



Draft National Electricity Amendment (Primary frequency response incentive arrangements) Rule 2021

under the National Electricity Law to the extent applied by:

- (a) the National Electricity (South Australia) Act 1996 of South Australia;
- (b) the Electricity (National Scheme) Act 1997 of the Australian Capital Territory;
- (c) the Electricity - National Scheme (Queensland) Act 1997 of Queensland;
- (d) the Electricity - National Scheme (Tasmania) Act 1999 of Tasmania;
- (e) the National Electricity (New South Wales) Act 1997 of New South Wales;
- (f) the National Electricity (Victoria) Act 2005 of Victoria;
- (g) the National Electricity (Northern Territory) (National Uniform Legislation) Act 2015 of the Northern Territory; and
- (h) the Australian Energy Market Act 2004 of the Commonwealth.

The Australian Energy Market Commission makes the following Rule under the National Electricity Law.

Anna Collyer
Chairperson
Australian Energy Market Commission

Draft National Electricity Amendment (Primary frequency response incentive arrangements) Rule 2021

1 Title of Rule

This Rule is the *Draft National Electricity Amendment (Primary frequency response incentive arrangements) Rule 2021*.

2 Commencement

Paragraph 6 of this Rule commences operation on [date this rule is made].

Schedules 1 and 3 of this Rule commence operation on [date this rule is made].

Schedule 2 of this Rule commences operation on [2 years and 3 months from the date this rule is made].

3 Amendment to the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 1.

4 Amendment to the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 2.

5 Savings and Transitional Amendment to the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 3.

6 Revocation of Schedule 2 of the Mandatory primary frequency response rule

Schedule 2 of the *National Electricity Amendment (Mandatory primary frequency response) Rule 2020 No. 5* is revoked.

Schedule 1 Amendment to the National Electricity Rules

(Clause 3)

[1] Clause 4.8.16 AEMO reporting on frequency reporting

After clause 4.8.16(b)(1), insert:

(1A) *AEMO's* assessment of the level of aggregate *frequency* responsiveness in the *power system* provided by *frequency* responsive *plant* in each *region*;

[2] Clause 11.122.2 Interim Primary Frequency Response Requirements

After clause 11.122.2(d), insert the following note:

Note

The obligations on *AEMO* to publish the Primary Frequency Response Requirements under clause 4.4.2A(a) are now set out in clause 11.[XXX].2(b).

Schedule 2 Amendment to the National Electricity Rules

(Clause 4)

[1] Clause 3.11.2A AER reporting on market ancillary services markets

In clause 3.11.2A(b)(1)(iii), omit "; and" and substitute ";".

[2] Clause 3.11.2A AER reporting on market ancillary services markets

In clause 3.11.2A(b)(1)(iv), after ";" insert "and".

[3] Clause 3.11.2A AER reporting on market ancillary services markets

In clause 3.11.2A(b)(1), after paragraph (iv), insert:

- (v) the total costs of *frequency performance payments* for each *region*.

[4] Clause 3.15.6A Ancillary service transactions

Omit clause 3.15.6A(h) and substitute:

- (h) The total amount calculated by *AEMO* under paragraph (a) for the *regulating raise service* or the *regulating lower service* in respect of each *trading interval* must be allocated by *AEMO* in accordance with the following procedure and the information provided under clause 3.9.2A(b):
 - (1) allocate on a pro-rata basis for each *region* and for each *trading interval* the proportion of the total amount calculated by *AEMO* under paragraph (a) for the *regulating raise service* and *regulating lower service* between *global market ancillary service requirements* and *local market ancillary service requirements* to the respective marginal prices for each such service; and
 - (2) calculate for each *trading interval* the sum of the costs of the *regulating raise service* or the *regulating lower service* for each *global market ancillary service requirement* for all *regions*, and for each *local market ancillary service requirement* for all relevant *regions*, as determined under subparagraph (1); and
 - (3) allocate for each *trading interval* the costs of the *global market ancillary service requirements* and *local market ancillary service requirements* calculated in subparagraph (2) in accordance with paragraph (i).

