule 8.3, **Technical Code B**, clause 7(6)(d)(ii) was amended from 7 May 2015 by replacing "45.5 Hertz" with "46.5 Hertz".
- (7) Clause 8.29(2) does not apply in respect of an application for a dispensation from a South Island **grid owner** until 7 August 2024.

Clause 8.54TE: inserted, on 5 October 2017, by clause 107 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

**8.54TF Transitional provisions for change to frequency limit in South Island**

- (1) No later than 7 February 2015, each South Island **grid owner** must prepare and give the **system operator** a plan for complying with Schedule 8.3, **Technical Code B**, clause 7(6)(d)(ii), as modified by clause 8.54T(6).
- (2) The **system operator** must approve a plan received under subclause (1) subject to any changes that the **system operator** considers necessary.
- (3) A South Island **grid owner** does not breach Schedule 8.3, **Technical Code B**, clause 7(6)(d)(ii) if the **grid owner** complies with a plan approved by the **system operator** under subclause (2).

**Subpart 6 – allocating costs**

**8.54U Contents of this subpart**

This subpart provides for the allocation of costs relating to **ancillary services** and **extended reserve**.

*Allocating costs for ancillary services and extended reserve*

**8.55 Identifying costs associated with ancillary services and extended reserve**

- (1) The **allocable costs** for each **ancillary service** are—
  - (a) the actual amounts that the **ancillary service agents** are entitled to receive for that **ancillary service** under contracts entered into by the **system operator** in implementing the **procurement plan**; plus
  - (b) the actual **administrative costs** of the **system operator** (as approved by the **Authority**) incurred in administering the **procurement plan** in respect of that **ancillary service**; less
  - (c) any readily identifiable and quantifiable costs to be paid by **asset owners** in respect of that **ancillary service** as a condition of any **dispensations** stipulated in accordance with clause 8.31(1)(a); less
  - (d) any identifiable costs to be paid by any person in respect of that **ancillary service**, as a condition of any agreement reached by the **system operator**, in accordance with clause 8.6.
- (2) The **allocable costs** for **extended reserve** are the actual amounts (if any) that **extended reserve providers** are entitled to receive for providing **extended reserve** under the current **extended reserve procurement schedule**.

**8.67A Extended reserve costs allocated to connected asset owners**

If there are **allocable costs** for **extended reserve** in a **billing period**, each **connected asset owner**, other than a **generator** that is directly **connected** to the **grid**, must pay a charge for **extended reserve** for the **billing period** in accordance with the following formula:

$$\text{Extended reserve charge}_D = \left( \text{TERAC}_{NI} \times \frac{L_{NI,D}}{L_{NI,TOT}} \right) + \left( \text{TERAC}_{SI} \times \frac{L_{SI,D}}{L_{SI,TOT}} \right)$$

where

Extended reserve charge<sub>D</sub> is the **extended reserve** charge owing by the **connected asset owner** for the **billing period**

TERAC<sub>NI</sub> is the sum of all payments for **extended reserve** provided in the North Island for the **billing period**

L<sub>NI, D</sub> is the **connected asset owner's total offtake** (in MWh) at **grid exit points** in the North Island in the **billing period**

L<sub>NI, TOT</sub> is the total **offtake** (in MWh) by all **connected asset owners** at **grid exit points** in the North Island in the **billing period**

TERAC<sub>SI</sub> is the sum of all payments for **extended reserve** provided in the South Island for the **billing period**

L<sub>SI, D</sub> is the **connected asset owner's total offtake** (in MWh) at **grid exit points** in the South Island in the **billing period**

L<sub>SI, TOT</sub> is the total **offtake** (in MWh) by all **connected asset owners** at **grid exit points** in the South Island in the **billing period**.

#### 8.68 Clearing manager to determine amounts owing

- (1) The **clearing manager** must determine the amount owing to the **system operator** by each **grid owner, purchaser, generator and connected asset owner** for **ancillary services** under clauses 8.55 to 8.67. On behalf of the **system operator**, the **clearing manager** must collect those amounts, and any amounts advised by the **system operator** as owing to it under clauses 8.6 and 8.31(1)(a), by including the relevant amounts in the amounts advised by the **clearing manager** as owing under Part 14.
- (2) To enable the **clearing manager** to determine those amounts, the **system operator** must provide to the **clearing manager** the total **allocable cost** for each **ancillary service** and any additional information required to carry out the calculations under clauses 8.55 to 8.67 that is not otherwise provided by the **reconciliation manager** or the **pricing manager** under Part 13.
- ~~(3) The **clearing manager** must determine the amount owing by each **connected asset owner**, other than a **generator** that is directly **connected** to the **grid**, for **extended reserve** in accordance with clause 8.67A.~~
- ~~(4) The **clearing manager** must determine the amount owing to each **extended reserve provider** for the provision of **extended reserve** in accordance with—  
(a) the **extended reserve schedule**; and  
(b) any relevant notice received from the **system operator** under clause 8.54Q(2).~~
- ~~(5) The **clearing manager** must collect the amounts determined under subclause (3) and pay the amounts determined under subclause (4) by including the relevant amounts in the invoices issued by the **clearing manager** under Part 14.~~
- (6) All amounts owing under this clause are subject to the priority order of payments set out in clause 14.56.

#### 8.69 Clearing manager to determine wash up amounts payable and receivable

- (1) The **clearing manager** must determine the following amounts owing as a result of **washups** under subpart 6 of Part 14:

- (a) the amount owing to the **system operator** by each **grid owner, purchaser, generator and connected asset owner** for **ancillary services** under clauses 8.55 to 8.67:
  - (b) the amount owing to each **grid owner, purchaser, generator and connected asset owner** by the **system operator** for **ancillary services** under clauses 8.55 to 8.67-~~(e)~~ ~~the amount owing by each distributor for extended reserve under clause 8.67A:~~
  - ~~(d) the amount owing to each extended reserve provider for extended reserve under clause 8.68.~~
- (2) On behalf of the **system operator** the **clearing manager** must collect or pay the amounts owing for **ancillary services**, and any amounts advised by the **system operator** as payable to it under clauses 8.6 and 8.31(1)(a) by including the relevant amounts advised by the **clearing manager** as owing under Part 14.
  - (3) To enable the **clearing manager** to determine the amounts payable for **ancillary services**, the **system operator** must provide to the **clearing manager** the **allocable cost** for each **ancillary service** and any additional information required to carry out the recalculations under clauses 8.55 to 8.67 that is not otherwise provided by the **reconciliation manager** or the **pricing manager** under Part 13.
  - (4) All amounts owing under this clause are subject to the priority order of payments set out in clause 14.56.

### Schedule 8.3, Technical Code A

#### 8 Records, tests and inspections

- (1) Each **asset owner** must arrange for, and retain, records for each of its **assets** to demonstrate that the **assets** comply with the **asset owner performance obligations** and this **technical code**.
- (2) In addition to the requirements for **commissioning** or testing in clause 2(6) to (8), each **asset owner** must carry out periodic testing—
  - (a) of its **assets and automatic under-frequency load shedding systems** in accordance with Appendix B; ~~and~~
  - ~~(b) in the case of an asset owner that is an extended reserve provider, of assets specified in its statement of extended reserve obligations in accordance with that statement.~~

### Schedule 8.3, Technical Code A, Appendix B

#### *Appendix B: Routine testing of assets and automatic under-frequency load shedding systems*

##### 1 Periodic tests to be carried out

- (1) This Appendix sets out periodic tests required for the purposes of clause 8(2) of **Technical Code A**.
- (2) Each **asset owner of automatic under-frequency load shedding systems** may be legally required, other than under this Code, to carry out additional tests to ensure that their **assets and automatic under-frequency load shedding systems** are safe and reliable.
- (2) For the purposes of this Appendix, **generating unit** does not include a **generating unit** for which wind is the primary power source.

