

Procurement Plan

Contents

Introduction	3
Ancillary services to purchase	4
Principles applied in making net purchase quantity assessment (clause 8.43(3)(a))	5
Process for making a net purchase quantity assessment (clause 8.43(3)(b))	6
<i>The requirements for complying with the principal performance obligations (clause 8.43(3)(b)(i))</i>	6
<i>The requirements for achieving the dispatch objective (clause 8.43(3)(b)(ii))</i>	6
<i>Asset owner contribution (clause 8.43(3)(b)(iii))</i>	6
<i>Impact of dispensations and alternative ancillary service arrangements held by asset owners (clause 8.43(3)(b)(iv))</i>	7
<i>Impact of local quality agreements and existing long term contracts held by asset owners</i>	7
Assessment of net quantities (clause 8.43(3)(c))	9
<i>Assessment methodology for frequency keeping</i>	9
<i>Assessment methodology for instantaneous reserve</i>	9
<i>Assessment methodology for over frequency reserve</i>	9
<i>Assessment methodology for voltage support</i>	10
<i>Assessment methodology for black start</i>	10
Proposed procurement processes (clause 8.43(3)(d))	11
<i>Tendering process</i>	11
<i>Market mechanisms</i>	11
Financial information concerning ancillary services (clause 8.43(3)(e))	12
<i>Administrative costs</i>	12
<i>Frequency keeping procurement costs</i>	12
<i>Instantaneous reserve procurement costs</i>	12
<i>Over frequency reserve procurement costs</i>	13
<i>Voltage support procurement costs</i>	13
<i>Black start procurement costs</i>	13
Technical requirements and key contracting terms (clause 8.43(3)(f))	15
Arrangements for unanticipated procurement of ancillary services (clause 8.43(3)(g))	16
Comment on competitive cost pressures and degree of market innovation involved (clause 8.43(3)(h))	17

System operator reporting to the Authority (clause 8.43(3)(i))	19
Appendix A – Market mechanisms for procuring ancillary services (paragraph 41).....	20
<i>Frequency keeping</i>	20
<i>Instantaneous reserve</i>	21
<i>Over frequency reserve</i>	21
<i>Voltage support</i>	22
<i>Black start</i>	22
Appendix B – Key technical requirements for ancillary services (paragraph 62).....	24
<i>Frequency keeping</i>	24
<i>Instantaneous reserve</i>	28
<i>Over frequency reserve</i>	32
<i>Voltage support</i>	33
<i>Black start</i>	35
Appendix C – Key contracting terms for ancillary service procurement contracts (paragraph 63)....	37
Appendix D – Glossary of terms	43

Introduction

1. This is the eighth **procurement plan**. It commences on 1 December 2012 and applies for 12 months or until amended or replaced in accordance with the Code. It sets out the processes the **system operator** must use reasonable endeavours to follow when it procures **ancillary services** during the term of this **procurement plan**.
2. Terms used in this **procurement plan** which are defined terms under the Code have the same meaning as contained in Part 1 of the Code. Some other terms are defined in Appendix D of this **procurement plan**.
3. Unless the context requires otherwise, references in this **procurement plan** to:
 - 3.1 clauses, Parts, Subparts and Schedules are to clauses, Parts, Subparts and Schedules of the Code;
 - 3.2 paragraphs are to paragraphs of this **procurement plan**; and
 - 3.3 Appendices are to Appendices of this **procurement plan**.A paragraph number in this **procurement plan** preceded by a letter indicates that the paragraph is in the Appendix corresponding to that letter.
4. The content and structure of this **procurement plan** is consistent with the content and structure set out in clause 8.43(3).

Ancillary services to purchase

5. The system operator may purchase the following **ancillary services** from **ancillary service agents**:
 - 5.1 **frequency keeping**;
 - 5.2 **instantaneous reserve**;
 - 5.3 **over frequency reserve**;
 - 5.4 **voltage support**; and
 - 5.5 **black start**.
6. The purpose of **frequency keeping** is to balance any generation and demand inequalities with the objective of maintaining the grid frequency at or near 50 Hertz under normal operating conditions. Factors that contribute to inequalities under normal operating conditions include unanticipated load changes, differences in generator ramping, and the inherent inaccuracies between the modelled and actual system conditions. **Frequency keeping** is defined as the use of spare generating capacity to continuously maintain the **grid** frequency at 50 Hertz and the system frequency to New Zealand standard time.
7. The purpose of instantaneous reserve is to manage frequency recovery after an **under-frequency event**, with the objective of arresting the frequency fall, and recovering the frequency after an **under-frequency event**.
8. The purpose of over frequency reserve is to manage frequency recovery after an event that might otherwise cause the **grid** frequency to exceed 52 Hertz in the North Island or 55 Hertz in the South Island. For such an event, the **system operator's** objective is to arrest the rise in frequency and recover it to the **normal band**.
9. The purpose of voltage support is to provide additional **reactive power** resources of the static or dynamic type, depending on the location and **network** loading conditions, to contribute to **network** voltage control when dispatched.
10. The purpose of **black start** is to maintain equipment that can initialise the supply for the progressive reliving of the **grid** following a partial or total blackout.
11. Implementation of this **procurement plan** is subject to the **ancillary services** actually being made available to the **system operator** on—
 - 11.1 the terms contained in this **procurement plan**; or
 - 11.2 terms that, in the **system operator's** reasonable opinion, do not differ materially from those contained in this **procurement plan**.

Principles applied in making net purchase quantity assessment (clause 8.43(3)(a))

12. In determining the quantity of **ancillary services** to be procured and in assessing the cost effectiveness of such **ancillary services**, the **system operator** must apply the following principles:
 - 12.1 **Ancillary services** must be procured on a fixed quantity and fixed price basis where the **system operator** assesses there is a requirement for a fixed quantity or a high availability, irrespective of dispatch, of the **ancillary service**. This type of procurement is referred to as “**firm quantity procurement**”.
 - 12.2 In all other cases, **ancillary services** must be procured through a half-hour clearing market process whereby, for each **ancillary service**, **ancillary service agents** submit offers to the **system operator**. The market for that service is reconciled, priced and settled on a half-hour basis for such quantities as the **system operator** assesses to be practicable and cost-effective to procure. Before an offer can be submitted the **ancillary service agent** must enter into an **ancillary service** procurement contract for the particular **ancillary service**. The **ancillary service** procurement contract must set out the offer, pricing and settlement mechanisms for the particular **ancillary service** without stipulating specific offer quantities or prices, unless the offer, pricing and settlement mechanisms for the **ancillary service** are already set out in the Code. This type of procurement is referred to as “**half-hour clearing market procurement**”.
 - 12.3 The **system operator** must apply one or a combination of the following pricing components in respect of each **ancillary service** procured by the **system operator**, as reasonably determined by the **system operator** to result in the most cost-effective outcome:
 - 12.3.1 *Offer price* is the price for the quantity of the service, expressed in \$ or \$ per unit capacity of the **ancillary service** over the period for which the quantity dispatched is measured and reconciled.
 - 12.3.2 *Availability price* is the price for making the service available, irrespective of dispatch, measured in \$ per period of time for which the service is made available.
 - 12.3.3 *Event price* is the price for calling on the **ancillary service** capacity for a particular event, expressed in \$ per event.
 - 12.4 The **system operator** must consider the following in achieving the appropriate balance between cost and quality for each **ancillary service** purchased:
 - 12.4.1 the technical specification of the plant being offered, including any measuring equipment required;
 - 12.4.2 the minimum acceptable service standard;
 - 12.4.3 the number of suppliers offering the service and reasons for any limitations;
 - 12.4.4 the actual cost of providing the service over the **ancillary service** procurement contract term; and
 - 12.4.5 the liability for providing the service and the potential cost of failure.

Process for making a net purchase quantity assessment (clause 8.43(3)(b))

The requirements for complying with the principal performance obligations (clause 8.43(3)(b)(i))

13. The **system operator** must procure **ancillary services** to assist it to achieve the following objectives:

Ancillary service	Objectives
Frequency keeping	Compliance with clause 7.2(1)(b) Compliance with the policy statement
Instantaneous reserve	Compliance with clause 7.2(1)(a), 7.2(1)(b), 7.2(2)(a) Prevent the frequency from going outside defined limits for specified contingencies Compliance with the policy statement
Over frequency reserve	Compliance with clause 7.2(1)(a), 7.2(1)(b), 7.2(2)(b) Compliance with the policy statement
Voltage support	Compliance with clause 7.2(1)(a) Compliance with the policy statement
Black start	Compliance with clause 8.5 Compliance with the policy statement

The requirements for achieving the dispatch objective (clause 8.43(3)(b)(ii))

14. The **system operator** must use reasonable endeavours to dispatch assets in a manner consistent with the **dispatch objective**. This includes the dispatch of **ancillary services**.
15. It is recognised within the Code that the meeting of the **dispatch objective** is subject to the availability and capability of generation and **ancillary services**. Accordingly, the **system operator** must dispatch **ancillary services** according to the **dispatch objective** provided there is sufficient availability of **ancillary services**.
16. The **policy statement** sets out the policies used by the **system operator** in scheduling and dispatching **ancillary services** to assist it in planning to comply and complying with its **dispatch objective**.

Asset owner contribution (clause 8.43(3)(b)(iii))

17. The **system operator** must assess the net purchase quantity of **ancillary services** required

to achieve compliance with the **PPOs**, taking into account its assessment of the contribution that **asset owners** provide in achieving the **PPOs** through compliance with the **asset owner performance obligations** and **technical codes**.

18. The **system operator's** assessment of the contribution provided by **asset owners** must rely on the following:
- 18.1 that **asset owners** will at all times comply with the **asset owner performance obligations** including any **dispensation** or **equivalence arrangement** in respect of these obligations that has been granted by the **system operator** pursuant to the Code;
 - 18.2 that information contained in the **asset capability statements** provided by **asset owners** is correct;
 - 18.3 the contribution provided by **asset owners** in meeting the relevant **asset owner performance obligations** will be provided at no additional procurement cost when dispatched for energy;
 - 18.4 the existence of any contracts of the type and nature set out in clause 8.6.

