

Electricity Industry Participation Code Amendment (Automatic Under-Frequency Load Shedding Systems) 2021


Under section 38 of the Electricity Industry Act 2010, and having complied with section 39 of that Act,
I make the following amendment to the Electricity Industry Participation Code 2010.

At Wellington on the 09 day of November 2021

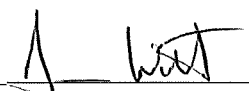


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 5 November 2021

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Amendment

1 Title

This is the Electricity Industry Participation Code Amendment (Automatic Under-Frequency Load Shedding Systems) 2021.

2 Commencement

This amendment comes into force on 21 December 2021.

3 Code amended

This amendment amends the Electricity Industry Participation Code 2010.

4 Clause 1.1 amended (Interpretation)

- (1) In clause 1.1(1), insert in its appropriate alphabetical order:
“**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”.
- (2) In clause 1.1(1) replace the definition of **automatic under-frequency load shedding** with:
“**automatic under-frequency load shedding** means automatic shedding of electrical load when frequency falls below the relevant pre-set frequency, or falls at a rate, specified by the **system operator** in the **AUFLS technical requirements report** or in clause 7(6) and 7(6A) of **Technical Code B** of Schedule 8.3”.
- (3) In clause 1.1(1), revoke the definitions of **extended reserve**, **extended reserve manager**, **extended reserve procurement notice**, **extended reserve procurement schedule**, **extended reserve provider**, **extended reserve selection methodology**, **extended reserve schedule**, **extended reserve technical requirements report**, **extended reserve technical requirements schedule** and **statement of extended reserve obligation**.
- (4) In clause 1.1(1), definition of **loss of communication**, replace “, **extended reserve providers**” with “**North Island connected asset owners**, **South Island grid owners**”.

5 Clause 3.1 amended (Appointment of market operation service providers)

Revoke clause 3.1(1)(g).

6 Clause 8.1 amended (Contents of this Part)

In clause 8.1, delete “, **extended reserve**”.

7 Clause 8.1A revoked (Requirement to provide complete and accurate information)

Revoke clause 8.1A.

8 Clause 8.4 amended (System operator may rely on information provided)

- (1) In clause 8.4(b), after the words “a valid **dispensation or equivalence arrangement**”, delete “; and”.
- (2) Revoke clause 8.4(c).

9 Clause 8.5 amended (Restoration)

Replace clause 8.5(1)(a) with:

“(a) the capability of **generation and ancillary services**; and”.

- 10 **Clause 8.19 amended (Contributions to frequency support in under-frequency events)**
In clause 8.19(5) replace “**extended reserve provider** must provide **extended reserve** in accordance with Schedule 8.3, Technical Code B.” with “North Island **connected asset owner** 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**.”.
- 11 **Clause 8.29 amended (Right to apply for approval of equivalence arrangement or grant of dispensation)**
In clause 8.29(2) replace “**extended reserve**” with “**automatic under-frequency load shedding**”.
- 12 **Subpart 5 of Part 8 revoked**
Revoke Subpart 5 of Part 8.
- 13 **Clause 8.54U amended (Contents of this subpart)**
In clause 8.54U delete “and **extended reserve**”.
- 14 **Cross heading above clause 8.55 amended**
In the cross heading above clause 8.55, delete “*and extended reserve*”.
- 15 **Clause 8.55 amended (Identifying costs associated with ancillary services and extended reserve)**
 - (1) In the heading to clause 8.55, delete “and **extended reserve**”.
 - (2) Revoke clause 8.55(2).
- 16 **Clause 8.67A revoked (Extended reserve costs allocated to connected asset owners)**
Revoke clause 8.67A.
- 17 **Clause 8.68 amended (Clearing manager to determine amounts owing)**
Revoke clause 8.68(3), (4) and (5).
- 18 **Clause 8.69 amended (Clearing manager to determine wash up amounts payable and receivable)**
Revoke clause 8.69(1)(c) and (d).
- 19 **Schedule 8.3, Technical Code A, clause 8 amended**
 - (1) In clause 8(2)(a)—
 - (a) after “of its **assets**”, insert “, including **automatic under-frequency load shedding systems**,”; and
 - (b) delete “; and”.
 - (2) Revoke clause 8(2)(b).
- 20 **Cross heading above Schedule 8.3, Technical Code A, Appendix B, clause 1 amended**
In the cross heading above Schedule 8.3, Technical Code A, Appendix B, clause 1 after “*assets*” insert “*and automatic under-frequency load shedding systems*”.

21 Schedule 8.3, Technical Code A, Appendix B, clause 1 amended

- (1) In Schedule 8.3, Technical Code A, Appendix B, clause 1(2), after “assets” insert “, including **automatic under-frequency load shedding systems**”.