## 6 North Island distributor automatic under-frequency load shedding systems profiles and trip settings

Each North Island **distributor** must—

- (a) provide the profile information described in clause 7(9) of **Technical Code B** of Schedule 8.3 to the **system operator** in an updated **asset capability statement** at least once every year; and
- (b) test the operation of its **automatic under-frequency load shedding** systems at least once every 4 years; and
- (c) based on the test carried out in accordance with paragraph (b), provide a verified set of trip settings and time delays to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test.

## 7 South Island grid owner automatic under-frequency load shedding systems profiles and trip settings

Each South Island **grid owner** must—

- (a) provide the profile information described in clause 7(9) of **Technical Code B** of Schedule 8.3 to the **system operator** in an updated **asset capability statement** at least once every year; and
- (b) test the operation of its **automatic under-frequency load shedding** systems at least once every 4 years; and
- (c) based on the test carried out in accordance with paragraph (b), provide a verified set of trip settings and time delays to the **system operator** in an updated **asset capability statement** within 3 months of the completion date of each such test.

### Schedule 8.3, Technical Code B

#### 1 Purpose and application

The purpose of this **technical code** is to set out the basis on which the **system operator** and **participants** must **plan for**, anticipate and respond to emergency events on the **grid** that affect the **system operator's** ability to plan to comply, and to comply with its **principal performance obligations**.

#### 6 Actions to be taken by the system operator in a grid emergency

- (1) If insufficient generation and **frequency keeping** gives rise to a **grid emergency**, the **system operator** may, having regard to the priority below, if practicable, and regardless of whether a **formal notice** has been issued, do 1 or more of the following:
  - (a) request that a **generator** varies its **offer** and **dispatch** the **generator** in accordance with that **offer**, to ensure there is sufficient generation and **frequency keeping**;
  - (b) request that a **purchaser** or a **connected asset owner** reduce **demand**;
  - (c) require a **grid owner** to reconfigure the **grid**;
  - (d) require the **electrical disconnection** of **demand** in accordance with clause ~~7A~~7(20);
  - (e) take any other reasonable action to alleviate the **grid emergency**.
- (2) If insufficient transmission capacity gives rise to a **grid emergency**, the **system operator** may, having regard to the priority below, if practicable, and regardless of whether a **formal notice** has been issued, do 1 or more of the following:
  - (a) request that a **generator** varies its **offer** and **dispatch** the **generator** in accordance with that **offer**, to ensure that the available transmission capacity within the **grid** is sufficient to transmit the remaining level of **demand**;

- (b) request that an **asset owner** restores its **assets** that are not in service:
  - (c) request that a **purchaser** or **connected asset owner** reduces its **demand**:
  - (d) require the **electrical disconnection** of **demand** in accordance with clause 7A7(20):
  - (e) take any other reasonable action to alleviate the **grid emergency**.
- (3) If frequency is outside the **normal band** and all available **injection** has been **dispatched**, the **system operator** may require the **electrical disconnection** of **demand** in accordance with clause 7A7(20) in appropriate block sizes until frequency is restored to the **normal band**.
- (4) If any **grid** voltage reaches the minimum voltage limit set out in the table contained in clause 8.22(1), and is sustained at or below that limit, the **system operator** may require the **electrical disconnection** of **demand** in accordance with clause 7A7(20) in appropriate block sizes until the voltage is restored to above the minimum voltage limit.

**7 ~~Extended reserve providers to provide extended reserve~~**

~~(1) Each **extended reserve provider** must provide **extended reserve** at all times in accordance with its current **statement of extended reserve obligations** issued by the **system operator** under clause 8.54P.~~

~~(2) An **extended reserve provider** must give written notice to the **system operator** as soon as practicable if the **extended reserve provider** is unable to comply with subclause (1).~~

**7 Load shedding systems**

- (1) Each North Island **distributor** must ensure, at all times, that an **automatic under-frequency load shedding** system is installed in accordance with subclause (6).
- (2) Every South Island **grid owner** must ensure, at all times, that an **automatic under-frequency load shedding** system is installed in accordance with subclause (6A) for each **grid exit point** in the South Island.
- (3) Subject to subclause (8), each **distributor** and **grid owner** must use reasonable endeavours to ensure that at all times its **automatic under-frequency load shedding** systems are maintained in accordance with subclauses (6) or (6A) as applicable.
- (4) If, at any time, a North Island **distributor** believes that an **automatic under-frequency load shedding** system may not be capable of meeting the requirements of subclause (6) or a South Island **grid owner** believes that an **automatic under-frequency load shedding** system may not be capable of meeting the requirements of subclause (6A), the relevant **distributor** or **grid owner** must notify the **system operator** as soon as practicable and provide any information that the **system operator** reasonably requests.
- (5) Each South Island **distributor** must co-operate fully with any **grid owner** in relation to an **automatic under-frequency load shedding** system installed at any **grid exit points** at which the **distributor's local network** is connected to the **grid**. Each South Island **distributor** must also provide the **grid owner** with any information relating to **automatic under-frequency load shedding** that the **grid owner** reasonably requests.
- (6) An **automatic under-frequency load shedding** system required to be provided in accordance with subclause (1) must enable, at all times, automatic disconnection of **demand** as either—
  - (a) 2 blocks of **demand** (each block being a minimum of 16% of the **distributor's** total pre-event **demand**), with block 1 disconnecting **demand**—

- (i) within 0.4 seconds after the frequency reduces to, and remains at or below, 47.8 Hertz,

and block 2 disconnecting **demand**—

- (ii) 15 seconds after the frequency reduces to, and remains at or below, 47.8 Hertz; ~~or~~ and

- (iii) within 0.4 seconds after the frequency reduces to, and remains at or below, 47.5 Hertz; or

- (b) in accordance with the **system operator's AUFLS technical requirements report**,

as agreed with the **system operator**, provided that all owners of **automatic under-frequency load shedding** systems required to be provided in accordance with subclause (1) must transition as soon as reasonably practicable, and must be proactively engaging with the **system operator** to transition as soon as reasonably practicable, to an **automatic under-frequency load shedding** system that complies with the **system operator's AUFLS technical requirements report**. This transition must be completed before 30 June 2025.

- (6A) An **automatic under-frequency load shedding** system required to be provided in accordance with subclause (2) must enable, at all times, automatic disconnection of 2 blocks of **demand** (each block being a minimum of 16% of the **grid owner's** total pre-event **demand**) subject to subclause (8), with block 1 disconnecting **demand**—

- (a) within 0.4 seconds after the frequency reduces to, and remains at or below, 47.5 Hertz,

and block 2 disconnecting **demand**—

- (b) 15 seconds after the frequency reduces to, and remains at or below, 47.5 Hertz; and

- (c) within 0.4 seconds after the frequency reduces to, and remains at or below, 46.5 Hertz.

- (7) To avoid doubt, the **demand** calculated to comprise **automatic under-frequency load shedding** blocks must be net of any **interruptible load** procured by the **system operator**.

