



National Electricity Amendment (Managing the rate of change of power system frequency) Rule 2017 No.9

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; 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.

John Pierce
Chairman
Australian Energy Market Commission

National Electricity Amendment (Managing the rate of change of power system frequency) Rule 2017 No. 9

1 Title of Rule

This Rule is the *National Electricity Amendment (Managing the rate of change of power system frequency) Rule 2017 No.9.*

2 Commencement

Schedule 8 commences operation on 19 September 2017.

Schedules 1 to 7 commence operation on 1 July 2018 immediately after the commencement of Schedules 1, 2, 4, 5 and 6 of the *National Electricity Amendment (Transmission Connection and Planning Arrangements) Rule 2017 No.4.*

3 Amendment of the National Electricity Rules

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

4 Amendment of the National Electricity Rules

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

5 Amendment of the National Electricity Rules

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

6 Amendment of the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 4.

7 Amendment of the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 5.

8 Amendment of the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 6.

9 Amendment of the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 7.

10 Savings and Transitional Amendments to the National Electricity Rules

The National Electricity Rules are amended as set out in Schedule 8.

Schedule 1 Amendment to the National Electricity Rules

(Clause 3)

**[1] Clause 3.9.7 Pricing for constrained on scheduled
generating units**

After clause 3.9.7(b), insert:

- (c) In the event that an *inertia network service* under an *inertia services agreement* is *enabled* such that an *inertia generating unit* is *constrained on* in any *dispatch interval* to provide *inertia*, that *inertia generating unit* must comply with *dispatch instructions* from *AEMO* in accordance with its availability as specified in its *dispatch offer* but may not be taken into account in the determination of the *dispatch price* in that *dispatch interval* except to the extent that the *inertia generating unit* is *dispatched* at a level above its minimum *loading level*.
- (d) A *Scheduled Generator* that is *constrained on* in accordance with paragraph (c) is not entitled to receive from *AEMO* any compensation due to its *dispatch price* being less than its *dispatch offer price*.

Schedule 2 Amendment to the National Electricity Rules

(Clause 4)

[1] Clause 4.1.1 Purpose

In clause 4.1.1(a)(3)(iv) after "*AEMO*", insert "and for *AEMO* to *enable inertia network services*."

[2] Clause 4.2.5 Technical envelope

In clause 4.2.5(c)(7) after "requirements" insert "and *inertia network service availability*"

[3] Clause 4.2.6 General principles for maintaining power system security

After clause 4.2.6(e), insert:

- (f) Sufficient *inertia* should be available in each *inertia sub-network* to meet the applicable *inertia requirements*.

[4] Clause 4.3.1 Responsibility of AEMO for power system security

In clause 4.3.1(o) after "*ancillary services*", insert "or *inertia network services*"

[5] Clause 4.3.1 Responsibility of AEMO for power system security

After clause 4.3.1(pa), insert:

- (pb) to determine the boundaries of *inertia sub-networks* and the *inertia requirements* for each *inertia sub-network* and to *enable inertia network services*;

[6] Clause 4.3.4 Network Service Providers

After clause 4.3.4(i), insert:

- (j) Each *Transmission Network Service Provider* that is an *Inertia Service Provider* must make *inertia network services* available to *AEMO* in accordance with clause 5.20B.4(b).
- (k) Each *Transmission Network Service Provider* that is an *Inertia Service Provider* must give *AEMO* information about *inertia support activities* and *inertia network services* made available by the *Inertia Service Provider* in accordance with clauses 5.20B.5 and 5.20B.6 and must update *AEMO* if there is a material change to that information.

[7] New Clause 4.4.4 Instructions to enable inertia network services

After clause 4.4.3, insert:

4.4.4 Instructions to enable inertia network services

- (a) Where a *contingency event* that would result in the *islanding* of an *inertia sub-network* has been classified as a *credible contingency event* or defined as a *protected event*:
 - (1) *AEMO* may require a range and quantity of *inertia network services* to be *enabled* that will provide *inertia* to the *inertia sub-network* to the level required under subparagraph (2) while the *contingency event* remains classified or defined in that way; and
 - (2) the level of *inertia* referred to in subparagraph (1) is:
 - (i) the *minimum threshold level of inertia* for the *inertia sub-network*; or
 - (ii) if the *minimum threshold level of inertia* for the *inertia sub-network* has been adjusted for *inertia support activities* under clause 5.20B.5(a), that adjusted level of *inertia*.
- (b) Where an *inertia sub-network* is *islanded*:
 - (1) *AEMO* may *enable* a range and quantity of *inertia network services* that will provide *inertia* to the *inertia sub-network* to the level required under subparagraph (2) while the *inertia sub-network* remains *islanded*; and
 - (2) the level of *inertia* referred to in subparagraph (1) is:
 - (i) the *secure operating level of inertia* for the *inertia sub-network*; or
 - (ii) if the *secure operating level of inertia* for the *inertia sub-network* has been adjusted for *inertia support activities* under clause 5.20B.5(a), that adjusted level of *inertia*.
- (c) In selecting the *inertia network services* to be *enabled* under paragraph (a) or (b), *AEMO* must use reasonable endeavours to select services in the order of priority specified by the *Inertia Service Provider* in its schedule of *inertia network services* given to *AEMO* under clause 5.20B.6(a).
- (d) For the purposes of paragraphs (a) and (b), *AEMO* may at any time give an instruction to an *Inertia Service Provider* who is providing

inertia network services or a *Registered Participant* who has agreed with an *Inertia Service Provider* to provide *inertia network services* stating that *AEMO* requires *inertia network services* to be *enabled*. Where *inertia network services* are provided by an *inertia generating unit*, the instruction must be given in accordance with the procedures for giving *dispatch instructions* under the *Rules*. Otherwise, the instruction must be given in accordance with the arrangements for giving instructions applicable to the *inertia network service* approved by *AEMO* under clause 5.20B.6(e).