22 Schedule 8.3, Technical Code A, Appendix B clauses 6 and 7 replaced

Replace Schedule 8.3, Technical Code A, Appendix B, clauses 6 and 7 with:

“6 North Island connected asset owner automatic under-frequency load shedding systems profiles and trip settings

Each North Island **connected asset 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 analogue **automatic under-frequency load shedding systems** at least once every 4 years; and
- (c) test the operation of its non-self monitoring digital **automatic under-frequency load shedding systems** at least once every 4 years; and
- (d) test the operation of its self monitoring digital **automatic under-frequency load shedding systems** at least once every 10 years; and
- (e) based on the relevant test carried out in accordance with paragraphs (b), (c) or (d), 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 the relevant 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 analogue **automatic under-frequency load shedding systems** at least once every 4 years; and
- (c) test the operation of its non-self monitoring digital **automatic under-frequency load shedding systems** at least once every 4 years; and
- (d) test the operation of its self monitoring digital **automatic under-frequency load shedding systems** at least once every 10 years; and
- (e) based on the relevant test carried out in accordance with paragraphs (b), (c) or (d), 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 the relevant test.”

23 Schedule 8.3, Technical Code B, clause 1 amended

In Schedule 8.3, Technical Code B, clause 1, after “must” insert “plan for,”.

24 Schedule 8.3, Technical Code B, clause 6 amended

In Schedule 8.3, Technical Code B, clause 6(1)(d), (2)(d), (3) and (4) replace “7A” with “7(20)”.

25 **Schedule 8.3, Technical Code B, clause 7 replaced**

In Schedule 8.3, Technical Code B, replace clause 7 with:

“7 Load shedding systems

- (1) Each North Island **connected asset owner** must ensure, at all times, that an **automatic under-frequency load shedding system** is installed in accordance with subclauses (6) and (6AA).
- (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 **connected asset owner** 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) and (6AA) or (6A) as applicable.
- (4) If, at any time, a North Island **connected asset owner** believes that an **automatic under-frequency load shedding system** may not be capable of meeting the requirements of subclauses (6) or (6AA) 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 **connected asset owner** 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 **connected asset owner** 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 **connected asset owner** is connected to the **grid**. Each South Island **connected asset owner** 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 **electrical disconnection of demand** either—
 - (a) as 2 blocks of **demand** (each block being a minimum of 16% of the **connected asset owner’s** total pre-event **demand**), with—
 - (i) block 1 **electrically disconnecting demand** within 0.4 seconds after the frequency reduces to, and remains at or below, 47.8 Hertz; and
 - (ii) block 2 **electrically disconnecting demand**—
 - (A) 15 seconds after the frequency reduces to, and remains at or below, 47.8 Hertz; and
 - (B) 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** and subject to subclause (6AA).
- (6AA) Each North Island **connected asset owner** 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**. The 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 **electrical 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—

- (a) block 1 **electrically disconnecting demand** within 0.4 seconds after the frequency reduces to, and remains at or below, 47.5 Hertz; and
- (b) block 2 **electrically disconnecting demand**—
 - (i) 15 seconds after the frequency reduces to, and remains at or below, 47.5 Hertz; and
 - (ii) 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 **connected asset owner** 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 **connected asset owner** 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), (6AA) 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), (6AA) 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) **connected asset owners** in the North Island;
 - (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;
 - (b) the revocation or expiry of the direction referred to in subclause (10).
- (17) The **system operator**, each **connected asset owner**, each **grid owner** and each relevant **retailer** 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 **connected asset owner** 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 **connected asset owner** 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 **electrically disconnected**; and
 - (b) may **electrically connect** the **demand electrically disconnected** through the **automatic under-frequency load shedding** system only when permitted to do so by the **system operator**; and
 - (c) must ensure **demand electrically connected** in accordance with paragraph (b) complies with subclauses (6), (6AA) and (6A); 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**, 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 **connected asset owner** must immediately cease the restoration 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. As soon as practicable after communications are restored, each **connected asset owner** 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** or in a format agreed with the **system operator**.
- (19) Each **connected asset owner** must maintain an up-to-date process for the **electrical disconnection** of **demand** for **points of connection**, including the specification of the **participant** who will effect the **electrical disconnection** of **demand**. The **connected asset owner** must obtain agreement for the process from the **system operator** and each **grid owner** (such agreement not to be unreasonably withheld). Each **connected asset owner** 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 **electrical disconnection** of **demand** in accordance with this **Technical Code**, the **system operator** must instruct **connected asset owners** and **grid owners** (as the case may be) in accordance with the agreed process in subclause (19) to **electrically disconnect demand** for the relevant **point of connection**. If the **system operator** and a **connected asset owner** or **grid owner** (as the case may be) have not agreed on a process for **electrical disconnection** of **demand** for a **point of connection**, the **system operator** must instruct **grid owners** to **electrically disconnect demand** directly at the

relevant **point of connection**. To the extent practicable, the **system operator** must use reasonable endeavours to ensure equity between **connected asset owners** when instructing the **electrical disconnection of demand**.

