2025 Ancillary Services Procurement Plan amendment

Decision paper

29 July 2025

ELECTRICITY AUTHORITY
TE MANA HIKO

Executive summary

The Electricity Authority Te Mana Hiko (Authority) has decided to implement some of the changes proposed by the System Operator in its latest review of the Ancillary Service Procurement Plan (procurement plan).

The procurement plan sets out the mechanisms the System Operator uses to procure ancillary services, the technical requirements for provision, and key contractual terms applying to each service. It is incorporated by reference into the Code and is required to be reviewed every two years.

The System Operator consulted with industry on an amendment to the procurement plan as part of its most recent review. After considering submissions, the System Operator modified some of its proposed changes and deferred the most controversial issues. It then submitted a final proposal to the Authority for approval.

The Authority has decided to implement the following changes proposed by the System Operator:

- clarifications of existing requirements
- additions to better align the plan to current practices and Code amendments
- additions to clarify requirements for new technologies, such as battery energy storage systems (BESS).

We decided to implement these changes because they are mostly minor, non-controversial and unlikely to unnecessarily increase administrative and compliance costs for stakeholders. We recognise that the changes will increase costs for BESS providers. However, we agree with the System Operator that this is outweighed by the benefits these changes bring to the system.

We appreciate the System Operator's decision to defer the changes submitters deemed controversial and to amend others to respond to submitters' feedback and our comments.

The Authority is satisfied that the proposal has had adequate consultation. Therefore, further consultation is not required.

Next step

The amended procurement plan will come into force on 7 August 2025.

Contents

1. Purpose

1.1. This paper sets out the Electricity Authority Te Mana Hiko's (Authority) decision to implement the System Operator's Ancillary Services Procurement Plan (procurement plan).

2. Background

The procurement plan sets out how to procure ancillary services to support the reliable operation of the power system

2.1. Ancillary services are crucial to the security and reliability of the power system.[1] The procurement plan sets out the mechanisms the System Operator uses to procure ancillary services, the technical requirements for provision of those services, and key contractual terms applying to each service.[2] It also assists the System Operator to meet its Principal Performance Obligations, as specified in the Code.

2.2. The plan is incorporated by reference into the Electricity Industry Participation Code 2010 (Code).[3]

2.3. The System Operator must use reasonable endeavours to follow the procurement plan when it procures ancillary services to support a reliable and secure power system.

The System Operator proposes changes to the procurement plan

2.4. The Code sets out the requirements and responsibilities for making changes to the procurement plan. The System Operator:

(a) is responsible for preparing and consulting on amendments to the procurement plan

(b) must review the procurement plan at least once every two years

(c) is required to finalise its proposal for the Authority's consideration, following consultation

(d) must provide a summary of submissions and its responses alongside its proposal.[4]

The Authority may implement any changes to the procurement plan

2.5. Under the Code, after receiving the System Operator's final proposal, the Authority may:

(a) approve the proposed amendments

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1 For more see About Ancillary Services on Transpower's website.

2 Clauses 8.40 to 8.47 of the Code set out the arrangements regarding the procurement plan.

3 Clause 8.42 of the Code.

4 Clauses 7.13 to 7.20 of the Code set out the processes the System Operator must follow to amend the procurement plan.

(b) require further consultation before resubmitting the proposed amendments for approval

(c) decline to approve the proposed amendments.[5]

2.6. The Code does not explicitly set out any matters the Authority must consider in deciding whether to approve a proposal. The Authority is therefore guided by its main statutory objective, which is 'to promote competition in, reliable supply by, and the efficient operation of the electricity industry for the long-term benefit of consumers'.[6] The Authority must also adhere to principles of public law when making decisions, including acting lawfully, fairly, and reasonably.

2.7. To give legal effect to an amendment to the procurement plan:

(a) the amended document must be of the same general character as the original

(b) the Authority must issue a notice to adopt the amendment as having legal effect as part of the Code.[7] This is done via Gazette Notice.

3. The System Operator reviewed the procurement plan proposal in response to submissions

The System Operator consulted on several amendments to procure ancillary services competitively, reliably and efficiently.

3.1. In April 2025, the System Operator publicly consulted on proposed changes to the procurement plan.[8] Its objectives included:

(a) Providing clarity to BESS owners and developers on their expected participation in ancillary services (by treating BESS in ways that better reflect its characteristics and abilities).

(b) Providing certainty to ancillary service providers to improve the efficiency of ancillary service procurement and to enable better investment decisions (by clarifying performance, testing, and monitoring provisions).[9]

(c) Aligning the plan with:

i Code changes made since the last procurement plan update became effective (May 2022)

ii ancillary services contracts

iii current ancillary service procurement practices.

(d) Drafting improvements to increase the usability of the procurement plan.

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5 Subclause 7.21(2) of the Code.

6 The Authority also has an additional objective to "protect the interests of domestic consumers and small business consumers in relation to the supply of electricity to those consumers", but this applies only to the Authority's activities in relation to the dealings of industry participants with domestic consumers and small business consumers.

7 Section 131B of the Electricity Industry Act 2010, *Material incorporated by reference.*

8 Transpower. Consultation on Ancillary Services Procurement Plan review 2025. 17 April 2025

9 Transpower. Consultation on Ancillary Services Procurement Plan review 2025. 17 April 2025

(e) Complying with its obligation under the Code for a two-yearly review of the plan.

4. Submissions

The System Operator received six submissions and one cross-submission

4.1. Submitters supported the rationale for updating the procurement plan and most of the proposed amendments.

4.2. The following sections provide a summary of the main themes of the submissions and the System Operator's responses.

4.3. All submission can be found on Transpower's website. Appendix A of the attached *FINAL Ancillary Services Procurement Plan Review Proposal* (Appendix C of this paper) provides detailed consultation comments and the System Operator's responses.

Submitters were concerned the proposals could result in higher compliance costs and be a barrier to entering ancillary service contracts.

4.4. Almost all concerns related to cost increases due to:

(a) **New metering and data requirements**, especially due to technical limitations of installed equipment

(b) Hard to manage changes to **interruptible Load and Automatic Under-frequency Load Shedding** (AUFLS)

4.5. Submitters were also concerned that rising costs and more rigorous technical requirements could discourage new entrants from participating in the ancillary service markets.

The System Operator decided to defer to a later date the most controversial changes.

4.6. These include proposed changes to pre- and post-event data requirements that submitters though onerous and costly, as well as raising safety concerns.

4.7. The System Operator considered further investigation and consideration are necessary before progressing these issues.

4.8. See all deferred issues in Appendix B of the *FINAL Ancillary Services Procurement Plan Review Proposal* (Appendix C of this paper).

The System Operator will engage further on the deferred issues

4.9. The System Operator will engage with submitters on a bilateral basis on matters we have deferred in response to their submissions.

4.10. This is because most of the deferred issues were submitter specific. However, if necessary, the System Operator will publicly consult on these issues before submitting any additional changes to the procurement plan to the Authority.

The System Operator considers most of the remaining amendments will result in either no or justified costs increases

4.11. The System Operator stated that most of the proposed changes would not increase compliance or administrative costs. This is because most of the proposed changes would only clarify and confirm existing practices.

4.12. For changes that would increase costs to providers, the System considered additional costs were proportionate and justified. These include metering data for BESS. This is because these amendments would increase the pool of potential providers of ancillary services and increase competition. This increase in competition is in the long-term benefit of consumers.

After consultation, the System Operator submitted a number of minor amendments for the Authority's final approval

4.13. The final changes range from technical drafting changes and refinements to improvements. For example:

(a) **all services** (eg, added requirements to have trained operators of the systems in addition to the existing provision around maintenance of the physical assets)

(b) **Over Frequency Reserve** (eg, less frequent testing for equipment that provide this service by tripping)

(c) **Instantaneous Reserve** (eg, different requirements for BESS based on their size)

(d) **Voltage Support** (to maintain consistency with other ancillary services – noting that no providers are currently contracted for this service)

(e) **Frequency keeping** (eg, introducing six-month testing)

(f) **Black Start** (eg, clarification of testing and monitoring requirements).[10]

4.14. Section 6 and Appendix C of the *FINAL Ancillary Services Procurement Plan Review Proposal* (Appendix C to this paper) provide a more comprehensive summary of the final amendments to the procurement plan. We also recommend all interested parties read the full Amended procurement plan (Appendix A and B to thus paper).

After consultation, the System Operator confirmed the removal of time error management

4.15. In this final version, the System Operator confirmed the removal of references to its requirement to manage frequency time error. This reflects the Authority's decision to remove this requirement under the Code.[11] However, the System Operator maintains a reasonable endeavours clause for the maintenance of frequency time error as close as possible to zero. This is a quality of performance measure that will support the System Operator to manage system frequency.

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10 See Appendix A (section 6 for a more detailed summary of these changes.

11 Electricity Authority. Code Amendment Omnibus #4 decision. 1 May 2025. This decision

5. The Authority has decided to amend the procurement plan

5.1. The Authority has decided to approve the System Operator's proposed changes to the procurement plan. We also recognise that the amended document is of the same general character as the original. [12]

The final amendments are technical and non-controversial

5.2. We consider the amendments, while numerous in number, are not controversial in nature. They also help ensure the System Operator's policies continue to improve and adapt to an evolving power system.

5.3. This assessment reflects the System Operator's decision to defer the most controversial amendments of its initial proposal in response to submissions. We appreciate this approach and wish to remain involved in future discussions over them.

The final amendments meet the Authority's main statutory objective

5.4. We consider the final version of the amendments mainly clarifies aspects of the procurement plan and aligns it to current practices and recent Code amendments.

5.5. The Authority's additional objective with regards to consumers is not engaged. The changes do not relate to dealings between domestic and small business consumers and participants supplying their electricity.

5.6. The Authority is also satisfied that the proposal has had adequate consultation. Therefore, further consultation is not required.

The procurement plan can be incorporated by reference

5.7. The amended procurement plan has the same general character as the original material. Therefore, it meets the requirements of section 131B(2)(a) of the Act, enabling the Authority to give legal effect to the amendments as part of the Code.

5.8. The Authority will issue a notice under section 131B(2)(b) of the Act stating that the amended procurement plan is given legal effect as part of the Code. The notice will be published in the Gazette.

6. Next steps

6.1. The Authority will issue a notice to adopt the amendment as having legal effect as part of the Code. This is done via Gazette Notice published on 29 July 2025.

6.2. The amended policy statement will come into force on 7 August 2025.

7. Attachments

7.1. The following appendices are attached to this paper:

Appendix A Draf final Procurement Plan (redline)

[12] Section 131B of the Electricity Industry Act 2010, *Material incorporated by reference.*

Appendix B Draft final Procurement Plan (clean)

Appendix C Draft final Ancillary Services Procurement Plan Review Proposal

Appendix A Draft final Procurement Plan (redline)

~~*Gazette* Effective Date – 3 May 2022~~

Ancillary services procurement plan

Contents

Introduction

1. This **procurement plan** 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 paragraphs are to paragraphs of this **procurement plan**;

   3.2 Appendices are to Appendices of this **procurement plan**; and

   3.3 "the term of this **procurement plan**" are to the period of time from the commencement of this **procurement plan** until the **Authority** adopts a new **procurement plan** ~~under clause 8.44B of the **Code**~~.

4. A paragraph number in this **procurement plan** preceded by a letter indicates that the paragraph is in the Appendix corresponding to that letter.

~~4.~~5. The content and structure of this **procurement plan** is consistent with the content and structure set out in clause 8.43 of the **Code**.

Ancillary services to purchase

~~5.~~6. The **system operator** may purchase the following **ancillary services** from **ancillary service agents**:

~~5.1~~6.1 **frequency keeping**;

~~5.2~~6.2 **instantaneous reserve**;

~~5.3~~6.3 **over frequency reserve**;

~~5.4~~6.4 **voltage support**; and

~~5.5~~6.5 **black start**.

~~6.~~7. The purpose of **frequency keeping** is to balance any generation and **demand** inequalities with the objective of maintaining the **grid** frequency within the **normal band** ~~at or near 50 Hertz~~ under normal operating conditions ~~and managing **frequency time error**~~. 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.

~~7.~~8. 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.~~9. The purpose of **over frequency reserve** is to manage frequency recovery after an event that might otherwise cause the **grid** frequency to exceed 52 H~~ert~~z in the North Island or 55 H~~ert~~z 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.~~10. 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.~~11. The purpose of **black start** is to maintain equipment that can initialise the **supply** for the progressive relivening of the **grid** following a partial or total blackout.

~~11.~~12. Implementation of this **procurement plan** is subject to the **ancillary services** being made available to the **system operator** on:~~—~~

~~11.1~~12.1 the terms contained in this **procurement plan**; or

~~11.2~~12.2 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 assessments (clause 8.43(a) of the Code)

The requirements for complying with the principal performance obligations (PPOs) (clause 8.43(a)(i) of the Code)

~~12.~~13. The **system operator** must procure **ancillary services** to assist it to achieve the following objectives:

Ancillary service	Objectives
Frequency keeping	Compliance with clause 7.2A(2), 7.2B~~, 7.2C~~ of the **Code** Compliance with the **policy statement**
Instantaneous reserve	Compliance with clause 7.2A, 7.2B~~, 7.2C~~ of the **Code** Prevent the frequency from going outside defined limits for specified contingencies Compliance with the **policy statement**
Over frequency reserve	Compliance with clause 7.2A(1), 7.2A(2), 7.2B~~, 7.2C~~ of the **Code** Compliance with the **policy statement**
Voltage support	Compliance with clause 7.2A(1) of the **Code** Compliance with the **policy statement**
Black start	Compliance with clause 8.5 of the **Code** Compliance with the **policy statement**

The requirements for achieving the dispatch objective (clause 8.43(a)(ii) of the Code)

~~13.~~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**.

~~14.~~15. It is recognised in 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**.

~~15.~~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(a)(iii) of the Code)

~~16.~~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**.

~~17.~~18. The **system operator's** assessment of the contribution provided by **asset owners** must rely on the following:

~~17.1~~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**;

~~17.2~~18.2 that information contained in the **asset capability statements** provided by **asset owners** is correct;

~~17.3~~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; and

~~17.4~~18.4 the existence of any contracts of the type and nature set out in clause 8.6 of the **Code**.

Impact of dispensations and alternative ancillary service arrangements held by asset owners (clause 8.43(a)(iv) of the Code)

Dispensations

~~18.~~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**.

~~19.~~20. **Allocable cost** excludes the readily identifiable and quantifiable costs resulting from granting **dispensations**. A **dispensation** may affect the net quantity of procurement for an **ancillary service**, and the additional procurement cost must be borne by the **asset owner** with the **dispensation**.

Alternative ancillary service arrangements

~~20.~~21. At the time of the preparation of this **procurement plan**, no **alternative ancillary service arrangements** were in place.

~~21.~~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

~~22.~~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 of the **Code**. These are referred to as local quality agreements.

Existing long term contracts

~~23.~~24. In assessing the net quantities of procurement, the **system operator** must take account of any **existing long term contracts**.

~~24.~~25. The **system operator** may continue to procure **ancillary services** under **existing long term contracts** during the term of this **procurement plan**.

Cost effectiveness

~~25.~~26. The **system operator** must consider the following in achieving the appropriate balance between cost and quality for each **ancillary service** purchased:

~~25.1~~26.1 the technical specification of the plant being offered, including any measuring equipment required;

~~25.2~~26.2 the minimum acceptable service standard;

~~25.3~~26.3 the number of suppliers offering the service and reasons for any limitations;

~~25.4~~26.4 the actual cost of providing the service over the **ancillary service** procurement contract term;

~~25.5~~26.5 the liability for providing the service and the potential cost of failure; and

~~25.6~~26.6 the desirability of maintaining capability and competition in the provision of **ancillary services**.

Methodologies for net purchase quantity assessments (clause 8.43(b) of the Code)

Assessment methodology for frequency keeping

~~26.~~27. Subject to paragraphs 28 and 29, 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**, on terms acceptable to 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(5)(a) of the **Code**.

~~27.~~28. The **system operator** may procure **back-up SFK** from one or more parties, but is not required to enter into an **ancillary service** procurement contract for **back-up SFK** with every potential provider of **back-up SFK**.

~~28.~~29. Parties who wish to provide **frequency keeping** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **frequency keeping**. Without limitation, the scope of the technical review may include a review of:

~~28.1~~29.1 the control accuracy of the party's proposed **FK sites**;

~~28.2~~29.2 the **response rates** of the party's proposed **FK sites**;

~~28.3~~29.3 the capabilities of the monitoring equipment for the party's proposed **FK sites**; and

29.4 for **multiple provider frequency keeping**, the ability of the party's **proposed FK sites** to receive and respond to **regulating instructions**.

~~29.~~30. The **system operator** must assess the net purchase quantity of **frequency keeping** in accordance with the processes set out in paragraphs 13 to 26.

~~30.~~31. The **system operator** must use reasonable endeavours to have an **ancillary service** procurement contract with at least one provider of **frequency keeping** in each **island**.

Assessment methodology for instantaneous reserve

~~31.~~32. Subject to paragraph 33, a~~A~~ll 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**, on terms acceptable to 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 of the **Code** and a contract to provide **instantaneous reserve** for the purposes of clause 13.82(5)(a) of the **Code**.

33. Parties who wish to provide **instantaneous reserve** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **instantaneous reserve**. Without limitation, the scope of the technical review may include a review of:

33.1 for **generation reserve**, the model and the model validation report submitted as part of the **asset capability statement** for the relevant site; and

33.2 relevant test methodology prior to testing and test results post testing.

~~32.~~34. The **system operator** must assess the net purchase quantity of **instantaneous reserve** in accordance with the processes set out in paragraphs 13 to 26 and Schedule 13.3 of the **Code**.

Assessment methodology for over frequency reserve

~~33.~~35. Subject to paragraph 36, ~~T~~the **system operator** ~~system operator~~ may procure **over frequency reserve~~s~~** from parties that can offer **over frequency reserve~~s~~** 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**, on terms acceptable to the **system operator**, to provide **over frequency reserve~~s~~** on a **firm quantity procurement** basis. Each such **ancillary service** procurement contract is a contract to provide **over frequency reserve~~s~~** for the purposes of clause 13.82(5)(a) of the **Code**.

36. Parties who wish to provide **over frequency reserve** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **over frequency reserve**. Without limitation, the scope of the technical review may include a review of:

36.1 relevant test methodology prior to testing and test results post testing;

36.2 **circuit breaker** operating time;

36.3 relay injection testing;

36.4 ramp rate if applicable;

36.5 control equipment operating time if applicable;

36.6 remote enable/disable control; and

36.7 remote/manual arming and disarming function.

~~34.0 relevant test methodology prior to testing and test results post testing.~~

~~35.~~37. The **system operator** must assess the net purchase quantity of **over frequency reserve~~s~~** in accordance with the processes set out in paragraphs 13 to 26.

Assessment methodology for voltage support

~~36.~~38. Subject to paragraph 39, t~~T~~he **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**, on terms acceptable to 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(5)(a) of the **Code**.

39. Parties who wish to provide **voltage support** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **voltage support**.

Without limitation, the scope of the technical review may include a review of relevant test methodology prior to testing and test results post testing.

~~37.~~40. The **system operator** must assess the net purchase quantity of **voltage support** in each **zone** in accordance with the processes set out in paragraphs 13 to 26.

Assessment methodology for black start

~~38.~~41. Subject to paragraph 42, t~~T~~he **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**, on terms acceptable to the **system operator,** to provide **black start** on a **firm quantity procurement** basis.

42. Parties who wish to provide **black start** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **black start**. Without limitation, the scope of the technical review may include a review of:

42.1 the auxiliary/battery bank or diesel generator being offered;

42.2 the capability of the generator to be livened without **grid** power;

42.3 the ability to synchronise the available unit(s);~~,~~

42.4 the ability to energise the grid circuits; and

~~38.1~~42.5 relevant test methodology prior to testing and test results post testing.

~~39.~~43. The **system operator** must assess the net purchase quantity of **black start** in accordance with the processes set out in paragraphs 13 to 26.

~~40.~~44. The **system operator** must use reasonable endeavours to have **ancillary service** procurement contracts for **black start** at two sites in each **island**.

Procurement processes (clause 8.43(c) of the Code)

Ancillary service procurement contracts

~~41.~~45. Subject to paragraph 46, the **system operator** may enter into an **ancillary service** procurement contract with an **ancillary service agent** at any time during the period of this **procurement plan** using any means of entering into the contract it considers appropriate.

Tendering

~~42.~~46. Subject to paragraphs 47 and 48, the **system operator** must seek tenders from potential providers of each **ancillary service** at least once every ~~24 months,~~ 2 years taking into account the period since the **system operator** last sought tenders from potential providers of the **ancillary service** under any previous **procurement plan**.

~~43.~~47. The **system operator** need not comply with paragraph 46 for an **ancillary service** that is or would be procured on a **firm quantity procurement** basis if the **system operator** considers none or no more of the **ancillary service** is required in the relevant **region**.

~~44.~~48. The **system operator** need not comply with paragraph 46 for an **ancillary service** if the **system operator** considers there is only one potential provider of the **ancillary service** in the relevant **region**.

~~45.~~49. The terms and conditions of each tender process referred to in paragraph 46 must require the **system operator** to treat information received from tenderers during the tender process as confidential, subject only to the provisions that permit the disclosure of confidential information under the **system operator's** standard form **ancillary service** procurement contract.

Contracting

~~46.~~50. The **system operator** must negotiate in good faith **ancillary service** procurement contracts using the **system operator's** standard form **ancillary service** procurement contracts as starting points.

~~47.~~51. The term of an **ancillary service** procurement contract may differ from that of this **procurement plan**. Without limitation, the **system operator** may enter into a **new long term contract** for any **ancillary service**.

Bases of procurement

~~48.~~52. Subject to paragraph 53, **ancillary services** must be procured through a half-hour clearing market process whereby, for each **ancillary service** and **trading period**, **ancillary service agents** submit offers to the **system operator** to provide **the ancillary service**. The market for the **ancillary service** is priced and settled for each **trading period** based on the offers dispatched by the **system operator**. This type of procurement is referred to as **"half-hour clearing market procurement"**.

~~49.~~53. **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"**.

~~50.~~54. **Ancillary services** procured on a firm quantity procurement basis must be paid for by way of an **availability fee**, an **event fee** or both. **Ancillary services** procured on a **half-hour**

clearing market procurement basis must be paid for by way of an offer price and may also be paid for by way of an **availability fee**.

~~51.~~55. The basis of procurement for each **ancillary service** is set out in Appendix A.

Islanded situations

~~52.~~56. Despite anything to the contrary in this **procurement plan**, when part of the **grid** is **islanded** the **system operator** may procure **ancillary services** for that part of the **grid** using procurement processes other than those set out in paragraphs 46 to 55 and Appendix A. For the avoidance of doubt, an **ancillary service** procured under this paragraph is not an **alternative ancillary service arrangement**.