- (e) *AEMO* may at any time give an instruction stating that *AEMO* requires the provision of an *inertia network service* to cease. The instruction must be given in the manner provided for in paragraph (d).
- (f) An instruction to *enable* or cease providing *inertia network services* must include:
 - (1) specific reference to the *inertia network service* to which the instruction applies;
 - (2) the time the instruction is issued; and
 - (3) the time at which the service is to be *enabled* or cease, if that is different from the time the instruction is issued.
- (g) An *Inertia Service Provider* or *Registered Participant* providing *inertia network services* must comply with an instruction given under paragraph (d) or (e).
- (h) An *Inertia Service Provider* or *Registered Participant* providing *inertia network services* must ensure that appropriate personnel or electronic facilities are available at all times to receive and immediately act upon instructions issued by *AEMO* to *enable* the *inertia network service* or cease providing it.

[8] New Clause 4.9.9C Inertia network service availability changes

After clause 4.9.9B, insert:

4.9.9C Inertia network service availability changes

An *Inertia Service Provider* must, without delay, notify *AEMO* of any event which has changed or is likely to change the availability of any *inertia support activity* or *inertia network service* made available by the *Inertia Service Provider* to *AEMO*, as soon as the *Inertia Service Provider* becomes aware of the event.

[9] Clause 4.10.2 Transmission network operations

In clause 4.10.2(c) after "*network support agreement*", insert ", *inertia services agreement*".

[10] Clause 4.11.1 Remote control and monitoring devices

In clause 4.11.1(b) after "*ancillary services*", insert "or *inertia network services*".

Schedule 3 Amendment to the National Electricity Rules

(Clause 5)

[1] Clause 5.1A.1 Purpose and Application

Omit clause 5.1A.1(f)(5) and substitute:

- (5) rule 5.19;
- (6) rule 5.20B;

[2] Clause 5.10.1 Content of Part D

After clause 5.10.1(m), insert:

- (m1) Clause 5.20B sets out the process for identifying and providing the *inertia requirements* for *inertia sub-networks*.

[3] Clause 5.12.2 Transmission Annual Planning Report

Omit clause 5.12.2(c)(8) and substitute:

- (8) any information required to be included in a *Transmission Annual Planning Report* under:
 - (i) clause 5.16.3(c) in relation to a *network* investment which is determined to be required to address an urgent and unforeseen *network* issue; or
 - (ii) clauses 5.20B.4(h) and (i) in relation to *network* investment and other activities to provide *inertia network services* or *inertia support activities*;

[4] Clause 5.16.1 Principles

In clause 5.16.1(b) after "corrective action", insert "or the provision of *inertia network services* required under clause 5.20B.4."

[5] Clause 5.16.3 Investments subject to the regulatory investment test for transmission

In clause 5.16.3(a)(7) omit "or".

[6] Clause 5.16.3 Investments subject to the regulatory investment test for transmission

In clause 5.16.3(a)(8) after "or replace *network* assets)", omit "." and substitute "; or".

[7] Clause 5.16.3 Investments subject to the regulatory investment test for transmission

After clause 5.16.3(a)(8), insert:

- (9) the proposed expenditure is an *inertia service payment*;
- (10) the proposed expenditure is for *network* investment undertaken by the *Transmission Network Service Provider* to satisfy its obligation as an *Inertia Service Provider* under clause 5.20B.4 to make available *inertia network services* in relation to an *inertia shortfall* for an *inertia sub-network* and:
 - (i) immediately prior to the notice of the *inertia shortfall* being given by *AEMO* under clause 5.20B.3(c), the *Inertia Service Provider* is not under an obligation to provide *inertia network services* for that *inertia sub-network* (including under rule 11.100); and
 - (ii) the time by which the *Inertia Service Provider* must make the *inertia network services* available is less than 18 months after the notice is given by *AEMO* under clause 5.20B.3(c); or

[8] Clause 5.16.3 Investments subject to the regulatory investment test for transmission

In clause 5.16.3(d), omit “subparagraphs (a)(1)-(7)” and substitute “paragraph (a)”.

[9] Clause 5.20.1 Preliminary consultation

In clause 5.20.1(a)(2)(ii) omit "." and substitute "; and".

[10] Clause 5.20.1 Preliminary consultation

After clause 5.20.1(a)(2), insert:

- (3) the *inertia requirements methodology*.

[11] Clause 5.20.1 Preliminary consultation

In clause 5.20.1(b)(3), omit "." and substitute "; and".

[12] Clause 5.20.1 Preliminary consultation

After clause 5.20.1(b)(3), insert:

- (4) the *inertia requirements methodology*.

[13] Clause 5.20.1 Preliminary consultation

Omit clause 5.20.1(c), substitute:

- (c) A person may make a written submission to *AEMO* on the proposed *NTNDP inputs*, the content of the *NTNDP* as it applies for the current year, the *inertia requirements methodology* or an issue raised in the statement of material issues within the period specified in the invitation.

[14] Clause 5.20.2 Publication of NTNDP

In clause 5.20.2(c)(12) omit "." and substitute "; and".

[15] Clause 5.20.2 Publication of NTNDP

After clause 5.20.2(c)(12), insert:

- (13) describe the boundaries of the *inertia sub-networks* and related *inertia requirements* determined by *AEMO* under rule 5.20B since the last *NTNDP* and details of *AEMO's* assessment of any *inertia shortfall* and *AEMO's* forecast of any *inertia shortfall* arising at any time within a planning horizon of at least 5 years.

[16] Clause 5.20.6 NTP Functions

After clause 5.20.6(b), insert:

- (c) To avoid doubt, the *NTP functions* do not include determining the *inertia requirements* or the assessment of *inertia shortfalls*.