[5] Clause 3.15.6A Ancillary service transactions

Omit clauses 3.15.6A(i) to (o) and substitute:

Cost recovery for regulation services

- (i) In each *trading interval* in relation to:
- (1) each *Market Participant* which has metering to allow their individual contribution to the aggregate deviation in *frequency* of the *power system* to be assessed, an *ancillary services transaction* occurs, which results in a *trading amount* for that *Market Participant* determined in accordance with the following formula:

$$TA = \text{the aggregate of} \left(TSFCAS \times \frac{NMPF}{NAMPF} \times \min \left(\frac{RR}{EA}, 1 \right) \right) \times -1$$

for each *trading interval* for *global market ancillary service requirements* and *local market ancillary service requirements* where:

TA (in \$) = the *trading amount* to be determined (which is a negative number);

TSFCAS (in \$) = each amount calculated by *AEMO* under paragraph (h)(2) for the *regulating raise service* or the *regulating lower service* in respect of a *trading interval*;

NMPF (a number) = the contribution factor for the relevant *trading interval* set by *AEMO* for the *Market Participant* under paragraph (j) for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service* (which is a negative number);

NAMPF (a number) = the aggregate of the NMPF values for all *Market Participants* for the *trading interval* for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service* (which is a negative number);

EA (in MW) = the total amount of the relevant *regulating raise service* or *regulating lower service* which has been *enabled* in a *trading interval*; and

RR (in MW) = the amount of the relevant *regulating raise service* or *regulating lower service* required

by *AEMO* in that *trading interval*.

or

- (2) in relation to each *Market Participant* for whom the *trading amount* is not calculated in accordance with the formula in subparagraph (1), an *ancillary services transaction* occurs, which results in a *trading amount* for that *Market Participant* determined in accordance with the following formula:

$$TA = \text{the aggregate of} \left(TSFCAS \times \frac{RMPF}{NAMPF} \times \min \left(\frac{RR}{EA}, 1 \right) \times \frac{TE}{ATE} \right) \times -1$$

for each *trading interval* for *global market ancillary service requirements* and *local market ancillary service requirements* where:

- TA (in \$) = the *trading amount* to be determined (which is a negative number);
- TSFCAS (in \$) = has the meaning given in subparagraph (1);
- RMPF (a number) = the aggregate residual contribution factor for the relevant *trading interval* set by *AEMO* for the *Market Participants* under paragraph (j) for whom the *trading amount* is not calculated in accordance with the formula in subparagraph (1), for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service* (which is a negative number);
- NAMPF (a number) = has the meaning given in subparagraph (1);
- TE (in MWh) = the sum of the absolute value of any *customer energy*, *generator energy* and *small generator energy* for the *Market Participant* for the *trading interval* in the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service*;
- ATE (in MWh) = the aggregate of the absolute value of *customer energy*, *generator energy* and *small generator energy* figures for all

Market Participants, for whom the *trading amount* is not calculated in accordance with the formula in subparagraph (1), for the *trading interval* for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service*;

EA (in MW) = has the meaning given in subparagraph (1); and

RR (in MW) = has the meaning given in subparagraph (1).

and

- (3) the total amount calculated by *AEMO* under paragraph (a) for any *enabled regulating raise service* or *enabled regulating lower service* that was not used by *AEMO* in that *trading interval* must be allocated by *AEMO* to each *Market Participant* pro-rated in proportion to the *customer energy*, *generator energy* and *small generator energy* (as the case may be) for that *Market Participant* in that *trading interval* as determined in accordance with the following formula:

$$TA = TSFCAS \times \left(1 - \min \left(\frac{RR}{EA}, 1 \right) \right) \times \frac{TE}{ATE} \times -1$$

where:

TA (in \$) = the *trading amount* to be determined (which is a negative number);

TSFCAS (in \$) = has the meaning given in subparagraph (1);

TE (in MWh) = the sum of the absolute value of any *customer energy*, *generator energy* and *small generator energy* for the *Market Participant* for the *trading interval* in the *region* or *regions*;

ATE (in MWh) = the aggregate of the absolute value of the *customer energy*, *generator energy* and *small generator energy* figures for all *Market Participants*, for whom the *trading amount* is not calculated in accordance with the formula in

subparagraph (1), for the *trading interval* for the *region* or *regions*;

EA (in MW) = has the meaning given in subparagraph (1); and

RR (in MW) = has the meaning given in subparagraph (1).