Impact of dispensations and alternative ancillary service arrangements held by asset owners (clause 8.43(3)(b)(iv))

Dispensations

19. The **system operator** must take into account all known **dispensations** from compliance with an **asset owner performance obligation** or **technical code** when determining the net quantity of procurement required for each **ancillary service**.
20. The **allocable cost** to be paid by **ancillary service payers** excludes the readily identifiable and quantifiable costs resulting from granting **dispensations**. Any **dispensations** awarded during this **procurement plan** period may affect the net quantity of procurement for each **ancillary service** but the cost to **ancillary service payers** must not be changed as the cost for the **dispensation** must be borne by the **asset owner** with the **dispensation**.

Alternative ancillary service arrangements

21. At the time of the preparation of this **procurement plan**, no **alternative ancillary service arrangements** were in place.
22. The **system operator** has no information indicating that any **alternative ancillary service arrangements** will be in operation over the period of this **procurement plan** which may decrease the quantity of **ancillary services** needing to be purchased by the **system operator**.

Impact of local quality agreements and existing long term contracts held by asset owners

Local quality agreements

23. In assessing the net quantities of procurement, the **system operator** must take account of any existing contracts for higher levels of **common quality** that the **system operator** has entered into under clause 8.6. These are referred to as local quality agreements.

Existing long term contracts

24. In assessing the net quantities of procurement, the **system operator** must take account of any **existing long term contracts**.
25. The **system operator** may continue to procure **ancillary services** under **existing long term contracts** during the term of this **procurement plan**.

Assessment of net quantities (clause 8.43(3)(c))

Assessment methodology for frequency keeping

26. Subject to paragraph 27, all parties that can offer **frequency keeping** compliant with the **system operator's** technical requirements and the Code and who are prepared to enter into an **ancillary service** procurement contract with the **system operator** to provide **frequency keeping** on a half-hour clearing market procurement basis must be contracted by the **system operator** for provision of **frequency keeping**. Each such **ancillary service** procurement contract is a contract to provide **frequency keeping** for the purposes of clause 13.82(g)(i).
27. Parties who wish to provide **multiple provider frequency keeping** are subject to a pre-contract review by the **system operator** of their technical capabilities relating to the provision of **multiple provider frequency keeping** (an "**MFK technical review**"). The **system operator** must be satisfied with the outcome of the **MFK technical review** before entering into an **ancillary service** procurement contract with that party for **multiple provider frequency keeping**. Without limitation, the scope of the **MFK technical review** may include a review of:
- 27.1 the ability of the party's proposed **FK sites** to receive and respond to **regulating instructions**;
 - 27.2 the control accuracy of the party's proposed **FK sites**;
 - 27.3 the **response rates** of the party's proposed **FK sites**; and
 - 27.4 the capabilities of the monitoring equipment for the party's proposed **FK sites**.
28. The **system operator** must assess the net purchase quantity of **frequency keeping** for each **trading period** in accordance with the processes set out in paragraphs 13 to 24.

Assessment methodology for instantaneous reserve

29. All parties that can offer **instantaneous reserve** compliant with the **system operator's** technical requirements and the Code and who are prepared to enter into an **ancillary service** procurement contract with the **system operator** to provide **instantaneous reserve** on a half-hour clearing market procurement basis must be contracted by the **system operator** for provision of **instantaneous reserve** on that basis. Each such **ancillary service** procurement contract is a contract to provide **reserve offers** for the purposes of clause 13.37 and a contract to provide **instantaneous reserve** for the purposes of clause 13.82(g)(i).
30. The **system operator** must assess the net purchase quantity of **instantaneous reserve** for each **trading period** in accordance with the processes set out in paragraphs 13 to 24 and Schedule 13.3.

Assessment methodology for over frequency reserve

31. The **system operator** may procure **over frequency reserves** from parties that can offer **over frequency reserves** compliant with the **system operator's** technical requirements and the Code and who are prepared to enter into an **ancillary service** procurement contract with the **system operator** to provide **over frequency reserves** on a firm quantity procurement basis. Each such **ancillary service** procurement contract is a contract to provide **over frequency reserves** for the purposes of clause 13.82(g)(i).
32. The **system operator** must assess the net purchase quantity of **over frequency reserves**

during the term of this **procurement plan** and for each **trading period** in accordance with the processes set out in paragraphs 13 to 24.

Assessment methodology for voltage support

33. The **system operator** may procure **voltage support** from parties that can offer **voltage support** compliant with the **system operator's** technical requirements and the Code and who are prepared to enter into an **ancillary service** procurement contract with the **system operator** to provide **voltage support** on a firm quantity procurement basis. Each such **ancillary service** procurement contract is a contract to provide **voltage support** for the purposes of clause 13.82(g)(i).
34. The **system operator** must assess the net purchase quantity of **voltage support** in each **zone** during the term of this **procurement plan** and for each **trading period** in accordance with the processes set out in paragraphs 13 to 24.

Assessment methodology for black start

35. The **system operator** may procure **black start** from parties that can offer **black start** compliant with the **system operator's** technical requirements and the Code and who are prepared to enter into an **ancillary service** procurement contract with the **system operator** to provide **black start** on a firm quantity procurement basis.
36. The **system operator** must assess the net purchase quantity of **black start** during the term of this **procurement plan** in accordance with the processes set out in paragraphs 13 to 24 and taking into account historic performance of the power system, including (but not limited to) information about previous events on the system and the **system operator's** reasonable opinion about the risk and location of future events.
37. The **system operator** must use reasonable endeavours to procure **black start** at two sites in each **island** for the term of this **procurement plan**.

Proposed procurement processes (clause 8.43(3)(d))

Tendering process

Invitation to tender

38. The **system operator** must, when inviting tenders for **ancillary services**, inform existing and potential **ancillary service agents** of the type of **ancillary services** sought and contact details for further information regarding the tender process.

Information disclosure

39. Unless otherwise required by the Code, the System Operator Service Provider Contract, or by **law**, the **system operator** may only disclose any information received during the tender process referred to above to the **Authority** (if so required by the **Authority**).

Contracting process

40. The **system operator** must negotiate in good faith **ancillary service** procurement contracts with **ancillary service agents** using the **system operator's** standard form **ancillary service** procurement contracts as starting points.

Market mechanisms

41. The proposed mechanisms for procuring the quantities of each of the **ancillary services** required to meet the **PPOs** and the **dispatch objective** for each **trading period** are identified in Appendix A.
42. The **system operator** has determined that it is uneconomic to procure **black start**, **over frequency reserve**, and **voltage support** during the term of this **procurement plan** using half-hour clearing markets. For these **ancillary services** the **system operator** must use its reasonable endeavours to procure the required quantity to achieve what, in the reasonable opinion of the **system operator**, is the most cost-effective outcome.
43. Where there is only one potential supplier for an **ancillary service**, the **system operator** must use reasonable endeavours to negotiate directly with that **ancillary service agent** to reach an outcome consistent with achieving the **dispatch objective**. The **system operator** must report to the **Authority** if such a situation should arise.

Financial information concerning ancillary services (clause 8.43(3)(e))

44. The costs associated with the procurement of **ancillary services** are:
- 44.1 the **administrative costs** associated with establishing procurement processes, tendering, and entering into **ancillary service** procurement contracts; and
 - 44.2 the procurement costs of the **ancillary services**, as paid to **ancillary service agents** by the **system operator**.

Administrative costs

45. Identifiable **administrative costs** are those significant costs incurred by the **system operator** as a direct consequence of implementing this **procurement plan** and that are specifically attributable to an **ancillary service** and that have been agreed to by the **Authority** and the **system operator**. The **system operator** is entitled to recover these costs as an **allocable cost** in accordance with the **ancillary service** cost recovery methodology set out in clauses 8.55 to 8.70.
46. Any **administrative costs** must be charged at the following standard rates:

Grade	Position	Rate \$/hr (excl GST)
1	Analyst/Engineer	138
2	Senior Analyst/Engineer/Consultant	170
3	Senior Advisor	222

Frequency keeping procurement costs

47. The actual costs for the procurement of **frequency keeping** for the procurement period 1 December 2010 to 30 November 2011 were \$55.3 million. (1 December 2009 to 30 November 2010 was \$47.1 million).
48. The actual costs for the procurement of **frequency keeping** for the period of this **procurement plan** are dependent on the following:
- 48.1 the offer prices and quantities received for **frequency keeping**;
 - 48.2 the number of available providers of **frequency keeping**; and
 - 48.3 the energy **offer** prices and quantities.
49. The **system operator** must provide an update on the current level of procurement costs for **frequency keeping** to the **Authority** in its monthly reports provided under paragraph 71.

Instantaneous reserve procurement costs

50. The actual costs for the procurement of **instantaneous reserve** for the procurement period 1 December 2010 to 30 November 2011 were \$23.7 million. (1 December 2009 to 30 November 2010 was \$21.9 million).

51. The actual costs for the procurement of **instantaneous reserve** for the period of this **procurement plan** are determined using the processes set out in Part 13 and are dependent on the following:
- 51.1 the offer prices and quantities received for **instantaneous reserve**;
 - 51.2 the number of available providers of **instantaneous reserve**; and
 - 51.3 the energy **offer** prices and quantities.
52. The **system operator** must provide an update on the current procurement costs for **instantaneous reserve** to the **Authority** in its monthly reports provided under paragraph 71.