- (8) Subject to the **system operator's** agreement, which must not be unreasonably withheld, a **grid owner** may redistribute **automatic under-frequency load shedding** quantities between **grid exit points**, if the overall **automatic under-frequency load shedding** quantity obligations in subclause (6A) are met.

- (9) In addition to their obligations to provide information under clauses 6 and 7 of Appendix B of **Technical Code A**, each North Island **distributor** and each South Island **grid owner** must provide **automatic under-frequency load shedding** block **demand** profile information to the **system operator** if reasonably requested by the **system operator**. For each North Island **distributor** that information must be in the form, and supplied by the date, specified by the **system operator** in the **AUFLS technical requirements report**. For each South Island **grid owner** that information must be in the form specified by the **system operator** in the relevant **asset capability statement**.

- (9A) If requested by the **Authority**, the **system operator** must provide information it obtains under clauses 6 and 7 of Appendix B of **Technical Code A** and subclause (9) of this clause to the **Authority**, supplemented by the **system operator's** assessment, based on its analysis of that information, as to whether the **automatic under frequency load shedding** scheme is secure.

- (10) Subclauses (12) to (16) apply if a direction under clause 9.15 is in force.

- (11) When subclauses (12) to (16) apply, the **system operator** may give notice to 1 or more of the **participants** specified in subclause (14), specifying modifications to the extent to which subclauses (1) to (4), (6) and (6A) apply to the **participant** during any 1 or more periods, or in any 1 or more circumstances, specified in the notice.
- (12) The **system operator** must keep a record of each notice given under subclause (11).
- (13) When a notice under subclause (11) is in force in relation to a **participant**, the requirements of subclauses (1) to (4), (6) and (6A) are modified for that **participant** to the extent, and during the periods or in the circumstances (as the case may be), specified in the notice.
- (14) The **participants** to whom the **system operator** may issue a notice in accordance with subclause (11) are—
  - (a) **distributors** in the North Island; and
  - (b) **grid owners** in the South Island.
- (15) The **system operator** may amend or revoke a notice, or revoke and substitute a new notice.
- (16) A notice under subclause (11) expires on the earlier of—
  - (a) the date (if any) specified in the notice for its expiry; or
  - (b) the revocation or expiry of the direction referred to in subclause (10).
- (17) The **system operator**, each **distributor**, each **grid owner** and relevant **retailers** must, to the extent reasonably practicable, co-operate to ensure that any **interruptible load** contracted by the **system operator** that could affect the size of an **automatic under-frequency load shedding** block is identified to assist the **distributor** or the **grid owner** to meet its obligations in subclauses (1) to (9).
- (18) On the operation of an **automatic under-frequency load shedding** system, the **distributor** or **grid owner**—
  - (a) must, as soon as practicable, advise the **system operator** of the operation of the **automatic under-frequency load shedding** system and, if reasonably required by the **system operator** to plan to comply, or to comply, with its **principal performance obligations**, a reasonable estimate of the amount of **demand** that has been disconnected; and
  - (b) may restore **demand** only when permitted to do so by the **system operator**; and
  - (c) must ensure **demand** restored in accordance with paragraph (b) complies with subclause (6) and (6A); and
  - (d) must report to the **system operator** if **demand** is moved between **points of connection**; and
  - (e) may request permission to restore **demand** from the **system operator** if no instruction to restore **demand** is received from the **system operator** within 15 minutes of the frequency returning to the **normal band**; and
  - (f) may cautiously and gradually restore the **demand** disconnected through the **automatic under-frequency load shedding** system if there is a **loss of communication**, after 15 minutes of the **loss of communication** occurring. This restoration must be done only while the frequency is within the **normal band** and the voltage is within the required range. Each **distributor** must immediately cease the restoration of **demand** and, to the extent necessary, disconnect **demand**, if the frequency drops below the **normal band** or the voltage moves outside the required range. As soon as practicable after communications are restored, each **distributor** or each **grid owner** must report to the **system operator** on the status of load restoration and the status of re-arming the **automatic under-frequency load shedding** system; and
  - (g) must provide data detailing the **automatic under-frequency load shedding** system



operation as detailed in the **AUFLS technical requirements report**.

- (19) Each **distributor** must maintain an up-to-date process for the disconnection of **demand for points of connection**, including the specification of the **participant** who will effect the disconnection of **demand**. The **distributor** must obtain agreement for the process from the **system operator** and each **grid owner** (such agreement not to be unreasonably withheld). Each **distributor** must advise the **system operator** of the agreed process in addition to any changes to a process previously advised.
- (20) If the **system operator** requires the disconnection of **demand** in accordance with this **technical code**, the **system operator** must instruct **distributors** and **grid owners** (as the case may be) in accordance with the agreed process in subclause (19) to disconnect **demand** for the relevant **point of connection**. If the **system operator** and a **distributor** or **grid owner** (as the case may be) have not agreed on a process for disconnection of **demand** for a **point of connection**, the **system operator** must instruct **grid owners** to disconnect **demand** directly at the relevant **point of connection**. To the extent practicable, the **system operator** must use reasonable endeavours to ensure equity between **distributors** when instructing the disconnection of **demand**.
- (21) Each **distributor** or **grid owner** must act as instructed by the **system operator** operating in accordance with clauses 6 and 7.

#### **7A — Emergency load shedding**

- (1) Each ~~connected asset owner~~ must maintain a process for ~~electrical disconnection of demand for points of connection~~.
- (2) The process must specify the **participant** that will effect the ~~electrical disconnection of demand~~.
- (3) The ~~connected asset owner~~ must obtain agreement for the process from the **system operator** and each **grid owner**.
- (4) Each ~~connected asset owner~~ must advise the **system operator** of the agreed process in addition to any changes to a process previously advised.
- (5) If the **system operator** requires the ~~electrical disconnection of demand~~ under this **technical code**, the **system operator** must instruct ~~connected asset owners~~ and **grid owners** in accordance with the agreed process under subclause (3) to ~~electrically disconnect demand~~ for the relevant **point of connection**.
- (6) If the **system operator** and a ~~connected asset owner~~ or **grid owner** have not agreed on a process for ~~electrical disconnection of demand~~ at a **point of connection**, the **system operator** must instruct **grid owners** to ~~electrically disconnect demand~~ directly at the relevant **point of connection**.
- (7) To the extent practicable, the **system operator** must use reasonable endeavours when instructing the ~~electrical disconnection of demand~~ to ensure equity between ~~connected asset owners~~.
- (8) Each ~~connected asset owner~~ or **grid owner** must act as instructed by the **system operator** operating under clause 6.

Clause 7A: inserted, on 7 August 2014, by clause 21 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.

Clause 7A(1), (2), (5), (6) and (7): amended, on 5 October 2017, by clause 126 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

Clause 7A(1), (3), (4), (5), (6), (7) and (8): amended, on 1 February 2016, by clause 20 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2015.