Frequency performance payments

(i1) In each *trading interval* in relation to:

- (1) each *Market Participant* which has metering to allow their individual contribution to the reduction of the aggregate deviation in *frequency* of the *power system* to be assessed, an *ancillary services transaction* occurs, which results in a *trading amount* for that *Market Participant* determined in accordance with the following formula:

$$TA = \text{the aggregate of} \left(TSFCAS \times \frac{PMPF}{NAMPF} \times \frac{RR}{EA} \right)$$

for each *trading interval* for *global market ancillary service requirements* and *local market ancillary service requirements* where:

TA (in \$) = the *trading amount* to be determined (which is a positive number);

TSFCAS (in \$) = each amount calculated by *AEMO* under paragraph (h)(2) for the *regulating raise service* or the *regulating lower service* in respect of a *trading interval*;

PMPF (a number) = the contribution factor for the relevant *trading interval* set by *AEMO* for the *Market Participant* under paragraph (j) for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service* (which is a positive number);

NAMPF (a number) = the aggregate of the *NMPF* values for all *Market Participants* for the *trading interval* for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service* (which is a

negative number);

RR (in MW) = the amount of the relevant *regulating raise service* or *regulating lower service enabled* and required by AEMO in that *trading interval*; and

EA (in MW) = the total amount of the relevant *market ancillary service* which has been *enabled* in the *trading interval*.

- (2) in relation to each *Market Participant* for whom the *trading amount* is not calculated in accordance with the formula in subparagraph (1), an *ancillary services transaction* occurs, which results in a *trading amount* for that *Market Participant* determined in accordance with the following formula:

$$TA = \text{the aggregate of} \left(TSFCAS \times \frac{PMPF}{NAMPF} \times \frac{RR}{EA} \times \frac{TE}{ATE} \right)$$

for each *trading interval* for *global market ancillary service requirements* and *local market ancillary service requirements* where:

TA (in \$) = the *trading amount* to be determined (which is a positive number);

EA (in MW) = has the meaning given in subparagraph (1);

TSFCAS (in \$) = has the meaning given in subparagraph (1);

PMPF (a number) = has the meaning given in subparagraph (1);

NAMPF (a number) = has the meaning given in subparagraph (1);

RR (in MW) = has the meaning given in subparagraph (1);

TE (in MWh) = the sum of the absolute value of any *customer energy*, *generator energy* and *small generator energy* for the *Market Participant* for the *trading interval* in the *region* or relevant to the *regulating raise service* or *regulating lower*

service; and

ATE (in MWh) = the aggregate of the absolute value of the *customer energy*, *generator energy* and *small generator energy* figures for all *Market Participants*, for whom the *trading amount* is not calculated in accordance with the formula in subparagraph (1), for the *trading interval* for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service*;

Cost recovery for frequency performance payments

(i2) In each *trading interval* in relation to:

- (1) each *Market Participant* which has metering to allow their individual contribution to the aggregate deviation in *frequency* of the *power system* to be assessed, a *frequency performance payment cost recovery transaction* occurs, which results in a *trading amount* for that *Market Participant* determined in accordance with the following formula:

$$TA = \text{the aggregate of} \left(TFPP \times \frac{NMPF}{NAMPF} \right) \times -1$$

for each *trading interval* for *global market ancillary service requirements* and *local market ancillary service requirements* where:

TA (in \$) = the *trading amount* to be determined (which is a negative number);

TFPP (in \$) = the total of all amounts calculated by *AEMO* under paragraph (i1) for the *frequency performance payments* in respect of a *trading interval*;

NMPF (a number) = the contribution factor for the relevant *trading interval* set by *AEMO* for the *Market Participant* under paragraph (j) for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service* (which is a negative number);

NAMPF (a number) = the aggregate of the NMPF values for all *Market Participants* for the *trading interval* for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service* (which is a negative number);

or

- (2) in relation to each *Market Participant* for whom the *trading amount* is not calculated in accordance with the formula in subparagraph (1), a *frequency performance payment cost recovery transaction* occurs, which results in a *trading amount* for that *Market Participant* determined in accordance with the following formula:

$$TA = \text{the aggregate of} \left(TFPP \times \frac{NMPF}{NAMPF} \times \frac{TE}{ATE} \right) \times -1$$

for each *trading interval* for *global market ancillary service requirements* and *local market ancillary service requirements* where:

TA (in \$) = the *trading amount* to be determined (which is a negative number);

TFPP costs (in \$) = has the meaning given in subparagraph (1);