[17] New Clause 5.20.7 Inertia requirements methodology

After clause 5.20.6, insert:

5.20.7 Inertia requirements methodology

- (a) The *inertia requirements methodology* determined by *AEMO* must provide for *AEMO* to take the following matters into account in determining the *secure operating level of inertia*:
 - (1) the capabilities and expected response times provided by *generating units* providing *market ancillary services* (other than the *regulating raise service* or *regulating lower service*) in the *inertia sub-network*;
 - (2) the maximum *load shedding* or *generation shedding* expected to occur on the occurrence of any *credible contingency event* affecting the *inertia sub-network* when the *inertia sub-network* is *islanded*;

- (3) additional *inertia* needed to account for the possibility of a reduction in *inertia* if the *contingency event* that occurs is the loss or unavailability of a *synchronous generating unit*, *synchronous condenser* or any other *facility* or service that is material in determining *inertia requirements*;
- (4) any *constraints* that could reasonably be applied to the *inertia sub-network* when *islanded* to achieve a *secure operating state* and any *unserved energy* that might result from the *constraints*; and
- (5) any other matters as *AEMO* considers appropriate.

[18] New Rule 5.20B Inertia sub-networks and requirements

After rule 5.20A, insert:

5.20B Inertia sub-networks and requirements

5.20B.1 Boundaries of inertia sub-networks

- (a) For the purpose of determining the required levels of *inertia* in the *national grid*, the *connected transmission systems* forming part of the *national grid* are to be divided into *inertia sub-networks*.
- (b) *AEMO* must determine the boundaries of *inertia sub-networks* and may from time to time adjust the boundaries, including adjustments that result in new *inertia sub-networks*.
- (c) The boundaries of an *inertia sub-network* must be aligned with the boundaries of a *region* or wholly confined within a *region*.
- (d) Subject to paragraph (c), in determining and adjusting the boundaries of *inertia sub-networks*, *AEMO* must take into account the following matters:
 - (1) *synchronous connections* between the proposed *inertia sub-network* and adjacent parts of the *national grid*;
 - (2) the likelihood of the proposed *inertia sub-network* being *islanded*; and
 - (3) the criticality and practicality of maintaining the proposed *inertia sub-network* in a *satisfactory operating state* if it is *islanded* and being able to return to a *secure operating state* while *islanded*.
- (e) In determining and adjusting the boundaries of *inertia sub-networks*, *AEMO* must comply with the *Rules consultation procedures*.

- (f) *AEMO* must *publish* the boundaries of the *inertia sub-networks* and any adjustments in the *NTNDP*.

5.20B.2 Inertia requirements

- (a) *AEMO* must from time to time determine the *inertia requirements* for *inertia sub-networks* applying the *inertia requirements methodology*. *AEMO* must make a determination under this paragraph:
 - (1) subject to subparagraph (2) and any other requirements under the *Rules*, for any *inertia sub-network*, no more than once in every 12 month period; and
 - (2) for each affected *inertia sub-network*, as soon as reasonably practical after becoming aware of a material change to the *power system* likely to affect the *inertia requirements* for the *inertia sub-network* where the timing, occurrence or impact of the change was unforeseen.
- (b) The *inertia requirements* to be determined for each *inertia sub-network* are:
 - (1) the *minimum threshold level of inertia*, being the minimum level of *inertia* required to operate the *inertia sub-network* in a *satisfactory operating state* when the *inertia sub-network* is *islanded*; and
 - (2) the *secure operating level of inertia*, being the minimum level of *inertia* required to operate the *inertia sub-network* in a *secure operating state* when the *inertia sub-network* is *islanded*.
- (c) *AEMO* must *publish* the *inertia requirements* determined for each *inertia sub-network* together with the results of its assessment under clause 5.20B.3 in the *NTNDP*.

5.20B.3 Inertia shortfalls

- (a) *AEMO* must as soon as practicable following its determination of the *inertia requirements* for an *inertia sub-network* under clause 5.20B.2 assess:
 - (1) the level of *inertia* typically provided in the *inertia sub-network* having regard to typical patterns of *dispatched generation in central dispatch*;
 - (2) whether in *AEMO*'s reasonable opinion, there is or is likely to be an *inertia shortfall* in the *inertia sub-network* and *AEMO*'s forecast of the period over which the *inertia shortfall* will exist; and

- (3) where *AEMO* has previously assessed that there was or was likely to be an *inertia shortfall*, whether in *AEMO*'s reasonable opinion that *inertia shortfall* has been or will be remedied.
- (b) In making its assessment under paragraph (a) for an *inertia sub-network*, *AEMO* must take into account:
 - (1) over what time period and to what extent the *inertia* that is typically provided in the *inertia sub-network* is or is likely to be below the *secure operating level of inertia*;
 - (2) the levels of *inertia* that are typically provided in adjacent *connected inertia sub-networks* and the likelihood of the *inertia sub-network* becoming *islanded*; and
 - (3) any other matters that *AEMO* reasonably considers to be relevant in making its assessment.
- (c) If *AEMO* assesses that there is or is likely to be an *inertia shortfall* in any *inertia sub-network*, *AEMO* must *publish* and give to the *Inertia Service Provider* for the *inertia sub-network* a notice of that assessment that includes *AEMO*'s specification of the date by which the *Inertia Service Provider* must ensure the availability of *inertia network services* in accordance with clause 5.20B.4(b), which must not be earlier than 12 months after the notice is *published* unless an earlier date is agreed with the *Inertia Service Provider*.
- (d) If *AEMO* assesses that an *inertia shortfall* in an *inertia sub-network* has been or will be remedied, *AEMO* must *publish* and give to the *Inertia Service Provider* for the *inertia sub-network* a notice of that assessment that includes *AEMO*'s specification of the date from which the obligation of the *Inertia Service Provider* under clause 5.20B.4(b) ceases, which must not be earlier than 12 months after the notice is *published* unless an earlier date is agreed with the *Inertia Service Provider*.