Administrative costs (clause 8.43(d) of the Code)

~~53.~~57. 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 of the **Code**.

~~54.~~58. 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

Technical requirements and key contracting terms (clause 8.43(e) of the Code)

~~55.~~59. The key technical requirements for each **ancillary service** are set out in Appendix B.

~~56.~~60. The key contracting terms for the procurement of **ancillary services** are set out in Appendix C.

~~57.~~61. When entering into **ancillary service** procurement contracts with **ancillary service agents** for the provision of **ancillary services**, subject to paragraph 63, the **system operator** must use reasonable endeavours to ensure that the **ancillary service** procurement contracts include the key technical requirements and the key contracting terms.

~~58.~~62. 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.

~~59.~~63. Despite anything to the contrary in this **procurement plan**, when part of the **grid** is **islanded** the **system operator** may procure **ancillary services** for that part of the **grid** under **ancillary service** procurement contracts that do not include the key technical requirements or key contracting terms set out in Appendices B or C. For the avoidance of doubt, an **ancillary service** procured under this paragraph is not an **alternative ancillary service arrangement**.

Arrangements for unanticipated procurement of ancillary services (clause 8.43(f) of the Code)

~~60.~~64. 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 of the **Code**.

~~61.~~65. Any departures from this **procurement plan** must be in accordance with clause 8.47 of the **Code**.

~~62.~~66. Where the **system operator** identifies a need to change any aspect of this **procurement plan**, the **system operator** may propose a change pursuant to clause 7.13(1)~~8.43A(1) or 8.44A(1)~~ of the **Code**.

System operator reporting to the Authority (clause 8.43(g) of the Code)

~~63.~~67. The **system operator** must report to the **Authority** in relation to the procurement of **ancillary services** as follows:

~~63.1~~67.1 settlement volumes, prices, costs, and **administrative costs** where appropriate, on a monthly basis;

~~63.2~~67.2 any issues arising with respect to cost allocation, liability and disputes, on a monthly basis; and

~~63.3~~67.3 other general procurement issues to be contained within the **system operator** monthly report provided in accordance with clause 3.13 and clause 3.14 of the **Code**.

Appendix A – Bases for procuring ancillary services (paragraph 55)

Frequency keeping

A1. The **system operator** must:

A1.1 procure **frequency keeping** on a **half-hour clearing market procurement** basis; and

A1.2 procure **frequency keeping** as **single provider frequency keeping** or **multiple provider frequency keeping**.

A2. The **system operator** may:

A2.1 procure **back-up SFK** at the same time it procures **multiple provider frequency keeping**; and

A2.2 pay an **availability fee** for **back-up SFK** but must not otherwise pay an **availability fee** for **frequency keeping**.

A3. For each **island** independently, the **system operator** may set an **MFK transition trading period** or **SFK transition trading period**.

A4. The **system operator** must communicate the setting of an **MFK transition trading period** or **SFK transition trading period** by:

A4.1 notifying all **ancillary service agents** with an **ancillary service** procurement contract for **frequency keeping** in the relevant **island**; and

A4.2 publishing the notification on the **system operator's** website.

A5. The **system operator** need not communicate an **SFK transition trading period** in accordance with paragraph A4 in advance of the **SFK transition trading period** if the transition to **single provider frequency keeping** is urgent.

A6. Subject to paragraph A7A7, the **system operator** must dispatch offer(s) 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** at least cost based on the **offer prices** and estimated **constraint costs**. For the avoidance of doubt, the aggregate **MW band** may be zero.

A7. The **system operator** may depart from paragraph A6 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 the affected **ancillary service agent** as soon as reasonably practicable if it does this.

A8. **Frequency keeping** for an **island** may be provided by one or more providers of **frequency keeping** in the other **island**, via the **HVDC link**.

Instantaneous reserve

A9. The **system operator** must:

A9.1 procure **instantaneous reserve** on a **half-hour clearing market procurement** basis; and~~.~~

A9.2 procure **instantaneous reserve** as **fast instantaneous reserve** and **sustained instantaneous reserve**.

A10. The **system operator** must dispatch **reserve offers** in accordance with Subpart 2 of Part 13 of the **Code**.

A11. **Reserve offers** dispatched by the **system operator** must be priced and settled in accordance with Subpart 4 of Part 13 of the **Code**.

A12. **Instantaneous reserve** for an **island** may be provided by one or more providers of **instantaneous reserve** situated in the other **island**, via the **HVDC link**.

Over frequency reserve, voltage support and black start

A13. The **system operator** has determined that it is uneconomic to procure **over frequency reserve**, **voltage support** and **black start** on a **half-hour clearing market procurement** basis.

A14. The **system operator** must procure **over frequency reserve**, **voltage support** and **black start** on a **firm quantity procurement** basis.

A15. For the purpose of determining when an **event fee** is payable for **over frequency reserve**, **voltage support** and **black start**:

A15.1 an **over frequency reserve** event occurs for a dispatched **OFR site** ~~**relay equipment** and the **generating unit** to which it is fitted~~ when the ~~**relay**~~**OFR equipment** ~~causes the **generating unit** to~~ initiates its **over frequency reserve** response;~~disconnect;~~

A15.2 ~~A~~ a **voltage support** event occurs for voltage support **equipment** when the **voltage support equipment** is dispatched; and

A15.3 ~~A~~ a **black start** event begins when the **system operator** requests **black start** and ends when **core grid** restoration is complete. There may be multiple attempts at restoration before the event ends.

Appendix B – Key technical requirements for ancillary services (paragraph 59)

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 **frequency keeping units** and trained operators or **control equipment** at an **FK site** that, collectively, are capable of meeting the relevant performance requirements set out ~~in~~in paragraphs B3 to B8 below~~:~~

~~B2.1 paragraphs , for **single provider frequency keeping**;~~

~~B2.2 paragraphfor **multiple provider frequency keeping**; and~~

~~B2.3 paragraphs, for both **single provider frequency keeping** and **multiple provider frequency keeping**.~~.

Single provider frequency keeping performance requirements

B3. Subject to paragraph B7, 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** and commences the response as fast as practicable but in all cases within 10 seconds of the **grid frequency error** occurring;

B3.2 ensure the relevant **FK site** provides an average **response rate** of at least 10 **MW** per minute when the **grid** frequency is outside the **normal band** over each of the **ancillary service agent's single provider frequency keeping periods**; ~~and~~

B3.3 at all times act to maintain the frequency of the **grid** within the **normal band**, and use reasonable endeavours to continuously maintain the frequency of the **grid** as close as possible to 50 H~~ert~~z; and ~~.~~;

~~B3. at all times act to maintain **frequency time error** within the limits specified in clause 7.2C(1) of the **Code**, and~~ use reasonable endeavours to continuously maintain **frequency time error** as close as possible to zero~~; and~~

B3.4 .

~~B4.0 return **frequency time error** to zero at least once every day.~~

~~B5.~~B4. Subject to paragraph B7, the **ancillary service agent** must ensure the ~~deviation of the~~ **grid frequency error** over any of the **ancillary service agent's single provider frequency keeping periods** does not exceed the maximum allowable **grid frequency error**~~deviation~~ specified in the **ancillary service agent's ancillary service** procurement contract. Such **grid frequency error** ~~deviation~~ must be determined by reference to the **system operator**

measured frequency but excluding any frequency measurements that are outside the **normal band**.

B5. If providing **back-up SFK**, the **ancillary service agent** must ensure the **FK site** is available continuously to provide **back-up SFK**, except:

B5.1 where there is an **allowed outage**; or

~~B5.1~~B5.2 during any **trading period** when the **FK site** is not dispatched to generate electricity.

Multiple provider frequency keeping performance requirements

B6. Subject to paragraph B7, when providing **multiple provider frequency keeping** the **ancillary service agent** must:

B6.1 comply with **regulating instructions** issued to it; and

B6.2 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**.

General frequency keeping performance requirements

B7. In meeting the performance requirements in paragraphs B3, B4 and B6, the **ancillary service agent's FK site** is not required to operate outside the limits of the **MW band** contained in the relevant **dispatch instruction** issued in accordance with Part 13 of the **Code** or above the relevant **control max** or below the relevant **control min.**

B8. The **ancillary service agent** must ensure that ~~each~~ **frequency keeping** ~~**unit equipment**and item of **control equipment** at an **FK site**~~ is maintained, and each operator of the **control equipment** is trained, in accordance with good industry practice to enable the provision of **frequency keeping** in accordance with the relevant performance requirements above.

Back-up SFK outages

B9. An outage of an **FK site** will not be taken into account in assessing the **ancillary service agent's** compliance with paragraph B5 (and will be an **allowed outage**) if the **ancillary service agent** removes the **FK site** from service:

B9.1 for maintenance of the **FK site**;

B9.2 to eliminate or mitigate a risk of injury to any person or damage to the **FK site**; or

B9.3 for a test of the **FK site**;

provided that:

B9.4 the **outage** is no longer than the shorter of:

B9.4.1 one month; and

B9.4.2 a period of time equivalent to a reduction in the relevant **availability fee** of the amount specified in the **ancillary service** procurement contract for the **FK site**; and

B9.5 the **ancillary service agent** otherwise complies with its obligations under the **ancillary service** procurement contract in respect of the **outage**.

B10. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any outage that affects the **ancillary service agent's** ability to provide **back-up SFK**.

B11. Where an outage that may compromise the **ancillary service agent's** ability to provide **back-up SFK** is planned or anticipated by the **ancillary service agent,** the **ancillary service agent** must:

B11.1 provide the **system operator** with as much advance warning as reasonably practicable of the **outage**, its expected start date and its expected duration;

B11.2 consult with the **system operator** on the timing of the **outage** with the intention that the timing of the **outage** must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B11.3 notify the **system operator** as soon as reasonably practicable of any amended programme for the **outage**; and

B11.4 keep the **system operator's** POCP (Planned Outage Coordination Process) system updated to ensure that POCP at all times accurately reflects the details of the **outage**.

B12. In the event of any unexpected **outage** that may compromise the **ancillary service agent's** ability to provide **back-up SFK**, the **ancillary service agent** must:

B12.1 inform the **system operator** as soon as reasonably practicable following the start of such unexpected **outage** of the cause and expected duration of the **outage**; and

B12.2 use reasonable endeavours to continue to provide **back-up SFK**.

Monitoring requirements for frequency keeping

~~B9.~~B13. The **ancillary service agent** must comply, and provide monitoring equipment that complies, with~~:~~ the relevant monitoring requirements as set out below.

~~B9.1 paragraphs B9 to B10, for **single provider frequency keeping**;~~

~~B9.2 paragraphs B11 to B12, for **multiple provider frequency keeping**; and~~

~~B9.3 paragraphs B14 to B15, for both **single provider frequency keeping** and **multiple provider frequency keeping**.~~

Single provider frequency keeping monitoring requirements

~~B10.~~B14. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:

~~B10.1~~B14.1 **FK output** at each of its **FK sites** that provides **single provider frequency keeping**; and

~~B10.2~~B14.2 frequency of the **grid** in H~~ert~~z~~.; and~~

~~B11.0 **frequency time error.**~~

~~B12.~~B15. When an **FK site is** providing **single provider frequency keeping** the relevant monitoring equipment must measure and record:

~~B12.1~~B15.1 **FK 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 measured value; and

~~B12.2~~B15.2 frequency at least once every 1 second (or such longer period as the **system operator** may determine), each measurement accurate to within 0.01 H~~ert~~z~~.; and~~

~~B12.3 **frequency time error** using a GPS clock or agreed equivalent at least twice every 1 minute, each measurement accurate to within 0.05 seconds.~~

Multiple provider frequency keeping monitoring requirements

~~B13.~~B16. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:

~~B13.1~~B16.1 FK output at each of its **FK sites** that provides **multiple provider frequency keeping**; and

~~B13.2~~B16.2 the **regulating instructions** received for each of its **FK sites** that provides **multiple provider frequency keeping**.

~~B14.~~B17. When an **FK Site** is providing **multiple provider frequency keeping** the relevant monitoring equipment must measure and record:

~~B14.1~~B17.1 **FK 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 **FK output** range of the **FK site**; and

~~B14.2~~B17.2 the **regulating instructions** received for the **FK site**.

General frequency keeping monitoring requirements

~~B15.~~B18. The **ancillary service agent** must ensure that the **frequency keeping** data recorded by the monitoring equipment at each **FK site** for each calendar month is held by the **ancillary service agent** for at least ~~15~~ 30 **business days** following the end of that calendar month and is provided to the **system operator** within 5 **business days** of a written request from the **system operator**.

~~B16.~~B19. If an **FK site** is a **block dispatch group**, **station dispatch group** or group of load sources then, for the purposes of paragraphs B13 to B18, the **FK site** is to be treated as the specific **frequency keeping unit(s)** within the **FK site** that are allocated to **frequency keeping** for the relevant period.

~~B17.~~B20. The **ancillary service agent** must ensure~~maintain~~ the monitoring equipment is maintained, and each operator of the monitoring equipment is trained, in accordance with good industry practice.

Offer requirements for frequency keeping

~~B18.~~B21. The **ancillary service agent** may submit an **offer** to provide **frequency keeping** no later than 2 **trading periods** immediately preceding the **trading period** to which the offer relates. Each offer submitted is valid until revised or cancelled in accordance with paragraph B25 or B26.

~~B19.~~B22. Each offer to provide **frequency keeping** must be submitted to the **system operator** through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the **Code.**~~same **information system** approved by the **Authority** for the time being for submitting **reserve offers** under clause 13.38 of the **Code**~~

~~B20.~~B23. There will be separate **ancillary service** procurement contract schedules for back-up SFK and multiple provider frequency keeping. The **ancillary service agent** must have:

~~B20.1~~B23.1 ~~aa~~An valid and enforceable **ancillary service** procurement contract for **back-up SFK** from an **FK site** in order to **offer single provider frequency keeping** from that **FK site**; and

~~B20.2~~B23.2 ~~aA~~a valid and enforceable~~n~~ **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**.

~~B21.~~B24. Each offer to provide **frequency keeping** must include the following information:

~~B21.1~~B24.1 a unique code for the **FK site** for which the **offer** is made;

~~B21.2~~B24.2 a unique code for the **ancillary service agent** submitting the **offe**r;

~~B21.3~~B24.3 the **trading day** for which the **offer** is made;

~~B21.4~~B24.4 the **trading periods** for which the **offer** is made;

~~B21.5~~B24.5 the **control min** and **control max** for the **FK site** for which the **offer** is made; and

~~B21.6~~B24.6 up to five separate **MW bands** and prices.

~~B22.~~B25. The **ancillary service agent** may revise or cancel an **offer** to provide **frequency keeping** by submitting a revised **offer** before the **FK gate closure** for the offer. ~~Each such revision must be submitted or notified to the **system operator** using the same **information system** approved by the **Authority** for the time being for revising **reserve offers** under clause 13.46 of the **Code**.~~

~~B23.~~B26. The **ancillary service agent** may ~~submit a new or revised~~revise or cancel an **offer** to provide **frequency keeping** after the **FK gate closure** for the **offer** only in circumstances where a **bona fide physical reason** necessitates the revision or cancellation ~~or submission~~ or where the **system operator** has issued a **formal notice**.

B27. Each revision or cancellation of an **offer** to provide **frequency keeping** must be submitted or notified to the **system operator** through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the **Code.**

~~B24.~~B28. If the **ancillary service agent** ~~submits a new or revised~~ revises or cancels an **offer** to provide **frequency keeping** ~~later than one hour prior to the beginning of the **trading period** in respect of which the offer is made~~after the **FK gate closure** for the offer,~~,~~ the **ancillary service agent** must report the ~~submission~~ revision or cancellation to the **system operator** in writing together with an explanation of the reasons for the ~~submission~~revision or cancellation. ~~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.~~

~~B25.~~B29. The **system operator** must, as soon as reasonably practicable, confirm to the **ancillary service agent** the receipt of any new or revised **offer** to provide **frequency keeping**, or the cancellation of such an **offer**, through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the Code. ~~using the same **information system** approved by the **Authority** for the time being for confirming receipt of **reserve offers** under clause 13.51(2) of the **Code**.~~

~~B26.~~B30. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements then:~~,~~

~~B26.1~~B30.1 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 **offers** to provide **frequency keeping** until and unless it has provided evidence that demonstrates to the **system operator's** reasonable satisfaction that it can meet the performance requirements; and

B30.2 **offers** to provide **frequency keeping** submitted by the **ancillary service agent** 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**.

~~B27.~~B31. ~~**Multiple provider** **F~~f~~requency keeping** offers for an **FK site** must be subject to a minimum and may be subject to a maximum **MW band**. The minimum and maximum **MW bands** must be based on the results of the ~~**MFK**~~ **technical review** referred to in paragraph 29~~of the **ancillary service agent**, including the measurement accuracy of the **ancillary service agent's** monitoring equipment for the **FK site**~~. The **system operator** must publish the minimum **MW band** on its website.

B32. The **ancillary service agent** must not submit **frequency keeping** offers unless:

B32.1 it has conducted and passed an **end-to-end test or baseline test** of the relevant **frequency keeping equipment** at the relevant **FK site(s)** and test results have been assessed and approved by the **system operator**; or

B32.2 it has demonstrated fully compliant operational performance of that **frequency keeping equipment** in accordance with paragraph B38.2.

B33. Paragraph B30 applies to any **frequency keeping offers** submitted in breach of paragraph B32.

Dispatch requirements for frequency keeping

~~B28.~~B34. 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.~~B35. 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.

~~B30.~~B36. The **ancillary service agent** must ensure that prior to ~~entering a~~the start of a **trading period** for which it has received a **dispatch instruction** to provide **frequency keeping**, the relevant ~~**frequency keeping units**~~**FK site** ~~are~~is connected and able to ~~perform~~ provide **frequency keeping** from the start of that **trading period.**

B37. If an **FK site** is a **block dispatch group**, **station dispatch group** or group of load sources then the **ancillary service agent** must ensure that during a **trading period** for which it has received a **dispatch instruction** to provide **single provider frequency keeping,** the **single provider frequency keeping** performance requirements in paragraphs B3 and B4 are met at the relevant **FK site(s)**.

~~Special testing~~ Testing requirements for frequency keeping

~~B31. Prior to offering **frequency keeping** for an **FK site** for **dispatch** for the first time, **ancillary service agents** must have conducted and passed a **baseline test** or otherwise demonstrated the capability of the relevant **FK site** to provide **frequency keeping** to the reasonable satisfaction of the **system operator.**~~

~~B32.~~B38. ~~Each~~ The **ancillary service agent** ~~that provides **multiple provider frequency keeping**~~ must either:

B38.1 conduct and pass ~~a **baseline**~~ an **end to end test** of each **FK site**~~, or otherwise demonstrate the capability of the relevant **FK site** to provide **multiple provider frequency keeping** to the reasonable satisfaction of the **system operator**,~~ at least once every ~~four years~~six months; or~~.~~

B38.2 have demonstrated fully compliant operational performance of the **FK site** by providing **frequency keeping** from the **FK site** during the previous six months, to the reasonable satisfaction of the **system operator**.

~~B33. Each **ancillary service agent** that provides **single provider frequency keeping** must conduct and pass a **baseline test** of equipment and/or trained operators at least once every six months, provided that the **ancillary service agent** is not required to conduct such a **baseline test** if the equipment and/or trained operators have provided and monitored **single provider frequency keeping** to the reasonable satisfaction of the **system operator** within the previous six months.~~

B39. The **ancillary service agent** must conduct and pass an **end-to-end test** of the **frequency keeping equipment** for an **FK site** following any change to the **frequency keeping equipment** for the **FK site** that may impact its **frequency keeping** performance.

~~B34. Other than those **baseline tests** described in paragraphs B29, B39 and B40, and , there are no other **baseline tests** for equipment and/or trained operators that are used, or may be used, to provide and monitor **frequency keeping**.~~

~~B35.~~B40. A~~n~~ **baseline test** or **on-demand test** of an **FK site**~~equipment~~ and/or trained operators used for providing **frequency keeping** (other than monitoring equipment) must verify whether or not the ~~relevant **FK Site**~~**frequency keeping equipment** meets the relevant performance requirements in paragraphs B3 to B8 ~~(for **single provider frequency keeping**) or B5B7 (for **multiple provider frequency keeping**)~~ or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

~~B36.~~B41. A ~~**baseline test** or on **demand test**~~test of monitoring equipment must verify whether or not the monitoring equipment meets the relevant performance requirements in paragraphs B14 to B20~~B9 and B10 (for **single provider frequency keeping**) or B11 and B12 (for **multiple provider frequency keeping**)~~**.**

~~B37.~~B42. ~~Upon completion~~Within 15 **business days** of completing a ~~**baseline test** or **on-demand test**~~ the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements~~within 15 **business days**~~.

Instantaneous reserve

Performance requirements and technical specifications for instantaneous reserve

~~B38.~~B43. To be able to provide **instantaneous reserve** the **ancillary service agent** must have **IR equipment** that can provide **fast instantaneous reserve** and/or **sustained instantaneous reserve**.

~~B39.~~B44. The~~An~~ **ancillary service agent** ~~providing **instantaneous reserve**~~ must ensure that at all times the **IR equipment** that is the subject of a~~the~~ **reserve offer**:

~~B39.1~~B44.1 is maintained, and each operator of the **IR equipment** is trained, in accordance with good industry practice ~~so that the equipment is able~~ to ~~provide~~ enable the provision of **instantaneous reserve** ~~that meets the standards set out in this **procurement plan**~~in accordance with the relevant performance requirements below;

~~B39.2~~B44.2 is able to respond, when dispatched, within the timeframe applicable to either **fast instantaneous reserve** or **sustained instantaneous reserve**, as the case may be; and~~.~~

B44.3 is available and has the capacity to provide the quantity of **instantaneous reserve** specified in the **reserve offer**.

B45. The~~An~~ **ancillary service agent** must, when dispatched to provide **instantaneous reserve** in accordance with Part 13 of the **Code** ~~must~~:

B45.1 provide additional **supply** into the **grid** equal to or exceeding the **dispatched quantity** of **instantaneous reserve** automatically when there is an **under-frequency event**; and/or

B45.2 reduce **demand** from the **grid** equal to or exceeding the **dispatched quantity** of **instantaneous reserve** automatically when the frequency of the **grid** falls to or

below the **trip frequency**.