TE (in MWh) = the sum of the absolute value of any *customer energy*, *generator energy* and *small generator energy* for the *Market Participant* for the *trading interval* in the *region* or relevant to the *regulating raise service* or *regulating lower service*;

ATE (in MWh) = the aggregate of the absolute value of the *customer energy*, *generator energy* and *small generator energy* figures for all *Market Participants*, for whom the *trading amount* is not calculated in accordance with the formula in subparagraph (1), for the *trading interval* for the *region* or *regions* relevant to the *regulating raise service* or *regulating lower service*;

NMPF (a number) = has the meaning given in subparagraph (1); and

NAMPF (a number) = has the meaning given in subparagraph (1);

(j) *AEMO* must determine for the purpose of paragraphs (i), (i1) and (i2):

(1) a contribution factor (which may be positive or negative) for each *Market Participant* which reflects that *Market Participant's* contribution to the need for, or reduction in the need for, the *regulating raise service*;

(1A) a contribution factor (which may be positive or negative) for each *Market Participant* which reflects that *Market Participant's* contribution to the need for, or reduction in the need for, the *regulating lower service*; and

(2) if a *region* has or *regions* have operated asynchronously during the relevant *trading interval*, the contribution factors relevant to each *Market Participant* in that *region* which reflects that *Market Participant's* contribution to the need for, or reduction in the need for, the *regulating raise service* or *regulating lower service* in that *region* or *regions*,

in accordance with the procedure prepared under paragraph (k).

(k) *AEMO* must prepare and publish the *frequency contribution factors procedure* for determining contribution factors (which may be positive or negative) to apply in each *trading interval* for use in paragraph (j), taking into account the following principles:

(1) a negative contribution factor for a *Market Participant* should reflect the extent to which the *Market Participant* contributed to the need for *regulation services*;

(1A) a positive contribution factor for a *Market Participant* should reflect the extent to which the *Market Participant* helped to reduce the need for *regulation services*;

(2) the contribution factors for all *Market Participants* that do not have metering to allow their individual contribution to the aggregate need for, or reduction in the need for, *regulation services* to be assessed must be equal across and within all classes of *Market Participant*;

(2A) separate contribution factors should be determined for the *regulating raise service* and the *regulating lower service*;

(3) **[Deleted]**;

- (4) an individual *Market Participant's* contribution to the aggregate need for, or reduction in the need for, *regulation services* will be determined by *AEMO* every *trading interval* unless in *AEMO's* reasonable opinion it is impractical to do so, in which case over a period of time to be determined by *AEMO*;
- (5) **[Deleted]**;
- (6) when a *region* or *regions* are operating asynchronously:
 - (i) *AEMO* must determine contribution factors to apply for those *regions* during the period of asynchronous operation; and
 - (ii) the contribution factors determined by *AEMO* under subparagraph (i) must reflect the effect of the separation of that *region* on the control of *power system frequency* and the need for and use of *regulation services* in that *region*;
- (7) **[Deleted]**
- (k1) *AEMO* must define in the *frequency contribution factors procedure* a formula that *AEMO* will use in each *trading interval* to describe its objective for controlling the *power system frequency*. The formula must be defined in sufficient detail so that a *Market Participant* can use it to estimate the need for *regulation services* in each *trading interval*, and may include parameters to be determined by *AEMO* from time to time to be applied to the different elements of the formula.
- (k2) *AEMO* must *publish* the data calculated using the formula referred to in paragraph (k1) as soon as practicable after the *trading interval* to which it applies.
- (k3) *AEMO* must set out in the *frequency contribution factors procedure*:
 - (1) the method *AEMO* will use to determine a reference trajectory in each *trading interval* for every *scheduled generating unit*, *scheduled load*, *semi-scheduled generating unit*, *non-scheduled market generating unit*, *non-scheduled market load*, *ancillary service generating unit*, *ancillary service load*, or *network connection point* operated by a *Market Network Service Provider*, which has metering to allow its individual contribution to the aggregate deviation in *frequency* of the *power system* to be assessed; and
 - (2) how the reference trajectory referred to in paragraph (1) must be informed by:
 - (i) The *dispatch target* for a *scheduled generating unit*, *scheduled load*, *ancillary service generating unit*, *ancillary service load*, or *network connection point*

operated by a *Market Network Service Provider* at the end of the previous *trading interval* and at the end of the *relevant trading interval*;