Over frequency reserve procurement costs

53. The actual costs for the procurement of **over frequency reserve** for the procurement period 1 December 2010 to 30 November 2011 were \$1.2 million. (1 December 2009 to 30 November 2010 was \$723,000).
54. The actual costs for the procurement of **over frequency reserve** for the period of this **procurement plan** are dependent on the following:
- 54.1 the **over frequency reserve** availability fees and any event fees that accrue;
 - 54.2 the number of available providers of **over frequency reserve**; and
 - 54.3 the dispatch of generation.
55. The **system operator** must provide an update on the procurement cost of **over frequency reserve** to the **Authority** in its reports provided under paragraph 71.

Voltage support procurement costs

56. The actual costs for the procurement of **voltage support** for the procurement period 1 December 2010 to 30 November 2011 were \$8 million. (1 December 2009 to 30 November 2010 was \$7.9 million).
57. The actual costs for the procurement of **voltage support** for the period of this **procurement plan** are dependent on the following:
- 57.1 the **voltage support** availability fees and any event fees that accrue;
 - 57.2 the number of available providers of **voltage support**; and
 - 57.3 the dispatch of generation.
58. The **system operator** must provide an update on the current procurement costs for **voltage support** to the **Authority** in its reports provided under paragraph 71.

Black start procurement costs

59. The actual costs for the procurement of **black start** for the procurement period 1 December 2010 to 30 November 2011 were \$550,000. (1 December 2009 to 30 November 2010 was \$499,000).
60. The actual costs for the procurement of **black start** for the period of this **procurement plan** are dependent on the following:
- 60.1 the **black start** availability fees and any event fees that accrue; and
 - 60.2 the number of available providers of **black start**.

61. The **system operator** must provide an update on the current procurement costs for **black start** to the **Authority** in its reports provided under paragraph 71.

Technical requirements and key contracting terms (clause 8.43(3)(f))

62. The key technical requirements for each **ancillary service** are set out in Appendix B.
63. The key contracting terms for the procurement of **ancillary services** are set out in Appendix C.
64. When entering into **ancillary service** procurement contracts with **ancillary service agents** for the provision of **ancillary services**, the **system operator** must use its reasonable endeavours to ensure that the **ancillary service** procurement contracts include the key technical requirements and the key contracting terms.
65. The **ancillary service** procurement contracts negotiated between the **system operator** and the **ancillary service agents** must not be materially inconsistent with the key contracting terms.

Arrangements for unanticipated procurement of ancillary services (clause 8.43(3)(g))

66. During a **grid emergency**, the **system operator** relies on **ancillary service agents** complying with their obligations set out in **technical code B** of schedule 8.3.
67. Any departures from this **procurement plan** must be in accordance with clause 8.47 of the Code.
68. Where the **system operator** identifies a need to change any aspect of this **procurement plan**, then a request for variation pursuant to clause 8.46 must be made to the **Authority**.

Comment on competitive cost pressures and degree of market innovation involved (clause 8.43(3)(h))

69. Refer to the following table:

Ancillary service	Competitive cost pressures	Degree of innovation involved in procurement process (the process for future development is described below)
Frequency keeping	<p>Low</p> <p>Frequency keeping has to be supplied separately for each HVAC island, and there are few stations with the capability.</p>	<p>Medium</p> <p>Procurement using half-hour clearing markets. Procurement process in line with international practice for the few markets that do not use AGC (automatic generation control).</p> <p>Various long term initiatives to allow greater participation in the frequency keeping market are being actively explored by the system operator, including AGC and the introduction of a national market. The first stage in the implementation of these initiatives is the introduction of provisions allowing for multiple provider frequency keeping.</p>
Instantaneous reserve	<p>Medium to High</p> <p>Medium in the South Island as there are a limited number of providers but prices remain very low.</p> <p>High in North Island as there are a variety of interruptible load and generation sources.</p>	<p>High</p> <p>Procurement using half-hour clearing markets. New Zealand's co-optimisation of energy and reserves is leading edge in electricity markets internationally.</p> <p>As the delivery of interruptible load reserve is critical in avoiding cascade failure, the system operator must have confidence that reserve will be delivered in a timely manner and in sufficient quantity to avoid such an event. Options for changing measurement and monitoring resolution requirements are to be explored in the short term, with a view to improving overall resolution. In 2011/12, the system operator undertook a review into under frequency management that identified a number of innovations for the reserves market. During 2012/13, the system operator will be engaging with the industry regarding the potential development of these initiatives.</p>
Over frequency reserve	<p>South Island Low</p> <p>Most South Island generation plant owned by one of two companies.</p> <p>North Island Medium</p> <p>In the North Island there are a variety of generation sources.</p>	<p>High</p> <p>A novel solution to a New Zealand-specific problem allowing better management of overall reserve costs.</p>
Voltage support	Low to Medium	Medium

	Small number of providers because voltage support requirements tend to be localised.	The combination of generator AOPOs and tendering for alternative solutions is in-line with world standards. Any concept of demand side participation in provision of voltage support would require an amendment to the Part A definition of voltage support. An investigation of the potential for demand side participation should be undertaken by interested industry participants, including the system operator.
Black start	Medium Not many generators have black start capability, but cost of new entry is relatively low.	Low But a simple procurement approach is appropriate given the relatively low cost of this service.

70. The **system operator** must engage constructively with the **Authority**, its Advisory Groups and the industry to pursue cost-effective development of **ancillary services** methodologies.

System operator reporting to the Authority (clause 8.43(3)(i))

71. The **system operator** must report to the **Authority** in relation to the procurement of **ancillary services** as follows:
- 71.1 settlement volumes, prices, costs, and **administrative costs** where appropriate, on a monthly basis;
 - 71.2 any issues arising with respect to cost allocation, liability and disputes, on a monthly basis;
 - 71.3 the details of any late cancellation of an offer or late submission of a new or revised offer reported to the **system operator** under paragraph B23; and
 - 71.4 other general procurement issues to be contained within the **system operator** monthly report provided in accordance with clause 3.14.

Appendix A – Market mechanisms for procuring ancillary services (paragraph 41)

Frequency keeping

Procurement proposal

- A1. The **system operator** must seek closed tenders from potential providers of **frequency keeping**. The **system operator** must seek to secure at least one provider of **frequency keeping** in each **island**.
- A2. The **system operator** may enter into **ancillary service** procurement contracts with other providers of **frequency keeping** at any time throughout the period of this **procurement plan**.
- A3. If part of the **grid** is **islanded** and the **system operator** reasonably believes there is a need for additional **frequency keeping** in that part of the **grid** in order to comply with the **policy statement** or **PPOs**, the **system operator** may procure such **frequency keeping** under an **ancillary service arrangement** that does not comply with the contractual or technical requirements of this **procurement plan**. For the avoidance of doubt:
- A3.1 any such **ancillary service arrangement** is not an **alternative ancillary service arrangement**; and
- A3.2 the procurement of **frequency keeping** under this paragraph A3 is not a departure from the processes or arrangements set out in this **procurement plan** for the purposes of clause 8.47 or otherwise.
- A4. The term of **ancillary service** procurement contracts for **frequency keeping** may vary to that of the term of this **procurement plan**. Without limitation, the **system operator** may enter into **new long term contracts** for **frequency keeping**.
- A5. The **system operator** must procure **frequency keeping** on a **half-hour clearing market procurement** basis.
- A6. The **system operator** must procure **frequency keeping** as either **single provider frequency keeping** or **multiple provider frequency keeping**.

Pricing structure for procurement of frequency keeping

- A7. Offers to provide **frequency keeping** dispatched by the **system operator** must be priced and settled in accordance with their individual offered prices.

Transition to multiple provider frequency keeping

- A8. For each **island** the **system operator** may set or reset a **trading period** on which **frequency keeping** for that **island** must transition from **single provider frequency keeping** to **multiple provider frequency keeping** (an “**MFK transition trading period**”).
- A9. For each **island** the **system operator** may set or reset a **trading period** on which **frequency keeping** for the **island** must revert to **single provider frequency keeping** (an “**SFK return trading period**”).
- A10. The **system operator** must communicate the setting or resetting of an **MFK transition trading period** or **SFK return trading period** by:

- A10.1 notifying all **ancillary service agents** with an **ancillary service** procurement contract for **frequency keeping** in the relevant **island**; and
- A10.2 publishing the notification on the **system operator's** website.

Frequency keeping selection

- A11. Except when part of the **grid** is **islanded**, and subject to paragraph A12, the **system operator** must select and dispatch the minimum number of offers to provide **frequency keeping** for each **island** for each **trading period** to provide an aggregate **MW band** sufficient to meet the **system operator's net purchase quantity assessment** for that **trading period** and **island** at least cost based on the offer prices and estimated **constraint costs**.
- A12. The **system operator** may depart from paragraph A11 by excluding a **frequency keeping** offer from its determination of the least cost **frequency keeping** solution if the **system operator** reasonably considers it necessary to do so to comply with the **PPOs**. The **system operator** must notify **participants** as soon as reasonably practicable if it departs from paragraph A11.

Instantaneous reserve

Procurement proposal

- A13. The **system operator** must seek closed tenders from potential providers of **instantaneous reserve**.
- A14. The **system operator** may enter into **ancillary service** procurement contracts with other providers of **instantaneous reserve** at any time throughout the period of this **procurement plan**.
- A15. The term of **ancillary service** procurement contracts for **instantaneous reserve** may vary to that of the term of this **procurement plan**. Without limitation, the **system operator** may enter into **new long term contracts** for **instantaneous reserve**.
- A16. The **system operator** must procure **instantaneous reserve** on a **half-hour clearing market procurement** basis.
- A17. The **system operator** must procure **instantaneous reserve** as **fast instantaneous reserve** and **sustained instantaneous reserve**.

Pricing structure for procurement of instantaneous reserve

- A18. **Reserve offers** dispatched by the **system operator** must be priced and settled in accordance with Subpart 4 of Part 13.

Over frequency reserve

Procurement proposal

- A19. The **system operator** must seek closed tenders from potential providers of **over frequency reserve**.
- A20. The **system operator** may enter into **ancillary service** procurement contracts with other providers of **over frequency reserve** at any time throughout the period of this **procurement plan**.