B46. The **ancillary service agent** must:

B46.1 in the case of **IR equipment** providing **interruptible load** other than **battery energy storage systems**:

~~B39.2.1~~B46.1.1 for **fast instantaneous reserve** ~~in the case of **interruptible load** other than that provided by **battery energy storage systems**~~**,** the drop in load (in **MW**) must occur within 1 second of the **grid** system frequency falling to or below 49.2 H~~ert~~z, or the **trip frequency** specified in the **ancillary service agent's ancillary service** procurement contract, and must be sustained for a period of at least 60 seconds; or

~~B39.2.2~~B46.1.2 for **sustained instantaneous reserve** ~~in the case of **interruptible load** other than that provided by **battery energy storage systems**~~, the average drop in load (in **MW**) must occur over the first 60 seconds after the **grid** system frequency falls to or below 49.2 H~~ert~~z, or the **trip frequency** specified in the **ancillary service agent's ancillary service** procurement contract, and must be sustained for a period of at least 30 minutes or until instructed by the **system operator**, whichever is lesser. The **ancillary service agent** must use reasonable endeavours to maintain the **sustained instantaneous reserve** response after the 30 minute period for as long as the **grid** system frequency remains below the **normal band**; and

B46.2 in the case of **IR equipment** providing **generation reserve** other than **battery energy storage systems**:

~~B39.3~~ meets, where relevant, the requirements for frequency response and control set out in clause 5(1) of **technical code** A of schedule 8.3 of the **Code** and has been approved by the **system operator**;

~~B39.4~~B46.2.1 ~~in the case of all equipment providing generation reserve, and battery energy storage systems providing interruptible load:~~

~~B39.4.1~~B46.2.2 provides stable performance with adequate damping;

~~B39.4.2~~B46.2.3 responds with a **droop** set within the range 1.5 - 7 per~~-~~cent or with a controlled response as agreed with the **system operator**; and

~~B39.4.3~~B46.2.4 does not adversely affect the operation of the **grid** because of any of its non-linear characteristics or rate of change in output;~~.~~

B46.3 in the case of **battery energy storage systems** of no more than 5 **MW** unit capacity from single or **aggregated battery energy storage systems** providing **instantaneous reserve,** meets the performance requirements for**:**

B46.3.1 **IR equipment** providing **interruptible load** in paragraph B46.1; or

B46.3.2 **battery energy storage systems** larger than 5 **MW** capacity providing **instantaneous reserve** in paragraph B46.4;~~.~~

B46.4 in the case of **battery energy storage systems** larger than 5 **MW** capacity from single or **aggregated battery energy storage systems** providing **instantaneous reserve**:

B46.4.1 provides stable performance and does not adversely affect operation of **grid**;

B46.4.2 provides a controlled dynamic response appropriate for both its inherent control characteristics and its location on the **grid**. The control action must be agreed with the **system operator** with regard to measurement delays, digital sample rates, speed of response (**MW**/sec), sensitivity of response (**MW**/Hz) and grid sensitivity (**MW**/Hz);

~~B39.4.4~~B46.4.3 if a **droop** control is used, the **battery energy storage system** responds with an appropriate **droop** across the full range of the **battery energy storage system** capability; and:~~.~~

46.4.3.1. **droop** need not be specified on rated capacity, however if it is specified on rated capacity, **droop** should not be lower than 2%; and~~.~~

46.4.3.2. any **droop** control must meet the controlled dynamic response agreed with the **system operator**;

B46.4.4 the maximum response delivered by a **droop** controller can be maintained when the **grid frequency** starts to recover to within the **normal band**, using a sample-and-hold or 'latch' control action. This enables the **battery energy storage system** to maximise the available **instantaneous reserve** response without use of a low **droop** setting. The response must return to a proportional response to frequency before the **grid frequency** exceeds the upper limit of the **normal band**. Reduction of **battery energy storage system** output to achieve this must be fast (in the order of 5 **MW**/sec) but must not continue if the frequency falls below the lower limit of the **normal band**; and

B46.4.5 a~~A~~ controlled ramp rate will apply for all output changes which are not related to a frequency deviations. This ramp rate must be in the order of 10 to 25 MW/min unless otherwise agreed with the **system operato**r.

B46.5 I~~i~~n the case of ~~all~~ equipment providing **generation reserve**~~, and battery energy storage systems providing interruptible load~~:

~~B39.5~~B46.5.1 in the North Island, remain connected:

~~B39.5.1~~46.5.1.1. at all times when the frequency is above 47.5 H~~ert~~z;

~~B39.5.2~~46.5.1.2. for at least 120 seconds when the frequency is at 47.5 H~~ert~~z;

~~B39.5.3~~46.5.1.3. for at least 20 seconds when the frequency is at 47.3 H~~ert~~z;

~~B39.5.4~~46.5.1.4. for at least 5 seconds when the frequency is at 47.1 H~~ert~~z;

~~B39.5.5~~46.5.1.5. for at least 0.1 seconds when the frequency is at 47.0 H~~ert~~z;

~~B39.5.6~~46.5.1.6. at any frequencies between those specified above, for times derived by linear interpolation;~~.~~

~~B39.6~~B46.5.2 ~~in the case of all equipment providing **generation reserve,** and **battery energy storage systems** providing **interruptible load**:~~ in the South Island, remain connected:

~~B39.6.1~~46.5.2.1. at all times while frequency is at or above 47 H~~ert~~z; ~~and at all times while frequency is at or above 47 Hertz;~~ and

~~B40.0.0~~ for 30 seconds if the frequency falls below 47 H~~ert~~z but not below 45 H~~ert~~z.~~;~~

~~B41.0 is available and has the capacity to provide the quantity of **instantaneous reserve** specified in the **reserve offer**.If **IR equipment** is capable of providing an **instantaneous reserve** response greater than 10 **MW** at a **single point of connection** to the **grid** or greater than 20 **MW** at an aggregated location in either the North Island or South Island, the **ancillary service agent** must have data and analogue indications of the net~~

import and export **MW** and the gross import and export **MW** at the relevant **point of connection** to the **grid.**

B42.1.1.1.1. An **ancillary service agent** dispatched to provide **instantaneous reserve** in accordance with Part 13 of the **Code** must:

B43.01.1.1.1. provide additional **supply** into the **grid** equal to or exceeding the dispatched quantity of **instantaneous reserve** automatically when there is an **under-frequency event**; and/or

B44.01.1.1.1. reduce **demand** from the **grid** equal to or exceeding the dispatched quantity of **instantaneous reserve** automatically when the frequency of the **grid** falls to or below the **trip frequency.**

B45.46.5.2.2. In determining the response capability specified in the definition of **fast instantaneous reserve** and **sustained instantaneous reserve** set out in Part 1 of the **Code,** the **system operator** must use reasonable endeavours to exclude inertial response.

Assessment of performance requirements for interruptible load other than that provided by battery energy storage systems

B46.B47. In assessing the delivery of **interruptible load** quantitiesother than that provided from **battery energy storage systems**, the **system operator** must apply the following methodology:

B46.1B47.1 **Fast instantaneous reserve** must be calculated as the total reduction in load that occurs within one second of either the **grid** system frequency falling to or below 49.2 Hertz or 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**.

B46.2B47.2 **Sustained instantaneous reserve** must be calculated as the average reduction in load that occurs over the first 60 seconds after either the **grid** system frequency falls to or below 49.2 Hertz or 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**.

B46.3B47.3 The **fast instantaneous reserve** and **sustained instantaneous reserve** delivered quantities must be determined from the aggregate load response:

B46.3.1B47.3.1 recorded at the **ancillary service agent's IR equipmen**t; or

B47.3.2 recorded at the **ancillary service agent's contracted GXPs** (if any), if no data is recorded at the ancillary service agent's**IR equipment** or and the **system operator** reasonably considers it is not appropriate to assess delivered quantities from this data recorded at the **IR equipment**.

B46.4 If the analysis required for the purpose of paragraph 40.3 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.

If the load response recorded at the **contracted GXPs** or **IR equipment** is likely to include demand or supply reductions or increases from other sources, the **ancillary service agent** must provide the **system operator** with

~~data for those sources to enable those reductions or increases to be netted off.~~

B47.4 If the assessment of **interruptible load** performance during an **under-frequency event** demonstrates a greater response than the contracted value for the **IR equipment**, then the contracted value for the relevant equipment may be increased to the level attained during the **under-frequency event**.

B47.5 In assessing **interruptible load** performance during an **under-frequency event**, the **system operator** must allow for **interruptible load** response to be up to ~~within +/-~~1 **MW** below ~~of~~ the **dispatched MW** quantity at the time.

~~B46. In determining the **pre-event load** the **system operator** must apply the following methodology when calculating delivered quantities:~~

~~B46.6~~B47.6 To account for possible timing errors in the data provided by the **ancillary service agent** 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~~50 ~~+/-~~0.1 H~~ert~~z ~~band~~ for at least 60 seconds prior to the **under-frequency event**.

Assessment of performance requirements for generation reserve~~, and interruptible load~~not ~~provided by~~from battery energy storage systems

~~B47.~~B48. In assessing the delivery of **fast instantaneous reserve** quantities from **generation reserve** not from **battery energy storage systems**, ~~and interruptible load provided by battery energy storage systems,~~ the **system operator** must apply the following methodology:

~~B47.1~~B48.1 ~~Equipment~~ **IR equipment** that is the subject of a **reserve offer** for **fast instantaneous reserve** is deemed to comply with the performance requirement in paragraph B46.2 if and only if the **IR equipment's** actual response meets or exceeds its **asset capability statement** modelled response.

~~B47.2~~B48.2 The **IR equipment's asset capability statement** modelled response is the response that could reasonably be expected if all the information in the **IR equipment's** current **asset capability statement** is correct, taking into account:

~~B47.2.1~~B48.2.1 the frequency profile of the **under-frequency event**;

~~B47.2.2~~B48.2.2 the **IR equipment's** real power output immediately before the start of the **under-frequency event** (**"pre-event real power output"**);

~~B47.2.3~~B48.2.3 the number of **generating units** on **partly loaded spinning reserve** mode;

~~B47.2.4~~B48.2.4 the number of hydro **generating units** on **tail water depressed reserve** mode; and

~~B47.2.5~~B48.2.5 the amount of **fast instantaneous reserve dispatched** ~~for generating units~~.

~~B47.3~~B48.3 ~~Subject to paragraph 39, T~~the **IR equipment's** actual response must be calculated as the additional **real power output** of the **IR equipment** compared to the **pre-event real power output** of the **IR equipment**.

B48.4 In calculating the actual response ~~capability specified in the definition of **fast instantaneous reserve** and **sustained instantaneous reserve** set out in Part 1 of the **Code**~~, the **system operator** must use reasonable endeavours to exclude

inertial response.

~~B47.4~~B48.5 In determining the **pre-event real power output** of the **IR equipment**, the **system operator** must apply the following methodology when calculating the delivered quantities:

~~B47.4.1~~B48.5.1 t~~T~~o account for possible timing errors contained in the data provided by the **ancillary service agent,** the **pre-event real power output** ~~at several different times must be used to calculate the delivered quantities;~~must be taken at a previous steady state frequency. That is, at a time when frequency is 50±0.1 Hz for at least 60 seconds prior to the **under-frequency event**;

~~B47.4.2 the maximum delivered quantity obtained from applying the **pre-event real power outputs** must be used to determine the reserve response during an **under-frequency event**; and~~

~~B47.4.3~~B48.5.2 **g~~G~~enerating unit** data must be used if measured and provided by the **ancillary service agent**.

~~B47.5~~B48.6 On request, the **system operator** must provide each **ancillary service agent** with details of the **system operator's** assessment under paragraph B48.5 of the **ancillary service agent's** delivery of **fast instantaneous reserve** quantities.

Assessment of performance requirements for instantaneous reserve from battery energy storage systems

B49. Unless the **battery energy storage system** is being assessed as **IR equipment** providing **interruptible load** under paragraph B47, in assessing the delivery of **fast instantaneous reserve** quantities from **battery energy storage systems,** the **system operator** must apply the following methodology:

B49.1 **IR equipment** that is the subject of a **reserve offer** for **fast instantaneous reserve** is deemed to comply with the performance requirements in paragraphs B46.3 and B46.4 if and only if the **IR equipment's** actual response meets or exceeds its **asset capability statement** modelled response.

B49.2 The **IR equipment's asset capability statement** modelled response is the response that could reasonably be expected if all the information in the **IR equipment's** current **asset capability statement** is correct, taking into account:

B49.2.1 the frequency profile of the **under-frequency event**;

B49.2.2 the **IR equipment's** operating state and real power output or load immediately before the start of the **under-frequency event** (**"pre-event real power"**); and

B49.2.3 the amount of **fast instantaneous reserve** dispatched.

B49.3 The **IR equipment's** actual response must be calculated as the change in the real power of the **IR equipment** from its **pre-event real power** ~~of the **IR equipment**~~.

~~In determining the **pre-event real power output** of the **equipment**, the **system operator** must apply the following methodology when calculating the delivered quantities:~~

~~To account for possible timing errors in the data provided by the **ancillary service agent**, the **pre-event real power** must be taken at a previous steady state frequency. That is, at a time when frequency is 50+/- 0.1 Hz for at least 60 seconds prior to the **under-frequency event**.~~

B49.4 On request, the **system operator** must provide each **ancillary service agent** with

details of the **system operator's** assessment under paragraph B49.3 of the **ancillary service agent's** delivery of **fast instantaneous reserve** quantities.

Monitoring requirements for instantaneous reserve

~~B48.~~B50. The **ancillary service agent** must provide monitoring equipment that accurately measures and records the **instantaneous reserve** response (in **MW**) from the **ancillary service agent's IR equipment**:

~~B48.1~~B50.1 in the case of all monitoring equipment ~~used for **interruptible load**~~:

~~B48.1.1~~B50.1.1 for **fast instantaneous reserve,** at no greater than 0.1 second intervals commencing not less than 15 seconds prior to, and continuing until 60 seconds after, the **UFE time** or **trip time** as applicable; ~~and~~

B50.1.2 for **sustained instantaneous reserve,** at no greater than 0.1 second intervals commencing not less than 15 seconds prior to, and continuing until 60 seconds after, the **UFE time** or **trip time** as applicable, and then at no greater than 1 second intervals until the **instantaneous reserve** response ends; ~~and~~

~~in the case of monitoring equipment used for **generation reserve** including **battery energy storage systems**:~~

~~for **fast** instantaneous **reserve,** at no greater than 0.1 second intervals commencing not less than 15 minutes priorseconds prior to, and continuing until 560 seconds minutes after, the **UFE time**; and~~

~~for **sustained instantaneous reserve,** at no greater than 0.1 second intervals commencing not less than 15 seconds minutes prior to, and continuing until 60 seconds after, the **UFE time**, and then at no greater than 1 second intervals until 15 minutes after, the **UFE time**the **instantaneous reserve** response ends; and~~

~~B48.1 in the case of all monitoring equipment:~~

~~B48.1.3~~B50.1.3 including measurement of the locally measured frequency at ±0.01 Hz resolution and the relay activation signal; ~~and~~

~~B48.1.4~~B50.1.4 in a time-tagged manner such that all recorded data is either:

~~48.1.4.1.~~50.1.4.1. GPS clock time-tagged; or

~~48.1.4.2.~~50.1.4.2. if GPS clock time-tagging capability is not available, then aligned with the time-tagged frequency measurement from the same device; and

B50.1.5 where possible, net of any **demand** or **supply** response from other sources at the same point of connection to the **grid**.

~~B49.~~B51. The **ancillary service agent** must ensure that the data recorded by the monitoring equipment under paragraph B50 is held by the **ancillary service agent** for at least 1560 ~~15~~ business days and is provided to the **system operator** within 5 **business days** of a written request from the **system operator**.

B52. **Interruptible load** data provided to the **system operator** under paragraph B51, must be aligned using the **trip time** and be provided in the format specified on the **system operator's** website, unless otherwise agreed with the **system operator**.

~~B50.~~B53. The **ancillary service agent** may provide an independently verified error range for data it provides to the **system operator** under paragraph B51, which the **system operator** must have regard to in any assessment of the **ancillary service agent's** compliance with performance requirements using the data.

~~B51.~~B54. For hydro **generating stations**, the data referred to in paragraph B50 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**. For other **generating stations** providing **partly loaded spinning reserve**, the data referred to in paragraph B50 must be measured, recorded and provided by **generating unit**.

~~B52.~~B55. The **ancillary service agent** must ensure ~~maintain~~ the monitoring equipment is maintained in accordance with good industry practice.

Offer requirements for instantaneous reserve

~~B53.~~B56. If the **system operator** reasonably believes 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.

~~B54.~~B57. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements, then:

~~B54.1~~B57.1 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 **system operator's** reasonable satisfaction that it can meet the performance requirements;

~~B54.2~~B57.2 **reserve offers** submitted by the **ancillary service agent** (or any **reserve offers** relating to specific **IR 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

~~B54.3~~B57.3 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).

B58. The **ancillary services agent** must ensure that its **reserve offers** for **interruptible load** not provided by **battery energy storage systems** do not include any load that may reasonably be required to be shed to satisfy any obligation (of the **ancillary service agent** or a third party) to provide:

B58.1 **automatic under-frequency load shedding** (AUFLS); or

B58.2 load shedding under any other agreement with Transpower, in its capacity as **system operator** or a **grid owner**, or a third party.

B59. For the avoidance of doubt, the **ancillary service agent** may not **offer** any **IR equipment** that:

B59.1 has been armed for AUFLS or which is armed for any other load shedding agreement; or

B59.2 may be dynamically/remotely armed to meet the AUFLS obligations by the **network** owner.

B60. Under clause 8.54B of Part 8 of the **Code**, the **ancillary services agent** is to provide information about **interruptible load** with the **connected asset owner** or **grid owner** as the

case may be within 10 business days of entering into the **ancillary services** procurement contract**.**

B61. The **ancillary service agent** must not submit reserve offers:

B61.1 in respect of **IR equipment** or **points of connection** to the **grid** that are not covered by the **ancillary service** procurement contract;

B61.2 for **interruptible load** unless:

B61.2.1 it has conducted and passed an **end-to-end test** of the relevant **IR equipment** and the test results have been assessed and approved by the **system operator**; or

B61.2.2 it has demonstrated fully compliant operational performance of that **IR equipment** in accordance with paragraph B46.1;~~.~~

B61.3 for **generation reserve**, unless it has conducted and passed a **baseline test** of each item of **IR equipment** and the test results have been assessed and approved by the **system operator**.

B62. Paragraphs B57.2 and B57.3 apply to any **reserve offers** submitted in breach of paragraph B58.

~~Special t~~Testing requirements for instantaneous reserve

~~B55.~~B63. For interruptible load~~ other than that provided by battery energy storage systems~~, the **ancillary service agent** must either:

~~B55.1~~B63.1 conduct and pass an **end-to-end test** of all items of **IR equipment** it uses for providing **interruptible load**;~~; or~~

B63.1.1 in the case of **interruptible load** ~~that is not **aggregated load**~~, at least once every 24 months;~~ and~~

~~in the case of **interruptible load** which is **aggregated load** or **aggregated battery energy storage systems**, at least once every 12 months; and~~

B63.1.2 immediately following any change to **IR equipment** that may impact the **IR equipment's instantaneous reserve** performance; or

~~B55.2~~B63.2 have demonstrated fully compliant operational performance of that **IR equipment** by responding to an **under-frequency event**.

~~56.0.0.0. at least once every 24 months.~~

~~B57.~~B64. The scope of the **end-to-end test** referred to in paragraph B63 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 **IR equipmen**t is demonstrated to the **system operator's** reasonable satisfaction.

~~B58.~~B65. For **generation reserve** and **instantaneous reserve** offered by **battery energy storage systems**~~, and interruptible load provided by battery energy storage systems~~, the **ancillary service agent** must conduct and pass a baseline test of each item of the ~~relevant~~ **IR equipment** used to provide **instantaneous reserve**:

~~B58.1~~B65.1 at least once every four years for analogue equipment and non-self-monitoring digital equipment; and

~~B58.2~~B65.2 at least once every ten years for self-monitoring digital equipment; and

B65.3 immediately following any change to **IR equipment** that may impact the **IR equipment's instantaneous reserve** performance.

B59. Notwithstanding paragraphs B50 and B52, the **ancillary service agent** must conduct an **baseline test** of the equipment it uses to provide **instantaneous reserve** following any change to such equipment that may impact its **instantaneous reserve** performance.

B60.B66. For the avoidance of doubt, a A **baseline test** for **generation reserve** and **instantaneous reserve** from **battery energy storage systems**:interruptible load provided by battery energy storage systems, ,

B60.1B66.1 must be used to validate the **asset capability statement** modelled response of the assets which are the subject of a **reserve offer** for **fast instantaneous reserve**; and

B66.2 may be combined with testing required under clause 2 of **Technical Code** A of Schedule 8.3, **Technical Code** A, Appendix B, Clause 2 of the **Code**; and

B66.3 must use settings (including speed governor settings for **generation reserve**) agreed between the **system operator** and the **ancillary service agent** before the test, which the **ancillary service agent** must not change without **system operator** approval.

B61.B67. An **end-to-end test, baseline test,** or **on-demand test** of **IR equipment** used for providing **instantaneous reserve** (other than monitoring equipment) must verify whether or not the equipment meets the relevant performance requirements in paragraphs B43 to B46 or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

B62.B68. An **end-to-end test, baseline test,** or **on-demand test** test of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B50.

B69. The **ancillary service agent** must conduct and pass a test of the **IR equipment** it uses to provide **instantaneous reserve** following any change to monitoring equipment that may impact its **instantaneous reserve** performance.

B63.B70. Upon Within 15 **business days** of completion of a **baseline test**, **end-to-end test**, **on-demand test**, the **ancillary service agent** must provide the **system operator** with the corresponding test or performance data and verification of meeting the relevant performance requirements within 15 **business days**.

B71. Test or performance data provided to the **system operator** under paragraphs B63 and B65 must include an indication of any time delays that occur in the measurement systems used by the control systems of the **IR equipment**.

B64. The **ancillary service agent** must not submit **reserve offers**:

B64.1 for interruptible load other than that provided by **battery energy storage systems** unless it has conducted and passed an **end-to-end test** of the relevant equipment or demonstrated fully compliant operational performance of that equipment in accordance with paragraph B50;

B64.2 for **generation reserve**, and **interruptible load** provided by **battery energy storage systems,** unless it has conducted and passed a **baseline test** of the relevant equipment in accordance with paragraph B54.

B65. For the avoidance of doubt –

B65.1 there are no other **baseline tests** for equipment used to provide or monitor **instantaneous reserve**; and

B65.2 paragraphs B49.2 and B49.3 apply to any **reserve offers** submitted in breach of paragraph B58.

Over frequency reserve

Performance requirements and technical specifications for over frequency reserve

B72. The **ancillary service agent** must ensure that the **OFR equipment** is maintained, and each operator of the **OFR equipment** is trained, in accordance with good industry practice to enable the provision of **over frequency reserve** in accordance with the relevant performance requirements below.