5.20B.4 Inertia Service Provider to make available inertia services

- (a) The *Inertia Service Provider* for an *inertia sub-network* is:
 - (1) the *Transmission Network Service Provider* for the *inertia sub-network*; or
 - (2) if there is more than one *Transmission Network Service Provider* for the *inertia sub-network*, the *jurisdictional planning body* for the *participating jurisdiction* in which the *inertia sub-network* is located.

- (b) If *AEMO* gives a notice under clause 5.20B.3(c) that *AEMO* has assessed that there is or is likely to be an *inertia shortfall* in an *inertia sub-network*, the *Inertia Service Provider* for the *inertia sub-network* must make *inertia network services* available in accordance with paragraph (c) that when *enabled* will provide *inertia* to:
 - (1) the *secure operating level of inertia*; or
 - (2) the *secure operating level of inertia* as adjusted for *inertia support activities*, but not less than the *minimum threshold level of inertia* as adjusted for *inertia support activities*.
- (c) For the purposes of paragraph (b), an *Inertia Service Provider* for an *inertia sub-network* must:
 - (1) use reasonable endeavours to make the *inertia network services* available by the date specified by *AEMO* in the notice under clause 5.20B.3(c);
 - (2) make a range and level of *inertia network services* available such that it is reasonably likely that *inertia network services* that provide the required level of *inertia* when *enabled* are continuously available, taking into account planned *outages* and the risk of unplanned *outages*;
 - (3) ensure that the *inertia network services* that when *enabled* provide *inertia* up to the *minimum threshold level of inertia* (as adjusted for *inertia support activities* if applicable) are qualifying *inertia network services* as specified in paragraph (d);
 - (4) ensure that the *inertia network services* that when *enabled* provide *inertia* beyond the *minimum threshold level of inertia* up to the *secure operating level of inertia* (as adjusted for *inertia support activities* if applicable), are qualifying *inertia network services* as specified in paragraph (e); and
 - (5) maintain the availability of those *inertia network services* until the date the *Inertia Service Provider's* obligation ceases, as specified by *AEMO* under clause 5.20B.3(d).
- (d) The *inertia network services* that qualify to provide *inertia* up to the *minimum threshold level of inertia* are:
 - (1) *inertia network services* made available by the *Inertia Service Provider* investing in its *network* through the installation, commissioning and operation of a *synchronous condenser*; and

- (2) *inertia network services* made available to the *Inertia Service Provider* by a *Registered Participant* and provided by means of a *synchronous generating unit* or a *synchronous condenser* under an *inertia services agreement*.
- (e) The *inertia network services* that qualify to provide *inertia* beyond the *minimum threshold level of inertia* up to the *secure operating level of inertia* are:
 - (1) the *inertia network services* referred to in paragraph (d);
 - (2) *inertia network services* made available by the *Inertia Service Provider* investing in its *network* other than those referred to in paragraph (d); and
 - (3) *inertia network services* made available to the *Inertia Service Provider* by a *Registered Participant* under an *inertia services agreement* other than those referred to in paragraph (d).
- (f) An *Inertia Service Provider* required to make *inertia network services* available under paragraph (b) must make available the least cost option or combination of options that will satisfy its obligation within the time referred to in subparagraph (c)(1) and for so long as the obligation to make the *inertia network services* available continues.
- (g) An *Inertia Service Provider* required to make *inertia network services* available under paragraph (b) must prepare and *publish* information to enable potential providers of *inertia network services* to develop *non-network options* for consideration by the *Inertia Service Provider* including:
 - (1) a description of the requirement for *inertia network services* including timing;
 - (2) the technical characteristics that a *non-network option* would be required to deliver, such as the level of *inertia*, location, availability, response time and operating profile;
 - (3) a summary of potential options to make the *inertia network services* available identified by the *Inertia Service Provider*, including *network options* and *non-network options*; and
 - (4) information to assist providers of *non-network options* wishing to present proposals to the *Inertia Service Provider* including details of how to submit a proposal for consideration.
- (h) An *Inertia Service Provider* must provide information in its *Transmission Annual Planning Report* about:

- (1) the activities undertaken to satisfy its obligation to make *inertia network services* available under paragraph (b); and
 - (2) *inertia support activities* undertaken to reduce the *minimum threshold level of inertia* or the *secure operating level of inertia*.
- (i) If the *Inertia Service Provider* proposes *network* investment for either of the purposes specified in paragraph (h), the *Inertia Service Provider* must provide the following information in its next *Transmission Annual Planning Report*:
- (1) the date when the proposed relevant *network* investment became or will become operational;
 - (2) the purpose of the proposed relevant *network* investment;
 - (3) the total cost of the proposed relevant *network* investment; and
 - (4) the indicative total cost of any *non-network options* considered.
- (j) An *Inertia Service Provider* may include the cost of *inertia service payments* in the calculation of *network support payments* in accordance with Chapter 6A.

5.20B.5 Inertia support activities

- (a) *AEMO* may at the request of an *Inertia Service Provider* approve activities (*inertia support activities*) under this clause and agree corresponding adjustments to the *minimum threshold level of inertia* or the *secure operating level of inertia* for the purposes of clause 5.20B.4(b) where the activities:
- (1) are to be undertaken by the *Inertia Service Provider* or provided as a service to the *Inertia Service Provider*;
 - (2) are not *inertia network services*; and
 - (3) *AEMO* is satisfied the activities will contribute to the operation of the *inertia sub-network* in a *satisfactory operating state* or *secure operating state* in the circumstances described in clause 4.4.4(a) or (b) as applicable.

Note

If approved by *AEMO* under paragraph (a), inertia support activities may include installing or contracting for the provision of *frequency control services*, installing emergency protection schemes or contracting with *Generators* in relation to the operation of their *generating units* in specified conditions.