- A21. The term of **ancillary service** procurement contracts for **over frequency reserve** may vary to that of the term of this **procurement plan**. Without limitation, the **system operator** may enter into **new long term contracts** for **over frequency reserve**.
- A22. The **system operator** must procure **over frequency reserve** on a **firm quantity procurement** basis.

Pricing structure for procurement of over frequency reserve

- A23. The **system operator** must procure **over frequency reserve** on the basis of:
- A23.1 a monthly availability fee; and/or
- A23.2 a single event fee.

Voltage support

Procurement proposal

- A24. The **system operator** must seek closed tenders from potential providers of **voltage support**.
- A25. The **system operator** may enter into **ancillary service** procurement contracts with other providers of **voltage support** at any time throughout the period of this **procurement plan**.
- A26. The term of **ancillary service** procurement contracts for **voltage support** may vary to that of the term of this **procurement plan**. Without limitation, the **system operator** may enter into **new long term contracts** for **voltage support**.
- A27. The **system operator** must procure **voltage support** on a **firm quantity procurement** basis.

Pricing structure for procurement of voltage support

- A28. The **system operator** must procure **voltage support** on the basis of:
- A28.1 a monthly availability fee; and/or
- A28.2 a single event fee.

Black start

Procurement proposal

- A29. The **system operator** must seek closed tenders from potential providers of **black start**.
- A30. The **system operator** may enter into **ancillary service** procurement contracts with other providers of **black start** at any time throughout the period of this **procurement plan**.
- A31. The term of **ancillary service** procurement contracts for **black start** may vary to that of the term of this **procurement plan**. Without limitation, the **system operator** may enter into **new long term contracts** for **black start**.
- A32. The **system operator** must procure **black start** on a **firm quantity procurement** basis.

Pricing structure for procurement of black start

- A33. The **system operator** must procure **black start** on the basis of:

A33.1 a monthly availability fee; and/or

A33.2 a single event fee.

Appendix B – Key technical requirements for ancillary services (paragraph 62)

- B1. For the avoidance of doubt, a key technical requirement that is expressed as an **ancillary service agent** right or obligation does not confer or impose that right or obligation on an **ancillary service agent** unless and until that right or obligation is included in an **ancillary service** procurement contract between the **system operator** and the **ancillary service agent**.

Frequency keeping

Performance requirements and technical specifications for frequency keeping

- B2. The **ancillary service agent** must provide one or more **generating units** and trained operators or **control equipment** at an **FK site** that, collectively, are capable of meeting the performance requirements in:
- B1.1 paragraphs B3 and B4, for **single provider frequency keeping**;
 - B1.2 paragraphs B5 and B8, for **multiple provider frequency keeping**; and
 - B1.3 paragraphs B7 and B8, for both **single provider frequency keeping** and **multiple provider frequency keeping**.

Single provider frequency keeping performance requirements

- B3. Subject to paragraph B8, when providing **single provider frequency keeping** the **ancillary service agent** must:
- B3.1 when there is a **grid frequency error**, ensure the relevant **FK site** responds to eliminate the **grid frequency error**;
 - B3.2 ensure the relevant **FK site** provides an average **response rate** of at least 10 **MW** per minute when the **grid frequency error** is greater than 0.2 Hertz (that is, when the **grid** frequency is outside the **normal band**) over all of the **ancillary service agent's single provider frequency keeping periods**;
 - B3.3 use all reasonable endeavours to continuously maintain the frequency of the **grid** as close as possible to 50 Hertz, but at all times to within the **normal band**;
 - B3.4 use all reasonable endeavours to continuously maintain **frequency time error** as close as possible to zero but at all times within the limits specified in clause 7.2(1)(b)(v); and
 - B3.5 return **frequency time error** to zero at least once every **day**.
- B4. Subject to paragraph B8, the **ancillary service agent** must ensure the standard deviation of the **grid frequency** over any of the **ancillary service agent's single provider frequency keeping periods** does not exceed the maximum allowable standard deviation specified in the **ancillary service agent's ancillary service** procurement contract. Such standard deviation must be determined by reference to the **system operator measured frequency** but excluding any frequency measurements that are outside the **normal band**.

Multiple provider frequency keeping performance requirements

- B5. Subject to paragraph B8, when providing **multiple provider frequency keeping** the **ancillary service agent** must:
- B5.1 comply with **regulating instructions** issued to it; and
 - B5.2 ensure that the relevant **FK site** provides a **response rate** of at least 0.4 **MW** per minute per **MW** in the dispatched **MW band**.
- B6. Subject to paragraph B8, the **ancillary service agent** will be deemed to have failed to comply with the performance standard in paragraph B5 if, and only if, a **regulating instruction error ratio** for the relevant **FK site** exceeds the maximum allowable **regulating instruction error ratio** for the **FK site** specified in the **ancillary service agent's ancillary service** procurement contract.

General frequency keeping performance requirements

- B7. The **ancillary service agent** must ensure that each **generating unit** and item of **control equipment** at an **FK site** is maintained in accordance with good industry practice.
- B8. In meeting the performance requirements in paragraphs B3, B4, B5 and B6, the **ancillary service agent's FK site** is not required to generate outside the limits of the **MW band** contained in the relevant **dispatch instruction** issued in accordance with Part 13 or above the relevant **control max** or below the relevant **control min**.

Monitoring requirements for frequency keeping

- B9. The **ancillary service agent** must comply, and provide monitoring equipment that complies, with:
- B9.1 paragraphs B10 to B12, for **single provider frequency keeping**;
 - B9.2 paragraphs B13 to B15, for **multiple provider frequency keeping**; and
 - B9.3 paragraph B16, for both **single provider frequency keeping** and **multiple provider frequency keeping**.

Single provider frequency keeping monitoring requirements

- B10. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:
- B10.1 generation output at each of its **FK sites** that provides **single provider frequency keeping**;
 - B10.2 frequency of the **grid** in Hertz; and
 - B10.3 **frequency time error**.
- B11. When an **FK site** is providing **single provider frequency keeping** the relevant monitoring equipment must measure and record:
- B11.1 generation output at an agreed location in the **grid** at least once every 10 seconds, each measurement accurate to within plus or minus 5%;
 - B11.2 frequency at least once every 2 seconds (or such longer period as the **system operator** may determine), each measurement accurate to within 0.01 Hertz; and
 - B11.3 **frequency time error** using a GPS clock or agreed equivalent at least twice every 1 minute.
- B12. The **ancillary service agent** must ensure that the data recorded by the monitoring equipment is held by the **ancillary service agent** for at least 14 **business days** and is provided to the **system operator** within 5 **business days** of a written request from the

system operator.

Multiple provider frequency keeping monitoring requirements

- B13. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:
- B13.1 generation output at each of its **FK sites** that provides **multiple provider frequency keeping**; and
 - B13.2 the **regulating instructions** received for each of its **FK sites** that provides **multiple provider frequency keeping**.
- B14. When an **FK site** is providing **multiple provider frequency keeping** the relevant monitoring equipment must measure and record:
- B14.1 generation output at an agreed location in the **grid** at least once every 1 second, each measurement accurate to within plus or minus 2% of the total expected generation output range of the relevant **FK site**; and
 - B14.2 the **regulating instructions** received for the **FK site**.
- B15. The **ancillary service agent** must provide the **system operator** with the data recorded by the monitoring equipment for each calendar month during which the **FK site** was dispatched to provide **multiple provider frequency keeping**:
- B15.1 within 5 **business days** of the end of the month; and
 - B15.2 if requested by the **system operator** in writing earlier than the end of the month, within 5 **business days** of the **system operator's** request.

General frequency keeping monitoring requirements

- B16. The **ancillary service agent** must maintain the monitoring equipment in accordance with good industry practice.

Offer requirements for frequency keeping

- B17. The **ancillary service agent** may, no later than 2 hours prior to a **trading period**, submit an offer to provide **frequency keeping** for that **trading period**. Each offer submitted is valid until revised or cancelled in accordance with paragraph B21 or B22.
- B18. Each offer to provide **frequency keeping** must be submitted to the **system operator** using the same **information system** approved by the **Authority** for the time being for submitting **reserve offers** under clause 13.38.
- B19. There will be separate **ancillary service** procurement contract schedules for **single provider frequency keeping** and **multiple provider frequency keeping**. The **ancillary service agent** must have:
- B19.1 an **ancillary service** procurement contract for **single provider frequency keeping** from an **FK site** in order to offer **single provider frequency keeping** from that **FK site**; and
 - B19.2 an **ancillary service** procurement contract for **multiple provider frequency keeping** from an **FK site** in order to offer **multiple provider frequency keeping** from that **FK site**.
- B20. Each offer to provide **frequency keeping** must include the following information:
- B20.1 a unique code for the **FK site** for which the offer is made;
 - B20.2 a unique code for the **ancillary service agent** submitting the offer;