## ~~7B Obligations of extended reserve providers in relation to automatic under-frequency load shedding~~

- ~~(1) On the operation of extended reserve that is an automatic under-frequency load shedding system, an extended reserve provider—
  - ~~(a) must, as soon as practicable, advise the system operator of the operation of the automatic under-frequency load shedding system and, if reasonably required by the system operator to plan to comply, or to comply, with its principal performance obligations, a reasonable estimate of the amount of demand that has been electrically disconnected; and~~
  - ~~(b) may electrically connect demand only when permitted to do so by the system operator; and~~
  - ~~(c) must ensure demand electrically connected under paragraph (b) complies with the obligations in its statement of extended reserve obligations; and~~
  - ~~(d) must report to the system operator if demand is moved between points of connection; and~~
  - ~~(e) may request permission to electrically connect demand from the system operator if no instruction to electrically connect demand is received from the system operator within 15 minutes of the frequency returning to the normal band; and~~
  - ~~(f) may cautiously and gradually electrically connect the demand electrically disconnected through the automatic under-frequency load shedding system if there is a loss of communication with the system operator, 15 minutes after the loss of communication occurred.~~~~
- ~~(2) An extended reserve provider may electrically connect demand only while frequency is within the normal band and voltage is within the required range.~~
- ~~(3) Each extended reserve provider must immediately cease the electrical connection of demand and, to the extent necessary, electrically disconnect demand, if the frequency drops below the normal band or the voltage moves outside the required range.~~
- ~~(4) As soon as practicable after communications are restored, each extended reserve provider must report to the system operator on the status of electrical connection of load and the status of re-arming the automatic under-frequency load shedding system.~~

~~Clause 7B: inserted, on 7 August 2014, by clause 21 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

~~Clause 7B: amended, on 5 October 2017, by clause 127 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

## ~~7C Obligations of extended reserve providers in security of supply situations~~

- ~~(1) This clause applies if a direction under clause 9.15 is in force.~~
- ~~(2) The system operator may give notice to 1 or more of the participants specified in subclause (5), specifying modifications to the participant's statement of extended reserve obligations during any 1 or more periods, or in any 1 or more circumstances, specified in the notice.~~
- ~~(3) The system operator must keep a record of each notice given under subclause (2).~~
- ~~(4) When a notice under subclause (2) is in force in relation to a participant, the requirements of the participant's statement of extended reserve obligations are modified for that participant to the extent, and during the periods or in the circumstances (as the case may be), specified in the notice.~~
- ~~(5) The participants to whom the system operator may issue a notice in accordance with subclause (2) are—
  - ~~(a) connected asset owners in the North Island; and~~
  - ~~(b) grid owners in the South Island.~~~~

~~(6) The **system operator** may amend or revoke a notice, or revoke and substitute a new notice.~~

~~(7) A notice under subclause (2) expires on the earlier of—~~

~~(a) the date (if any) specified in the notice for its expiry; and~~

~~(b) the revocation or expiry of the direction referred to in subclause (1).~~

~~Clause 7C: inserted, on 7 August 2014, by clause 21 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2014.~~

~~Clause 7C(5)(a): amended, on 1 February 2016, by clause 21 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2015.~~

~~Schedule 8.5 cl 8.54D(7), 8.54E(4)(b), 8.54F(2)(b)(ii),  
8.54G(4), 8.54I(2), 8.54J(8), (9)~~

## ~~Consultation and approval requirements for extended reserve procurement documents~~

~~Part 1~~

~~Consultation on extended reserve technical requirements schedule~~

### ~~1 Application of this Part~~

~~This Part sets out the consultation requirements that apply to the **extended reserve technical requirements schedule**.~~

#### ~~2 Publication of extended reserve technical requirements schedule~~

~~(1) The **system operator** must prepare a draft of the **extended reserve technical requirements schedule**.~~

~~(2) The **system operator** must give the draft schedule to the **Authority** for comment, along with the **extended reserve technical requirements report**.~~

~~(3) The **Authority** must provide comments on the draft schedule to the **system operator** as soon as practicable after receiving it.~~

~~(4) The **system operator** must consider the **Authority's** comments.~~

~~(5) After the **system operator** has considered the **Authority's** comments, the **system operator** must—~~

~~(a) consult with persons that the **system operator** thinks are representative of the interests of persons likely to be substantially affected by the draft schedule; and~~

~~(b) consider submissions made on the draft schedule.~~

~~(6) The **system operator** must give a copy of each submission made to it and a copy of the draft schedule that the **system operator** proposes to **publish** to the **Authority**.~~

~~(7) The **Authority** must provide comments on the draft schedule as soon as practicable after receiving it.~~

~~(8) The **system operator** must consider the **Authority's** comments.~~

~~(9) Following the consultation required by this clause, the **system operator** must finalise and **publish** the draft schedule.~~

### ~~3 Technical and non-controversial changes~~

~~(1) The **system operator** may at any time make a change to the **extended reserve technical requirements schedule** that it considers is technical and non-controversial.~~

~~(2) If the **system operator** makes a change to the **extended reserve technical requirements schedule** under subclause (1), the **system operator** is not required to comply with clause 2 of this Schedule.~~

~~(3) The **system operator** must give written notice to the **Authority** of any changes to the **extended reserve technical requirements schedule** made under this clause.~~

~~Clause 3(3): amended, on 19 December 2014, by clause 16 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.~~

Clause 3(3): amended, on 5 October 2017, by clause 137 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

## Part 2

Consultation on extended reserve selection methodology

### **4 Application of this Part**

This Part sets out the consultation and approval requirements that apply to the ~~extended reserve selection methodology~~.

### **5 Preparation of and consultation on extended reserve selection methodology**

(1) The ~~extended reserve manager~~ must prepare a draft of the ~~extended reserve selection methodology~~.

(2) The ~~extended reserve manager~~ must give the draft methodology to the **Authority** and the **system operator** for comment, along with one or more worked examples of an ~~extended reserve procurement schedule~~, created using—

(a) the draft ~~extended reserve selection methodology~~; and

(b) data specified by the ~~system operator~~.

(3) The **Authority** and the **system operator** must provide comments on the draft methodology to the ~~extended reserve manager~~ as soon as practicable after receiving it.

(4) The ~~extended reserve manager~~ must consider the comments provided by the **Authority** and the **system operator**.

(5) After the ~~extended reserve manager~~ has considered the comments provided by the **Authority** and the **system operator**, the ~~extended reserve manager~~ must—

(a) consult with persons that the ~~extended reserve manager~~ thinks are representative of the interests of persons likely to be substantially affected by the draft methodology; and

(b) consider submissions made on the draft methodology.

### **6 Approval of extended reserve selection methodology**

(1) The ~~extended reserve manager~~ must give the **Authority** and the **system operator**—

(a) a copy of each submission made on the draft ~~extended reserve selection methodology~~; and

(b) a response to each issue raised in each submission; and

(c) a copy of the draft methodology that the ~~extended reserve manager~~ proposes to **publish**.

(2) As soon as practicable, but no later than 15 ~~business days~~ after receiving a copy of the draft methodology, the ~~system operator~~ must—

(a) give the **Authority** any comments it wishes to make on the draft methodology; or

(b) advise the **Authority** that it does not wish to make any comments.

(3) As soon as practicable after receiving the ~~system operator's~~ comments, or advice that the ~~system operator~~ does not wish to make any comments, the **Authority** must, by notice in writing to the ~~extended reserve manager~~ and the ~~system operator~~,—

(a) approve the draft methodology; or

(b) decline to approve the draft methodology.

(4) If the **Authority** declines to approve the draft methodology, the **Authority** must either—

(a) **publish** the changes that the **Authority** wishes the ~~extended reserve manager~~ to make to the draft methodology; or

(b) require the ~~extended reserve manager~~ to prepare a new draft methodology.