- (b) An adjustment to the *minimum threshold level of inertia* or the *secure operating level of inertia* for *inertia support activities* will apply to the level determined by *AEMO* and only where and to the extent that the approved activity is *enabled* and performing in accordance with the conditions of any approval determined by *AEMO*.
- (c) An *Inertia Service Provider* making a request under paragraph (a) must give *AEMO*:
 - (1) details of the proposed *inertia support activity* and the other information about the *inertia support activity* consistent with the requirements of clause 5.20B.6(c);
 - (2) the proposed technical specification and performance standards and the information about arrangements to *enable* the *inertia support activity* consistent with the requirements of clause 5.20B.6(d);
 - (3) information about how the *inertia support activity* will contribute to operation of the *inertia sub-network* in a *satisfactory operating state* or *secure operating state* in the circumstances described in clause 4.4.4(a) or (b) as applicable;
 - (4) the *Inertia Service Provider's* proposal for calculating adjustments to be made and the times they will apply; and
 - (5) any other information requested by *AEMO* in connection with the request.
- (d) *AEMO* may give or withhold its approval under this clause in its discretion and subject to any conditions determined by *AEMO*.
- (e) The technical specification, performance standards and information referred to in paragraph (c)(2) and any change to them must be approved by *AEMO*.
- (f) An *Inertia Service Provider* must obtain *AEMO's* approval under paragraph (e) before any change to the technical specification, performance standards or arrangements to give instructions that apply to an *inertia support activity* comes into effect.

5.20B.6 Inertia network services information and approvals

- (a) An *Inertia Service Provider* required to make *inertia network services* available under clause 5.20B.4(b) must prepare and give to *AEMO* and keep up to date, a schedule setting out:
 - (1) the *inertia network services* made available by the *Inertia Service Provider* for the *inertia sub-network*; and

- (2) the *Inertia Service Provider's* proposed order of priority for the *inertia network services* to be *enabled*.
- (b) Where the *Inertia Service Provider* procures *inertia network services* from a *Generator* provided by means of a *synchronous generating unit* under an *inertia services agreement*, the *Inertia Service Provider* must register the *generating unit* with *AEMO* as an *inertia generating unit* and specify that the *generating unit* may be periodically used to provide *inertia network services* and will not be eligible to set *spot prices* when *constrained on* to provide *inertia* in accordance with clause 3.9.7(c).
 - (c) An *Inertia Service Provider* required to make *inertia network services* available under clause 5.20B.4(b) must give to *AEMO* and keep up to date the following details for each *inertia network service*:
 - (1) a description of the *inertia network service*, including:
 - (i) the nature of the *inertia network service*;
 - (ii) the *generating unit* or other *facilities* used to provide the *inertia network service*;
 - (iii) the purpose for which the *inertia network service* is being provided;
 - (iv) the location in the *transmission network* or *distribution network* of the *facilities* used to provide the *inertia network service*;
 - (v) the quantity of *inertia* to be provided when the *inertia network service* is *enabled*; and
 - (vi) any other information requested by *AEMO* in connection with the *inertia network service*;
 - (2) information about the availability of the *inertia network service*, including:
 - (i) the times when, and the period over which, the *inertia network service* will be available to provide *inertia*; and
 - (ii) any possible restrictions on the availability of the *inertia network service*.
 - (d) An *Inertia Service Provider* required to make *inertia network services* available under clause 5.20B.4(b) must prepare and submit to *AEMO* for approval under paragraph (e) the following details for each *inertia network service*:

- (1) the technical specification and performance standards for the *inertia network service*; and
 - (2) the arrangements necessary for *AEMO* to give instructions to *enable* or cease the provision of the *inertia network service* including:
 - (i) the period of any notice that has to be given to the provider of the *inertia network service* for it to be *enabled*;
 - (ii) the response time to any instruction for the *inertia network service* to be *enabled* or to cease being provided; and
 - (iii) communication protocols between it, *AEMO* and the *Registered Participants* that provide *inertia network services*.
- (e) The technical specification, performance standards and arrangements necessary for *AEMO* to give the instructions referred to in paragraph (d) and any change to them must be consistent with the *Rules* and approved by *AEMO*.
- (f) An *Inertia Service Provider* must ensure that *AEMO*'s approval is obtained under paragraph (e) before the *inertia network service* is first made available and in the case of a change, before the change comes into effect.
- (g) *AEMO* must use reasonable endeavours to respond to the *Inertia Service Provider* within 20 *business days* following the receipt of a request for approval under paragraph (e) stating whether it gives its approval.
- (h) If *AEMO* does not approve the matters in a request for approval under paragraph (e):
- (1) *AEMO* must tell the *Inertia Service Provider* its reasons for withholding approval and may advise the *Inertia Service Provider* of the changes *AEMO* requires to be made; and
 - (2) the *Inertia Service Provider* must amend its request to address the matters identified by *AEMO* and submit to *AEMO* a new request for approval.

Schedule 4 Amendment to the National Electricity Rules

(Clause 6)

[1] Clause 6A.7.3 Pass through events

In clause 6A.7.3(a1)(4), omit "and".

[2] Clause 6A.7.3 Pass through events

In clause 6A.7.3(a1)(5), omit "." and substitute "; and".

[3] Clause 6A.7.3 Pass through events

After clause 6A.7.3(a1)(5), insert:

(6) an *inertia shortfall event*.