- B20.3 the **trading day** for which the offer is made;
 - B20.4 the **trading periods** for which the offer is made;
 - B20.5 the **control min** and **control max** for the **FK site** for which the offer is made; and
 - B20.6 up to five separate **MW bands** and prices.
- B21. The **ancillary service agent** may revise an offer to provide **frequency keeping** by submitting a revised offer up to two hours prior to the beginning of the **trading period** in respect of which the offer is made. The **ancillary service agent** may cancel an offer to provide **frequency keeping** up to two hours prior to the beginning of the **trading period** in respect of which the offer is made. Each such revision or cancellation must be submitted or notified to the **system operator** using the same **information system** approved by the **Authority** for the time being for revising or cancelling **reserve offers** under clause 13.46(1).
- B22. The **ancillary service agent** may cancel or submit a new or revised offer to provide **frequency keeping** later than two hours prior to the beginning of the **trading period** in respect of which the offer is made only in circumstances where a **bona fide physical reason** necessitates the cancellation or submission or where the **system operator** has issued a **formal notice**, but not otherwise.
- B23. If the **ancillary service agent** cancels an offer or submits a new or revised offer to provide **frequency keeping** later than two hours prior to the beginning of the **trading period** in respect of which the offer is made, the **ancillary service agent** must report the cancellation or submission to the **system operator** in writing together with an explanation of the reasons for the cancellation or submission. The **ancillary service agent** must provide the **system operator** with a written monthly report of all such cancellations and submissions by the 20th of the month following the month being reported.
- B24. The **system operator** must, as soon as reasonably practicable, confirm to the **ancillary service agent** the receipt of any new or revised offer or cancellation of an offer to provide **frequency keeping** using the same **information system** approved by the **Authority** for the time being for confirming receipt of **reserve offers** and cancellations of **reserve offers** under clause 13.51(2).
- B25. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements then, if so **notified** by the **system operator** (which notice must outline the areas of concern that the **system operator** has), the **ancillary service agent** must not submit any offers to provide **frequency keeping** until and unless it has provided evidence that demonstrates to the reasonable satisfaction of the **system operator**, acting in accordance with good industry practice, that it can meet the performance requirements.
- B26. Subject to paragraph A9, the **ancillary service agent** may not submit for an **island**:
- B26.1 a **single provider frequency keeping** offer for a **trading period** on or after the **MFK transition trading period**; or
 - B26.2 a **multiple provider frequency keeping** offer for a **trading period** before the **MFK transition trading period**.
- B27. Each **MW band** of the **multiple provider frequency keeping** offers for an **FK site** must be subject to a minimum, and may be subject to a maximum, **MW value**. The minimum and maximum **MW values** must be based on:
- B27.1 the results of the **MFK technical review** of the **ancillary service agent**, including the measurement accuracy of the **ancillary service agent's** monitoring equipment for the **FK site**; and
 - B27.2 the capabilities of the **system operator's** tools for **frequency keeping** selection.

Dispatch requirements for frequency keeping

- B28. The **system operator** must use all reasonable endeavours to issue **dispatch instructions** for **frequency keeping** at least five minutes in advance of the start or end of the relevant **trading period**, as the case may be.
- B29. If an **ancillary service agent** finds it cannot maintain the frequency or time error within the required targets the **ancillary service agent** must advise the **system operator** as soon as is practicable. If so notified the **system operator** must review its **dispatch instructions** for **frequency keeping** and make any further **dispatch instructions** it considers reasonably necessary or desirable to maintain the frequency or time error within the required targets.

Special testing requirements for frequency keeping

- B30. There are no **baseline tests** for equipment used to provide or monitor **frequency keeping** during the term of this **procurement plan**.
- B31. An **on-demand test** of equipment and/or trained operators used for providing **frequency keeping** (other than monitoring equipment) must verify whether or not the relevant **FK Site** meets the performance requirements in paragraphs B3 and B5 or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.
- B32. An **on-demand test** of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraphs B9, B11 and B14.

Instantaneous reserve

Performance requirements and technical specifications for instantaneous reserve

- B33. To be able to provide **instantaneous reserve** the **ancillary service agent** must have equipment that can provide **fast instantaneous reserve** and/or **sustained instantaneous reserve**. The definitions of **fast instantaneous reserve** and **sustained instantaneous reserve** are set out in Part 1. Only **ancillary service agents** that can meet the technical requirements of these definitions can provide **instantaneous reserve**.
- B33.1 An **ancillary service agent** must ensure that at all times the equipment that is the subject of the **reserve offer**:
- B33.1.1 is maintained in accordance with good industry practice so that the equipment is able to provide **instantaneous reserve** that meet the standards set out in this **procurement plan**;
 - B33.1.2 is able to respond, when dispatched, within the timeframe applicable to either **fast instantaneous reserve** or **sustained instantaneous reserve**, as the case may be;
 - B33.1.3 meets, where relevant, the requirements for frequency response and control set out in clause 5(1) of **technical code A** of schedule 8.3 and has been approved by the **system operator**;
 - B33.1.4 is available and has the capacity to provide the quantity of **instantaneous reserve** specified in the **reserve offer**; and
 - B33.1.5 is available and has the capacity to provide the dispatched quantity of **instantaneous reserve**.
- B33.2 An **ancillary service agent** dispatched to provide **instantaneous reserve** in

accordance with Part 13 must provide either:

- B33.2.1 additional generation automatically following an **under-frequency event** which is consistent with the dispatched quantity of **instantaneous reserve**; or
- B33.2.2 reduced **demand** or load disconnection consistent with the dispatched quantity of **instantaneous reserve** whenever the frequency of the **grid** falls to or below the **trip frequency**.
- B33.3 In determining the response capability specified in the definition of **fast instantaneous reserve** and **sustained instantaneous reserve** set out in Part 1, inertial response must be excluded.

Assessment of performance requirements for interruptible load

- B34. In assessing the delivery of **interruptible load** quantities the **system operator** must apply the following methodology:
 - B34.1 **Fast instantaneous reserve** must be calculated as the total reduction in load that occurs one second after the **trip time**, and which is sustained for a period of at least 60 seconds. The total reduction in load is to be calculated from the **pre-event load**.
 - B34.2 **Sustained instantaneous reserve** must be calculated as the average reduction in load that occurs over 60 seconds after the **trip time**. The average reduction in load is to be calculated from the **pre-event load**. **Sustained instantaneous reserve** load is not to be restored until advised by the **system operator**.
 - B34.3 The **fast instantaneous reserve** and **sustained instantaneous reserve** delivered quantities must be determined from the aggregate load response:
 - B34.3.1 recorded at the **ancillary service agent's** equipment; or
 - B34.3.2 recorded at the **ancillary service agent's contracted GXPs** (if any), if no data is recorded at the **ancillary service agent's** equipment or the **system operator** reasonably considers it is not appropriate to assess delivered quantities from this data.
 - B34.4 If the analysis required for the purpose of paragraph B34.3 indicates an under-delivery of **interruptible load**, the analysis must be performed on each item of the **ancillary service agent's** equipment or each of the **ancillary service agent's contracted GXPs**, as the case may be. The data may be time adjusted to account for possible timing errors.
- B35. In determining the **pre-event load** the **system operator** must apply the following methodology when calculating delivered quantities:
 - B35.1 To account for possible timing errors in data and a possible reduction in **pre-event load** due to the influence of falling frequency, the **pre-event load** must be taken at a previous steady state frequency, prior to the frequency falling. That is, at a time when frequency is within a +/-0.1 Hertz band for at least 60 seconds.

Assessment of performance requirements for fast instantaneous reserve other than interruptible load

- B36. In assessing the delivery of **fast instantaneous reserve** quantities other than **interruptible load** the **system operator** must apply the following methodology:
 - B36.1 Equipment that is the subject of a **reserve offer** for **fast instantaneous reserve** is

deemed to comply with the performance requirement in paragraph B33.2 if and only if the equipment's actual response meets or exceeds its **asset capability statement** modelled response.

- B36.2 The equipment's **asset capability statement** modelled response is the response that could reasonably be expected if all the information in the equipment's current **asset capability statement** is correct, taking into account:
- B36.2.1 the frequency profile of the **under-frequency event**;
 - B36.2.2 the equipment's generating output immediately before the start of the **under-frequency event** ("**pre-event generating output**");
 - B36.2.3 the number of generating units on partly loaded spinning reserve mode;
 - B36.2.4 the number of hydro generating units on tail water depressed reserve mode; and
 - B36.2.5 the amount of **fast instantaneous reserve** dispatched for generating units.
- B36.3 Subject to paragraph B33.3, the equipment's actual response must be calculated as the additional generating output of the equipment compared to the **pre-event generating output** of the equipment.
- B36.4 In determining the **pre-event generating output** of the equipment the **system operator** must apply the following methodology when calculating the delivered quantities:
- B36.4.1 to account for possible timing errors contained in the data provided by the **ancillary service agent**, the **pre-event generating output** at several different times must be used to calculate the delivered quantities;
 - B36.4.2 the maximum delivered quantity obtained from applying the **pre-event generating outputs** must be used to determine the reserve response during an **under-frequency event**; and
 - B36.4.3 generating unit data must be used if measured and provided by the **ancillary service agent**.
- B36.5 On request, the **system operator** must provide each **ancillary service agent** with:
- B36.5.1 the model the **system operator** uses to determine **asset capability statement** modelled response under paragraph B36.2 in respect of the **ancillary service agent's** assets; and
 - B36.5.2 details of the **system operator's** assessment under paragraph B36.4 of the **ancillary service agent's** delivery of **fast instantaneous reserve** quantities.

Assessment of performance requirements for instantaneous reserve generally

- B37. For the purposes of assessing the delivery of **instantaneous reserve** quantities, the **UFE time** (in the case of **instantaneous reserve** other than **interruptible load**) or the **trip time** (in the case of **interruptible load**) must be determined by reference to the **system operator measured frequency**.