Clause 6(4)(a): amended, on 5 October 2017, by clause 138 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

### **7 Consultation on proposed changes**

(1) When the **Authority** **publishes** changes that the **Authority** wishes the ~~extended reserve manager~~ to make to the draft ~~extended reserve selection methodology~~ under clause 6(4), the **Authority** must advise the ~~extended reserve manager~~ and interested parties of the date by which submissions on the changes must be made to the **Authority**.

- (2) Each submission on the changes to the draft methodology must be made in writing to the **Authority** and be received by the date specified by the **Authority**.
- (3) The **Authority** must—
- (a) give a copy of each submission made to the **extended reserve manager**; and
- (b) **publish** the submissions.
- (4) The **extended reserve manager** may make its own submission on the changes to the draft methodology and the submissions made in relation to the changes.
- (5) The **Authority** must **publish** the **extended reserve manager's** submission when it is received.
- (6) The **Authority** must consider the submissions made to it on the changes to the draft methodology and prepare a revised draft methodology incorporating any amendments that the **Authority** proposes be made to the methodology.
- (7) The **Authority** must give the revised draft methodology prepared under subclause (6) to the **system operator**, and clause 6(2) applies as if the revised draft methodology was the draft methodology prepared under clause 5.
- (8) As soon as practicable after receiving the **system operator's** comments, or advice that the **system operator** does not wish to make any comments, the **Authority** must,—
- (a) by notice in writing to the **extended reserve manager** and the **system operator**,—
- (i) approve the revised draft methodology; or
- (ii) amend the revised draft methodology to address any comments received from the **system operator**, and approve it; or
- (b) **publish** a further revised draft methodology, and advise the **extended reserve manager** and interested parties of the date by which submissions on the changes must be made to the **Authority**.
- (9) If the **Authority publishes** a further revised draft methodology under subclause (8)(b), subclauses (2) to (8) apply as if the further revised draft methodology was the revised draft methodology.
- Clause 7(1): amended, on 19 December 2014, by clause 17 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.
- Clause 7(1) and (9): amended, on 5 October 2017, by clause 139(1) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.
- Clause 7(3)(b), (5) and (8)(b): amended, on 5 October 2017, by clause 139(2) of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.
- Clause 7(8)(b): amended, on 19 December 2014, by clause 17 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.

### **8 Technical and non-controversial changes**

- (1) The **extended reserve manager** may at any time propose a change to the **extended reserve selection methodology** that it considers is technical and non-controversial by giving a draft methodology to the **Authority** together with an explanation of the proposed change.
- (2) If the **extended reserve manager** gives a draft methodology to the **Authority** under subclause (1) the **extended reserve manager** is not required to comply with clauses 5 and 6 of this Schedule.
- (3) The **Authority** must give written notice to the **system operator** of any proposed change to the **extended reserve selection methodology** that it receives under subclause (1).
- (4) The **Authority** must, as soon as practicable after receiving a draft methodology and the information required by subclause (1), by notice in writing to the **extended reserve manager** and the **system operator**—
- (a) approve the draft methodology; or

~~(b) decline to approve the draft methodology, giving reasons.~~

~~Clause 8(3): amended, on 19 December 2014, by clause 18 of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.~~

~~Clause 8(3): amended, on 5 October 2017, by clause 140 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

### ~~9 Publication of extended reserve selection methodology~~

~~As soon as practicable after the Authority approves the extended reserve selection methodology under clause 6(3)(a), 7(8)(a), or 8(4)(a), the extended reserve manager must publish the methodology.~~

~~Clause 9: amended, on 5 October 2017, by clause 141 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.~~

Part 3

Consultation on extended reserve procurement schedule

### ~~10 Application of this Part~~

~~This sets out the consultation and approval requirements that apply to the extended reserve procurement schedule.~~

#### ~~11 Preparation of and consultation on extended reserve procurement schedule~~

~~(1) The extended reserve manager must prepare a draft of the extended reserve procurement schedule.~~

~~(2) The extended reserve manager must —~~

~~(a) give the draft to the Authority and the system operator for comment; and~~

~~(b) if requested, give the Authority or the system operator the information used by the extended reserve manager to prepare the draft.~~

~~(3) The Authority and the system operator must provide comments on the draft procurement schedule to the extended reserve manager as soon as practicable after receiving it.~~

~~(4) The extended reserve manager must consider the comments provided by the Authority and the system operator.~~

~~(5) After the extended reserve manager has considered the comments provided by the Authority and the system operator, the extended reserve manager must —~~

~~(a) consult with persons that the extended reserve manager thinks are representative of the interests of persons likely to be substantially affected by the draft procurement schedule; and~~

~~(b) consider submissions made on the draft procurement schedule.~~

### ~~12 Approval of extended reserve procurement schedule~~

~~(1) The extended reserve manager must give the Authority and the system operator —~~

~~(a) a copy of each submission made on the draft extended reserve procurement schedule; and~~

~~(b) a response to each issue raised by each submission; and~~

~~(c) a copy of the draft procurement schedule that the extended reserve manager proposes to publish.~~

~~(2) As soon as practicable, but no later than 15 business days after receiving a copy of the draft procurement schedule, the system operator must —~~

~~(a) give the Authority any comments it wishes to make on the draft procurement schedule; or~~

~~(b) advise the Authority that it does not wish to make any comments.~~

~~(3) As soon as practicable after receiving the system operator's comments, or advice that the system operator does not wish to make any comments, the Authority must, by notice in writing to the extended reserve manager and the system operator, —~~

~~(a) approve the draft procurement schedule; or~~

~~(b) decline to approve the draft procurement schedule.~~

~~(4) If the Authority declines to approve the draft procurement schedule, the Authority must either —~~

(a) ~~publish~~ the changes that the ~~Authority~~ wishes the ~~extended reserve manager~~ to make to the draft procurement schedule; or

(b) require the ~~extended reserve manager~~ to prepare a new draft procurement schedule.

Clause 12(4)(a): amended, on 5 October 2017, by clause 142 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

### ~~13 Consultation on proposed changes~~

(1) When the ~~Authority publishes~~ changes that the ~~Authority~~ wishes the ~~extended reserve manager~~ to make to the draft ~~extended reserve procurement schedule~~ under clause 12(4), the ~~Authority~~ must advise the ~~extended reserve manager~~ and interested parties of the date by which submissions on the changes must be made to the ~~Authority~~.

(2) Each submission on the changes to the draft procurement schedule must be made in writing to the ~~Authority~~ and be made by the date advised by the ~~Authority~~.

(3) The ~~Authority~~ must—

(a) give a copy of each submission made to the ~~extended reserve manager~~; and

(b) ~~publish~~ the submissions.

(4) The ~~extended reserve manager~~ may make its own submission on the changes to the draft procurement schedule and the submissions made in relation to the changes.

(5) The ~~Authority~~ must ~~publish~~ the ~~extended reserve manager's~~ submission when it is received.

(6) The ~~Authority~~ must consider the submissions made to it on the changes to the draft procurement schedule and prepare a revised draft procurement schedule incorporating any amendments that the ~~Authority~~ proposes be made to the schedule.

(7) The ~~Authority~~ must give the revised draft procurement schedule prepared under subclause (6) to the ~~system operator~~, and clause 12(2) applies as if the revised draft procurement schedule was the draft procurement schedule prepared under clause 11.