(21) Each **connected asset owner** or **grid owner** must act as instructed by the **system operator** operating in accordance with clauses 6 and 7.”

- 26 Schedule 8.3, Technical Code B, clause 7A revoked**
Revoke Schedule 8.3, Technical Code B, clause 7A.
- 27 Schedule 8.3, Technical Code B, clause 7B revoked**
Revoke Schedule 8.3, Technical Code B, clause 7B.
- 28 Schedule 8.3, Technical Code B, clause 7C revoked**
Revoke Schedule 8.3, Technical Code B, clause 7C.
- 29 Schedule 8.5 revoked**
Revoke Schedule 8.5.
- 30 New Schedule 8.6 inserted**
After Schedule 8.5, insert the Schedule 8.6 set out in the Schedule of this amendment.
- 31 Clause 13.82 amended (Dispatch instructions to be complied with)**
In clause 13.82(2)(g)(ii), replace “7A” with “7(20)”.
- 32 Clause 14.1 amended (Contents of this Part)**
In clause 14.1(b), delete “, extended reserve”.
- 33 Clause 14.14 amended (Amounts owing for ancillary services)**
In clause 14.14, delete “(1)” in each place.
- 34 Clause 14.14A (Amounts owing for extended reserve) revoked**
Revoke clause 14.14A.
- 35 Clause 14.18 amended (Clearing manager to advise participant of amounts owing and payable)**
In clause 14.18(3), delete “, extended reserve”.
- 36 Clause 14.19 amended (Amounts owing by participant to clearing manager)**
(1) In clause 14.19(2)(f), after “8.68”, delete “(1)”.
(2) Revoke clause 14.19(2)(fa).
- 37 Clause 14.20 amended (Amounts owing by clearing manager to participant)**
Revoke clause 14.20(2)(fa).

- 38 **Clause 14.56 amended (Calculation of revised amount owing for general amounts)**
Replace clause 14.56(1)(b) with:
“(b) to satisfy any amounts owing to the **system operator** for **ancillary services** under clauses 8.6, 8.31(1)(a), and 8.55 to 8.67:”
- 39 **Clause 14A.18 amended (System operator to provide information)**
In clause 14A.18(a), after “**services**” delete “or **extended reserve**”.
- 40 **Schedule 14A.1, clause 9 amended**
Revoke Schedule 14A.1, clause 9(1)(ab).
- 41 **Schedule 14A.1, clause 10 amended**
Revoke Schedule 14A.1, clause 10(1)(ab).
- 42 **Clause 15.14 amended (Notice of changes to the grid)**
In clause 15.14(3)—
(a) delete “the **extended reserve manager**,”; and
(b) after “**clearing manager**”, delete “,”.
- 43 **Schedule 15.4, clause 28 amended**
(1) In Schedule 15.4, clause 28(f), delete “; and”.
(2) Revoke Schedule 15.4, clause 28(g).
- 44 **Schedule 15.4, clause 29 revoked**
Revoke Schedule 15.4, clause 29.
- 45 **Clause 17.45 replaced**
Replace clause 17.45 with:
“**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.”
- 46 **New clause 17.48C inserted**
After clause 17.48B, insert:
“**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;
(b) the date on which the exemption is superseded by the **system operator** approving an **equivalence arrangement** under clause 8.30.”

Schedule
New Schedule 8.6 inserted
Schedule 8.6

cl 1.1

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 variation 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 the 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 or not 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** under clause 3 of this Schedule or confirm its approval of a draft **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.

Explanatory Note

This note is not part of the amendment, but is intended to indicate its general effect.

This amendment to the Electricity Industry Participation Code 2010 comes into force on 21 December 2021.

The amendment inserts new provisions into the Electricity Industry Participation Code 2010 (“Code”) to re-introduce the regime for ‘automatic under-frequency load shedding’ relays (“AUFLS”). References to extended reserve in the Code are deleted. The amendment implements the Authority’s decision to transition the AUFLS provision in the North Island to the system operator’s 4-block scheme with rate-of-change-of-frequency (“RoCoF”) trip settings on the fourth AUFLS block. Planning for the scheme will require that North Island connected asset owners submit their current 2-block AUFLS load data to the system operator, and then subsequently submit load data annually for periodical review by the system operator. The aim is to provide the North Island with a reliable and efficient electricity system to manage the challenges posed by the changing power system.

Date of notification in the *Gazette*: 17 November 2021