Monitoring requirements for instantaneous reserve

- B38. The **ancillary service agent** must provide monitoring equipment that accurately:

- B38.1 measures in a time tagged manner the **instantaneous reserve** response (in **MW**) from the **ancillary service agent's** equipment at no greater than 6 second intervals for **fast instantaneous reserve** and no greater than 10 second intervals for **sustained instantaneous reserve**; and
- B38.2 uses such measured response data to record in a time tagged manner:
- B38.2.1 for **fast instantaneous reserve**, the actual **instantaneous reserve** response (in **MW**) from the **ancillary service agent's** equipment over intervals no greater than six seconds; and
- B38.2.2 for **sustained instantaneous reserve**, either the average **instantaneous reserve** response (in **MW**) at no greater than 60 seconds, or the actual **instantaneous reserve** response (in **MW**) at no greater than 10 seconds, from the **ancillary service agent's** equipment.
- B39. The monitoring referred to in paragraph B38 is required during all periods for which the **ancillary service agent's** equipment is dispatched to provide **instantaneous reserve**:
- B39.1 commencing not less than six seconds prior to the **UFE time** (in the case of **instantaneous reserve** other than **interruptible load**) or the **trip time** (in the case of **interruptible load**), in both cases as determined by reference to the **system operator measured frequency**; and
- B39.2 ending not less than 15 minutes later for **sustained instantaneous reserve** and 60 seconds later for **fast instantaneous reserve**.
- B40. The **ancillary service agent** must ensure that the data recorded by the monitoring equipment under paragraph B39 is held by the **ancillary service agent** for at least 14 **business days** and is provided to the **system operator** within 5 **business days** of a written request from the **system operator**.
- B41. The **ancillary service agent** may provide an independently verified error range for data it provides to the **system operator** under paragraph B40, which the **system operator** must have regard to in any assessment of the **ancillary service agent's** compliance with performance requirements using the data.
- B42. For thermal **generating stations**, the data referred to in paragraph B39 must be measured, recorded and provided by **generating unit**. For hydro **generating stations**, the data referred to in paragraph B39 may be measured, recorded and provided by **generating station** unless the **generating station** is providing both **tail water depressed reserve** and **partly loaded spinning reserve**, in which case the data must be measured, recorded and provided by **generating unit**.
- B43. The **ancillary service agent** must maintain the monitoring equipment in accordance with good industry practice.

Offer requirements for instantaneous reserve

- B44. If the **system operator** reasonably believes (acting in accordance with good industry practice) that the maximum quantities of **fast instantaneous reserve** and **sustained instantaneous reserve** that can be provided by the **ancillary service agent** are higher or lower than the maximum quantities specified in the **ancillary service** procurement contract, the **system operator** may, by written notice to the **ancillary service agent**, increase or decrease the maximum quantities of **fast instantaneous reserve** and **sustained instantaneous reserve** specified in the **ancillary service** procurement contract. The **system operator** must use reasonable endeavours to contact the **ancillary service agent** and discuss the matter prior to providing such notice, but any failure to do so does not invalidate the notice).
- B45. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements then:

- B45.1 if so notified by the **system operator** (which notice must outline the areas of concern that the **system operator** has), the **ancillary service agent** must not submit any **reserve offers** until and unless it has provided evidence that demonstrates to the reasonable satisfaction of the **system operator**, acting in accordance with good industry practice, that it can meet the performance requirements;
- B45.2 **reserve offers** submitted by the **ancillary service agent** (or any **reserve offers** relating to specific equipment) are deemed not to be submitted pursuant to a valid and enforceable contract with the **system operator** and must not be accepted by the **system operator**; and
- B45.3 if such **reserve offers** are in the **price-responsive schedule** or the **non-response schedule** (as the case may be), the **system operator** may require the removal of such **reserve offers** from the relevant **price-responsive schedule** or **non-response schedule** (as the case may be).

Special testing requirements for instantaneous reserve

- B46. The **ancillary service agent** must conduct an **end-to-end test** of all items of equipment it uses for providing **interruptible load**, at least once during the term of this **procurement plan**, unless the **ancillary service agent** has demonstrated fully compliant operational performance of that equipment by responding to an **under-frequency event** in the 12 month period immediately preceding the commencement of this **procurement plan**.
- B47. The scope of the **end-to-end test** must be agreed between the **ancillary service agent** and the **system operator** and may not require the full contracted amount of **interruptible load** to be shed, provided the functionality of the equipment is demonstrated to the **system operator's** reasonable satisfaction.
- B48. The **ancillary service agent** must not submit **reserve offers** for **interruptible load** unless it has conducted and passed the **end-to-end test** of the relevant equipment or demonstrated fully compliant operational performance of that equipment in accordance with paragraph B46.
- B49. For the avoidance of doubt—
- B49.1 there are no other **baseline tests** for equipment used to provide or monitor **instantaneous reserve** during the term of this **procurement plan**; and
- B49.2 paragraphs B45.2 and B45.3 apply to any **reserve offers** submitted in breach of paragraph B48.
- B50. An **end-to-end test** or **on-demand test** of equipment used for providing **instantaneous reserve** (other than monitoring equipment) must verify whether or not the equipment meets the performance requirements in paragraphs B33.2 and B33.3, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.
- B51. An **end-to-end test** or **on-demand test** of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B38.

Over frequency reserve

Performance requirements and technical specifications for over frequency reserve

- B52. To be able to provide **over frequency reserve**, the **ancillary service agent** must provide **relay equipment** that:

- B52.1 when armed, automatically disconnects the **generating unit** to which it is fitted within half a second of the frequency of the **grid** rising to or above the **required frequency** for that **generating unit**;
 - B52.2 if the **system operator** has remote arming and/or disarming control of the **relay equipment**, immediately arms or disarms (as appropriate) when it receives a remote arming or disarming signal from the **system operator's** co-ordination centre;
 - B52.3 is available at all times to provide **over frequency reserve** during the period of this **procurement plan** except:
 - B52.3.1 where the **relay equipment** is taken out of service under the conditions specified in the **ancillary service** procurement contract; and
 - B52.3.2 during the period in which any tests are conducted; and
 - B52.3.3 during any **trading period** when the **generating unit** is not generating **electricity**; and
 - B52.4 is maintained in accordance with good industry practice so that the **relay equipment** is able to provide **over frequency reserve** in accordance with the **ancillary service** procurement contract.
- B53. The conditions under which outages may occur on the **relay equipment** are specified in the **ancillary service** procurement contract with the **ancillary service agent**.

Monitoring requirements for over frequency reserve

- B54. The **ancillary service agent** must provide monitoring equipment that:
- B54.1 is available at all times (except during an **allowed outage** or during a test);
 - B54.2 continuously measures and transmits to the designated interface point information as to whether or not the **relay equipment** is armed (except during an **allowed outage** or during a test); and
 - B54.3 is maintained in accordance with good industry practice.

Special testing requirements for over frequency reserve

- B55. The **ancillary service agent** must conduct a **baseline test** of each item of **relay equipment** at least once during the term of this **procurement plan** (or less frequently, if agreed by the **system operator**). There are no other **baseline tests** for equipment used to provide or monitor **over frequency reserve** during the term of this **procurement plan**.
- B56. A **baseline test** or **on-demand test** of **relay equipment** must verify whether or not the **relay equipment** meets the performance requirements in paragraphs B52.1 and B52.2, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.
- B57. An **on-demand test** of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B54.2.

Voltage support

Performance requirements and technical specifications for voltage support

- B58. In order to provide **voltage support**, the **ancillary service agent** must provide either:

- B58.1 continuously variable **reactive power** resources that have:
 - B58.1.1 the capability of providing the contracted **reactive power** quantities whilst the **grid** is operated to the voltage range, as specified in the **technical codes**; and
 - B58.1.2 both automatic and 24-hour manual voltage control facilities; or
- B58.2 static **reactive power** resources that have:
 - B58.2.1 provision for manual control available on a 24-hour basis; and
 - B58.2.2 automatic operation to parameters and for conditions specified by the **system operator**.
- B59. All **voltage support equipment** provided by an **ancillary service agent** must have data and analogue indications of the **reactive power** and status of the **voltage support equipment**, provided in accordance with the requirements of the **technical codes**.
- B60. To be able to provide **voltage support**, the **ancillary service agent** must provide **voltage support equipment** that:
 - B60.1 is available at all times to provide **voltage support** during the period of this **procurement plan** at the maximum **reactive power** and network busbar(s) specified in the **ancillary service** procurement contract, except:
 - B60.1.1 where the **voltage support equipment** is taken out of service under the conditions specified in the **ancillary service** procurement contract; or
 - B60.1.2 during the period in which any tests are conducted;
 - B60.2 is able to respond, when dispatched, in accordance with the response times specified in the **ancillary service** procurement contract; and
 - B60.3 is maintained in accordance with good industry practice so that the **voltage support equipment** is able to provide **voltage support** in accordance with the **ancillary service** procurement contract.

Monitoring requirements for voltage support

- B61. The **ancillary service agent** must provide monitoring equipment that:
 - B61.1 is available at all times (except during an **allowed outage** or during a test);
 - B61.2 continuously measures and transmits to the designated interface point the **reactive power** provided by the **voltage support equipment** (except during an **allowed outage** or during a test); and
 - B61.3 is maintained in accordance with good industry practice.

Special testing requirements for voltage support

- B62. There are no **baseline tests** for equipment used to provide or monitor **voltage support** during the term of this **procurement plan**.
- B63. An **on-demand test** of **voltage support equipment** must verify whether or not the **voltage support equipment** meets the performance requirements in paragraphs B60.1 and B60.2, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.
- B64. An **on-demand test** of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B61.2.

Black start

Performance requirements and technical specifications for black start

- B65. The **ancillary service agent** must ensure that, when requested to provide **black start**, it provides such services by:
- B65.1 starting a **generating unit** and raising it to synchronous speed, without any power being obtained from the **grid** or any **local network**;
 - B65.2 operating the **generating unit** at zero load at synchronous speed for 15 minutes (or such shorter period as instructed by the **system operator**);
 - B65.3 having the **generating unit** switched on to de-energised **network** busbar(s);
 - B65.4 providing generation output that supports the initial charging of transmission circuits and **assets**, and the progressive energising of the **grid at network** busbar(s);
 - B65.5 providing the **reactive capability** specified in clause 8.23 for the **generating unit**;
 - B65.6 subject to paragraph B65.5, controlling the **network** voltage as instructed by the **system operator**; and
 - B65.7 providing an emergency frequency regulating reserve service by maintaining the frequency to between 49.25 Hertz and 50.75 Hertz, to the extent practicable.
- B66. The **ancillary service agent** must ensure that:
- B66.1 sufficient **black start equipment** is available at all times to provide **black start** in accordance with the **ancillary service** procurement contract;
 - B66.2 the **black start equipment** is able to start without power being obtained from the **grid** or any **local network**;
 - B66.3 sufficient **generating units** are available continuously to provide **black start**, except where there is an **allowed outage** preventing the provision of **black start**;
 - B66.4 such **generating units** are able to achieve the response times to synchronous speed specified in the **ancillary service** procurement contract;
 - B66.5 such **generating units** otherwise have the capabilities specified in the **ancillary service** procurement contract; and
 - B66.6 such **generating units** and the **black start equipment** are maintained in accordance with good industry practice to enable the provision of **black start** in accordance with the **ancillary service** procurement contract.