(8) As soon as practicable after receiving the ~~system operator's~~ comments, or advice that the ~~system operator~~ does not wish to make any comments, the ~~Authority~~ must,—

(a) by notice in writing to the ~~extended reserve manager~~ and the ~~system operator~~,—

(i) approve the revised draft procurement schedule; or

(ii) amend the revised draft procurement schedule to address any comments received from the ~~system operator~~, and approve it; or

(b) ~~publish~~ a further revised draft procurement schedule, and advise the ~~extended reserve manager~~ and interested parties of the date by which submissions on the changes must be made to the ~~Authority~~.

(9) If the ~~Authority publishes~~ a further revised draft procurement schedule under subclause (8)(b), subclauses (2) to (8) apply as if the further revised draft procurement schedule was the revised procurement schedule.

Clause 13(1) and (8)(b): amended, on 19 December 2014, by clause 19(1) of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.

Clause 13(2): amended, on 19 December 2014, by clause 19(2) of the Electricity Industry Participation Code Amendment (Minor Code Amendments) (No 3) 2014.

Clause 13(1), (3)(b), (5), (8)(b) and (9): amended, on 5 October 2017, by clause 143 of the Electricity Industry Participation Code Amendment (Code Review Programme) 2017.

### ~~14 Publication of extended reserve procurement schedule~~

As soon as practicable after the ~~Authority~~ approves the ~~extended reserve procurement schedule~~ under clause 12(3)(a) or 13(8)(a), the ~~extended reserve manager~~ must ~~publish~~ the schedule.

## Consultation and approval requirements for the **AUFLS technical requirements report**

### **1 Contents of this Schedule**

This Schedule sets out the consultation and approval requirements that apply to the **AUFLS technical requirements report**.

### **2 Incorporation of AUFLS technical requirements report by reference**

- (1) The **AUFLS technical requirements report** is incorporated by reference in this Code in accordance with section 32 of the **Act**.
- (2) Subclause (1) is subject to Schedule 1 of the **Act**, which includes a requirement that the Authority must give notice in the *Gazette* before legal effect is given to an amendment to, or replacement of, a document incorporated by reference in this Code.

### **3 Changes and variations to AUFLS technical requirements report**

- (1) The **system operator** may at any time propose a change to the **AUFLS technical requirements report** by submitting a draft **AUFLS technical requirements report** to the **Authority** together with an explanation of the proposed change.
- (2) The **Authority** must provide comments on the draft **AUFLS technical requirements report** to the **system operator** as soon as practicable after receiving it.
- (3) The **system operator** must consider the **Authority's** comments.
- (4) After the **system operator** has considered the **Authority's** comments, the **system operator** must—
  - (a) consult with persons that the **system operator** thinks are representative of the interests of persons likely to be substantially affected by the draft **AUFLS technical requirements report**; and
  - (b) consider submissions made on the draft **AUFLS technical requirements report**.
- (5) The **system operator** must give a copy of each submission made to it and a copy of the draft **AUFLS technical requirements report** that the **system operator** proposes to publish to the **Authority**.
- (6) The **Authority** must provide comments to the **system operator** on the draft **AUFLS technical requirements report** as soon as practicable after receiving it.
- (7) The **system operator** must consider the **Authority's** comments.
- (8) Following the consultation required by this clause, the **system operator** must finalise and publish the draft **AUFLS technical requirements report** and provide it to the Authority.
- (9) Following the process required by subclauses (1) to (8), the **Authority** may approve the draft **AUFLS technical requirements report**.
- (10) The **Authority** may choose to carry out consultation on the proposed changes before deciding whether to approve the draft **AUFLS technical requirements report**.

### **4 Technical and non-controversial changes**

- (1) The **system operator** may at any time propose a change to the **AUFLS technical requirements report** that it considers is technical and non-controversial by submitting a draft **AUFLS technical requirements report** to the **Authority** together with an explanation of the proposed change.
- (2) If the **system operator** proposes a change to the **AUFLS technical requirements report** under subclause (1), the **system operator** is not required to comply with clause 3 of this Schedule.



- (3) The **Authority** must, as soon as practicable after receiving a draft **AUFLS technical requirements report** and the information required under subclause (1), by notice in writing to the **system operator**—
  - (a) approve the draft **AUFLS technical requirements report** to be incorporated by reference into this Code; or
  - (b) decline to approve the draft **AUFLS technical requirements report**, giving reasons.
- (4) If the **Authority** approves the draft **AUFLS technical requirements report** it must as soon as practicable—
  - (a) **publish** notice of its intention to incorporate the draft **AUFLS technical requirements report** by reference into this Code; and
  - (b) include in the notice the **Authority's** reasons for considering that the changes proposed in the draft **AUFLS technical requirements report** are technical and non-controversial; and
  - (c) invite comment from **participants** on the reasons given in the notice.
- (5) After considering any comments made under subclause 4(c) the **Authority** must advise the **system operator** by notice in writing of its decision as to whether to confirm or revoke its approval of the draft **AUFLS technical requirements report**, and give reasons for its decision.
- (6) The **Authority** must **publish** its decision and reasons as soon as practicable.

## 5 Authority adopts new AUFLS technical requirements report

If the Authority approves a draft **AUFLS technical requirements report** under clause 3 of this Schedule or confirms its approval of a draft **AUFLS technical requirements report** under clause 4 of this Schedule it must—

- (a) incorporate the new **AUFLS technical requirements report** by reference into this Code in accordance with Schedule 1 of the Act; and
- (b) **publish** the new **AUFLS technical requirements report** and the date on which it takes legal effect.

## Part 13

### 13.82 Dispatch instructions to be complied with

- (1) This clause applies to—
  - (a) a **generator**; and
  - (b) an **ancillary service agent**; and
  - (c) a **dispatched purchaser**.
- (2) Each **participant** to which this clause applies must comply with a **dispatch instruction** properly issued by the **system operator** under clause 13.72 unless,—
  - (a) in the **participant's** reasonable opinion,—
    - (i) personnel or plant safety is at risk; or
    - (ii) following the **dispatch instruction** will contravene a law; or
  - (b) the **generating plant** or **dispatch-capable load station** is already responding to an automated signal to activate—
    - (i) **capacity reserve**; or
    - (ii) **instantaneous reserve**; or
    - (iii) **automatic under-frequency load shedding**; or
    - (iv) **over frequency reserve**; or
  - (c) the **participant** is a **generator** or **ancillary service agent** acting in accordance with clause 13.86; or

- (d) the **participant** is an **intermittent generator** and the **system operator** has not **flagged** the **dispatch instruction** in accordance with clause 13.73(1A); or
- (e) the **participant**—
  - (i) is a **generator**; and
  - (ii) deviates from a **dispatch instruction** for **active power** to comply with clause 8.17; or
- (f) the **participant**—
  - (i) is a **dispatched purchaser**; and
  - (ii) deviates from the dispatch instruction—
    - (A) to comply with a request issued by the **system operator** under clause 5(4) of **Technical Code B** of Schedule 8.3; or
    - (B) to comply with clause 8.18; or
- (g) the **participant**—
  - (i) is a **dispatched purchaser**; and
  - (ii) cannot comply with the **dispatch instruction** because **demand** has been **electrically disconnected** under clause ~~7A~~**7(20)** of **Technical Code B** of Schedule 8.3; or

## Part 14 Clearing and settlement

### 14.1 Contents of this Part

This Part provides for—

- (a) the sale and purchase of **electricity** to and from the **clearing manager**; and
- (b) the calculation and invoicing of amounts owing to and by the **clearing manager** for **electricity, ancillary services, extended reserve, FTRs**, and other payments that may be received or paid by the **clearing manager**; and
- (c) the settlement of amounts payable under this Part; and
- (d) processes and remedies for an **event of default**; and
- (e) obligations of the **clearing manager** in relation to clearing and settlement, including reporting obligations and requirements for the **operating account** that must be established and held by the **clearing manager**.