- (ii) The *dispatch* level for a *semi-scheduled generating unit* at the end of the previous *trading interval* and at the end of the *relevant trading interval*; and
- (iii) information provided by a *non-scheduled market participant*, that relates to its expected trajectory over the *trading interval*;

and may be informed by (where relevant):

- (i) the requirement for an *ancillary service generating unit* or *ancillary service load enabled* for a *market ancillary service*, to respond to electronic signals from *AEMO* in relation to the provision of that *market ancillary service* within the *trading interval*; and
 - (ii) any other factors *AEMO* determines to be relevant.
- (l) *AEMO* may amend the *frequency contribution factors procedure* from time to time.
 - (m) *AEMO* must comply with the *Rules consultation procedures* when making or amending the *frequency contribution factors procedure*.
 - (m1) *AEMO* may make minor or administrative amendments to the *frequency contribution factors procedure* without complying with the *Rules consultation procedures*.
 - (n) *AEMO* must *publish*, in accordance with the *timetable*, the historical data used in determining contribution factors for each *Market Participant* for the purposes of clauses 3.15.6A(h), (i), (i1) and (i2) in accordance with the *frequency contribution factors procedure*, including the measured data for each *scheduled generating unit*, *scheduled load*, *semi-scheduled generating unit*, *ancillary service generating unit*, *ancillary service load*, or *network connection point* operated by a *Market Network Service Provider* which has metering to allow its individual contribution to the aggregate deviation in *frequency* of the *power system* to be assessed.
 - (na) Notwithstanding any other provisions of the *Rules*, *AEMO* must *publish* the contribution factors determined in accordance with paragraph (j) as soon as practicable after the *relevant trading interval*.
 - (nb) **[Deleted]**
 - (nc) *AEMO* must *publish* any parameters it determines under paragraph (k1) at least 5 *business days* prior to applying those parameters in determining the formula described in paragraph (k1).

- (o) *AEMO* is not required to comply with the *Rules consultation procedures* when determining or amending the parameters referred to in paragraph (k1).

[6] Chapter 10 New definitions

In Chapter 10, insert the following new definitions in alphabetical order:

frequency contribution factors procedure

The procedure developed and published by *AEMO* in accordance with clause 3.15.6A(k).

frequency performance payment

A payment made by *AEMO* to a *Market Participant* in accordance with clause 3.15.6A(i1) and the *frequency contribution factors procedure* in relation to that *Market Participant's* contribution to the reduction in the aggregate need for *regulation services* over a *trading interval*.

Schedule 3 Savings and Transitional Amendment to the National Electricity Rules

(Clause 5)

[1] Chapter 11 Savings and Transitional Amendments to the National Electricity Rules

After Part ZZZZ[X], insert:

Part ZZZZ[] Primary frequency response incentive arrangements

11.[xxx] Rules consequential on the making of the National Electricity Amendment (Primary frequency response incentive arrangements) Rule 2021

11.[xxx].1 Definitions

For the purposes of this rule 11.[xxx]:

Amending Rule means the National Electricity Amendment (Primary frequency response incentive arrangements) Rule 2021.

Commencement date means [date Schedule 1 of this rule commences].

new clause 3.15.6A(k) means clause 3.15.6A(k) of the *Rules* as in force on and from the Commencement date.

old clause 3.15.6A(k) means clause 3.15.6A(k) of the *Rules* as in force immediately before the Commencement date.

11.[xxx].2 Primary Frequency Response Requirements

- (a) Despite clause 11.122.2(d), the interim Primary Frequency Response Requirements developed and published by *AEMO* in accordance with clause 11.122.2(a) will continue to apply until the *Primary Frequency Response Requirements* are made and published under paragraph (b).
- (b) *AEMO* must develop and publish the *Primary Frequency Response Requirements* under clause 4.4.2A(a) by [date which is [6] months from the date this rule is made].

11.[xxx].3 Frequency Contribution Factors Procedure

- (a) *AEMO* must develop and publish the first *frequency contribution factors procedure* required under new clause 3.15.6A(k) by [date that is 9 months from the date the rule is made].
- (b) On and from the Commencement date the *frequency contribution factors procedure* will replace the procedure prepared and published

by *AEMO* under old clause 3.15.6A(k) in its entirety, and that procedure will no longer apply.