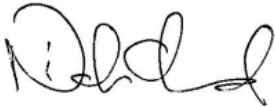


Electricity Industry Participation Code Amendment (Enabling Energy Storage Systems to Offer Instantaneous Reserve) 2022

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 22 day of March 2022

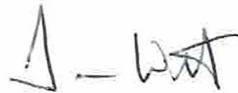


Dr Nicola Lane Crauford
Chair
Electricity Authority

Certified in order for signature:



Mark Dunlop
Senior Legal Counsel
Electricity Authority



Simon Watt
Consultant
Bell Gully

18 March 2022

10 March 2022

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Amendment

1 Title

This is the Electricity Industry Participation Code Amendment (Enabling Energy Storage Systems to Offer Instantaneous Reserve) 2022.

2 Commencement

This amendment comes into force on 3 May 2022.

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 their appropriate alphabetical order:

“**energy storage system** means all equipment functioning together as a single entity that is able to take **electricity** from a **network**, store the energy in another form, and provide **injection**

“**generation reserve** means a form of **instantaneous reserve** (including, without limitation, **partly loaded spinning reserve**, **tail water depressed reserve** and that provided by **energy storage systems**) which comprises generating capacity that is able to provide **fast instantaneous reserve** or **sustained instantaneous reserve** in accordance with the **procurement plan**”.

(2) In clause 1.1(1), definition of **bona fide physical reason**, paragraph (b), replace “**partly loaded spinning reserve**, **tail water depressed**” with “**generation**”.

(3) In clause 1.1(1), replace definitions as follows:

(a) **fast instantaneous reserve** with:

“**fast instantaneous reserve** means the increase in generation or reduction in **demand** (in **MW**) provided no later than 6 seconds, and measured at 6 seconds, after the start of a “Contingent Event” (as defined in the **policy statement**) and that is sustained until at least 60 seconds after the start of the “Contingent Event”;

(b) **instantaneous reserve** with:

“**instantaneous reserve** means an **ancillary service** provided to balance the injection of **electricity** into the **grid** with the offtake of **electricity** from the **grid** following a drop in system frequency to the level specified in the **procurement plan**, comprising 1 or more of the following:

(a) **interruptible load**:

(b) **generation reserve**”;

(c) **interruptible load** with:

“**interruptible load** means a form of **instantaneous reserve** comprised of **demand** that is able to be reduced to provide **fast instantaneous reserve** or **sustained instantaneous reserve** following a drop in system frequency, in accordance with the **procurement plan**”;

(d) **partly loaded spinning reserve** with:

“**partly loaded spinning reserve** means a form of **generation reserve** consisting of spare capacity, held in reserve on a **generating unit**, generating, but not operating at full output, but excludes the spare capacity provided by an **energy storage system**”;

(e) **sustained instantaneous reserve** with:

“**sustained instantaneous reserve** means the average increase in generation or reduction in **demand** (in **MW**) provided by **instantaneous reserve** during the first 60

- seconds after the start of a “Contingent Event” (as defined in the **policy statement**) and that is sustained for at least 15 minutes after the start of the “Contingent Event” (unless a new **dispatch instruction** is given before the expiry of that 15 minute period)”.
- (4) In clause 1.1(1), definition of **tail water depressed reserve**, replace “**instantaneous**” with “**generation**”.
- 5 **Clause 13.38 amended (Ancillary service agents to submit reserve offers to system operator)**
Replace clause 13.38(2)(a) with:
“(a) contain all the information required by Form 5(1) in Schedule 13.1 for **partly loaded spinning reserve** or Form 5(2) in Schedule 13.1 for all other categories of **generation reserve**; and”.
- 6 **Clause 13.40 amended (Inter-relationship between reserve offers of interruptible load and bids)**
In clause 13.40, replace “**electrically disconnects**” with “**reduces**”.
- 7 **Clause 13.44 replaced (How quantity is to be specified in reserve orders)**
Replace clause 13.44 with:
“**13.44 How quantity is to be specified in reserve orders**
(1) For each price band, a **reserve offer** must specify the quantity of **instantaneous reserve** offered to respond as **fast instantaneous reserve** and/or **sustained instantaneous reserve**—
(a) as the generation available to be injected as a proportion of **electricity** output up to a specified maximum quantity for **partly loaded spinning reserve**; or
(b) as the generation available to be injected for all other categories of **generation reserve**; or
(c) as the **demand** available to be reduced for **interruptible load**.
(2) The quantity that may be offered in a price band for a **trading period** must be expressed in **MW** to not more than 3 decimal places and must not be less than 0.000 **MW**.”
- 8 **Clause 13.53 replaced (Additional information to be provided by participants)**
Replace clause 13.53 with:
“**13.53 Additional information to be provided by participants**
Despite clauses 13.22, 13.23, 13.51, and 13.52, if an **ancillary service agent** submits a **reserve offer** for **generation reserve** in accordance with clauses 13.37 to 13.54, the **ancillary service agent** must also provide the maximum quantity of fast response **generation reserve** expressed in **MW** and/or the maximum quantity of sustained response **generation reserve** expressed in **MW** to the **system operator** in a manner and at such times as are approved by the **system operator** (such approval not to be unreasonably withheld).”
- 9 **Schedule 13.1, Form 5 amended**
(1) In the heading “**1 Partly Loaded Spinning Reserve**”, replace “**1**” with “**(1)**”.
(2) Replace the heading “**2 Tail water depressed reserve**” with “**(2) All other forms of generation reserve**”.