Schedule 6 Amendment to the National Electricity Rules

(Clause 8)

[1] Chapter 10 New Definitions

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

former Chapter 6A

Chapter 6A of the *Rules* as in force immediately prior to the commencement of Schedules 1, 2, 4, 5 and 6 of the *National Electricity Amendment (Transmission Connection and Planning Arrangements) Rule 2017 No.4* and which is applicable for a *declared transmission system* of an *adoptive jurisdiction* under clause 11.98.8, as amended from time to time.

inertia

Contribution to the capability of the *power system* to resist changes in *frequency* by means of an inertial response from a *generating unit*, *network element* or other equipment that is electro-magnetically coupled with the *power system* and *synchronised* to the *frequency* of the *power system*.

inertia generating unit

A *generating unit* registered with AEMO under clause 5.20B.6(b).

inertia network service

A service for the provision of *inertia* to a *transmission system*.

inertia requirements

The *minimum threshold level of inertia* and the *secure operating level of inertia* for an *inertia sub-network* determined by AEMO under clause 5.20B.2(a).

inertia requirements methodology

The process AEMO uses to determine the *inertia requirements* for each *inertia sub-network*, published by AEMO under clause 5.20.1(a)(3).

inertia service payment

A payment by a *Transmission Network Service Provider* made under an *inertia services agreement* where:

- (a) the payment is made for *inertia network services* or *inertia support activities* to be made available or provided as a service to the *Transmission Network Service Provider* in its capacity as an *Inertia Service Provider* to (in the case of *inertia network services*) satisfy

an obligation under clause 5.20B.4 or (in the case of *inertia support activities*) resulting in an adjustment to the *minimum threshold level of inertia* or the *secure operating level of inertia*; and

- (b) the *inertia network services* are made available or provided, or the *inertia support activity* is undertaken, in accordance with:
 - (1) applicable technical specifications and performance standards approved by *AEMO*; and
 - (2) in the case of an *inertia support activity*, any conditions of *AEMO's* approval under clause 5.20B.5(a).

Inertia Service Provider

The *Inertia Service Provider* for an *inertia sub-network* as specified under clause 5.20B.4(a).

inertia services agreement

An agreement under which a person agrees to provide one or more *inertia network services* to an *Inertia Service Provider* or to undertake an *inertia support activity*.

inertia shortfall

A shortfall in the level of *inertia* typically provided in an *inertia sub-network* (having regard to typical patterns of *dispatched generation in central dispatch*) compared to the *secure operating level of inertia* most recently determined by *AEMO* for the *inertia sub-network*.

inertia shortfall event

A *Transmission Network Service Provider* is required to make *inertia network services* available under clause 5.20B.4 as a consequence of an assessment by *AEMO* under clause 5.20B.3(c) that there is an *inertia shortfall* in an *inertia sub-network* for which the *Transmission Network Service Provider* is the *Inertia Service Provider* or to cease making *inertia network services* available under clause 5.20B.4 as a consequence of an assessment by *AEMO* under clause 5.20B.3(d) that an *inertia shortfall* in the *inertia sub-network* has ceased and:

- (a) the *Transmission Network Service Provider* is required to provide, or cease providing, *inertia network services* during the course of a *regulatory control period*; and
- (b) making *inertia network services* available or ceasing to make *inertia network services* available *materially* increases or *materially* decreases the *Transmission Network Service Provider's* costs of providing *prescribed transmission services*.

inertia sub-network

A part of the *national grid* determined by *AEMO* in accordance with clause 5.20B.1.

inertia support activity

An activity approved by *AEMO* under clause 5.20B.5(a).

islanded, islanding

In relation to an *inertia sub-network* or a combination of two or more *inertia sub-networks*, temporary loss of synchronous *connection* to all adjacent parts of the *national grid*.

minimum threshold level of inertia

For an *inertia sub-network*, the *minimum threshold level of inertia* determined by *AEMO* and referred to in clause 5.20B.2(b)(1).

secure operating level of inertia

For an *inertia sub-network*, the *secure operating level of inertia* determined by *AEMO* and referred to in clause 5.20B.2(b)(2).

[2] Chapter 10 Substituted Definitions

In Chapter 10, substitute the following definitions:

constrained on

In respect of a *generating unit*, the state where, due to a *constraint* on a *network* or in order to provide *inertia network services* under an *inertia services agreement*, the output of that *generating unit* is limited above the level to which it would otherwise have been *dispatched* by *AEMO* on the basis of its *dispatch offer*.

dispatch

The act of initiating or enabling all or part of the response specified in a *dispatch bid*, *dispatch offer* or *market ancillary service offer* in respect of a *scheduled generating unit*, *semi-scheduled generating unit*, a *scheduled load*, a *scheduled network service*, an *ancillary service generating unit* or an *ancillary service load* in accordance with rule 3.8, or a *direction* or operation of capacity the subject of a *reserve contract* or an instruction under an *ancillary services agreement* or to *enable* an *inertia network service* as appropriate.

enabled, enable

A *market ancillary service* is enabled when *AEMO* has selected the relevant *generating unit* or *load* for the provision of the *market ancillary service* and has notified the relevant *Market Participant* accordingly.

An *inertia network service* is enabled when *AEMO* has selected the relevant *inertia network service* and the service is providing *inertia* to an *inertia sub-network*.

An *inertia support activity* is enabled when the activity is performing and available in accordance with any conditions of *AEMO's* approval under clause 5.20B.5(a).

negative network support event

A *network support event* which entails a *Transmission Network Service Provider* making lower *network support payments* in the preceding *regulatory year* than the amount of the *network support payment allowance* (if any) for that provider for that preceding *regulatory year*.

network element

A single identifiable major component of a *transmission system* or *distribution system* involving:

- (a) an individual *transmission* or *distribution* circuit or a phase of that circuit; or
- (b) a major item of apparatus or equipment associated with the function or operation of a *transmission line*, *distribution line* or an associated *substation* or *switchyard* which may include *transformers*, circuit breakers, *synchronous condensers*, *reactive plant* and *monitoring equipment* and control equipment.

network support and control ancillary service or NSCAS

A service (excluding an *inertia network service*) with the capability to control the *active power* or *reactive power* flow into or out of a *transmission network* to address an *NSCAS need*.

network support event

- (a) If, at the end of a *regulatory year* of a *regulatory control period*, the amount of *network support payments* made by a *Transmission Network Service Provider* for that previous *regulatory year* is higher or lower than the amount of the *network support payment allowance* (if any) for the *Transmission Network Service Provider* for that previous *regulatory year*, this constitutes a *network support event*.
- (b) In calculating the amount for the purposes of a *network support event* referred to in paragraph (a), the amount of *network support payments* made by a *Transmission Network Service Provider* must not include an amount of *network support payments* that are a substitute for a *network augmentation* where an allowance for capital expenditure in relation to that *network augmentation* has been provided for in the *revenue determination* or an *approved pass through amount* arising from an *inertia shortfall event*.