Monitoring requirements for black start

- B67. Any failure of the starting equipment that compromises the ability of the **ancillary service agent** to perform **black start** must be reported to the **system operator** immediately. The cause of the failure must be determined and rectified as soon as practicable, and the **system operator** advised of the expected date of completion.

Special testing requirements for black start

- B68. The **ancillary service agent** must conduct a **baseline test** of each item of **black start equipment** at least once every six weeks during the term of this **procurement plan**, provided that the **ancillary service agent** is not required to conduct such a **baseline test** if

the **black start equipment** has been generating for 66% or more of the time since the last such **baseline test**.

- B69. Without limiting any other rights the **system operator** may have to request tests of **black start**, the **system operator** may require the **ancillary service agent** to conduct a **baseline test** of **black start** no more than once during the term of this **procurement plan**. There are no other **baseline tests** for equipment used to provide or monitor **black start** during the term of this **procurement plan**.
- B70. A **baseline test** or **on-demand test** of **black start equipment** must verify whether or not the **black start equipment** meets the performance requirements in paragraph B66.2.
- B71. A **baseline test** or **on-demand test** of **black start** must verify whether or not the **black start** meets the performance requirements in paragraphs B65 and B66, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

Appendix C – Key contracting terms for ancillary service procurement contracts (paragraph 63)

- C1. For the avoidance of doubt, a key contracting term that is expressed as an **ancillary service agent** right or obligation does not confer or impose that right or obligation on an **ancillary service agent** unless and until that right or obligation is included in an **ancillary service** procurement contract between the **system operator** and the **ancillary service agent**.

Disputes

- C2. In the event of a dispute between the parties in relation to the **ancillary service** procurement contract (not being a dispute under the **regulations** or Code) that the parties cannot resolve by negotiation, the parties can agree to refer the dispute for resolution by:
- C1.1 mediation; or
 - C1.2 independent expert determination; or
 - C1.3 Rulings Panel determination under Part 3 of the **enforcement regulations**; or
 - C1.4 arbitration in accordance with the provisions of the Arbitration Act 1996.
- C3. In the event that the parties do not agree to refer an unresolved dispute to one of the above forms of dispute resolution, or having been referred to such dispute resolution the dispute is not resolved within 100 **business days** (or such longer period as the parties may agree), either party may refer the dispute to an arbitrator for resolution. The arbitrator must be agreed between the parties or, failing agreement, must be an arbitrator appointed by the President for the time being of the New Zealand Law Society. Such arbitration shall be conducted under and in accordance with the provisions of the Arbitration Act 1996.

Obligations under the regulations and Code

- C4. Nothing in the ancillary **service** procurement contract limits any obligation of the **ancillary service agent** or the **system operator** to comply with the **regulations** or Code or limit any liabilities arising due to the breach of the **regulations** or Code by an **ancillary service agent** or the **system operator**.
- C5. Any performance requirement in the **ancillary service** procurement contract that refers to a specific clause in the Code is subject to any **dispensation** granted to the **ancillary service agent**, provided the **ancillary service agent** has notified the **system operator** of the **dispensation**.

Rights to terminate

- C6. A party has the right to terminate the **ancillary service** procurement contract (or an **ancillary service** schedule to the **ancillary service** procurement contract) immediately on notice to the other party where a change to the **regulations** or Code that occurs during the term of the **ancillary service** procurement contract:
- C6.1 results in the **ancillary service** procurement contract being materially inconsistent with the **regulations** or Code; or
 - C6.2 imposes material additional obligations or material costs on the terminating party in respect of matters covered by the **ancillary service** procurement contract.

Whether any such change is material is to be decided by independent dispute resolution where the parties cannot agree.

- C7. A party has the right to terminate the **ancillary service** procurement contract immediately on notice to the other party if:
- C7.1 the other party goes into liquidation, compromises with its creditors, enters statutory management or receivership, becomes insolvent, or is subject to any analogous event; or
 - C7.2 the other party sells its business without the consent of the terminating party, such consent not to be unreasonably withheld; or
 - C7.3 it becomes illegal for the terminating party to perform the **ancillary service** procurement contract.
- C8. The **system operator** has the right to terminate an **ancillary service** schedule to the **ancillary service** procurement contract immediately on notice to the **ancillary service agent** if:
- C8.1 the **ancillary service agent** commits a material breach of the **ancillary service** procurement contract in relation to that **ancillary service**; and
 - C8.2 such breach, if remediable, is not remedied to the **system operator's** reasonable satisfaction within 10 **business days** of the **system operator's** notice, or such longer period as the **system operator** may determine.
- C9. A failure by the **ancillary service agent** to meet a performance requirement for the **ancillary service** is not a material breach unless—
- C9.1 the **ancillary service agent** has previously failed to meet the same performance requirement under its existing **ancillary service** procurement contract; or
 - C9.2 the **ancillary service agent** has failed to meet the performance requirement in paragraph B4; or
 - C9.3 the effect of the failure is that the **ancillary service** was not provided at all when it should have been.

Payment and invoicing

- C10. The payment and invoicing terms of the **ancillary service** procurement contract must recognise and be consistent with the obligations of the parties under the Code in respect of payment and invoicing.
- C11. The **system operator** may delegate its invoicing obligations under the **ancillary service** procurement contract to the **clearing manager**. Invoices for **ancillary services** are paid by the **clearing manager** on the **system operator's** behalf.

Limitation of liability

- C12. Where a party breaches an obligation under the **ancillary service** procurement contract that is also an obligation contained within the **regulations** or Code, the liability (if any) of that party is determined under and in accordance with the **regulations** and Code (including the limitations of liability contained in the **regulations** and Code) and that party has no liability under the **ancillary service** procurement contract.
- C13. The **system operator's** liability to the **ancillary service agent** under the **ancillary service** procurement contract is limited to situations where the **system operator** has breached the provisions of the **ancillary service** procurement contract. For the avoidance of doubt, the **ancillary service agent** has no claim against the **system operator** for failing to follow the **procurement plan** in any respect.

- C14. The **system operator** is only be liable to the **ancillary service agent** for direct loss suffered by the **ancillary service agent** and caused by the **system operator's** breach of the **ancillary service** procurement contract. The **system operator** is not be liable for loss of use, revenue or profit, any third party damages, and third party settlement or any costs associated with such items, even where such losses may be direct losses.
- C15. The **ancillary service agent's** liability to the **system operator** under the **ancillary service** procurement contract is limited to situations where the **ancillary service agent** has breached the provisions of the **ancillary service** procurement contract.
- C16. The **ancillary service agent** is only be liable to the **system operator** for direct loss suffered by the **system operator** and caused by the **ancillary service agent's** breach of the **ancillary service** procurement contract. The **ancillary service agent** is not be liable for loss of use, revenue or profit, any third party damages, and third party settlement or any costs associated with such items, even where such losses may be direct losses.
- C17. The maximum liability of each party to the other party under the **ancillary service** procurement contract is as follows:
- C17.1 \$100,000 in any 12 month period in respect of all defaults of obligations contained in the general contracting terms of the **ancillary service** procurement contract (and not contained in an **ancillary service** schedule to the **ancillary service** procurement contract) irrespective of the number of defaults; and
- C17.2 In respect of defaults of obligations contained in an **ancillary service** schedule to the **ancillary service** procurement contract:
- C17.2.1 the combined maximum liability for any single event or related series of events is the lesser of 5% of the total amount of the expected annual fees payable for that particular **ancillary service** (such total to be set by the **system operator** prior to the execution of the **ancillary service** procurement contract) or \$100,000; and
- C17.2.2 the combined maximum liability in any 12 month period is the lesser of 20% of the total amount of the expected annual fees payable for that particular **ancillary service** (to be set by the **system operator** prior to the execution of the contract) or \$300,000, irrespective of the number of events.
- C18. The **system operator** has no liability to the **ancillary service agent** in respect of:
- C18.1 the **system operator's** selection or dispatch of any other **ancillary service agent** to provide **multiple provider frequency keeping**; or
- C18.2 any other **ancillary service agent's** failure to comply with a **dispatch instruction** for **multiple provider frequency keeping**, **regulating instructions** or any performance or monitoring requirement for **multiple provider frequency keeping**.
- C19. Nothing in paragraphs C12 to C18 limits the **system operator's** ability to withhold payment for an **ancillary service** under paragraph C23.1.

Force majeure

- C20. The parties must be able to rely on force majeure in certain circumstances to limit any liability under the **ancillary service** procurement contract for a breach of the provisions contained in the **ancillary service** procurement contract. The following situations must be included in the definition of force majeure within the **ancillary service** procurement contract:
- C20.1 any event or circumstance occasioned by, or in consequence of, any act of God (being an event or circumstance (i) due to natural causes, directly or indirectly and exclusively without human intervention, and (ii) which could not by any amount of ability have been foreseen or, if foreseen, could not by any amount of human care

and skill have been resisted), strikes, lockouts, other industrial disturbances, acts of public enemy, wars, blockades, insurrections, riots, epidemics, aircraft, or civil disturbances; or

- C20.2 the binding order of any Court, government or a local authority (except where the **ancillary service agent** seeks to invoke this paragraph and the local authority which made the binding order is the owner of, or is otherwise associated with or related to, the **ancillary service agent**); or
 - C20.3 any other event or circumstance beyond the control of the party invoking this paragraph and being such that, by the exercise of reasonable care acting in accordance with good industry practice, such party could not have prevented such failure.
- C21. Any force majeure provision contained in the **ancillary service** procurement contract must not apply to any liability of the **ancillary service agent** that arises due to a breach of the **regulations** or Code whether or not such obligation arises in the provision of **ancillary services**.