~~B66.~~B73. In the case of an **OFR site** that provides **over frequency reserve** by tripping~~To be able to provide **over frequency reserve**~~, the **ancillary service agent** must ensure ~~provide **relay equipment** ~~that:

~~B66.1~~B73.1 when the **relay equipment** is armed, the **relay equipment** and **circuit breaker equipment** automatically disconnects the **OFR site**~~**generating unit**~~ to which they are~~it is~~ fitted within 0.5~~half a~~ seconds of the frequency of the **grid** rising to or above the ~~**required frequency**~~frequency specified in the **ancillary service** procurement contract for that ~~**generating unit**~~**OFR site**. This maximum time to disconnect covers both the action of the **relay equipment** and **circuit breaker equipment**; and

~~B66.2~~B73.2 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.~~;~~

~~B67.0 is available at all times to provide **over frequency reserve** except:~~

~~B68.0.0 where the **relay equipment** is taken out of service under the conditions specified in the **ancillary service** procurement contract; and~~

~~B69.0.0 during the period in which any tests are conducted; and~~

~~B70.0.0 during any **trading period** when the **generating unit** is not generating **electricity**.; and~~

~~B71.0 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.~~

~~B72. The conditions under which outages may occur on the **relay equipment** are specified in the **ancillary service** procurement contract with the **ancillary service agent**.~~

B74. In the case of an **OFR site** that is a **battery energy storage system** or provides **over frequency reserve** by fast ramping**,** the **ancillary service agent** must ensure that:

B74.1 when the **control equipment** is enabled, the **control equipment** automatically reduces the real power output of the **OFR site** within 0.5 seconds of the frequency of the **grid** rising above the frequency specified in the **ancillary service** procurement contract; and

B74.2 the rate of reduction of the real power output is at or above the ramp rate specified in the **ancillary service** procurement contract for the **OFR site.**

B75. The **ancillary service agent** must ensure that all **OFR equipment** is available continuously to provide **over frequency reserve** except:

B75.1 where there is an **allowed outage**; or

B75.2 during any **trading period** when the relevant **OFR site** is not generating electricity.

Over frequency reserve outages

B76. An **outage** of **OFR equipment** ~~S~~will not be taken into account in assessing the **ancillary service agent's** compliance with the performance requirements in paragraph B75 (and will be an **allowed outage**) if the **ancillary service agent** removes the **OFR equipment** from service:

B76.1 for maintenance of the **OFR equipment**;

B76.2 to eliminate or mitigate a risk of injury to any person or damage to the **OFR equipment**; or

B76.3 for a test of the **OFR equipment;**

provided that:

B76.4 the **outage** is no longer than the shorter of:~~;~~

B76.4.1 one month; and

B76.4.2 a period of time equivalent to a reduction in the relevant **availability fee** of the amount specified in the **ancillary service** procurement contract for the **OFR site**; and

B76.5 the **ancillary service agent** otherwise complies with its obligations under the **ancillary service** procurement contract in respect of the **outage.**

B77. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any **outage** that affects the **ancillary service agent's** ability to provide **over frequency reserve**.

B78. Where an **outage** that may compromise the **ancillary service agent's** ability to provide **over frequency reserve** is planned or anticipated by the **ancillary service agent** the **ancillary service agent** must:

B78.1 provide the **system operator** with as much advance warning as reasonably practicable of the **outage**, its expected start date and its expected duration;

B78.2 consult with the **system operator** on the timing of the outage with the intention that the timing of the **outage** must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B78.3 notify the **system operator** as soon as reasonably practicable of any amended programme for the **outage**; and

B78.4 keep the **system operator's** POCP (Planned Outage Coordination Process) system updated to ensure that POCP at all times accurately reflects the details of the **outages**.

B79. In the event of any unexpected **outage** that may compromise the **ancillary service agent's** ability to provide **over frequency reserve**, the **ancillary service agent** must:

B79.1 inform the **system operator** as soon as reasonably practicable following the start of such unexpected **outage** of the cause and expected duration of the outage; and

B79.2 use reasonable endeavours to continue to provide **over frequency reserve**.

Monitoring requirements for over frequency reserve

~~B73.~~B80. The **ancillary service agent** must provide monitoring equipment for each **OFR site** that:

~~B73.1~~B80.1 is available ~~at all times~~continuously (except during an **allowed outage** ~~or during a test~~);

~~B73.2~~B80.2 continuously measures and transmits to the designated interface point

information as to whether or not the ~~**relay equipment**~~**or control equipment** is armed (except during an **allowed outage** ~~or during a test~~); and

~~B73.3~~B80.3 is maintained, and ensure each operator of the monitoring equipment is trained, in accordance with good industry practice.

~~Special t~~Testing requirements for over frequency reserve

~~B74.~~B81. In the case of an **OFR site** that provides **over frequency reserve** by tripping, ~~T~~the **ancillary service agent** must conduct and pass a **baseline test** of ~~each item~~all items of ~~relay~~**OFR equipment** at the **OFR site** ~~at least once every 24 months unless~~:

~~B74.1 otherwise agreed with the **system operator**; or~~

~~B74.2 each **ancillary service agent** providing **over frequency reserve** has demonstrated fully compliant operational performance of its **generating units** by providing **over frequency reserve** in the previous 24 months.~~

B81.1 at least once every 4 years, unless:

B81.1.1 the **ancillary service agent** has demonstrated fully compliant operational performance of the **OFR equipment** by providing **over frequency reserve** in the previous 4 years; and

B81.1.2 the **ancillary service agent** has provided the **system operator** with the corresponding operational data for verification of fully compliant operational performance of the **OFR equipment**; and

B81.2 immediately following any change to **OFR equipment** that may impact the **FK site's over frequency reserve** performance.

B82. For tests under paragraph B81, the operation time of the **circuit breaker equipment** may be tested separately to the relay operating time, hold delay, and trip coil supervision.

B83. In the case of an **OFR site** that provides **over frequency reserve** by tripping, the **ancillary service agent** must:

B83.1 carry out a review of each trip circuit and relay configuration; and

B83.2 conduct and pass a **baseline test** of monitoring equipment, including arming/disarming indications and remote enabling/disabling control unless~~:~~ the **ancillary service agent** has demonstrated fully compliant operational performance of the monitoring equipment by providing **over frequency reserve** in the previous 2 years.

~~B1.1.1 the **ancillary service agent** has demonstrated fully compliant operational performance of the monitoring equipment by providing **over frequency reserve** in the previous 2 years.~~

B84. In the case of an **OFR site** that is a **battery energy storage system** or provides **over frequency reserve** by fast ramping**,** the **ancillary service agent** must conduct and pass an **end-to-end test** of the **OFR site**:

B84.1 at least once every 1 year, unless:

B84.1.1 the **ancillary service agent** has demonstrated fully compliant operational performance of the **OFR site** by providing **over frequency reserve** in the previous 1 year; and

B84.1.2 the **ancillary service agent** has provided the **system operator** with the corresponding operational data for verification of fully compliant operational performance of the **OFR site;** and

B84.2 immediately following any change to the **OFR equipment** that may impact the **OFR equipment's over frequency reserve** performance.

~~B75.~~B85. A **baseline test,** **end-to-end test** or **on-demand test** of ~~**relay equipment**~~**OFR equipment** or an **OFR site** must verify whether or not the ~~**relay**~~ **OFR** **equipment** or **OFR site** meets the performance requirements in paragraphs B73 and B74 (as appropriate)~~, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.~~.

~~B76.~~B86. A~~n~~ test~~**on-demand test**~~ of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B80.2.

~~B77.~~B87. ~~An **on-demand test** of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph .~~Within 15 **business days** of~~Upon~~ completion of a test, ~~**baseline test** or **on-demand test**~~ the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements using the **system operator's** prescribed test form~~within 15 **business days**~~.

Voltage support

Performance requirements and technical specifications for voltage support

~~B78.~~B88. In order to provide **voltage support**, the **ancillary service agent** must provide either:

~~B78.1~~B88.1 continuously variable **reactive power** resources that have:

~~B78.1.1~~B88.1.1 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

~~B78.1.2~~B88.1.2 both automatic and 24-hour manual voltage control facilities; or

~~B78.2~~B88.2 static **reactive power** resources that have:

~~B78.2.1~~B88.2.1 provision for manual control available on a 24-hour basis; and

~~B78.2.2~~B88.2.2 automatic operation to parameters and for conditions specified by the **system operator**.

~~B79.~~B89. 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**.

~~B80.~~B90. To be able to provide voltage support, the **ancillary service agent** must provide **voltage support equipment** that:

~~B80.1~~B90.1 is available ~~at all times~~continuously to provide **voltage support** at the maximum **reactive power** and network busbar(s) specified in the **ancillary service** procedure contract, except where there is an **allowed outage**;~~.~~

~~B80.2.0 where the **voltage support equipment** is taken out of service under the conditions specified in the **ancillary service** procurement contract; or~~

~~B80.3.0 during the period in which any tests are conducted;~~

~~B80.4~~B90.2 is able to respond, when dispatched, in accordance with the response times specified in the **ancillary service** procurement contract; and

~~B80.5~~B90.3 is maintained in accordance with good industry practice ~~so that the **voltage support equipment** is able to provide~~to enable the provision of **voltage support** in accordance with the ~~**ancillary service** procurement contract~~performance requirements above.

Monitoring requirements for voltage support

~~B81.~~B91. The **ancillary service agent** must provide monitoring equipment that:

~~B81.1~~B91.1 is available at all times (except during an **allowed outage** ~~or during a test~~);

~~B81.2~~B91.2 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

~~B81.3~~B91.3 is maintained in accordance with good industry practice.

~~Special t~~Testing requirements for voltage support

~~B82.~~B92. There are no **baseline tests** for ~~equipment used to provide or monitor~~ **voltage support**.

~~B83.~~B93. An **on-demand test** of **voltage support equipment** must verify whether or not the **voltage support equipment** meets the performance requirements in paragraphs B88 to B90, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

~~B84.~~B94. A~~n **on-demand test**~~test of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B91.2.

~~B85.~~B95. Upon completion of an **on-demand test** the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements within 15 **business days**.

Black start

Performance requirements and technical specifications for black start

B96. The **ancillary service agent** must ensure that the **black start equipment** and **black start generating units** are maintained, and each operator of the **black start equipment** and **black start generating units** are trained, in accordance with good industry practice to enable the provision of **black start** in accordance with the performance requirements below.

~~B86.~~B97. The **ancillary service agent** must ensure that, when requested to provide **black start**, it provides ~~**such services**~~ **black start** by:

~~B86.1~~B97.1 starting a **black start** **generating unit** and raising it to synchronous speed, without any power being obtained from the **grid** or any **local network**;

~~B86.2~~B97.2 operating the **black start** **generating unit** at zero load at synchronous speed for 15 minutes (or such shorter period as instructed by the **system operator**);

~~B86.3~~B97.3 having the **black start** **generating unit** switched on to de-energised **network** busbar(s);

B97.4 starting any remaining **black start generating units** and synchronising to the **network** busbar(s);

~~B86.4~~B97.5 progressively energisinge the **grid** from those **network** busbar(s) by providing

generation output that supports the initial charging of transmission circuits and **assets**~~, and the progressive energising of the **grid** at **network** busbar(s);~~

~~B86.5~~B97.6 ensuring the **black start generating units** provide the **reactive power capability** specified in clause 8.23 of the **Code** ~~for the **generating unit**~~;

~~B86.6~~B97.7 subject to paragraph B97.6B97.6, controlling the ~~**network**~~ **grid** voltage as instructed by the **system operator**; and

~~B86.7~~B97.8 providing an emergency frequency regulating reserve service by maintaining the **grid** frequency to between 49.25 H~~ert~~z and 50.75 H~~ert~~z, to the extent practicable.

~~B87.~~B98. The **ancillary service agent** must ensure that:

~~B87.1~~B98.1 sufficient **black start equipment** and **black start generating units** are available ~~at all times~~continuously to provide **black start**~~in accordance with the **ancillary service** procurement contract~~, except where there is an **allowed outage**;

~~B87.2~~B98.2 the **black start equipment** is able to start without power being obtained from the **grid** or any **local network**;

~~B87.3 sufficient **generating units** are available continuously to provide **black start**, except where there is an **allowed outage** preventing the provision of **black start**;~~

~~B87.4~~B98.3 ~~such~~ the **black start** **generating units** are able to achieve the response times to synchronous speed specified in the **ancillary service** procurement contract; and

~~B87.5~~B98.4 the **black start**~~such~~ **generating units** otherwise have the capabilities specified in the **ancillary service** procurement contract~~; and~~.

~~B88.0 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.~~

B99. When requested by the **system operator**, the **ancillary service agent** must use reasonable endeavours to provide additional services to re-energise the **grid** or prevent **grid** de-energisation over and above the **black start** service described in paragraph B98. The **system operator** must pay the **ancillary service agent** for the reasonable costs incurred by the **ancillary service agent** in providing these additional services.

Black start outages

~~B89.~~B100. An outage of the **black start equipment** or **black start generating units** will not be taken into account in assessing the **ancillary service agent's** compliance with the performance requirement in paragraph B98.1 (and will be an **allowed outage**) if the **ancillary service agent** removes the **black start equipment** or **black start generating units** from service ~~for~~:

~~B89.1~~B100.1 for maintenance of the **black start equipment** or **black start generating units**;

~~B89.2~~B100.2 to eliminate or mitigate a risk of injury to any person or damage to the **black start equipment** or **black start generating units**;

~~B89.3~~B100.3 for a test of the **black start equipment** or **black start generating units**,~~;~~

~~and~~ provided that the **ancillary service agent** ~~otherwise~~ complies with ~~paragraph~~ its obligations under the~~its~~ **ancillary service** procurement contract in respect of the outage.

~~B90.~~B101. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any outage that affects the **ancillary service agent's** ability to provide **black start**.

~~B91.~~B102. Where an outage that may compromise the **ancillary service agent's** ability to provide **black start** is planned or anticipated by the **ancillary service agent** the **ancillary service agent** must:

~~B91.1~~B102.1 consult with the **system operator** on the timing of the outage with the intention that the timing of the outage must ensure that the **system operator** can, at all times, comply with its **p~~P~~rincipal p~~P~~erformance o~~O~~bligations**;~~.~~

~~B91.2~~B102.2 unless the **system operator** agrees otherwise in writing, **provide** notice to the **system operator** of the outage, its expected start date, its expected duration and the programme of works no later than:

~~B91.2.1~~B102.2.1 ~~twelve~~ 12 weeks before the start of the outage for outages planned to be 12 hours or greater in duration; or

~~B91.2.2~~B102.2.2 ~~two~~ 2 weeks before the start of the outage for outages planned to be less than 12 hours in duration; and

~~unless the **system operator** agrees otherwise in writing;~~

~~B91.4~~B102.3 if the expected start date, expected duration or programme of works for a planned outage changes, provide the **system operator** with as much advance warning as reasonably practicable of the revised expected start date, expected duration or programme of works.~~;~~

~~B92.~~B103. For each planned outage for which the **ancillary service agent** fails to meet the notice requirements in paragraphs~~clause~~ B102.2 the **ancillary service agent** is liable to the **system operator** for an amount equal to the **availability fee** charged by the **ancillary service agent** for one month.

~~B93.~~B104. In the event of any unexpected **outage** that compromises the **ancillary service agent's** ability to provide **black start**, the **ancillary service agent** must:

~~B93.1~~B104.1 immediately report the unexpected **outage** to the **system operator**, including reporting to the **system operator** the expected time to rectify the unexpected **outage**;

~~B93.2~~B104.2 determine and rectify the cause of the unexpected **outage** as soon as practicable;

~~B93.3~~B104.3 use reasonable endeavours to continue to provide **black start**; and~~.~~

B104.4 notify the **system operator** upon completion of the outage.

~~Monitoring requirements for black start~~

~~B94. Any failure of the 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** must be advised of the expected date of completion, and upon completion.~~

~~Special~~ T~~t~~esting requirements for black start

~~B95.~~B105. The **ancillary service agent** must conduct and pass a **baseline test** of each item of **black start equipment**~~: at least once every six weeks, provided that the **ancillary service agent** is not required to conduct such a **baseline test** if the **black start equipment** has been generating at any time since the last such **baseline test.**~~

B105.1 at least once every 6 weeks, unless:

B105.1.1 the item of **black start equipment** has been generating at any time during that period; and

B105.1.2 the **ancillary service agent** has notified the **system operator** via email of the results of the test within 5 business days of the test; and

B105.2 immediately following any change to the item of **black start equipment** that may impact its **black start** performance.

~~B96.~~B106. 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 B98.2.

~~B97.~~B107. 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 ~~every~~ per rolling 12~~-2 monthsyear~~ month period.

~~B98.~~B108. A **baseline test** or **on-demand test** of **black start** must verify whether or not the **black start** meets the performance requirements in paragraphs B97 and B98, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**. A **baseline test** or **on-demand test** of **black start** will include a full station shutdown unless the **system operator** determines otherwise in consultation with the **ancillary service agent**.

~~If requested by the **system operator**, the **ancillary service agent** must allow the **system operator** to test the operation of any remote **grid** synchronisation breaker used to provide **black start** and energise the **grid.**~~

The **ancillary service agent** must ensure that following a **baseline test** or **on-demand test** of **black start**, the ~~monitoring equipment accurately measures and records the active power, active power setpoint, reactive power, generator speed, generator terminal voltage, generator voltage setpoint and gate position for the **black start generating unit**. This~~ data must ~~:~~

~~be measured and recorded (in a time tagged manner) over intervals no greater than 0.02 seconds;~~

~~commence not less than 6 seconds prior to the test and ending not less than 60 seconds after the response has stabilised to a steady state; and~~

B109. be held by the **ancillary service agent** for a period of not less than 2 years.

B110. Within 15 **business days** of completion of a **test,** the **ancillary service agent** must provide the **system operator** with the corresponding test data in a form reasonably acceptable to the **system operator**. The **system operator** is to verify whether the testing meets the relevant performance requirements.

Appendix C – Key contracting terms for ancillary service procurement contracts (paragraph 60)

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:

C2.1 mediation; or

C2.2 independent expert determination; or

C2.3 Rulings Panel determination under Part 3 of the **enforcement regulations**; or

C2.4 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 of 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~~C9.2 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 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 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~~1 year 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 i~~I~~n 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 1 year~~2 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~~ may be able to rely on force majeure in certain circumstances to ~~limit~~ provide relief from 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 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. The **ancillary service agent** must pay its costs of any **baseline test**.

C25. For each **ancillary service** the **system operator** may request:

C25.1 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**,

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 **ancillary service agent** must provide the **system operator** with written information in such detail as the **system operator** reasonably requires about the timing of tests and the results of tests.

C27. The **system operator** must pay the **ancillary service agent**'s reasonable costs of an **on-demand test** unless:

C27.1 the equipment fails the **on-demand test**; or

C27.2 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.

C28. If equipment used to provide or monitor an **ancillary service** fails a **baseline test** or **on-demand test** the **ancillary service agent**:

C28.1 is deemed to be incapable of providing or monitoring the **ancillary service** until the test is passed; and

C28.2 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:

C28.2.1 the equipment is used to provide or monitor **frequency keeping** and/or **instantaneous reserve** and no other **ancillary service**; or

C28.2.2 otherwise agreed with the **system operator.**

~~C28.2.2~~C29. In carrying out and reporting on a test, the **ancillary service agent** must comply with any relevant test guidelines published on the **system operator's** website, including by using and submitting to the **system operator** any standard forms in those guidelines.

Inspections

~~C29.~~C30. 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.

~~C30.~~C31. 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

~~C31.~~C32. 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.

~~C32.~~C33. 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

~~C33.~~C34. The following provisions must be included in any new long term contract for **back-up SFK**, over frequency reserve, voltage support or black start:

~~C33.1~~C34.1 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**.

~~C33.2~~C34.2 Any **availability fee** or **event fee** payable under the **new long term contract** is to be subject to adjustment no more frequently than once ~~every 12 months~~per year in accordance with an objective formula to be agreed between the **system operator** and **ancillary service agent**.