network support payment

Any of the following payments:

- (a) a payment by a *Transmission Network Service Provider* to:
 - (1) any *Generator* providing *network* support services in accordance with rule 5.3A.12; or
 - (2) any other person providing a *network* support service that is an alternative to *network augmentation*; and
- (b) an *inertia support payment*.

network support payment allowance

The amount of *network support payments* (if any) that is provided for a *Transmission Network Service Provider* for a *regulatory year* in:

- (a) the *annual building block revenue requirement* for the *Transmission Network Service Provider* for that *regulatory year*; or
- (b) any *approved pass through amount* for the *Transmission Network Service Provider* for that *regulatory year* arising from an *inertia shortfall event*,

less the amount (expressed as a positive) of avoided *network support payments* (if any) that is provided for in any *required pass through amount* for the *Transmission Network Service Provider* for that *regulatory year* arising from an *inertia shortfall event*.

Non-market ancillary service or NMAS

Any of the following services:

- (a) *network support and control ancillary services* and other services acquired by *Transmission Network Service Providers* under *connection agreements* or *network support agreements* to meet the service standards linked to the technical requirements of schedule 5.1 or in *applicable regulatory instruments* (but to avoid doubt, excluding *inertia network services* and *inertia support activities*); and
- (b) *system restart ancillary services* and *network support and control ancillary services* acquired by AEMO under *ancillary services agreements*.

NSCAS need

- (a) Subject to paragraph (b), *network support and control ancillary service* required to:

- (1) maintain *power system security* and reliability of *supply* of the *transmission network* in accordance with the *power system security standards* and the *reliability standard*; and
 - (2) maintain or increase the *power transfer capability* of that *transmission network* so as to maximise the present value of net economic benefit to all those who produce, consume or transport electricity in the *market*.
- (b) Any requirement for a service that satisfies paragraph (a) and is also capable of being made available as an *inertia network service* to address an *inertia shortfall* through the arrangements in rule 5.20B must be treated as an *inertia shortfall* and is not an *NSCAS need*.

positive network support event

A *network support event* which entails a *Transmission Network Service Provider* making higher *network support payments* in the preceding *regulatory year* than the amount of the *network support payment allowance* (if any) for that provider for that preceding *regulatory year*.

synchronous condensers

Apparatus or equipment similar in construction to a *synchronous generating unit*, which operates at the equivalent speed of the *frequency* of the *power system*.

Schedule 7 Amendments to the National Electricity Rules

(Clause 9)

[1] Clause 11.98.8 Preservation for adoptive jurisdictions

Omit clause 11.98.8(a), substitute:

- (a) Subject to paragraph (b), for a *declared transmission system* of an *adoptive jurisdiction*:
 - (1) former Chapter 6A continues to apply and the amendments made by the Amending Rule to Chapter 6A are of no effect;
 - (2) old rule 5.4A continues to apply and the deletion of rule 5.4A by the Amending Rule is of no effect;
 - (3) old clause 5.3.6(i) continues to apply and the deletion of clause 5.3.6(i) by the Amending Rule is of no effect; and
 - (4) new clause 5.3AA(e)(2) applies as amended below:
 - (i) insert the phrase “*transmission network user access or*” before “*distribution network user access*”; and
 - (ii) insert “*transmission networks and*” before “*distribution networks*”.
- (b) If a provision in former Chapter 6A, old rule 5.4A or old clause 5.3.6(i) is amended, the provision as amended continues to apply in accordance with paragraph (a).

Schedule 8 Savings and Transitional Amendments to the National Electricity Rules

(Clause 10)

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

In Chapter 11, after Part ZZZA insert:

Part ZZZB Managing the rate of change of power system frequency

11.100 Rules consequential on the making of the National Electricity Amendment (Managing the rate of change of power system frequency) Rule 2017

11.100.1 Definitions

(a) In this rule 11.100:

Amending Rule means the *National Electricity Amendment (Managing the rate of change of power system frequency) Rule 2017*.

commencement date means the date of commencement of Schedules 1 to 7 of the Amending Rule.

inertia-related NSCAS gap means an *NSCAS gap* that is a shortfall in the level of *inertia* typically provided in a *region* (having regard to typical patterns of *dispatched generation* in *central dispatch*) compared to the minimum level of *inertia* required to operate the *region* in a *secure operating state* when it is *islanded*.

new Chapter 10 means Chapter 10 as amended by the Amending Rule.

new clause 3.9.7 means clause 3.9.7 of the *Rules* as will be in force immediately after the commencement date

new clause 4.4.4 means clause 4.4.4 of the *Rules* as will be in force immediately after the commencement date.

new clause 4.4.9C means clause 4.4.9C of the *Rules* as will be in force immediately after the commencement date.

new clause 5.16.3 means clause 5.16.3 of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20.1(a)(3) means clause 5.20.1(a)(3) of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20.7(a) means clause 5.20.7(a) of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20B.2(a) means clause 5.20B.2(a) of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20B.3(a) means clause 5.20B.3(a) of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20B.3(c) means clause 5.20B.3(c) of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20B.4(b) means clause 5.20B.4(a) of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20B.4(h) means clause 5.20B.4(h) of the *Rules* as will be in force immediately after the commencement date.

new clause 5.20B.4(i) means clause 5.20B.4(i) of the *Rules* as will be in force immediately after the commencement date.

new clause 6A.7.3(a1) means clause 6A.7.3(a1) of the *Rules* as will be in force immediately after the commencement date.

new rule 5.20B means rule 5.20B of the *Rules* as will be in force immediately after the commencement date.

NSCAS transition period means the period after the date this schedule commences and before the commencement date.