Claims for failure to perform

- C22. The **system operator** may notify the **ancillary service agent** of a claim that the **ancillary service agent** has failed, or is unable, to meet a performance requirement in the **ancillary service** procurement contract or comply with a **dispatch instruction** for the **ancillary service**.
- C23. If the claim is accepted (voluntarily by the **ancillary service agent** or after dispute resolution):
- C23.1 the **system operator** is not be liable to pay the **ancillary service agent** for providing the **ancillary service** for the relevant period; and
 - C23.2 the **ancillary service agent** must take remedial steps to ensure that it is able to meet the performance requirement and/or comply with **dispatch instructions**.

Tests

- C24. For some **ancillary services** a minimum number of tests of the equipment used to provide or monitor them are required (each a “**baseline test**”). The **ancillary service agent** must pay the costs of any **baseline test**.
- C25. For each **ancillary service** the **system operator** may request:
- C25.1 a test of the equipment used to provide or monitor the **ancillary service** (which may be in addition to a **baseline test**) (an “**on-demand test**”); and/or
 - C25.2 a statement of the capability and operational limitations of the equipment used to provide or monitor the **ancillary service**,
 - C25.3 which, if requested, the **ancillary service agent** must carry out or provide within a timeframe agreed between the **system operator** and the **ancillary service agent**. Unless the **system operator** and the **ancillary service agent** agree otherwise, if an **on-demand test** has been requested but not carried out and passed within 30 **business days** of the **system operator’s** request, the **ancillary service agent** is deemed to be incapable of providing or monitoring the **ancillary service** from the end of that period until the **on-demand test** is carried out and passed.
- C26. The **system operator** must pay the **ancillary service agent’s** reasonable costs of an **on-demand test** unless:
- C26.1 the equipment fails the **on-demand test**; or

- C26.2 the **system operator** requested the **on-demand test** within 20 **business days** of the **ancillary service agent** notifying the **system operator** that the **ancillary service agent** had completed remedial action on the equipment in response to a claim by the **system operator** under paragraph C22, and the sole purpose of the **on-demand test** is to determine the sufficiency of that remedial action.
- C27. If equipment used to provide or monitor an **ancillary service** fails a **baseline test** or **on-demand test** the **ancillary service agent**:
- C27.1 is deemed to be incapable of providing or monitoring the **ancillary service** until the test is passed; and
- C27.2 must re-test the equipment until the test is passed, and the **ancillary service agent** must pay the costs of any such re-test unless:
- C27.2.1 the equipment is used to provide or monitor **frequency keeping** and/or **instantaneous reserve** and no other **ancillary service**; or
- C27.2.2 otherwise agreed with the **system operator**.

Inspections

- C28. The **system operator** may inspect any equipment used by the **ancillary service agent** to provide or monitor an **ancillary service**. The **system operator** must not interfere unreasonably with the **ancillary service agent's** business in carrying out such an inspection.
- C29. The **system operator** must give the **ancillary service agent** at least five **business days'** notice of any such inspection, unless the **system operator** reasonably believes that the equipment is being used in a manner inconsistent with providing the **ancillary service** in accordance with the **ancillary service** procurement contract, in which case the **system operator** may give less or no notice.

Sub-contracting and assignment

- C30. The **ancillary service agent** may not sub-contract any of its obligations under the **ancillary service** procurement contract to any person without the **system operator's** prior consent. If the **ancillary service agent** does sub-contract any of its obligations under the **ancillary service** procurement contract, it remains primarily responsible for the performance of those obligations, including for any breach of the **regulations** or Code arising from the performance or non-performance of those obligations.
- C31. The **system operator** may assign its interest in the **ancillary service** procurement contract to any person who takes over the role of **system operator**. Otherwise, neither party may assign its interest in the **ancillary service** procurement contract to any person without the consent of the other party.

New long term contracts

- C32. The following provisions must be included in any **new long term contract** for **over frequency reserve, voltage support** or **black start**:
- C32.1 If, in the **system operator's** reasonable opinion, the number or duration of maintenance outages of equipment used to provide or monitor the **ancillary service** is such that the **ancillary service agent's** ability to provide or monitor the **ancillary service** in accordance with the **new long term contract** has been substantially detrimentally affected, the **system operator** may, by giving one month's prior written notice to the **ancillary service agent**, terminate the **new long term contract**.

- C32.2 Any availability or event fee payable under the **new long term contract** is to be subject to adjustment no more frequently than once every 12 months in accordance with an objective formula to be agreed between the **system operator** and **ancillary service agent**.

Appendix D – Glossary of terms

allowed outage means an outage of that equipment that is permitted under an **ancillary service** procurement contract

average dispatched MW band means, for an **FK site**, the average number of **MW** in the **MW bands** for which the **FK site** is dispatched to provide **multiple provider frequency keeping**

baseline test is defined in paragraph C24

black start equipment means diesel generators or auxiliary hydro plant

constraint costs means **constrained off amounts** and **constrained on amounts** attributable to **frequency keeping**

contracted GXPs means the **GXPs** at which an **ancillary service agent** may provide **interruptible load**, as set out in an **ancillary service** procurement contract for **instantaneous reserve**

control equipment means equipment in respect of a **generating unit** or **demand** block that automatically responds to changes in frequency for the purposes of providing **frequency keeping**

control min means the minimum quantity of power (in megawatts) an **FK site** must generate to provide **frequency keeping** to the relevant performance requirements

control max means the maximum quantity of power (in megawatts) an **FK site** can generate and still provide **frequency keeping** to the relevant performance requirements. The **control max** offered for an **FK site** must be greater than or equal to **control min** plus twice the range of the offered **MW band** for the **FK site**

end-to-end test means a **baseline test** to verify that the integrated components of an **interruptible load** system, other than the monitoring components, function correctly as part of the overall system from start to finish

existing long term contract means an **ancillary service** procurement contract entered into between the **system operator** and an **ancillary service agent** before the commencement date of this **procurement plan**, the term of which **ancillary service** procurement contract overlaps with the term of this **procurement plan**

enforcement regulations means the Electricity Industry (Enforcement) Regulations 2010

firm quantity procurement is defined in paragraph 12.1

FK site means a **generating unit**, **generating station**, **block dispatch group** or **station dispatch group** that is capable of providing **frequency keeping**

grid frequency error means the **grid** frequency deviation in Hertz from 50.00 Hertz

half-hour clearing market procurement is defined in paragraph 12.2

islanded, in relation to part of the **grid**, means that that part of the **grid** is disconnected from the rest of the **grid** owing to planned or unplanned outages

MFK technical review is defined in paragraph 27

MFK transition trading period is defined in paragraph A8

multiple provider frequency keeping means, for a **trading period** and **island**, **frequency keeping** that is dispatched on the basis that during the **trading period** there may be more than one provider of **frequency keeping** in the **island**

MW band means a range in (**MW**) over which an **FK site** may vary its generation

new long term contract means an **ancillary service** procurement contract entered into between the **system operator** and an **ancillary service agent** during the term of this **procurement plan**, the term of which **ancillary service** procurement contract exceeds the term of this **procurement plan**

on-demand test is defined in paragraph C25.1

pre-event generating output is defined in paragraph B36.2.2

pre-event load means the average load over a period of 60 seconds with a reasonable adjustment for any load change detected on the relevant **network**

relay equipment means equipment fitted to a **generating unit** that automatically disconnects the **generating unit** when the frequency of the **grid** reaches the **required frequency** for that **generating unit**

required frequency means, in relation to a **generating unit**, the frequency at which that **generating unit** is contracted to disconnect

regulating instruction means an instruction by the **system operator** to an **ancillary service agent** providing **multiple provider frequency keeping** from an **FK site** to increase or decrease generation from the **FK site** within the dispatched **MW band** for the **FK site**. For the avoidance of doubt, a **regulating instruction** is not a **dispatch instruction**

regulating instruction error means, in relation to an **FK site**, the average deviation (in **MW**) over a three minute period between:

- (a) the expected generation output from the **FK site**, being dispatched generation adjusted for **regulating instructions**; and
- (b) actual generation output from the **FK site**

regulating instruction error ratio means, for an **FK site**, the ratio of the **regulating instruction standard deviation** to the **average dispatched MW band** for the **FK site** over a month

regulating instruction standard deviation means, for an **FK site**, the standard deviation of the **regulating instruction errors** for the **FK site**

regulations means the **enforcement regulations** and any other regulations made under the **Act**

response rate means the rate of change in generation output from an **FK site** in **MW** per minute

SFK return trading period is defined in paragraph A9

single provider frequency keeping means, for a **trading period** and **island**, **frequency keeping** that is dispatched on the basis that during the **trading period** there must be only one provider of **frequency keeping** in the **island**

single provider frequency keeping period means, in relation to an **ancillary service agent** and **island**, all the **trading periods** within any continuous period of 30 days for which the **ancillary service agent** was dispatched to provide **single provider frequency keeping** in the **island**, provided the number of such **trading periods** is at least 24

system operator measured frequency means the frequency of the **grid** as determined by **system operator** frequency logging

trip frequency means the trip frequency for **interruptible load** specified in the relevant **ancillary service** procurement contract

trip time means the time at which the frequency of the **grid** falls to or below the **trip frequency**

UFE time means the time at which an **under-frequency event** occurs and

voltage support equipment means assets capable of providing reactive power.