Appendix D – Glossary of terms

In this **procurement plan**, unless the context otherwise requires:

~~**"aggregated battery energy storage systems"** means **battery energy storage systems** which are located either at the same GXP or at multiple GXPs which have been aggregated by an **ancillary service agent;**~~

~~**"aggregated loads"** means loads from two or more ICPs located at the same **contracted GXP** which have been aggregated by an **ancillary service agent,** or at multiple **contracted GXPs** to form an **interruptible load group GXP**;~~

"allowed outage" means an outage of ~~that~~ equipment used to provide the relevant **ancillary service** that is permitted under an **ancillary service** procurement contract;

"availability fee" means a fixed fee for the availability of an **ancillary service**, irrespective of dispatch or provision, expressed as dollars per period of availability;

"**back-up SFK**" means **single provider frequency keeping** that is procured against the risk of technical failure of **multiple provider frequency keeping**;

"baseline test" means a ~~set of~~ test~~s~~ of an **ancillary service** or the equipment used to provide an **ancillary service** that is specified in Appendix B as a test the **ancillary service agent** is required to carry out;~~to demonstrate to the reasonable satisfaction of the **system operator** that the equipment and associated systems are able to, and will continue to be able to, meet the performance requirements of the **ancillary service** for which the equipment and associated systems is offered or is intended to be offered;~~

"**battery energy storage system**" means an **energy storage system** with an electro-chemical storage component;

"black start equipment" means diesel generators or auxiliary hydro plant capable of livening a **black start generating unit** isolated from the **grid**;

"black start generating unit" means the generating unit that is livened during a **black start** event;

"circuit breaker equipment" means a circuit breaker and auxiliary equipment that supports operation of the circuit breaker;

"Code" means the Electricity Industry Participation Code 2010, in which this **procurement plan** is incorporated by reference under clause 8.42(1);

"**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:

a) for **frequency keeping**, equipment in respect of a **frequency keeping unit** that automatically responds to changes in frequency for the purposes of providing **frequency keeping**; or

~~a)~~b) for **over frequency reserve**, equipment that is capable of tripping or controlling the output of an **OFR site** and may include **relay equipment**, **circuit breaker equipment** or a control system capable of automatically reducing the real power output of the **OFR site**;

"control max" means the maximum quantity of power (in ~~megawatts~~**MWs**) an **FK site** can operate at 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**;

"control min" means the minimum quantity of power (in ~~megawatts~~**MWs**) an **FK site** must operate at to provide **frequency keeping** to the relevant performance requirements;

~~**"control max"** means the maximum quantity of power (in megawatts) an **FK site** can operate at 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**;~~

"droop" refers to a proportional droop or **control system** that adjusts a generator's power output proportionally to deviations in frequency;

"end-to-end test" means a specific type of ~~**baseline**~~ test to verify that the integrated components of a~~n **interruptible load**~~ system for providing an **ancillary service**, ~~other than~~including the monitoring components (except for **black start** monitoring components), function correctly as a complete system and are able to provide the relevant **ancillary service** in accordance with all performance requirements for the **ancillary service** in the **ancillary service** procurement contract;

"enforcement regulations" means the Electricity Industry (Enforcement) Regulations 2010;

"event fee" means a fixed price for the dispatch or provision of an **ancillary service**, expressed as dollars per event;

"existing long term contract" means an **ancillary service** procurement contract entered into between the **system operator** and an **ancillary service agent** before the commencement 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 53;

"FK gate closure" means, for a **frequency keeping** offer, the time referred to in clause 13.46 of the **Code** after which the offer could not be revised if the offer were a **reserve offer**;

"FK output" means the generation from or load at an **FK site**, as the case may be;

"**FK site**" means a **frequency keeping unit** or group of **frequency keeping units**. An **FK site** may be a **generating unit**, **generating station**, **block dispatch group**, **station dispatch group**, load source or group of load sources;

"frequency keeping equipment" means all equipment used to provide **frequency keeping** including **control equipment** and the **FK site** but excluding monitoring equipment;

"**frequency time error**" means a deviation from **New Zealand standard time** caused by variations in system frequency;

~~**"frequency keeping equipment"** means all equipment used to provide **frequency keeping** including **control equipment** and the **FK site** but excluding monitoring equipment;~~

~~**"gate closure"** means, for a **frequency keeping** offer, the time referred to in clause 13.46 of the **Code** after which the offer could not be revised if the offer were a **reserve offer**;~~

"grid frequency error" means the **grid** frequency deviation in H~~ert~~z from 50.00 H~~ert~~z;

"half-hour clearing market procurement" is defined in paragraph 52;

"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;

"IR equipment" means all equipment used to provide **instantaneous reserve**, which may include **generating units**, load sources or **battery energy storage systems**, but excluding monitoring equipment;

"**MFK transition trading period**" is a trading period on which **frequency keeping** for an island will transition from **single provider frequency keeping** to **multiple provider frequency keeping**;

"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 **FK output**;

"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 1~~2 months~~ year;

"offer price" means a price offered by an **ancillary service agent** for the dispatch of an **ancillary service** for a **trading period**, expressed as dollars per unit of quantity of the **ancillary service**;

"OFR equipment" means all equipment used to provide **over frequency reserve** including **relay equipment, circuit breakers**, monitoring equipment, control equipment and/or arming/disarming equipment and indication;

"**OFR site**" means one or more **generating units or battery energy storage systems** to which **control equipment** is fitted in order to provide **over frequency reserve**;

"on-demand test" ~~is a~~ means a test of an **ancillary service** or the equipment used to provide an **ancillary service** that is not a **baseline test** and that the **ancillary service agent** is only required to carry out if requested by the **system operator** under the **ancillary service** procurement contract**;** ~~**baseline test** conducted at the specific request of the **system operator**;~~

"pre-event real power" is defined in paragraph B49.2.2~~B49.2.2B51.2.2**Error! Reference source not found.**~~;

"pre-event real power output" is defined in paragraph B48.2.2;

"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**;

"region" means New Zealand, an **island** or a smaller geographical region within an **island**, and includes a **zone**;

~~**"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 FK output 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;

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

"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**;

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

"**SFK transition trading period**" is a **trading period** on which **frequency keeping** for an island will transition from **multiple provider frequency keeping** to **single provider frequency keeping**;

"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;

"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** ~~other than that provided by~~not from **battery energy storage systems** and specified in the relevant **ancillary service** procurement contract;

"trip time" means, for~~only relates to~~ **interruptible load** ~~other than that provided~~not from ~~**by**~~ **battery energy storage systems**, ~~and means~~ the time at which the **ancillary service agent's** locally measured frequency of the **grid** falls to or below the **trip frequency**~~; (if not available the frequency of the **grid** as otherwise determined by the **system operator**)~~;

"UFE time" means the time at which an **under-frequency event** occurs, as determined by reference to the **system operator measured frequency**; and

"**voltage support equipment**" means all equipment used to provide **voltage support** including assets capable of providing reactive power but excluding monitoring equipment.

Appendix B Draft final Procurement Plan (clean)

Ancillary services procurement plan

Contents

Introduction

1. This **procurement plan** 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 paragraphs are to paragraphs of this **procurement plan**;

   3.2 Appendices are to Appendices of this **procurement plan**; and

   3.3 "the term of this **procurement plan**" are to the period of time from the commencement of this **procurement plan** until the **Authority** adopts a new **procurement plan**.

4. A paragraph number in this **procurement plan** preceded by a letter indicates that the paragraph is in the Appendix corresponding to that letter.

5. The content and structure of this **procurement plan** is consistent with the content and structure set out in clause 8.43 of the **Code**.

Ancillary services to purchase

6. The **system operator** may purchase the following **ancillary services** from **ancillary service agents**:

   6.1 **frequency keeping**;

   6.2 **instantaneous reserve**;

   6.3 **over frequency reserve**;

   6.4 **voltage support**; and

   6.5 **black start**.

7. The purpose of **frequency keeping** is to balance any generation and **demand** inequalities with the objective of maintaining the **grid** frequency within the **normal band** 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.

8. 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**.

9. The purpose of **over frequency reserve** is to manage frequency recovery after an event that might otherwise cause the **grid** frequency to exceed 52 Hz in the North Island or 55 Hz 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**.

10. 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.

11. The purpose of **black start** is to maintain equipment that can initialise the **supply** for the progressive relivening of the **grid** following a partial or total blackout.

12. Implementation of this **procurement plan** is subject to the **ancillary services** being made available to the **system operator** on:

    12.1 the terms contained in this **procurement plan**; or

    12.2 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 assessments (clause 8.43(a) of the Code)

The requirements for complying with the principal performance obligations (PPOs) (clause 8.43(a)(i) of the Code)

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

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

The requirements for achieving the dispatch objective (clause 8.43(a)(ii) of the Code)

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 in 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(a)(iii) of the Code)

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; and

    18.4 the existence of any contracts of the type and nature set out in clause 8.6 of the **Code**.

Impact of dispensations and alternative ancillary service arrangements held by asset owners (clause 8.43(a)(iv) of the Code)

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. **Allocable cost** excludes the readily identifiable and quantifiable costs resulting from granting **dispensations**. A **dispensation** may affect the net quantity of procurement for an **ancillary service**, and the additional procurement cost 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 of the **Code**. 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**.

Cost effectiveness

26. The **system operator** must consider the following in achieving the appropriate balance between cost and quality for each **ancillary service** purchased:

    26.1 the technical specification of the plant being offered, including any measuring equipment required;

    26.2 the minimum acceptable service standard;

    26.3 the number of suppliers offering the service and reasons for any limitations;

    26.4 the actual cost of providing the service over the **ancillary service** procurement contract term;

    26.5 the liability for providing the service and the potential cost of failure; and

    26.6 the desirability of maintaining capability and competition in the provision of **ancillary services**.

Methodologies for net purchase quantity assessments (clause 8.43(b) of the Code)

Assessment methodology for frequency keeping

27. Subject to paragraphs 28 and 29, 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**, on terms acceptable to 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(5)(a) of the **Code**.

28. The **system operator** may procure **back-up SFK** from one or more parties, but is not required to enter into an **ancillary service** procurement contract for **back-up SFK** with every potential provider of **back-up SFK**.

29. Parties who wish to provide **frequency keeping** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **frequency keeping**. Without limitation, the scope of the technical review may include a review of:

    29.1 the control accuracy of the party's proposed **FK sites**;

    29.2 the **response rates** of the party's proposed **FK sites**;

    29.3 the capabilities of the monitoring equipment for the party's proposed **FK sites**; and

    29.4 for **multiple provider frequency keeping**, the ability of the party's **proposed FK sites** to receive and respond to **regulating instructions**.

30. The **system operator** must assess the net purchase quantity of **frequency keeping** in accordance with the processes set out in paragraphs 13 to 26.

31. The **system operator** must use reasonable endeavours to have an **ancillary service** procurement contract with at least one provider of **frequency keeping** in each **island**.

Assessment methodology for instantaneous reserve

32. Subject to paragraph 33, 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**, on terms acceptable to 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 of the **Code** and a contract to provide **instantaneous reserve** for the purposes of clause 13.82(5)(a) of the **Code**.

33. Parties who wish to provide **instantaneous reserve** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **instantaneous reserve**. Without limitation, the scope of the technical review may include a review of:

33.1 for **generation reserve**, the model and the model validation report submitted as part of the **asset capability statement** for the relevant site; and

33.2 relevant test methodology prior to testing and test results post testing.

34. The **system operator** must assess the net purchase quantity of **instantaneous reserve** in accordance with the processes set out in paragraphs 13 to 26 and Schedule 13.3 of the **Code**.

Assessment methodology for over frequency reserve

35. Subject to paragraph 36, the **system operator** may procure **over frequency reserve** from parties that can offer **over frequency 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**, on terms acceptable to the **system operator**, to provide **over frequency reserve** on a **firm quantity procurement** basis. Each such **ancillary service** procurement contract is a contract to provide **over frequency reserve** for the purposes of clause 13.82(5)(a) of the **Code**.

36. Parties who wish to provide **over frequency reserve** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **over frequency reserve**. Without limitation, the scope of the technical review may include a review of:

36.1 relevant test methodology prior to testing and test results post testing;

36.2 **circuit breaker** operating time;

36.3 relay injection testing;

36.4 ramp rate if applicable;

36.5 control equipment operating time if applicable;

36.6 remote enable/disable control; and

36.7 remote/manual arming and disarming function.

37. The **system operator** must assess the net purchase quantity of **over frequency reserve** in accordance with the processes set out in paragraphs 13 to 26.

Assessment methodology for voltage support

38. Subject to paragraph 39, 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**, on terms acceptable to 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(5)(a) of the **Code**.

39. Parties who wish to provide **voltage support** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **voltage support**. Without limitation, the scope of the technical review may include a review of relevant test methodology prior to testing and test results post testing.

40. The **system operator** must assess the net purchase quantity of **voltage support** in each **zone** in accordance with the processes set out in paragraphs 13 to 26.

Assessment methodology for black start

41. Subject to paragraph 42, 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,** on terms acceptable to the **system operator,** to provide **black start** on a **firm quantity procurement** basis.

42. Parties who wish to provide **black start** are subject to a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost. The **system operator** must be satisfied with the outcome of the technical review before entering into an **ancillary service** procurement contract with that party for **black start**. Without limitation, the scope of the technical review may include a review of:

    42.1 the auxiliary/battery bank or diesel generator being offered;

    42.2 the capability of the generator to be livened without **grid** power;

    42.3 the ability to synchronise the available unit(s);

    42.4 the ability to energise the grid circuits; and

    42.5 relevant test methodology prior to testing and test results post testing.

43. The **system operator** must assess the net purchase quantity of **black start** in accordance with the processes set out in paragraphs 13 to 26.

44. The **system operator** must use reasonable endeavours to have **ancillary service** procurement contracts for **black start** at two sites in each **island**.

Procurement processes (clause 8.43(c) of the Code)

Ancillary service procurement contracts

45. Subject to paragraph 46, the **system operator** may enter into an **ancillary service** procurement contract with an **ancillary service agent** at any time during the period of this **procurement plan** using any means of entering into the contract it considers appropriate.

Tendering

46. Subject to paragraphs 47 and 48, the **system operator** must seek tenders from potential providers of each **ancillary service** at least once every 2 years taking into account the period since the **system operator** last sought tenders from potential providers of the **ancillary service** under any previous **procurement plan**.

47. The **system operator** need not comply with paragraph 46 for an **ancillary service** that is or would be procured on a **firm quantity procurement** basis if the **system operator** considers none or no more of the **ancillary service** is required in the relevant **region**.

48. The **system operator** need not comply with paragraph 46 for an **ancillary service** if the **system operator** considers there is only one potential provider of the **ancillary service** in the relevant **region**.

49. The terms and conditions of each tender process referred to in paragraph 46 must require the **system operator** to treat information received from tenderers during the tender process as confidential, subject only to the provisions that permit the disclosure of confidential information under the **system operator's** standard form **ancillary service** procurement contract.

Contracting

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

51. The term of an **ancillary service** procurement contract may differ from that of this **procurement plan**. Without limitation, the **system operator** may enter into a **new long term contract** for any **ancillary service**.

Bases of procurement

52. Subject to paragraph 53, **ancillary services** must be procured through a half-hour clearing market process whereby, for each **ancillary service** and **trading period**, **ancillary service agents** submit offers to the **system operator** to provide **the ancillary service**. The market for the **ancillary service** is priced and settled for each **trading period** based on the offers dispatched by the **system operator**. This type of procurement is referred to as **"half-hour clearing market procurement"**.

53. **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"**.

54. **Ancillary services** procured on a firm quantity procurement basis must be paid for by way of an **availability fee**, an **event fee** or both. **Ancillary services** procured on a **half-hour**

clearing market procurement basis must be paid for by way of an offer price and may also be paid for by way of an **availability fee**.

55. The basis of procurement for each **ancillary service** is set out in Appendix A.

Islanded situations

56. Despite anything to the contrary in this **procurement plan**, when part of the **grid** is **islanded** the **system operator** may procure **ancillary services** for that part of the **grid** using procurement processes other than those set out in paragraphs 46 to 55 and Appendix A. For the avoidance of doubt, an **ancillary service** procured under this paragraph is not an **alternative ancillary service arrangement**.

Administrative costs (clause 8.43(d) of the Code)

57. 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 of the **Code**.

58. 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

Technical requirements and key contracting terms (clause 8.43(e) of the Code)

59. The key technical requirements for each **ancillary service** are set out in Appendix B.

60. The key contracting terms for the procurement of **ancillary services** are set out in Appendix C.

61. When entering into **ancillary service** procurement contracts with **ancillary service agents** for the provision of **ancillary services**, subject to paragraph 63, the **system operator** must use reasonable endeavours to ensure that the **ancillary service** procurement contracts include the key technical requirements and the key contracting terms.

62. 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.

63. Despite anything to the contrary in this **procurement plan**, when part of the **grid** is **islanded** the **system operator** may procure **ancillary services** for that part of the **grid** under **ancillary service** procurement contracts that do not include the key technical requirements or key contracting terms set out in Appendices B or C. For the avoidance of doubt, an **ancillary service** procured under this paragraph is not an **alternative ancillary service arrangement**.

Arrangements for unanticipated procurement of ancillary services (clause 8.43(f) of the Code)

64. 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 of the **Code**.

65. Any departures from this **procurement plan** must be in accordance with clause 8.47 of the **Code**.

66. Where the **system operator** identifies a need to change any aspect of this **procurement plan**, the **system operator** may propose a change pursuant to clause 7.13(1) of the **Code**.

System operator reporting to the Authority (clause 8.43(g) of the Code)

67. The **system operator** must report to the **Authority** in relation to the procurement of **ancillary services** as follows:

    67.1 settlement volumes, prices, costs, and **administrative costs** where appropriate, on a monthly basis;

    67.2 any issues arising with respect to cost allocation, liability and disputes, on a monthly basis; and

    67.3 other general procurement issues to be contained within the **system operator** monthly report provided in accordance with clause 3.13 and clause 3.14 of the **Code**.

Appendix A – Bases for procuring ancillary services (paragraph 55)

Frequency keeping

A1. The **system operator** must:

A1.1 procure **frequency keeping** on a **half-hour clearing market procurement** basis; and

A1.2 procure **frequency keeping** as **single provider frequency keeping** or **multiple provider frequency keeping**.

A2. The **system operator** may:

A2.1 procure **back-up SFK** at the same time it procures **multiple provider frequency keeping**; and

A2.2 pay an **availability fee** for **back-up SFK** but must not otherwise pay an **availability fee** for **frequency keeping**.

A3. For each **island** independently, the **system operator** may set an **MFK transition trading period** or **SFK transition trading period**.

A4. The **system operator** must communicate the setting of an **MFK transition trading period** or **SFK transition trading period** by:

A4.1 notifying all **ancillary service agents** with an **ancillary service** procurement contract for **frequency keeping** in the relevant **island**; and

A4.2 publishing the notification on the **system operator's** website.

A5. The **system operator** need not communicate an **SFK transition trading period** in accordance with paragraph A4 in advance of the **SFK transition trading period** if the transition to **single provider frequency keeping** is urgent.

A6. Subject to paragraph A7, the **system operator** must dispatch offer(s) 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** at least cost based on the **offer prices** and estimated **constraint costs**. For the avoidance of doubt, the aggregate **MW band** may be zero.

A7. The **system operator** may depart from paragraph A6 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 the affected **ancillary service agent** as soon as reasonably practicable if it does this.

A8. **Frequency keeping** for an **island** may be provided by one or more providers of **frequency keeping** in the other **island**, via the **HVDC link**.

Instantaneous reserve

A9. The **system operator** must:

A9.1 procure **instantaneous reserve** on a **half-hour clearing market procurement** basis; and

A9.2 procure **instantaneous reserve** as **fast instantaneous reserve** and **sustained instantaneous reserve**.

A10. The **system operator** must dispatch **reserve offers** in accordance with Subpart 2 of Part 13 of the **Code**.

A11. **Reserve offers** dispatched by the **system operator** must be priced and settled in accordance with Subpart 4 of Part 13 of the **Code**.

A12. **Instantaneous reserve** for an **island** may be provided by one or more providers of **instantaneous reserve** situated in the other **island**, via the **HVDC link**.

Over frequency reserve, voltage support and black start

A13. The **system operator** has determined that it is uneconomic to procure **over frequency reserve**, **voltage support** and **black start** on a **half-hour clearing market procurement** basis.

A14. The **system operator** must procure **over frequency reserve**, **voltage support** and **black start** on a **firm quantity procurement** basis.

A15. For the purpose of determining when an **event fee** is payable for **over frequency reserve**, **voltage support** and **black start**:

A15.1 an **over frequency reserve** event occurs for a dispatched **OFR site** when the **OFR equipment** initiates its **over frequency reserve** response;

A15.2 a **voltage support** event occurs for voltage support **equipment** when the **voltage support equipment** is dispatched; and

A15.3 a **black start** event begins when the **system operator** requests **black start** and ends when **core grid** restoration is complete. There may be multiple attempts at restoration before the event ends.

Appendix B – Key technical requirements for ancillary services (paragraph 59)

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 **frequency keeping units** and trained operators or **control equipment** at an **FK site** that, collectively, are capable of meeting the relevant performance requirements set out in paragraphs B3 to B8 below

Single provider frequency keeping performance requirements

B3. Subject to paragraph B7, 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** and commences the response as fast as practicable but in all cases within 10 seconds of the **grid frequency error** occurring;

B3.2 ensure the relevant **FK site** provides an average **response rate** of at least 10 **MW** per minute when the **grid** frequency is outside the **normal band** over each of the **ancillary service agent's single provider frequency keeping periods**;

B3.3 at all times act to maintain the frequency of the **grid** within the **normal band**, and use reasonable endeavours to continuously maintain the frequency of the **grid** as close as possible to 50 Hz; and

B3.4 use reasonable endeavours to continuously maintain **frequency time error** as close as possible to zero.

B4. Subject to paragraph B7, the **ancillary service agent** must ensure the **grid frequency error** over any of the **ancillary service agent's single provider frequency keeping periods** does not exceed the maximum allowable **grid frequency error** specified in the **ancillary service agent's ancillary service** procurement contract. Such **grid frequency error** must be determined by reference to the **system operator measured frequency** but excluding any frequency measurements that are outside the **normal band**.

B5. If providing **back-up SFK**, the **ancillary service agent** must ensure the **FK site** is available continuously to provide **back-up SFK**, except:

B5.1 where there is an **allowed outage**; or

B5.2 during any **trading period** when the **FK site** is not dispatched to generate electricity.

Multiple provider frequency keeping performance requirements

B6. Subject to paragraph B7, when providing **multiple provider frequency keeping** the **ancillary service agent** must:

B6.1 comply with **regulating instructions** issued to it; and

B6.2 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**.

General frequency keeping performance requirements

B7. In meeting the performance requirements in paragraphs B3, B4 and B6, the **ancillary service agent's FK site** is not required to operate outside the limits of the **MW band** contained in the relevant **dispatch instruction** issued in accordance with Part 13 of the **Code** or above the relevant **control max** or below the relevant **control min.**

B8. The **ancillary service agent** must ensure that **frequency keeping equipment** is maintained, and each operator of the **control equipment** is trained, in accordance with good industry practice to enable the provision of **frequency keeping** in accordance with the relevant performance requirements above.

Back-up SFK outages

B9. An outage of an **FK site** will not be taken into account in assessing the **ancillary service agent's** compliance with paragraph B5 (and will be an **allowed outage**) if the **ancillary service agent** removes the **FK site** from service:

B9.1 for maintenance of the **FK site**;

B9.2 to eliminate or mitigate a risk of injury to any person or damage to the **FK site**; or

B9.3 for a test of the **FK site**;

provided that:

B9.4 the **outage** is no longer than the shorter of:

B9.4.1 one month; and

B9.4.2 a period of time equivalent to a reduction in the relevant **availability fee** of the amount specified in the **ancillary service** procurement contract for the **FK site**; and

B9.5 the **ancillary service agent** otherwise complies with its obligations under the **ancillary service** procurement contract in respect of the **outage**.

B10. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any outage that affects the **ancillary service agent's** ability to provide **back-up SFK**.

B11. Where an outage that may compromise the **ancillary service agent's** ability to provide **back-up SFK** is planned or anticipated by the **ancillary service agent,** the **ancillary service agent** must:

B11.1 provide the **system operator** with as much advance warning as reasonably practicable of the **outage**, its expected start date and its expected duration;

B11.2 consult with the **system operator** on the timing of the **outage** with the intention that the timing of the **outage** must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B11.3 notify the **system operator** as soon as reasonably practicable of any amended

programme for the **outage**; and

B11.4 keep the **system operator's** POCP (Planned Outage Coordination Process) system updated to ensure that POCP at all times accurately reflects the details of the **outage**.

B12. In the event of any unexpected **outage** that may compromise the **ancillary service agent's** ability to provide **back-up SFK**, the **ancillary service agent** must:

B12.1 inform the **system operator** as soon as reasonably practicable following the start of such unexpected **outage** of the cause and expected duration of the **outage**; and

B12.2 use reasonable endeavours to continue to provide **back-up SFK**.

Monitoring requirements for frequency keeping

B13. The **ancillary service agent** must comply, and provide monitoring equipment that complies, with the relevant monitoring requirements as set out below.

Single provider frequency keeping monitoring requirements

B14. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:

B14.1 **FK output** at each of its **FK sites** that provides **single provider frequency keeping**; and

B14.2 frequency of the **grid** in Hz.

B15. When an **FK site is** providing **single provider frequency keeping** the relevant monitoring equipment must measure and record:

B15.1 **FK 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 measured value; and

B15.2 frequency at least once every 1 second (or such longer period as the **system operator** may determine), each measurement accurate to within 0.01 Hz.