### 14.14 Amounts owing for ancillary services

The **clearing manager** must determine amounts owing in respect of **ancillary services** in accordance with clauses 8.6, 8.31, 8.55(1), and 8.68(1).

### ~~14.14A Amounts owing for extended reserve~~

~~The **clearing manager** must determine amounts owing in respect of **extended reserve** in accordance with clauses 8.55(2), 8.67A, and 8.68(3) and (4).~~

### 14.18 Clearing manager to advise participant of amounts owing and payable

- (1) The **clearing manager** must advise each **participant**, for which the **clearing manager** has determined that the **participant** owes or is owed an amount under subpart 3, the following:
  - (a) amounts owing by the **participant** to the **clearing manager** in accordance with clause 14.19;
  - (b) amounts owing by the **clearing manager** to the **participant** in accordance with clause 14.20;
  - (c) the amount of the settlement retention amount calculated in accordance with the methodology **published** by the **clearing manager** under clause 14.21;

- (d) any amount payable by the **participant** to the **clearing manager** and any amount payable by the **clearing manager** to the **participant** under subpart 5 in accordance with clause 14.22.
- (2) The **clearing manager** must advise each **participant** of each amount owing and each amount payable no later than—
  - (a) the 9<sup>th</sup> **business day** of the month following the **billing period**; or
  - (b) if the **clearing manager** has not received **reconciliation information** in accordance with clause 28(c) of Schedule 15.4 or **dispatchable load information** under clause 15.20C(a) in respect of the prior **billing period** from the **reconciliation manager**, 2 **business days** after the **clearing manager** has received both the **reconciliation information** and the **dispatchable load information**.
- (3) A **participant** must not issue a **GST** invoice for supplies of **electricity**, **ancillary services** ~~**extended reserve**~~, or **ancillary service administrative costs** to the **clearing manager**.

#### 14.19 Amounts owing by participant to clearing manager

- (2) The **clearing manager** must specify any amount owing by the **participant** to the **clearing manager** in respect of the periods referred to in subclause (1) for the following:
  - (a) **electricity** purchased under clauses 14.2 to 14.7:
  - (b) **constrained off compensation** under clause 13.201A:
  - (c) **constrained on compensation** under clause 13.212:
  - (d) a **washup** amount and any interest on that amount under subpart 6:
  - (e) **auction revenue** under clause 13.110:
  - (f) **ancillary services** under clauses 8.6, 8.31(1)(a), and 8.68(4):
  - ~~(fa) **extended reserve** under clauses 8.67A, and 8.68(3):~~
  - (g) payment of an amount under any **hedge settlement agreement**:
  - (h) for each **FTR** in respect of which the **participant** is registered as the holder of the **FTR**, the net amount of the **FTR acquisition cost** for the **FTR** minus the **FTR hedge value** for the **FTR**, if that net amount is positive:
  - (i) any amount owing in respect of the assignment of any **FTR** under clause 13.249(4):
  - (j) **GST**.

..

#### 14.20 Amounts owing by clearing manager to participant

- (2) The **clearing manager** must specify any amount owing by the **clearing manager** to the **participant** in respect of the periods referred to in subclause (1) for the following:
  - (a) **electricity** sold under clauses 14.2 to 14.7:
  - (b) **constrained off compensation** under clause 13.201A:
  - (c) **constrained on compensation** under clause 13.212:
  - (d) a **washup** amount and any interest on that amount under subpart 6:
  - (e) **auction revenue** under clause 13.112:
  - (f) **ancillary services** under clause 8.55(a):
  - ~~(fa) **extended reserve** under clause 8.68(4):~~
  - (g) payment of an amount under any **hedge settlement agreement**:
  - (h) for each **FTR** in respect of which the **participant** is registered as the holder of the **FTR**, the net amount of the **FTR hedge value** for the **FTR** minus the **FTR acquisition cost** for the **FTR**, if that net amount is positive:
  - (i) any amount owing in respect of the assignment of any **FTR** under clause 13.249(7):
  - (j) **GST**:
  - (k) **loss and constraint excess** and **residual loss and constraint excess** under clause 14.16(7).

..

#### 14.56 Calculation of revised amount owing for general amounts

- (1) The **clearing manager** must apply any amount available for the settlement of general amounts in accordance with the following order of priority:
- (a) to satisfy any liability to pay **GST** and other governmental charges or levies, that are payable by the **clearing manager** in respect of the amounts owing and payable under subparts 4 to 6, taking into account any **GST** input tax credits available to the **clearing manager** in respect of payments under paragraphs (b) to (e):
    - (ab) *[Revoked]*
    - (b) to satisfy any amounts owing to the following parties, pro rata according to the amounts owing to them for ~~ancillary services or extended reserve~~ (as the case may be):
      - (i) the **system operator** for **ancillary services** under clauses 8.6, 8.31(1)(a), and 8.55 to 8.67:
      - (ii) ~~an extended reserve provider for extended reserve~~ under clauses 8.55(2) and 8.68(4):
  - (c) to satisfy any amount of **loss and constraint excess** to be applied to the settlement of **FTRs** under clause 14.16(4) or (5):
  - (d) to satisfy any amount owing to each **grid owner** for any **loss and constraint excess** in accordance with clause 14.16(7)(a):
  - (e) to satisfy any other general amount owing by the **clearing manager** to a **participant**.

### Changes to Part 14A

#### 14A.18 System operator to provide information

The **system operator** must provide the **clearing manager** with the following information immediately upon becoming aware of the information:

- (a) any likely significant change to any amount to be allocated to a **participant** in respect of ~~ancillary services or extended reserve~~:
- (b) the amount incurred by a **participant** as a result of the **participant** causing an **under-frequency event**.

### Schedule 14A.1

#### 9 Calculating clearing manager's outstanding financial exposure to participant

- (1) The expected amount of the **clearing manager's** outstanding financial exposure to a **participant** on any **trading day** is an estimate of all unsettled amounts owing by the **participant** to the **clearing manager** and by the **clearing manager** to the **participant** to the end of the previous **trading day**, including the **clearing manager's** estimate of the following amounts:
- (a) the amount owing to or by the **participant** for purchasing and selling **electricity**:
  - ~~(ab) the amount owing to or by the **participant** in relation to **extended reserve**:~~
  - (b) the amount owing to or by the **participant** in relation to **ancillary services**:
  - (c) the net amount owing to or by the **participant** in respect of any **hedge settlement agreement** lodged with the **clearing manager** under clause 14.8:
  - (d) the amount of any **GST** payable by the **participant** in respect of the above amounts.
- (2) The **clearing manager** must use **final prices** in calculating amounts under subclause (1) unless—
- (a) **final prices** are not available, in which case the **clearing manager** must use **interim prices**; or
  - (b) neither **final prices** nor **interim prices** are available, or an **undesirable trading situation** has been claimed in respect of a **trading period** or **trading day** that is

included in the **clearing manager's** estimate, in which case the **clearing manager** must use the price calculated in accordance with clause 10(2)(c) that is used in the methodology for determining the exit period prudential margin.

- (3) The **clearing manager** must take **washup** amounts that have been calculated by the **clearing manager** into account in estimating the amounts described in this clause.