- (b) Italicised terms used in this rule 11.100 (other than *NSCAS gap* and *NSCAS need*) have the same meaning as in new Chapter 10.

11.100.2 Inertia sub-networks

On the date this schedule commences, *AEMO* is taken to have determined *inertia sub-networks* having the same boundaries as the boundaries of each *region* on that date.

11.100.3 Inertia requirements methodology

- (a) By 30 June 2018, *AEMO* must develop and *publish* a methodology setting out the process *AEMO* will use to determine the *inertia requirements* for each *inertia sub-network*. The methodology must provide for *AEMO* to take into account the matters listed in new clause 5.20.7(a) in determining the *inertia requirements* for each *inertia sub-network*.

- (b) *AEMO* must include an explanation of the differences between the methodology determined under paragraph (a) and the first *inertia requirements methodology* published in accordance with new clause 5.20.1(a)(3).

11.100.4 Inertia requirements

- (a) *AEMO* must make a determination of the *inertia requirements* for all *inertia sub-networks* under new clause 5.20B.2(a) and make the assessments required under new clause 5.20B.3(a) by 30 June 2018, applying the methodology determined under clause 11.100.3(a) as if it were an *inertia requirements methodology*.
- (b) If *AEMO* assesses that there is or is likely to be an *inertia shortfall* in any *inertia sub-network* in its assessment carried out in accordance with paragraph (a), *AEMO* must as soon as practicable after making that assessment *publish* and give to the *Inertia Service Provider* for the *inertia sub-network* a notice of that assessment that includes *AEMO's* specification of the date by which the *Inertia Service Provider* must ensure the availability of *inertia network services* in accordance with new clause 5.20B.4(b), which must not be earlier than 1 July 2019 unless an earlier date is agreed with the *Inertia Service Provider*.
- (c) An *Inertia Service Provider* given a notice under paragraph (b) must make *inertia network services* available in accordance with new clause 5.20B.4(b) and otherwise comply with new rule 5.20B as if the notice had been given under new clause 5.20B.3(c).
- (d) If an *Inertia Service Provider* is given a notice under paragraph (b) later than 30 April 2017, it is not required to include the information referred to in new clauses 5.20B.4(h) and (i) in its *Transmission Annual Planning Report* due to be published by 30 June 2018, but the information must be included in its next *Transmission Annual Planning Report*.
- (e) Where an *Inertia Service Provider* is given a notice under paragraph (b), clause 5.16.3 regarding the *regulatory investment test for transmission*, clause 6A.7.3(a1) regarding *pass through events* and the related definitions apply in relation to *inertia network services* and *inertia support activities* made available in response to the notice as if they were new clause 5.16.3, new clause 6A.7.3(a1) and the related definitions in new Chapter 10.

11.100.5 NSCAS not to be used to meet an inertia shortfall after 1 July 2019

- (a) Paragraphs (b) and (c) do not apply in respect of a system inertia-related NSCAS gap declared on or before 19 September 2017.

- (b) In the NSCAS transition period, *AEMO* must not, in respect of any period after 1 July 2019, acquire *NSCAS* to meet an *NSCAS gap* in relation to a requirement for a service that is both an *NSCAS need* and is also capable of being made available as an *inertia network service* to address an *inertia shortfall* through the arrangements in new rule 5.20B.
- (c) In the NSCAS transition period, a *Transmission Network Service Provider* must not, in respect of any period after 1 July 2019, put in place arrangements referred to in rule 3.11.3(b) to meet an *NSCAS gap* referred to in paragraph (a).

11.100.6 Inertia network services may be used to meet an NSCAS gap declared in the NSCAS transition period

- (a) If, in the NSCAS transition period, *AEMO* declares an inertia-related NSCAS gap in respect of a period starting within 12 months of the declaration being made, a *Transmission Network Service Provider* given a request under clause 3.11.3 in relation to the inertia-related NSCAS gap may by notice to *AEMO* elect to treat the declaration of that inertia-related NSCAS gap as if it were a notice of an *inertia shortfall* under new clause 5.20B.3(c).
- (b) If, in the NSCAS transition period, *AEMO* declares an inertia-related NSCAS gap in respect of a period starting 12 months or more after the declaration is made, a *Transmission Network Service Provider* given a request under clause 3.11.3 in relation to the inertia-related NSCAS gap must treat the declaration of that inertia-related NSCAS gap as if it were a notice of an *inertia shortfall* under new clause 5.20B.3(c).
- (c) Where in accordance with paragraph (a) or (b) a *Transmission Network Service Provider* elects or is required to treat a declaration of an inertia-related NSCAS gap as if it were notice of an *inertia shortfall* under new clause 5.20B.3(c):
 - (1) subject to paragraph (d), the *Transmission Network Service Provider* must make *inertia network services* available in accordance with new clause 5.20B.4(b);
 - (2) *AEMO* and the *Transmission Network Service Provider* must otherwise comply with new rule 5.20B as if the notice had been given under new clause 5.20B.3(c); and
 - (3) clause 5.16.3 regarding the *regulatory investment test for transmission*, clause 6A.7.3(a1) regarding *pass through events* and the related definitions apply in relation to *inertia network services* made available in response to the notice as if they were new clause 5.16.3, new clause 6A.7.3(a1) and the related definitions in new Chapter 10.

11.100.7 Inertia network services made available before the commencement date

If a *Transmission Network Service Provider* makes *inertia network services* available under this rule 11.100 in the NSCAS transition period, new clause 3.9.7, new clause 4.4.4, new clause 4.4.9C and the related definitions in new Chapter 10 apply in respect of those *inertia network services* as if those provisions had commenced on the date the *inertia network services* were first made available and (in the case of *inertia network services* provided under clause 11.100.6) as if AEMO had determined a *secure operating level of inertia* for the *region* equal to the minimum level of *inertia* determined in the declaration of the inertia-related NSCAS gap.

[END OF RULE AS MADE]