Multiple provider frequency keeping monitoring requirements

B16. The **ancillary service agent** must provide monitoring equipment that accurately measures and records in a time-tagged manner the following:

B16.1 FK output at each of its **FK sites** that provides **multiple provider frequency keeping**; and

B16.2 the **regulating instructions** received for each of its **FK sites** that provides **multiple provider frequency keeping**.

B17. When an **FK Site** is providing **multiple provider frequency keeping** the relevant monitoring equipment must measure and record:

B17.1 **FK 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 **FK output** range of the **FK site**; and

B17.2 the **regulating instructions** received for the **FK site**.

General frequency keeping monitoring requirements

B18. The **ancillary service agent** must ensure that the **frequency keeping** data recorded by the monitoring equipment at each **FK site** for each calendar month is held by the **ancillary service agent** for at least 30 **business days** following the end of that calendar month and is provided to the **system operator** within 5 **business days** of a written request from the **system operator**.

B19. If an **FK site** is a **block dispatch group**, **station dispatch group** or group of load sources then, for the purposes of paragraphs B13 to B18, the **FK site** is to be treated as the specific **frequency keeping unit(s)** within the **FK site** that are allocated to **frequency keeping** for the relevant period.

B20. The **ancillary service agent** must ensure the monitoring equipment is maintained, and each operator of the monitoring equipment is trained, in accordance with good industry practice.

Offer requirements for frequency keeping

B21. The **ancillary service agent** may submit an **offer** to provide **frequency keeping** no later than 2 **trading periods** immediately preceding the **trading period** to which the offer relates. Each offer submitted is valid until revised or cancelled in accordance with paragraph B25 or B26.

B22. Each offer to provide **frequency keeping** must be submitted to the **system operator** through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the **Code**.

B23. There will be separate **ancillary service** procurement contract schedules for back-up SFK and multiple provider frequency keeping. The **ancillary service agent** must have:

B23.1 a valid and enforceable **ancillary service** procurement contract for **back-up SFK** from an **FK site** in order to **offer single provider frequency keeping** from that **FK site**; and

B23.2 a valid and enforceable **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**.

B24. Each offer to provide **frequency keeping** must include the following information:

B24.1 a unique code for the **FK site** for which the **offer** is made;

B24.2 a unique code for the **ancillary service agent** submitting the **offe**r;

B24.3 the **trading day** for which the **offer** is made;

B24.4 the **trading periods** for which the **offer** is made;

B24.5 the **control min** and **control max** for the **FK site** for which the **offer** is made; and

B24.6 up to five separate **MW bands** and prices.

B25. The **ancillary service agent** may revise or cancel an **offer** to provide **frequency keeping** by submitting a revised **offer** before the **FK gate closure** for the offer.

B26. The **ancillary service agent** may revise or cancel an **offer** to provide **frequency keeping** after the **FK gate closure** for the **offer** only in circumstances where a **bona fide physical reason** necessitates the revision or cancellation or where the **system operator** has issued a **formal notice**.

B27. Each revision or cancellation of an **offer** to provide **frequency keeping** must be submitted or notified to the **system operator** through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the **Code.**

B28. If the **ancillary service agent** revises or cancels an **offer** to provide **frequency keeping** after the **FK gate closure** for the offer, the **ancillary service agent** must report the revision or cancellation to the **system operator** in writing together with an explanation of the reasons for the revision or cancellation.

B29. The **system operator** must, as soon as reasonably practicable, confirm to the **ancillary service agent** the receipt of any new or revised **offer** to provide **frequency keeping**, or the cancellation of such an **offer**, through **WITS** or, if necessary, using the back-up procedures specified by the **WITS manager** under clause 13.52 of the Code.

B30. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements then:

B30.1 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 **offers** to provide **frequency keeping** until and unless it has provided evidence that demonstrates to the **system operator's** reasonable satisfaction that it can meet the performance requirements; and

B30.2 **offers** to provide **frequency keeping** submitted by the **ancillary service agent** 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**.

B31. **Frequency keeping** offers for an **FK site** must be subject to a minimum and may be subject to a maximum **MW band**. The minimum and maximum **MW bands** must be based on the results of the **technical review** referred to in paragraph 29. The **system operator** must publish the minimum **MW band** on its website.

B32. The **ancillary service agent** must not submit **frequency keeping** offers unless:

B32.1 it has conducted and passed an **end-to-end test or baseline test** of the relevant **frequency keeping equipment** at the relevant **FK site(s)** and test results have been assessed and approved by the **system operator**; or

B32.2 it has demonstrated fully compliant operational performance of that **frequency keeping equipment** in accordance with paragraph B38.2.

B33. Paragraph B30 applies to any **frequency keeping offers** submitted in breach of paragraph B32.

Dispatch requirements for frequency keeping

B34. 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.

B35. If an **ancillary service agent** finds it cannot maintain the frequency 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 within the required targets.

B36. The **ancillary service agent** must ensure that prior to the start of a **trading period** for which it has received a **dispatch instruction** to provide **frequency keeping**, the relevant **FK site** is connected and able to provide **frequency keeping** from the start of that **trading period.**

B37. If an **FK site** is a **block dispatch group**, **station dispatch group** or group of load sources then the **ancillary service agent** must ensure that during a **trading period** for which it has received a **dispatch instruction** to provide **single provider frequency keeping,** the **single provider frequency keeping** performance requirements in paragraphs B3 and B4 are met at the relevant **FK site(s)**.

Testing requirements for frequency keeping

B38. The **ancillary service agent** must either:

B38.1 conduct and pass an **end to end test** of each **FK site** at least once every six months; or

B38.2 have demonstrated fully compliant operational performance of the **FK site** by providing **frequency keeping** from the **FK site** during the previous six months, to the reasonable satisfaction of the **system operator**.

B39. The **ancillary service agent** must conduct and pass an **end-to-end test** of the **frequency keeping equipment** for an **FK site** following any change to the **frequency keeping equipment** for the **FK site** that may impact its **frequency keeping** performance.

B40. A **baseline test** or **on-demand test** of an **FK site** and/or trained operators used for providing **frequency keeping** (other than monitoring equipment) must verify whether or not the **frequency keeping equipment** meets the relevant performance requirements in paragraphs B3 to B8 or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

B41. A test of monitoring equipment must verify whether or not the monitoring equipment meets the relevant performance requirements in paragraphs B14 to B20**.**

B42. Within 15 **business days** of completing a **test** the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements.

Instantaneous reserve

Performance requirements and technical specifications for instantaneous reserve

B43. To be able to provide **instantaneous reserve** the **ancillary service agent** must have **IR equipment** that can provide **fast instantaneous reserve** and/or **sustained instantaneous reserve**.

B44. The **ancillary service agent** must ensure that at all times the **IR equipment** that is the subject of a **reserve offer**:

B44.1 is maintained, and each operator of the **IR equipment** is trained, in accordance with good industry practice to enable the provision of **instantaneous reserve** in accordance with the relevant performance requirements below;

B44.2 is able to respond, when dispatched, within the timeframe applicable to either **fast instantaneous reserve** or **sustained instantaneous reserve**, as the case may be; and

B44.3 is available and has the capacity to provide the quantity of **instantaneous reserve** specified in the **reserve offer**.

B45. The **ancillary service agent** must, when dispatched to provide **instantaneous reserve** in accordance with Part 13 of the **Code**:

B45.1 provide additional **supply** into the **grid** equal to or exceeding the **dispatched quantity** of **instantaneous reserve** automatically when there is an **under-frequency event**; and/or

B45.2 reduce **demand** from the **grid** equal to or exceeding the **dispatched quantity** of **instantaneous reserve** automatically when the frequency of the **grid** falls to or

below the **trip frequency**.

B46. The **ancillary service agent** must:

B46.1 in the case of **IR equipment** providing **interruptible load** other than **battery energy storage systems**:

B46.1.1 for **fast instantaneous reserve,** the drop in load (in **MW**) must occur within 1 second of the **grid** system frequency falling to or below 49.2 Hz, or the **trip frequency** specified in the **ancillary service agent's ancillary service** procurement contract, and must be sustained for a period of at least 60 seconds; or

B46.1.2 for **sustained instantaneous reserve**, the average drop in load (in **MW**) must occur over the first 60 seconds after the **grid** system frequency falls to or below 49.2 Hz, or the **trip frequency** specified in the **ancillary service agent's ancillary service** procurement contract, and must be sustained for a period of at least 30 minutes or until instructed by the **system operator**, whichever is lesser. The **ancillary service agent** must use reasonable endeavours to maintain the **sustained instantaneous reserve** response after the 30 minute period for as long as the **grid** system frequency remains below the **normal band**; and

B46.2 in the case of **IR equipment** providing **generation reserve** other than **battery energy storage systems**:

B46.2.1 meets, where relevant, the requirements for frequency response and control set out in clause 5(1) of **technical code** A of schedule 8.3 of the **Code** and has been approved by the **system operator**;

B46.2.2 provides stable performance with adequate damping;

B46.2.3 responds with a **droop** set within the range 1.5 - 7 percent or with a controlled response as agreed with the **system operator**; and

B46.2.4 does not adversely affect the operation of the **grid** because of any of its non-linear characteristics or rate of change in output;

B46.3 in the case of **battery energy storage systems** of no more than 5 **MW** unit capacity from single or **aggregated battery energy storage systems** providing **instantaneous reserve,** meets the performance requirements for**:**

B46.3.1 **IR equipment** providing **interruptible load** in paragraph B46.1; or

B46.3.2 **battery energy storage systems** larger than 5 **MW** capacity providing **instantaneous reserve** in paragraph B46.4;

B46.4 in the case of **battery energy storage systems** larger than 5 **MW** capacity from single or **aggregated battery energy storage systems** providing **instantaneous reserve**:

B46.4.1 provides stable performance and does not adversely affect operation of **grid**;

B46.4.2 provides a controlled dynamic response appropriate for both its inherent control characteristics and its location on the **grid**. The control action must be agreed with the **system operator** with regard to measurement delays, digital sample rates, speed of response (**MW**/sec), sensitivity of response (**MW**/Hz) and grid sensitivity (**MW**/Hz);

B46.4.3 if a **droop** control is used, the **battery energy storage system** responds with an appropriate **droop** across the full range of the **battery energy storage system** capability; and

46.4.3.1. **droop** need not be specified on rated capacity, however if it is

specified on rated capacity, **droop** should not be lower than 2%; and

46.4.3.2. any **droop** control must meet the controlled dynamic response agreed with the **system operator**;

B46.4.4 the maximum response delivered by a **droop** controller can be maintained when the **grid frequency** starts to recover to within the **normal band**, using a sample-and-hold or 'latch' control action. This enables the **battery energy storage system** to maximise the available **instantaneous reserve** response without use of a low **droop** setting. The response must return to a proportional response to frequency before the **grid frequency** exceeds the upper limit of the **normal band**. Reduction of **battery energy storage system** output to achieve this must be fast (in the order of 5 **MW**/sec) but must not continue if the frequency falls below the lower limit of the **normal band**; and

B46.4.5 a controlled ramp rate will apply for all output changes which are not related to a frequency deviations. This ramp rate must be in the order of 10 to 25 MW/min unless otherwise agreed with the **system operato**r.

B46.5 In the case of equipment providing **generation reserve**:

B46.5.1 in the North Island, remain connected:

46.5.1.1. at all times when the frequency is above 47.5 Hz;

46.5.1.2. for at least 120 seconds when the frequency is at 47.5 Hz;

46.5.1.3. for at least 20 seconds when the frequency is at 47.3 Hz;

46.5.1.4. for at least 5 seconds when the frequency is at 47.1 Hz;

46.5.1.5. for at least 0.1 seconds when the frequency is at 47.0 Hz;

46.5.1.6. at any frequencies between those specified above, for times derived by linear interpolation;

B46.5.2 in the South Island, remain connected:

46.5.2.1. at all times while frequency is at or above 47 Hz; and

46.5.2.2. for 30 seconds if the frequency falls below 47 Hz but not below 45 Hz.

Assessment of performance requirements for interruptible load other than that provided by battery energy storage systems

B47. In assessing the delivery of **interruptible load** quantities, the **system operator** must apply the following methodology:

B47.1 **Fast instantaneous reserve** must be calculated as the total reduction in load that occurs within one second of either the **grid** system frequency falling to or below 49.2 Hz or 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**.

B47.2 **Sustained instantaneous reserve** must be calculated as the average reduction in load that occurs over the first 60 seconds after either the **grid** system frequency falls to or below 49.2 Hz or 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**.

B47.3 The **fast instantaneous reserve** and **sustained instantaneous reserve** delivered quantities must be determined from the aggregate load response:

B47.3.1 recorded at the **ancillary service agent's IR equipmen**t; or

B47.3.2 recorded at the **contracted GXPs** (if any), if no data is recorded at the **IR equipment** and the **system operator** reasonably considers it is not appropriate to assess delivered quantities from data recorded at the **IR equipment**.

B47.4 If the assessment of **interruptible load** performance during an **under-frequency event** demonstrates a greater response than the contracted value for the **IR equipment**, then the contracted value for the relevant equipment may be increased to the level attained during the **under-frequency event**.

B47.5 In assessing **interruptible load** performance during an **under-frequency event**, the **system operator** must allow for **interruptible load** response to be up to 1 **MW** below the **dispatched MW** quantity at the time.

B47.6 To account for possible timing errors in the data provided by the **ancillary service agent** 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. That is, at a time when frequency is 50+/-0.1 Hz for at least 60 seconds prior to the **under-frequency event**.

Assessment of performance requirements for generation reserve not from battery energy storage systems

B48. In assessing the delivery of **fast instantaneous reserve** quantities from **generation reserve** not from **battery energy storage systems**, the **system operator** must apply the following methodology:

B48.1 **IR equipment** that is the subject of a **reserve offer** for **fast instantaneous reserve** is deemed to comply with the performance requirement in paragraph B46.2 if and only if the **IR equipment's** actual response meets or exceeds its **asset capability statement** modelled response.

B48.2 The **IR equipment's asset capability statement** modelled response is the response that could reasonably be expected if all the information in the **IR equipment's** current **asset capability statement** is correct, taking into account:

B48.2.1 the frequency profile of the **under-frequency event**;

B48.2.2 the **IR equipment's** real power output immediately before the start of the **under-frequency event** (**"pre-event real power output"**);

B48.2.3 the number of **generating units** on **partly loaded spinning reserve** mode;

B48.2.4 the number of hydro **generating units** on **tail water depressed reserve** mode; and

B48.2.5 the amount of **fast instantaneous reserve dispatched**.

B48.3 The **IR equipment's** actual response must be calculated as the additional **real power output** of the **IR equipment** compared to the **pre-event real power output** of the **IR equipment**.

B48.4 In calculating the actual response, the **system operator** must use reasonable endeavours to exclude inertial response.

B48.5 In determining the **pre-event real power output** of the **IR equipment**, the **system operator** must apply the following methodology when calculating the delivered

quantities:

B48.5.1 to account for possible timing errors contained in the data provided by the **ancillary service agent,** the **pre-event real power output** must be taken at a previous steady state frequency. That is, at a time when frequency is 50±0.1 Hz for at least 60 seconds prior to the **under-frequency event**;

B48.5.2 **generating unit** data must be used if measured and provided by the **ancillary service agent**.

B48.6 On request, the **system operator** must provide each **ancillary service agent** with details of the **system operator's** assessment under paragraph B48.5 of the **ancillary service agent's** delivery of **fast instantaneous reserve** quantities.

Assessment of performance requirements for instantaneous reserve from battery energy storage systems

B49. Unless the **battery energy storage system** is being assessed as **IR equipment** providing **interruptible load** under paragraph B47, in assessing the delivery of **fast instantaneous reserve** quantities from **battery energy storage systems,** the **system operator** must apply the following methodology:

B49.1 **IR equipment** that is the subject of a **reserve offer** for **fast instantaneous reserve** is deemed to comply with the performance requirements in paragraphs B46.3 and B46.4 if and only if the **IR equipment**'s actual response meets or exceeds its **asset capability statement** modelled response.

B49.2 The **IR equipment's asset capability statement** modelled response is the response that could reasonably be expected if all the information in the **IR equipment's** current **asset capability statement** is correct, taking into account:

B49.2.1 the frequency profile of the **under-frequency event**;

B49.2.2 the **IR equipment's** operating state and real power output or load immediately before the start of the **under-frequency event** (**"pre-event real power"**); and

B49.2.3 the amount of **fast instantaneous reserve** dispatched.

B49.3 The **IR equipment's** actual response must be calculated as the change in the real power of the **IR equipment** from its **pre-event real power**.

B49.4 On request, the **system operator** must provide each **ancillary service agent** with details of the **system operator's** assessment under paragraph B49.3 of the **ancillary service agent's** delivery of **fast instantaneous reserve** quantities.

Monitoring requirements for instantaneous reserve

B50. The **ancillary service agent** must provide monitoring equipment that accurately measures and records the **instantaneous reserve** response (in **MW**) from the **ancillary service agent's IR equipment**:

B50.1 in the case of all monitoring equipment:

B50.1.1 for **fast instantaneous reserve,** at no greater than 0.1 second intervals commencing not less than 15 seconds prior to, and continuing until 60 seconds after, the **UFE time** or **trip time** as applicable;

B50.1.2 for **sustained instantaneous reserve,** at no greater than 0.1 second intervals commencing not less than 15 seconds prior to, and continuing

until 60 seconds after, the **UFE time** or **trip time** as applicable, and then at no greater than 1 second intervals until the **instantaneous reserve** response ends;

B50.1.3 including measurement of the locally measured frequency at ±0.01 Hz resolution and the relay activation signal;

B50.1.4 in a time-tagged manner such that all recorded data is either:

50.1.4.1. GPS clock time-tagged; or

50.1.4.2. if GPS clock time-tagging capability is not available, then aligned with the time-tagged frequency measurement from the same device; and

B50.1.5 where possible, net of any **demand** or **supply** response from other sources at the same point of connection to the **grid**.

B51. The **ancillary service agent** must ensure that the data recorded by the monitoring equipment under paragraph B50 is held by the **ancillary service agent** for at least 15 business days and is provided to the **system operator** within 5 **business days** of a written request from the **system operator**.

B52. **Interruptible load** data provided to the **system operator** under paragraph B51, must be aligned using the **trip time** and be provided in the format specified on the **system operator's** website, unless otherwise agreed with the **system operator**.

B53. The **ancillary service agent** may provide an independently verified error range for data it provides to the **system operator** under paragraph B51, which the **system operator** must have regard to in any assessment of the **ancillary service agent's** compliance with performance requirements using the data.

B54. For hydro **generating stations**, the data referred to in paragraph B50 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**. For other **generating stations** providing **partly loaded spinning reserve**, the data referred to in paragraph B50 must be measured, recorded and provided by **generating unit**.

B55. The **ancillary service agent** must ensure the monitoring equipment is maintained in accordance with good industry practice.

Offer requirements for instantaneous reserve

B56. If the **system operator** reasonably believes 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.

B57. If at any time the **system operator** is not satisfied (acting reasonably) that the **ancillary service agent** can meet the relevant performance requirements, then:

B57.1 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 **system operator's** reasonable satisfaction that it can meet the performance requirements;

B57.2 **reserve offers** submitted by the **ancillary service agent** (or any **reserve offers** relating to specific **IR 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

B57.3 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).

B58. The **ancillary services agent** must ensure that its **reserve offers** for **interruptible load** not provided by **battery energy storage systems** do not include any load that may reasonably be required to be shed to satisfy any obligation (of the **ancillary service agent** or a third party) to provide:

B58.1 **automatic under-frequency load shedding** (AUFLS); or

B58.2 load shedding under any other agreement with Transpower, in its capacity as **system operator** or a **grid owner**, or a third party.

B59. For the avoidance of doubt, the **ancillary service agent** may not **offer** any **IR equipment** that:

B59.1 has been armed for AUFLS or which is armed for any other load shedding agreement; or

B59.2 may be dynamically/remotely armed to meet the AUFLS obligations by the **network** owner.

B60. Under clause 8.54B of Part 8 of the **Code**, the **ancillary services agent** is to provide information about **interruptible load** with the **connected asset owner** or **grid owner** as the case may be within 10 business days of entering into the **ancillary services** procurement contract**.**

B61. The **ancillary service agent** must not submit reserve offers:

B61.1 in respect of **IR equipment** or **points of connection** to the **grid** that are not covered by the **ancillary service** procurement contract;

B61.2 for **interruptible load** unless:

B61.2.1 it has conducted and passed an **end-to-end test** of the relevant **IR equipment** and the test results have been assessed and approved by the **system operator**; or

B61.2.2 it has demonstrated fully compliant operational performance of that **IR equipment** in accordance with paragraph B46.1;

B61.3 for **generation reserve**, unless it has conducted and passed a **baseline test** of each item of **IR equipment** and the test results have been assessed and approved by the **system operator**.

B62. Paragraphs B57.2 and B57.3 apply to any **reserve offers** submitted in breach of paragraph B58.

Testing requirements for instantaneous reserve

B63. For interruptible load, the **ancillary service agent** must either:

B63.1 conduct and pass an **end-to-end test** of all items of **IR equipment** it uses for providing **interruptible load**:

B63.1.1 in the case of **interruptible load,** at least once every 24 months;

B63.1.2 immediately following any change to **IR equipment** that may impact the

IR equipment's instantaneous reserve performance; or

B63.2 have demonstrated fully compliant operational performance of that **IR equipment** by responding to an **under-frequency event**.

B64. The scope of the **end-to-end test** referred to in paragraph B63 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 **IR equipmen**t is demonstrated to the **system operator's** reasonable satisfaction.

B65. For **generation reserve** and **instantaneous reserve** offered by **battery energy storage systems**, the **ancillary service agent** must conduct and pass a baseline test of each item of the **IR equipment** used to provide **instantaneous reserve**:

B65.1 at least once every four years for analogue equipment and non-self-monitoring digital equipment; and

B65.2 at least once every ten years for self-monitoring digital equipment; and

B65.3 immediately following any change to **IR equipment** that may impact the **IR equipment's instantaneous reserve** performance.

B66. A **baseline test** for **generation reserve** and **instantaneous reserve** from **battery energy storage systems**:

B66.1 must be used to validate the **asset capability statement** modelled response of the assets which are the subject of a **reserve offer** for **fast instantaneous reserve**;

B66.2 may be combined with testing required under clause 2 of **Technical Code** A of Schedule 8.3 of the **Code**; and

B66.3 must use settings (including speed governor settings for **generation reserve**) agreed between the **system operator** and the **ancillary service agent** before the test, which the **ancillary service agent** must not change without **system operator** approval.

B67. An **end-to-end test, baseline test,** or **on-demand test** of **IR equipmen**t must verify whether the equipment meets the relevant performance requirements in paragraphs B43 to B46 or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

B68. A test of monitoring equipment must verify whether the monitoring equipment meets the performance requirements in paragraph B50.