## 10 Exit period prudential margin

- (1) The exit period prudential margin for a **participant** is the **clearing manager's** estimate of the amount that the **participant** will incur and earn during the prudential exit period for the **participant** in respect of the following:
- (a) the sale and purchase of **electricity**;
  - ~~(ab) **extended reserve**;~~
  - (b) **ancillary services**;
  - (c) any **hedge settlement agreement** lodged with the **clearing manager** under clause 14.8;
  - (d) any **GST** payable in respect of the above amounts.
- (2) The estimated amounts to be incurred and earned by the **participant** in respect of the sale and purchase of **electricity** under subclause (1)(a) are based on—
- (a) the number of **trading days** in the prudential exit period for the **participant** determined under clause 14A.22(3); and
  - (b) the expected value of **electricity** to be purchased by the **participant** minus the expected value of **electricity** to be sold by the **participant** during that period based on the prices in paragraph (c); and
  - (c) the sum of the following amounts:
    - (i) the prices of **electricity** expected to apply during the quarter to which the calculation relates in accordance with subclauses (3) and (4);
    - (ii) an amount determined as set out in subclause (5).
- (3) In determining the prices under subclause (2)(c)(i), the **clearing manager** must use prices of **electricity** futures products that are available and that the **clearing manager** considers provide a reasonable estimate of the average price of **electricity** for the relevant quarter.
- (4) The **clearing manager** must determine the prices under subclause (2)(c)(i)—
- (a) for each quarter beginning 1 January, 1 April, 1 July, and 1 October; and
  - (b) no later than 2 months before the beginning of each quarter.
- (5) The amount determined under subclause (2)(c)(ii) must—
- (a) be an amount expressed in **\$/MWh** of not less than **\$0/MWh**; and
  - (b) be determined on the basis that the exit period prudential margin for a hypothetical **purchaser** that purchases a constant proportion of total **electricity** purchased from the **clearing manager** for every **trading period** is greater than the general exit period exposure for the **purchaser** on 75% of the days in the relevant quarter in a modeling period of 3 to 10 years selected by the **clearing manager**.
- (6) The **clearing manager** must determine the amount under subclause (2)(c)(ii)—
- (a) for each quarter in a calendar year; and
  - (b) no later than 2 months before the beginning of each calendar year.
- (7) The methodology must specify how the clearing manager will estimate the initial amount of security for **ancillary services** for a new **participant**.
- (8) The expected amounts to be incurred and earned by the **participant** in respect of a **hedge settlement agreement** must be based on the price determined by the **clearing manager** under subclause (2)(c).

## Part 15

### 15.14 Notice of changes to the grid

- (1) Each **grid owner** must give written notice to the **reconciliation manager**, in accordance with any procedures or other requirements reasonably specified by the **reconciliation manager** from time to time, of any changes that the **grid owner** intends to make to the **grid** that will affect reconciliation.
- (2) The **grid owner** must give the notice at least 1 month before the effective date of the intended change.
- (3) No later than 1 **business day** after receipt of the notice, the **reconciliation manager** must give a copy of the notice to the ~~extended reserve manager~~, the **clearing manager**, and the **Authority**.

### 28 Provision of reconciliation information

The **reconciliation manager** must provide the following information to the **clearing manager** and those **participants** listed below, and in the case of paragraph (f), to the **Authority**, in respect of the prior **consumption period**, by 1600 hours on the 7th **business day** of each **reconciliation period**, and in respect of revisions in accordance with clauses 15.27 and 15.28 by 1200 hours on the last **business day** of each **reconciliation period**. These reports must be in the format, and contain the information determined by the **Authority**. The reports are—

- (a) to each **generator** or **purchaser**, the **reconciliation information** applying to that **generator** or **purchaser**, to enable the **generator** or **purchaser** to verify its **reconciliation information**; and
- (b) to each **grid owner**, such information as is required by that **grid owner** to calculate its charges; and
- (c) to the **clearing manager**, the **reconciliation information** (including all amounts derived by the **reconciliation manager** in accordance with clause 20) applying to each **participant** to enable the **clearing manager** to calculate the amounts owing by the **clearing manager** to each **participant** and by each **participant** to the **clearing manager**; and
- (d) to each **retailer** and **direct purchaser**, the calculated daily **seasonal adjustment shape** related to any **point of connection** for which the **retailer** and **direct purchaser** is trading; and
- (e) to each **retailer**, **generator**, and **direct purchaser**, the **reconciliation manager** must **publish half hour profile** shape data for **profiles**; and
- (f) to the **Authority**, the **reconciliation manager** must provide the report prepared by the **reconciliation manager** referred to in clause 10 of Schedule 15.3; and
- ~~(g) to the **extended reserve manager**, the **reconciliation information** applying to each **participant** to enable the **extended reserve manager** to carry out and manage its procurement process.~~

### ~~29 Extended reserve manager use of reconciliation information~~

~~The **extended reserve manager** must not **publish** or otherwise make available any **reconciliation information** provided to it under clause 28 that identifies any **retailer**, **purchaser**, or **generator**.~~

~~Clause 29: inserted, on 19 January 2017, by clause 18 of the Electricity Industry Participation Code Amendment (Extended Reserve) 2016.~~

### Changes to Part 17

#### **17.45 Redistribution of automatic under-frequency load shedding**

An agreement to redistribute **automatic under-frequency load shedding** quantities between **grid exit points** under clause 6.4 of technical code B of schedule C3 of part C of the **rules** that was in force immediately before this Code came into force, is deemed to be an agreement under clause 7(8) of **Technical Code B** of Schedule 8.3.

#### **17.48C Transitional provisions for exemptions to provide automatic under-frequency load shedding**

Exemptions under section 11 of the **Act** to clause 8.19(5) of this Code and clauses 7(1), 7(8) and 7(9) of **Technical Code B** of Schedule 8.3 of this Code that were in force prior to this clause coming into force will continue to be in force until the earlier of—

- a) 30 June 2022; or
- b) the date on which the exemption is superseded by the **system operator** approving an **equivalence arrangement** under clause 8.30.

**Q10. Do you have any comments on the drafting of the proposed amendment?**

## Appendix D Cost benefit analysis



## Appendix E Format for submissions

Submitter	
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Question	Comment
Q1. Do you agree the issues identified by the Authority are worthy of attention?	
Q2. Do you agree with the objectives of the proposed amendment? If not, why not?	
Q3. Do you agree with the proposed changes to the monitoring data resolution and requirements? If you disagree, what monitoring regime do you think would be more efficient?	
Q4. Do you agree with the incorporation by reference of the ATR and the proposed process for amending the ATR?	
Q5. Do you agree that a 30 June 2025 deadline will provide enough time for providers to transition their systems to the 4-block AUFLS scheme?	
Q6. Do you agree with the use of equivalence arrangements to allow previously exempted parties to work towards compliant AUFLS provision?	
Q7. Do you agree the benefits of the proposed amendment outweigh its costs?	
Q8. 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 objective in section 15 of the Electricity Industry Act 2010.	
Q9. Do you agree the Authority's proposed amendment complies with section 32(1) of the Act?	

Q10. Do you have any comments on the drafting of the proposed amendment?	
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## Glossary of abbreviations and terms

<b>Authority</b>	Electricity Authority
<b>Act</b>	Electricity Industry Act 2010
<b>Code</b>	Electricity Industry Participation Code 2010
<b>Regulations</b>	Electricity Industry (Enforcement) Regulations 2010