10 **Schedule 13.3, clause 8 amended**

Replace Schedule 13.3, clause 8(1) with:

“(1) The objective function of the modelling system is described mathematically as:

$$\text{Maximise } \left\{ \begin{array}{l} \text{Gross Consumer Benefit} \\ \hline \sum_{i,j} D_{i,j} \times BP_{i,j} \\ \text{minus} \\ \text{Cost of Generation} \\ \hline \sum_{i,j} G_{i,j} \times OP_{i,j} \\ \text{minus} \\ \text{Cost of Fast Instantaneous Reserves} \\ \hline \sum_{i,j} R_{i,j}^{GR,f} \times OP_{i,j}^{GR,f} + \sum_{i,j} R_{i,j}^{IL,f} \times OP_{i,j}^{IL,f} \\ \text{minus} \\ \text{Cost of Sustained Instantaneous Reserves} \\ \hline \sum_{i,j} R_{i,j}^{GR,s} \times OP_{i,j}^{GR,s} + \sum_{i,j} R_{i,j}^{IL,s} \times OP_{i,j}^{IL,s} \end{array} \right\}$$

where

i is a price band of a **bid** / **offer** or a **reserve offer**

j is a **generating unit** / **generating station**, or a **purchaser**

$D_{i,j}$ is the scheduled demand corresponding to price band i of the **bid** for **purchaser** j or metered demand, whichever is relevant, and where the relevant **bids** used here are formed from a combination of the following, as appropriate to the schedule being calculated:

- nominated bids:
- the forecast prepared under clause 13.7A(1);
- difference bids (if difference bids are used, the quantities must be added or subtracted, as appropriate, from the forecast prepared under clause 13.7A(1));
- the system operator's expectation of the profile of demand during the relevant period covered by the schedule being calculated;
- a measure of actual demand during the relevant period

$BP_{i,j}$ is the **bid** prices corresponding to price band i of the **bid** for **purchaser** j

$G_{i,j}$ is the scheduled generation corresponding to price band i of the **offer** for unit / station j

$OP_{i,j}$ is the **offer** price corresponding to price band i of the **offer** for unit / station j

$R_{i,j}^{GR,f}$ is the scheduled fast GR corresponding to price band i of the fast **reserve offer** for unit / station j

$R_{i,j}^{GR,s}$ is the scheduled sustained GR corresponding to price band i of the **reserve offer** for unit / station j

$OP_{i,j}^{GR,f}$ is the **reserve offer** price corresponding to price band i of the fast GR **reserve offer** for unit / station j

$OP_{i,j}^{GR,s}$ is the **reserve offer** price corresponding to price band i of the sustained GR **reserve offer** for unit / station j

$R_{i,j}^{IL,f}$ is the scheduled fast IL corresponding to price band i of the **reserve offer** for purchaser j

$R_{i,j}^{IL,s}$ is the scheduled sustained IL corresponding to price band i of the **reserve offer** for purchaser j

$OP_{i,j}^{IL,f}$ is the **reserve offer** price corresponding to price band i of the fast IL **reserve offer** for purchaser j

$OP_{i,j}^{IL,s}$ is the **reserve offer** price corresponding to price band i of the sustained IL **reserve offer** for purchaser j

and where

GR is **generation reserve**

IL is **interruptible load**

fast is **fast instantaneous reserve**

sustained is **sustained instantaneous reserve**".

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 ("Code") comes into force on 3 May 2022.

The amendment amends Part 1 and Part 13 of the Code to enable new types of instantaneous reserve, such as battery energy storage systems, to be offered as an ancillary service in the wholesale market. The amendments to Part 1 of the Code include the introduction of a new defined term, "energy storage

system”, which refers to equipment that is able to take electricity from a network, store the energy in another form and provide injection. The definition of “instantaneous reserve” is also amended to generalise its meaning and restructure the definition into two categories, “interruptible load” and “generation reserve”. A new defined term, “generation reserve” is introduced to refer to all forms of injectable reserve, including energy storage systems. Other consequential amendments to definitions are also made. Part 13 and clause 8 of Schedule 13.3 are amended to reflect the changes to definitions in Part 1 of the Code. These amendments are intended to allow battery energy storage systems and future storage technologies to offer instantaneous reserve, both when charging from and injecting energy into, the electricity grid.

In addition to this amendment, the procurement plan has been amended to update the corresponding technical performance requirements for instantaneous reserve.

Date of notification in the *Gazette*: 29 March 2022