B69. The **ancillary service agent** must conduct and pass a test of the **IR equipment** it uses to provide **instantaneous reserve** following any change to monitoring equipment that may impact its **instantaneous reserve** performance.

B70. Within 15 **business days** of completion of a **test** the **ancillary service agent** must provide the **system operator** with the corresponding test or performance data and verification of meeting the relevant performance requirements.

B71. Test or performance data provided to the **system operator** under paragraphs B63 and B65 must include an indication of any time delays that occur in the measurement systems used by the control systems of the **IR equipment**.

Over frequency reserve

Performance requirements and technical specifications for over frequency reserve

B72. The **ancillary service agent** must ensure that the **OFR equipment** is maintained, and each operator of the **OFR equipment** is trained, in accordance with good industry practice to enable the provision of **over frequency reserve** in accordance with the relevant performance requirements below.

B73. In the case of an **OFR site** that provides **over frequency reserve** by tripping, the **ancillary service agent** must ensure that:

B73.1 when the **relay equipment** is armed, the **relay equipment** and **circuit breaker equipment** automatically disconnects the **OFR site** to which they are fitted within 0.5 seconds of the frequency of the **grid** rising to or above the frequency specified in the **ancillary service** procurement contract for that **OFR site**. This maximum time to disconnect covers both the action of the **relay equipment** and **circuit breaker equipment**; and

B73.2 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.

B74. In the case of an **OFR site** that is a **battery energy storage system** or provides **over frequency reserve** by fast ramping**,** the **ancillary service agent** must ensure that:

B74.1 when the **control equipment** is enabled, the **control equipment** automatically reduces the real power output of the **OFR site** within 0.5 seconds of the frequency of the **grid** rising above the frequency specified in the **ancillary service** procurement contract; and

B74.2 the rate of reduction of the real power output is at or above the ramp rate specified in the **ancillary service** procurement contract for the **OFR site.**

B75. The **ancillary service agent** must ensure that all **OFR equipment** is available continuously to provide **over frequency reserve** except:

B75.1 where there is an **allowed outage**; or

B75.2 during any **trading period** when the relevant **OFR site** is not generating electricity.

Over frequency reserve outages

B76. An **outage** of **OFR equipment** will not be taken into account in assessing the **ancillary service agent's** compliance with the performance requirements in paragraph B75 (and will b e an **allowed outage**) if the **ancillary service agent** removes the **OFR equipment** from service:

B76.1 for maintenance of the **OFR equipment**;

B76.2 to eliminate or mitigate a risk of injury to any person or damage to the **OFR equipment**; or

B76.3 for a test of the **OFR equipment;**

provided that:

B76.4 the **outage** is no longer than the shorter of:

B76.4.1 one month; and

B76.4.2 a period of time equivalent to a reduction in the relevant **availability fee** of the amount specified in the **ancillary service** procurement contract for the **OFR site**; and

B76.5 the **ancillary service agent** otherwise complies with its obligations under the **ancillary service** procurement contract in respect of the **outage.**

B77. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any **outage** that affects the **ancillary service agent's** ability to provide **over frequency reserve**.

B78. Where an **outage** that may compromise the **ancillary service agent's** ability to provide **over frequency reserve** is planned or anticipated by the **ancillary service agent** the **ancillary service agent** must:

B78.1 provide the **system operator** with as much advance warning as reasonably practicable of the **outage**, its expected start date and its expected duration;

B78.2 consult with the **system operator** on the timing of the outage with the intention that the timing of the **outage** must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B78.3 notify the **system operator** as soon as reasonably practicable of any amended programme for the **outage**; and

B78.4 keep the **system operator's** POCP (Planned Outage Coordination Process) system updated to ensure that POCP at all times accurately reflects the details of the **outages**.

B79. In the event of any unexpected **outage** that may compromise the **ancillary service agent's** ability to provide **over frequency reserve**, the **ancillary service agent** must:

B79.1 inform the **system operator** as soon as reasonably practicable following the start of such unexpected **outage** of the cause and expected duration of the outage; and

B79.2 use reasonable endeavours to continue to provide **over frequency reserve**.

Monitoring requirements for over frequency reserve

B80. The **ancillary service agent** must provide monitoring equipment for each **OFR site** that:

B80.1 is available continuously (except during an **allowed outage**);

B80.2 continuously measures and transmits to the designated interface point information as to whether or not the **control equipment** is armed (except during an **allowed outage**); and

B80.3 is maintained, and ensure each operator of the monitoring equipment is trained, in accordance with good industry practice.

Testing requirements for over frequency reserve

B81. In the case of an **OFR site** that provides **over frequency reserve** by tripping, the **ancillary service agent** must conduct and pass a **baseline test** of all items of **OFR equipment** at the **OFR site**:

B81.1 at least once every 4 years, unless:

B81.1.1 the **ancillary service agent** has demonstrated fully compliant operational performance of the **OFR equipment** by providing **over frequency reserve** in the previous 4 years; and

B81.1.2 the **ancillary service agent** has provided the **system operator** with the corresponding operational data for verification of fully compliant operational performance of the **OFR equipment**; and

B81.2 immediately following any change to **OFR equipment** that may impact the **FK site's over frequency reserve** performance.

B82. For tests under paragraph B81, the operation time of the **circuit breaker equipment** may be tested separately to the relay operating time, hold delay, and trip coil supervision.

B83. In the case of an **OFR site** that provides **over frequency reserve** by tripping, the **ancillary service agent** must:

B83.1 carry out a review of each trip circuit and relay configuration; and

B83.2 conduct and pass a **baseline test** of monitoring equipment, including arming/disarming indications and remote enabling/disabling control unless the **ancillary service agent** has demonstrated fully compliant operational performance of the monitoring equipment by providing **over frequency reserve** in the previous 2 years.

B84. In the case of an **OFR site** that is a **battery energy storage system** or provides **over frequency reserve** by fast ramping**,** the **ancillary service agent** must conduct and pass an **end-to-end test** of the **OFR site**:

B84.1 at least once every 1 year, unless:

B84.1.1 the **ancillary service agent** has demonstrated fully compliant operational performance of the **OFR site** by providing **over frequency reserve** in the previous 1 year; and

B84.1.2 the **ancillary service agent** has provided the **system operator** with the corresponding operational data for verification of fully compliant operational performance of the **OFR site;** and

B84.2 immediately following any change to the **OFR equipment** that may impact the **OFR equipment's over frequency reserve** performance.

B85. A **baseline test, end-to-end test** or **on-demand test** of **OFR equipment** or an **OFR site** must verify whether or not the **OFR equipment** or **OFR site** meets the performance requirements in paragraphs B73 and B74 (as appropriate).

B86. A test of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B80.2.

B87. Within 15 **business days** of completion of a test, the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements using the **system operator's** prescribed test form.

Voltage support

Performance requirements and technical specifications for voltage support

B88. In order to provide **voltage support**, the **ancillary service agent** must provide either:

B88.1 continuously variable **reactive power** resources that have:

B88.1.1 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

B88.1.2 both automatic and 24-hour manual voltage control facilities; or

B88.2 static **reactive power** resources that have:

B88.2.1 provision for manual control available on a 24-hour basis; and

B88.2.2 automatic operation to parameters and for conditions specified by the **system operator**.

B89. 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**.

B90. To be able to provide voltage support, the **ancillary service agent** must provide **voltage support equipment** that:

B90.1 is available continuously to provide **voltage support** at the maximum **reactive power** and network busbar(s) specified in the **ancillary service** procurement contract, except where there is an **allowed outage**;

B90.2 is able to respond, when dispatched, in accordance with the response times specified in the **ancillary service** procurement contract; and

B90.3 is maintained in accordance with good industry practice to enable the provision of **voltage support** in accordance with the performance requirements above.

Monitoring requirements for voltage support

B91. The **ancillary service agent** must provide monitoring equipment that:

B91.1 is available at all times (except during an **allowed outage**);

B91.2 continuously measures and transmits to the designated interface point the **reactive power** provided by the **voltage support equipment** (except during an **allowed outage**); and

B91.3 is maintained in accordance with good industry practice.

Testing requirements for voltage support

B92. There are no **baseline tests** for **voltage support**.

B93. An **on-demand test** of **voltage support equipment** must verify whether or not the **voltage support equipment** meets the performance requirements in paragraphs B88 to B90, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**.

B94. A test of monitoring equipment must verify whether or not the monitoring equipment meets the performance requirements in paragraph B91.2.

B95. Upon completion of an **on-demand test** the **ancillary service agent** must provide the **system operator** with the corresponding test data and verification of meeting the relevant performance requirements within 15 **business days**.

Black start

Performance requirements and technical specifications for black start

B96. The **ancillary service agent** must ensure that the **black start equipment** and **black start generating units** are maintained, and each operator of the **black start equipment** and **black start generating units** are trained, in accordance with good industry practice to enable the provision of **black start** in accordance with the performance requirements below.

B97. The **ancillary service agent** must ensure that, when requested to provide **black start**, it provides **black start** by:

B97.1 starting a **black start generating unit** and raising it to synchronous speed, without any power being obtained from the **grid** or any **local network**;

B97.2 operating the **black start generating unit** at zero load at synchronous speed for 15 minutes (or such shorter period as instructed by the **system operator**);

B97.3 having the **black start generating unit** switched on to de-energised **network** busbar(s);

B97.4 starting any remaining **black start generating units** and synchronising to the **network** busbar(s);

B97.5 progressively energising the **grid** from those **network** busbar(s) by providing generation output that supports the initial charging of transmission circuits and **assets**;

B97.6 ensuring the **black start generating units** provide the **reactive power capability** specified in clause 8.23 of the **Code**;

B97.7 subject to paragraph B97.6, controlling the **grid** voltage as instructed by the **system operator**; and

B97.8 providing an emergency frequency regulating reserve service by maintaining the **grid** frequency to between 49.25 Hz and 50.75 Hz, to the extent practicable.

B98. The **ancillary service agent** must ensure that:

B98.1 sufficient **black start equipment** and **black start generating units** are available continuously to provide **black start**, except where there is an **allowed outage**;

B98.2 the **black start equipment** is able to start without power being obtained from the **grid** or any **local network**;

B98.3 the **black start generating units** are able to achieve the response times to synchronous speed specified in the **ancillary service** procurement contract; and

B98.4 the **black start generating units** otherwise have the capabilities specified in the **ancillary service** procurement contract.

B99. When requested by the **system operator**, the **ancillary service agent** must use reasonable endeavours to provide additional services to re-energise the **grid** or prevent **grid** de-energisation over and above the **black start** service described in paragraph B98. The **system operator** must pay the **ancillary service agent** for the reasonable costs incurred by the **ancillary service agent** in providing these additional services.

Black start outages

B100. An outage of the **black start equipment** or **black start generating units** will not be taken into account in assessing the **ancillary service agent's** compliance with the performance requirement in paragraph B98.1 (and will be an **allowed outage**) if the **ancillary service agent** removes the **black start equipment** or **black start generating units** from service:

B100.1 for maintenance of the **black start equipment** or **black start generating units**;

B100.2 to eliminate or mitigate a risk of injury to any person or damage to the **black start equipment** or **black start generating units**;

B100.3 for a test of the **black start equipment** or **black start generating units**,

provided that the **ancillary service agent** complies with its obligations under the **ancillary service** procurement contract in respect of the outage.

B101. The **ancillary service agent** must use reasonable endeavours to minimise the duration and frequency of any outage that affects the **ancillary service agent's** ability to provide **black start**.

B102. Where an outage that may compromise the **ancillary service agent's** ability to provide **black start** is planned or anticipated by the **ancillary service agent** the **ancillary service agent** must:

B102.1 consult with the **system operator** on the timing of the outage with the intention that the timing of the outage must ensure that the **system operator** can, at all times, comply with its **principal performance obligations**;

B102.2 unless the **system operator** agrees otherwise in writing, **provide** notice to the **system operator** of the outage, its expected start date, its expected duration and the programme of works no later than:

B102.2.1 12 weeks before the start of the outage for outages planned to be 12 hours or greater in duration; or

B102.2.2 2 weeks before the start of the outage for outages planned to be less than 12 hours in duration; and

B102.3 if the expected start date, expected duration or programme of works for a planned outage changes, provide the **system operator** with as much advance warning as reasonably practicable of the revised expected start date, expected duration or programme of works.

B103. For each planned outage for which the **ancillary service agent** fails to meet the notice requirements in paragraph B102.2 the **ancillary service agent** is liable to the **system operator** for an amount equal to the **availability fee** charged by the **ancillary service agent** for one month.

B104. In the event of any unexpected **outage** that compromises the **ancillary service agent's** ability to provide **black start**, the **ancillary service agent** must:

B104.1 immediately report the unexpected **outage** to the **system operator**, including reporting to the **system operator** the expected time to rectify the unexpected **outage**;

B104.2 determine and rectify the cause of the unexpected **outage** as soon as practicable;

B104.3 use reasonable endeavours to continue to provide **black start**; and

B104.4 notify the **system operator** upon completion of the outage.

Testing requirements for black start

B105. The **ancillary service agent** must conduct and pass a **baseline test** of each item of **black start equipment**:

B105.1 at least once every 6 weeks, unless:

B105.1.1 the item of **black start equipment** has been generating at any time during that period; and

B105.1.2 the **ancillary service agent** has notified the **system operator** via email of the results of the test within 5 business days of the test; and

B105.2 immediately following any change to the item of **black start equipment** that may impact its **black start** performance.

B106. 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 B98.2.

B107. 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 per rolling 12-month period.

B108. A **baseline test** or **on-demand test** of **black start** must verify whether or not the **black start** meets the performance requirements in paragraphs B97 and B98, or such lesser performance requirements as the **system operator** may determine in consultation with the **ancillary service agent**. A **baseline test** or **on-demand test** of **black start** will include a full station shutdown unless the **system operator** determines otherwise in consultation with the **ancillary service agent**.

B109. The **ancillary service agent** must ensure that following a **baseline test** or **on-demand test** of **black start**, the data must be held by the **ancillary service agent** for a period of not less than 2 years.

B110. Within 15 **business days** of completion of a **test,** the **ancillary service agent** must provide the **system operator** with the corresponding test data in a form reasonably acceptable to the **system operator**. The **system operator** is to verify whether the testing meets the relevant performance requirements.

Appendix C – Key contracting terms for ancillary service procurement contracts (paragraph 60)

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:

C2.1 mediation; or

C2.2 independent expert determination; or

C2.3 Rulings Panel determination under Part 3 of the **enforcement regulations**; or

C2.4 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 of 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 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 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 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 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 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 1 year 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 1 year 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 may be able to rely on force majeure in certain circumstances to provide relief from 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 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. The **ancillary service agent** must pay its costs of any **baseline test**.

C25. For each **ancillary service** the **system operator** may request:

C25.1 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**,

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 **ancillary service agent** must provide the **system operator** with written information in such detail as the **system operator** reasonably requires about the timing of tests and the results of tests.

C27. The **system operator** must pay the **ancillary service agent**'s reasonable costs of an **on-demand test** unless:

C27.1 the equipment fails the **on-demand test**; or

C27.2 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.

C28. If equipment used to provide or monitor an **ancillary service** fails a **baseline test** or **on-demand test** the **ancillary service agent**:

C28.1 is deemed to be incapable of providing or monitoring the **ancillary service** until the test is passed; and

C28.2 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:

C28.2.1 the equipment is used to provide or monitor **frequency keeping** and/or **instantaneous reserve** and no other **ancillary service**; or

C28.2.2 otherwise agreed with the **system operator.**

C29. In carrying out and reporting on a test, the **ancillary service agent** must comply with any relevant test guidelines published on the **system operator's** website, including by using and submitting to the **system operator** any standard forms in those guidelines.

Inspections

C30. 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.

C31. 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

C32. 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.

C33. 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

C34. The following provisions must be included in any new long term contract for **back-up SFK**, over frequency reserve, voltage support or black start:

C34.1 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**.

C34.2 Any **availability fee** or **event fee** payable under the **new long term contract** is to be subject to adjustment no more frequently than once per year in accordance with an objective formula to be agreed between the **system operator** and **ancillary service agent**.

Appendix D – Glossary of terms

In this **procurement plan**, unless the context otherwise requires:

"allowed outage" means an outage of equipment used to provide the relevant **ancillary service** that is permitted under an **ancillary service** procurement contract;

"availability fee" means a fixed fee for the availability of an **ancillary service**, irrespective of dispatch or provision, expressed as dollars per period of availability;

"**back-up SFK**" means **single provider frequency keeping** that is procured against the risk of technical failure of **multiple provider frequency keeping**;

"baseline test" means a test of an **ancillary service** or the equipment used to provide an **ancillary service** that is specified in Appendix B as a test the **ancillary service agent** is required to carry out;

"**battery energy storage system**" means an **energy storage system** with an electro-chemical storage component;

"black start equipment" means diesel generators or auxiliary hydro plant capable of livening a **black start generating unit** isolated from the **grid**;

"black start generating unit" means the generating unit that is livened during a **black start** event;

"circuit breaker equipment" means a circuit breaker and auxiliary equipment that supports operation of the circuit breaker;

"Code" means the Electricity Industry Participation Code 2010, in which this **procurement plan** is incorporated by reference under clause 8.42(1);

"**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:

a) for **frequency keeping**, equipment in respect of a **frequency keeping unit** that automatically responds to changes in frequency for the purposes of providing **frequency keeping**; or

b) for **over frequency reserve**, equipment that is capable of tripping or controlling the output of an **OFR site** and may include **relay equipment**, **circuit breaker equipment** or a control system capable of automatically reducing the real power output of the **OFR site**;

"control max" means the maximum quantity of power (in **MWs**) an **FK site** can operate at 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**;

"control min" means the minimum quantity of power (in **MWs**) an **FK site** must operate at to provide **frequency keeping** to the relevant performance requirements;

"droop" refers to a proportional droop or **control system** that adjusts a generator's power output proportionally to deviations in frequency;

"end-to-end test" means a specific type of test to verify that the integrated components of a system for providing an **ancillary service**, including the monitoring components (except for **black start** monitoring components), function correctly as a complete system and are able to provide the relevant **ancillary service** in accordance with all performance requirements for the **ancillary service** in the **ancillary service** procurement contract;

"enforcement regulations" means the Electricity Industry (Enforcement) Regulations 2010;

"event fee" means a fixed price for the dispatch or provision of an **ancillary service**, expressed as dollars per event;

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

"firm quantity procurement" is defined in paragraph 53;

"FK gate closure" means, for a **frequency keeping** offer, the time referred to in clause 13.46 of the **Code** after which the offer could not be revised if the offer were a **reserve offer**;

"FK output" means the generation from or load at an **FK site**, as the case may be;

"**FK site**" means a **frequency keeping unit** or group of **frequency keeping units**. An **FK site** may be a **generating unit**, **generating station**, **block dispatch group**, **station dispatch group**, load source or group of load sources;

"frequency keeping equipment" means all equipment used to provide **frequency keeping** including **control equipment** and the **FK site** but excluding monitoring equipment;

"**frequency time error**" means a deviation from **New Zealand standard time** caused by variations in system frequency;

"grid frequency error" means the **grid** frequency deviation in Hz from 50.00 Hz;

"half-hour clearing market procurement" is defined in paragraph 52;

"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;

"IR equipment" means all equipment used to provide **instantaneous reserve**, which may include **generating units**, load sources or **battery energy storage systems**, but excluding monitoring equipment;

"**MFK transition trading period**" is a trading period on which **frequency keeping** for an island will transition from **single provider frequency keeping** to **multiple provider frequency keeping**;

"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 **FK output**;

"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 1 year;

"offer price" means a price offered by an **ancillary service agent** for the dispatch of an **ancillary service** for a **trading period**, expressed as dollars per unit of quantity of the **ancillary service**;

"OFR equipment" means all equipment used to provide **over frequency reserve** including **relay equipment, circuit breakers**, monitoring equipment, control equipment and/or arming/disarming equipment and indication;

"**OFR site**" means one or more **generating units or battery energy storage systems** to which **control equipment** is fitted in order to provide **over frequency reserve**;

"on-demand test" means a test of an **ancillary service** or the equipment used to provide an **ancillary service** that is not a **baseline test** and that the **ancillary service agent** is only required to carry out if requested by the **system operator** under the **ancillary service** procurement contract**;**

"pre-event real power" is defined in paragraph B49.2.2;

"pre-event real power output" is defined in paragraph B48.2.2;

“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**;

“region” means New Zealand, an **island** or a smaller geographical region within an **island**, and includes a **zone**;

“**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 FK output 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;

“regulations” means the **enforcement regulations** and any other regulations made under the **Act**;

“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**;

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

“**SFK transition trading period**” is a **trading period** on which **frequency keeping** for an island will transition from **multiple provider frequency keeping** to **single provider frequency keeping**;

“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;

“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** not from **battery energy storage systems** and specified in the relevant **ancillary service** procurement contract;

“trip time” means, for **interruptible load** not from **battery energy storage systems**, the time at which the **ancillary service agent’s** locally measured frequency of the **grid** falls to or below the **trip frequency**;

“UFE time” means the time at which an **under-frequency event** occurs, as determined by reference to the **system operator measured frequency**; and

“**voltage support equipment**” means all equipment used to provide **voltage support** including assets capable of providing reactive power but excluding monitoring equipment.

Appendix C Draft final Ancillary Services Procurement Plan Review Proposal

Proposal document

Ancillary Services Procurement Plan Review 2025

6 June 2025

Disclaimer

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Contact Details

Address:	Transpower New Zealand Ltd Waikoukou PO Box 1021 Wellington New Zealand
Telephone:	+64 4 495 7000
Fax:	+64 4 498 2671
Email:	system.operator@transpower.co.nz
Website:	http://www.transpower.co.nz

Contents

1 Summary

1. This paper presents our proposals to the Electricity Authority (**Authority**) to amend the Ancillary Services Procurement Plan (**Procurement Plan**).

2. The paper explains the process undertaken for consultation on the draft proposals, key feedback received, our consideration of that feedback and the changes we have made to our proposals.

3. The Procurement Plan sets out the processes the System Operator must use reasonable endeavours to follow when it procures ancillary services, such as for frequency keeping and instantaneous reserves.

1.1 Proposals for amending the Procurement Plan

4. We are proposing a number of amendments to the Procurement Plan, ranging from technical drafting changes and refinement to improvements aimed at addressing identified issues.

5. The changes fall into three high level categories:

   - amendments to align with changes to:

   (i) the Electricity Industry Participation Code (**the Code**);
   (ii) existing ancillary contract provisions; and
   (iii) existing ancillary service procurement practices.

   - various drafting improvements e.g. making the treatment of outages of service provision consistent across all five ancillary services; and
   - technical changes e.g. inclusion of battery energy storage systems (**BESS**) to reflect their role in provision of instantaneous reserve.

6. Most of the changes we are proposing will better line up the Procurement Plan with existing ancillary service practices and the Code. This means the proposals won't result in change or an increase in compliance or administrative costs, rather they clarify and confirm existing practice. Some elements of the proposed changes will increase compliance costs for Ancillary Service Agents and for the System Operator – notably in relation to indications and measurements requirements for interruptible load (**IL**) and pre- and post-event monitoring data for BESS. Having considered the feedback we received in submissions we remain of the view these changes are proportionate and justified.

7. Some matters raised in submissions require further investigation and consideration. These include feedback related to additional compliance costs and providers indicating they couldn't meet some requirements that we currently consider they had met previously. We have deferred these matters and may submit a separate, additional, proposal for amendment of the Procurement Plan once we have considered them further.

8. Appendix A contains detailed consultation comments and responses, Appendix B contains a list of deferred matters. Appendix C contains tables which provide paragraph-by-paragraph explanations of our proposed changes and contains a qualitative Cost Benefit Analysis. An updated copy of the draft Procurement Plan is attached as a separate document.

2 Purpose

9. This paper presents our proposals to amend the Ancillary Services Procurement Plan (**Procurement Plan**), that is incorporated by reference in the Electricity Industry Participant Code 2010 (**the Code**) under clause 8.42.

10. The paper explains the process undertaken for consultation on the draft proposals, key feedback received, our consideration of that feedback and the changes we have made to our proposals.

11. The proposal paper is accompanied by:

- the proposed new Procurement Plan with the proposed changes tracked (Annex 1); and
- a clean version of the proposed new Procurement Plan in Word format (Annex 2).

3 Background: What is the Procurement Plan

12. The Procurement Plan sets out the mechanisms we use for procuring ancillary services, as well as the technical requirements and key contractual terms applying to each service.[1] The System Operator is required to use reasonable endeavours to both implement and comply with the Procurement Plan.

13. We procure ancillary services to support the reliable operation of the power system and assist us to meet our Principal Performance Obligations (**PPOs**) specified in the clauses 7.2A to 7.2D of the Code.

14. There are currently five ancillary services we can procure:

- Frequency Keeping (**FK**)
- Instantaneous Reserve (**IR**)
- Over-frequency Reserve (**OFR**)
- Voltage Support (**VS**)
- Black Start (**BS**)

[1] https://www.transpower.co.nz/system-operator/information-industry/electricity-market-operation/ancillary-services/about

4 Why we undertook the review of the Procurement Plan

15. The System Operator must conduct a full review of the Procurement Plan at least once every 2 years (clause 7.15(1) of the Code).

16. The last review was completed on 7 June 2023, and the System Operator did not propose any changes.[2]

17. The System Operator must consult on any proposed amendments to the Procurement Plan (clause 7.20(1)).

4.1 Requirements for amendment of the Procurement Plan

18. We must submit any proposed amendment of the Procurement Plan to the Electricity Authority (**Authority**) for approval or otherwise advise the Authority that we do not consider an amendment is required (clause 7.15(3)).

19. Clause 7.21 of the Code sets out the requirements for the information the System Operator must provide to the Authority.

20. After receipt of the proposal, the Authority may: (a) approve the proposed amendments; or (b) require the System Operator to conduct further consultation before re-submitting the proposed amendments to the Authority for approval; or (c) decline to approve the proposed amendments (clause 7.21(2)).

21. Before the Authority can amend the Code to incorporate the proposed amendments to the Procurement Plan, it will need to consult, unless it is satisfied on reasonable grounds that: "(a) the nature of the amendment is technical and non-controversial; or (b) there is widespread support for the amendment among the people likely to be affected by it; or (c) there has been adequate prior consultation (for instance, by or through an advisory group) so that all relevant views have been considered" (section 39 of the Electricity Industry Act).

[2] Letter from David Katz, Market and Security of Supply Manager, System Operator, to Chris Otton, Manager Operations Policy, Electricity Authority, Procurement Plan review: Clauses 8.42A and 8.42B of the Code, 7 June 2023: Transpower_Procurement_Plan_review_letter.pdf

5 Consultation process

22. The consultation period was 3 weeks followed by a 1-week period for cross-submissions.

23. Transpower received six submissions and one cross-submission. The submissions and cross-submission listed are below and are available on our website. [3] We thank all submitters for their participation in the consultation process and appreciate the feedback we received.[4]

Submissions	Cross-submissions
Contact Energy	Enel X
Genesis Energy	
Mercury NZ	
Meridian Energy	
NewPower Energy	
Simply Energy	

5.1 Summary of the main submission points and themes

24. Submissions were supportive of updating the Procurement Plan and generally supported our specific drafting proposals.

25. For example, "Contact generally supports and agrees with the objectives of the need to change the existing Procurement Plan so that the System Operator (SO) can continue to meet its Principal Performance Objectives (PPOs)" and "acknowledge that updates are required to manage power system security …" Genesis Energy "support the System Operator undertaking this review to ensure the Ancillary Services Procurement Plan remains fit for purpose." Meridian: "The proposed changes appear broadly reasonable." New Power "supports the proposal to amend the Procurement Plan."

5.1.1 The main concerns that were raised

26. The main area of concern was that aspects of the proposals could result in higher compliance costs and higher costs could serve as a barrier to entering ancillary service contracts.

27. For example, Genesis Energy was concerned "some of the proposed changes … will add cost and administrative burden to ancillary service agents" as "Some the proposed changes will require additional work to price these ancillary services contracts by technical staff due to additional reporting and testing requirements (particularly to meet the requirements under BS and reserve response areas)." Meridian similarly submitted "some of these changes could result in significant costs for ancillary service providers, meaning potentially higher costs to Transpower, and ultimately consumers, to procure those services" and that the higher costs "… will raise barriers to entry and may deter parties from seeking to provide ancillary services."

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[3] Invitation to Comment: Draft Ancillary Services Procurement Plan 2025 (Closed) | Transpower

[4] A summary of the submissions and our responses are provided in Appendix A.

28. Almost all the concerns were in relation to two topics:

- Metering and data requirements – citing cost increases for service provision and technical limitations of installed equipment; and
- IL and Automatic Underfrequency Load Shedding (**AUFLS**) – citing beliefs changes will be too hard to manage, reduce IL), and therefore increase costs.

29. Most of the changes we are proposing will better line up the Procurement Plan with existing ancillary contract practices and the Code. This means the proposals won't result in a change or an increase in compliance or administrative costs, rather they just clarify and confirm existing practice. We acknowledge that some elements of the proposed changes will increase compliance costs – notably in relation to indications and measurements requirements for IL and pre- and post-event metering data for BESS – but consider that these changes are proportionate and justified. For example, we have made the most significant changes to reflect the changes in technology with the explicit provision in relation to BESS. The changes proposed will better accommodate BESS's characteristics in the Procurement Plan which will increase the pool of potential providers of ancillary services. This will increase competition for the provision of the services, delivering benefits for consumers, who ultimately pay for ancillary services.[5]

5.1.2 Matters raised that were out of scope

30. Some of the feedback raised issues that are outside of the review of the Procurement Plan. For example, New Power raised that they consider the review a missed opportunity to redesign all ancillary services from the ground up. Assessing the design and suitability of ancillary services is on the Future Security and Resilience (**FSR**) work programme but isn't something which can be delivered by the Procurement Plan alone.

31. Similarly, Genesis Energy's submission included that "One additional suggestion we have is for the SO to consider (with the EA) whether it needs the discretion to put in place day-ahead security contracts to bring on HLY Rankine units where Genesis does not intend to otherwise commit those units. We understand this would require a Code change." Again, nothing can be done about this as part of the Procurement Plan review process. We have highlighted Genesis' concerns for the Authority as a matter that could potentially be addressed in separate Authority/System Operator workstreams.

Sections 5.2, 5.3, and 5.4 list the changes made to the proposed amendments to the Procurement Plan after consultation and the reasons for the changes.

5.2 We have considered the feedback and made changes

32. We have reviewed submissions and made a number of amendments to our original proposal as listed below[6]. A full list of proposed changes can be found in Appendix C: Details of proposed changes to the Procurement Plan including costs and benefits or proposed changes.

[5] Refer to section 7.3 for more details.

[6] A summary of the submissions and our responses are provided in Appendix A.

33. Meridian Energy submitted that paragraph B106 conflicts with B108, saying the testing for each item of BS equipment must be at least once every 6 weeks, and B108 saying the System Operator may only require the Ancillary Service Agent to conduct a baseline test no more than once every year.

System Operator response: The wording has been updated to make clear the intention that testing will be no more than one additional test per rolling 12-month period. The testing programme for BS has not changed. Paragraph B106 refers to testing of BS equipment which is defined in the Procurement Plan as the diesel generators or auxiliary hydro plant capable of livening a BS generating unit isolated from the grid. The frequency of testing for BS equipment is every six weeks. Paragraph B108 refers to testing of BS, which is a Code defined term which refers to the service required to enable a generating unit that is isolated from the Grid to be made live and electrically connected to the Grid. The frequency of testing for BS is no more than one per year.

34. Genesis Energy sought clarification in relation to paragraph B106 requirements for BS equipment testing and notification after a change of equipment whether the changes will be required to go via the POCP.

System Operator response: We have updated the wording to make it clear that notification will be via e-mail to the System Operator mailbox.

35. Genesis Energy commented on the new timeframe of 15 business days for provision and verification of test data for BS – in relation to paragraph B112 requirements for BS testing.

System Operator response: The requirement for test data to be provided to the System Operator after a BS test is erroneously 5 business days in the draft Procurement Plan. This should be 15 days to be consistent with other ancillary services and current practices. There is no timeframe specified for the verification of performance.

36. Simply Energy questioned the clarity of paragraph B48.6: There may be unintended consequences of this paragraph as drafted. In practice the System Operator permits IL sites to remain armed at all times. This will mean for any Under-Frequency Event (UFE) where they are not dispatched, they will overdeliver and potentially be in breach of this new clause.

37. Enel X agreed with Simply Energy that the proposed paragraph is unclear in its drafting, and the link to clause 13.68(a) of the Code, which specifies that Ancillary Service Agents need not comply with dispatch instructions varying by less than 1 MW from the most recently followed instruction, is not immediately apparent.

System Operator response: We have revised the paragraph to ensure it is clear that over-provision will not be penalised at this stage. We note over-provision of IL is likely to pose issues for the System Operator at some stage in the near future e.g. for over-frequency. However, at this point in time, the System Operator does not intend to penalise or manage the over-provision.

38. Simply Energy submitted that "or otherwise agreed" should be added to paragraph B53 to allow for flexibility where mutually beneficial.

System Operator response: We agree with this suggestion and have amended the paragraph accordingly.

5.3 We have made changes

39. The requirement for the System Operator to manage frequency time error has been removed from the Code and we have removed references to this requirement. However, after reconsideration, we have decided to maintain a reasonable endeavours clause for the maintenance of frequency time error as close as possible to zero. This is a quality of performance measure that will support the System Operator to manage system frequency while changes are considered to frequency management[78].

5.4 We have deferred some matters

40. There are some matters raised in submissions which we did not have sufficient time to fully or appropriately consider. We have deferred these matters and may submit a separate, additional, proposal for amendment of the Procurement Plan once we have considered them further. In particular:

- some submissions raised issues about additional compliance costs we want to work through;
- some submissions raised questions about providers not being able to meet current contract requirements (including when they have previously done so) and we want to better understand their points raised;
- we want to better understand some of the participants concerns e.g, in relation to safety concerns; and
- some of our proposals need additional rework based on submissions e.g, in relation to workability issues.

41. A full list of deferred matters can be found in Appendix B.

5.5 Next steps for deferred matters

42. We intend to initially engage with submitters on a bilateral basis on matters we have deferred in response to their submissions. Various of the issues we have listed above for deferral were individual-submitter specific for which wider engagement would not be necessary or beneficial given the consultation we have already undertaken.

43. We will assess whether additional consultation would be desirable or necessary prior to submitting a second set of proposed changes to the Procurement Plan to the Authority.

44. We would undertake a second round of consultation if we consider it would be useful or necessary, including if our revised proposals end-up being materially different from those we initially consulted on and/or involved new information that other stakeholders have not had an opportunity to comment on.

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7 Decision_paper_Potential_solutions_for_peak_electricity_capacity_issues.pdf

8 Promoting reliable electricity supply: Frequency-related Code amendment proposals | Our consultations | Our projects | Electricity Authority

6 Proposed amendments to the Procurement Plan

45. We propose a number of minor amendments to the Procurement Plan, ranging from technical drafting changes and refinements to improvements aimed at addressing issues we have identified.

46. The draft changes we are proposing include:

- changes in relation to all services e.g. added requirements to have trained operators of the systems in addition to the existing provision around maintenance of the physical assets,
- changes to the provisions relating to OFR e.g. reduced frequency of periodic testing for OFR equipment, where OFR is provided by tripping,
- changes relating to VS where needed to maintain consistency with other ancillary services – noting that no providers are currently contracted for this service, and
- changes relating to FK e.g. all FK is now subject to 6 monthly testing.

6.1 All services

47. The key changes include:

- added requirements to have trained operators of the systems in addition to the existing provision around maintenance of the physical assets
- change of process when Procurement Plan is amended – references to relevant Code sections updated
- outages – reviewed across all services to ensure wording in the Procurement Plan is aligned with actual practice/expectations, and consistent between services.

6.2 Over Frequency Reserves

48. The key changes include:

- added requirement for pre-contract technical review
- added specifications for service provision by BESS through ramping output rather than tripping the asset
- added standard ancillary service provision outage conditions under which outages will not be considered in assessing compliance:
    - requirement for Planned Outage Coordination Process (POCP9) to accurately reflect all planned outages
- clarified testing requirements:

[9] Planned Outage Coordination Process (POCP) is an application which provides a mechanism for Asset Owners to provide information on their outages to the System Operator Customer Portal - POCP.

- new requirements/consideration of OFR provided by fast ramping or BESS, including requirement to test annually
- reduced frequency of periodic testing for OFR equipment, where OFR is provided by tripping
- introduction of interim testing of indications and controls and an interim review of each trip circuit and relay configuration
- added requirement to perform testing after any change to equipment used to provide OFR
- trip circuit operation times included in allowable time to disconnect generating units
- trip circuit operation times to be tested on the same schedule as relay equipment but are now allowed to be carried out either alongside other tests or separately
- new requirement for data to be provided to verify performance requirements were met during an event if seeking exemption from testing
- introduction of requirement to provide Test Form summarising test results.

6.3 Instantaneous Reserves

49. The key changes include:

- for BESS larger than 5 MW, a dynamic response which is proportional to grid frequency is required which will be assessed using:
  - reference to each BESS's Asset Capability Statement and the modelled response derived from the same
  - the frequency profile of the event
  - the operating state of the BESS immediately prior to the event
  - the quantity of IR dispatched
- BESS of no more than 5 MW may provide a standard IL type response which is triggered when the frequency drops to an agreed setpoint or a proportional response as above:
  - Note that an Asset Capability Statement and modelled response will not be required for an IL type response
  - removed requirement for BESS larger than 5 MW to await load restoration instruction after an event
- speed governor settings must be agreed with the System Operator and not changed without System Operator approval
- clarification of the monitoring requirements for provision of IR:
  - IL event data must be provided in the format specified on the System Operator's website unless agreed with the System Operator
- clarification of the offer requirements of IR:
  - to only include quantities that have been tested and are covered in the provider's contract
  - to exclude AUFLS or any other load shedding scheme quantities
- clarification of the testing requirements for IR:
  - addition of a requirement for the System Operator to allow a -1 MW tolerance for assessment of compliance during an event

- test or performance data provided to the System Operator must include an indication of any time delays that occur in the measurement systems
- the contracted value of IL may be increased based on performance during an event.

6.4 Black Start

50. The key changes include:

- alignment with the BS provision contracts regarding using reasonable endeavours to provide additional services if requested by the System Operator:
  - Payment for delivery of such services to be at reasonable costs
- clarifying multiple BS generating units can operate in sequence to provide the service
- clarification of testing and monitoring requirements:
  - requirement to perform testing after any change to equipment used to provide BS
  - requirement to notify the System Operator of the outcome of six weekly auxiliary plant testing
  - testing requirements updated to align with contract requirements already in place.

6.5 Voltage Support

51. The key changes include:

- changes only where needed to maintain consistency with other ancillary services.

6.6 Frequency Keeping

52. The key changes include:

- removal of references to 'time error' as time error management has been removed from the Code
- back-up Single Frequency Keeping (SFK) to be available continuously except as allowed for by 'outages' or when not dispatched to generate electricity
  - SFK is now subject to MW bands (previously only applied to Multiple Frequency Keeping (**MFK**), now applies to both)
  - consideration of block dispatch groups, station dispatch groups and group loads of assets – these must meet SFK requirements when offering SFK
- added standard ancillary service provision outage conditions:
  - Note this only applies to SFK, not MFK, as MFK is procured half hourly and does not have an availability fee associated
  - requirement added for Ancillary Service Agents to keep POCP up to date (regarding outages)
- clarification of the testing requirements:

- All FK is now subject to 6 monthly testing. This was previously 6 monthly for SFK and 4 yearly for MFK
- FK data is now to be held for 30 business days (previously 15 business days) from the end of the calendar month
- removal of periodic testing of trained operators
- requirement to perform testing after any change to equipment used to provide FK.

- clarified offer requirements for MFK:
  - aligned Procurement Plan provisions concerning MFK offers, including the addition of a gate closure for FK offers, with the Code's treatment of IR offers (Note: FK offers are not included in the Code)
  - stipulated all MFK offer submissions, revisions, and cancellations are to be made via WITS
- added requirement for offers to be made only where testing requirements have been met:
  - Note this is already reflected in contracts, so this update is only to keep the Procurement Plan in line with actual practices.

7 Regulatory Statement for the proposed amendments

7.1 Objectives of the proposed amendments

53. The Procurement Plan sets out the process the System Operator must use reasonable endeavours to follow when it procures ancillary services.

54. The objective of reviewing the Procurement Plan is to ensure ancillary services continue to be procured competitively, reliably and efficiently. More specifically, the objectives of the proposed Procurement Plan amendments include:

- Improved treatment of BESS to better reflect their characteristics and abilities. Giving more clarity to BESS owners and developers concerning expectations for ancillary service participation and to better enable a secure and reliable power system,
- Clarification of performance, testing, and monitoring provisions to provide certainty to ancillary service providers to improve the efficiency of ancillary service procurement and to enable better investment decisions to be made,
- Alignment with:
  - Code changes made since the last Procurement Plan update effective 3 May 2022.
  - Ancillary services contracts.
  - Current ancillary service procurement practices.
- Drafting improvements to increase the usability of the Procurement Plan, and
- Compliance with our Code based obligation for a 2 yearly review of the Procurement Plan.

7.2 The proposed amendments

55. The drafting of the proposed amendment is shown in the track-change version of the Procurement Plan included as Annex 1 of this consultation.

7.3 The benefits are expected to outweigh the costs

56. Assessing the effect of proposed amendments is complex and not easily quantifiable. We consider that a quantitative analysis of the costs and benefits of the proposal is not practicable.

57. Mercury and New Power explicitly supported our view that a quantified Cost Benefit Analysis should not be undertaken. Enel X was the only submitter to question our view that quantitative analysis is not practical but did not offer any suggestions about how quantitative analysis could be undertaken or why it questioned our view. We remain of the view that a quantified Cost Benefit Analysis would not be practicable and, regardless, do not consider it would be proportionate given other System Operator priorities and resource constraints. We do not consider that there have been any changes that mean a qualitative approach – consistent with our previous approach – would no longer be suitable.

58. We have therefore assessed the benefits of our proposed amendments relative to the status quo on a qualitative basis. This is consistent with the approach we and the Authority adopted for the 2021 Procurement Plan review when we respectively consulted on the last set of changes made to the Plan.

59. Our qualitative analysis suggests the proposal's benefits outweigh the costs. For example, we propose to decrease the frequency with which an Ancillary Service Agent must conduct an end-to-end test of each item of equipment used in the provision of OFR including relay equipment and circuit breakers from at least every 24 months to at least once every 48 months. We anticipate this will reduce participants' compliance requirements without unduly affecting performance of the service.

60. The proposed requirement that the Ancillary Service Agent must provide the System Operator with the corresponding data for verification of meeting the performance requirements for the purpose of exemption from testing will allow the System Operator to monitor compliance more accurately.

61. One of the most significant changes is to reflect the changes in technology used in the electricity sector with explicit provision in relation to BESS.

62. BESS is a comparatively new technology of which there are several hundred megawatts currently being connected to the grid and more coming – to both the grid and distribution networks. The changes proposed to better reflect the unique characteristics of BESS in the procurement of ancillary services will realise benefits through better utilisation of the investment made in BESS. It will also provide greater certainty to future investment decisions regarding BESS specifications in the design and build phases.

63. Better accommodation of BESS's characteristics in the Procurement Plan will increase the pool of potential providers of ancillary services. This will increase competition for the provision of the services, delivering benefits for consumers, who ultimately pay for ancillary services. Further, increasing the pool of potential providers will decrease the likelihood of shortages of ancillary service provision, such as shortfalls in IR. Ancillary services are crucial to the security

and reliability of the power system, and shortages of these services pose real risks to the provision of safe, secure, and reliable electricity supply to consumers.

64. We consider that improved Procurement Plan drafting and alignment with the Code, ancillary services contracts, and current ancillary services procurement practices will deliver efficiencies for current and prospective providers of ancillary services. This will reduce costs of existing providers and may lead to market entry by prospective providers.

7.4 The proposal is preferred to other options

65. We consider that the current Procurement Plan (the status quo) is out-of-date and no longer suitable. In developing our proposed option, we considered other potential variants and options for amending the Procurement Plan, but these would have principally resulted in a more highly prescriptive and detailed Procurement Plan. After considering submissions, we do not think a more prescriptive approach would be supported given the feedback we received that we should carefully consider the compliance costs of the proposals.

66. We did not receive any submissions suggesting viable alternative options.

67. Based on our experience and expertise, we consider that this would have required a lot of additional work for little or no benefit; particularly given how quickly technology, the power system etc is changing. The updated proposals for amending the Procurement Plan are based on our experience and expertise in the role of System Operator and feedback we have received from stakeholders.

7.5 The proposal complies with section 32(1) of the Act

68. The Authority's main objective under section 15(1) of the Act is to promote competition in, reliable supply by, and efficient operation of, the electricity industry for the long-term benefit of consumers. The Authority's additional objective under section 15(2) of the Act is to protect the interests of domestic and small business consumers in relation to their supply of electricity. The additional objective only applies, however, to the Authority's activities in relation to the dealings between participants and domestic and small business consumers, under section 32(3).

69. Section 32(1) of the Act provides that the Code may contain any provisions that are consistent with the Authority's objectives and are necessary or desirable to promote one or all of the matters listed in section 32(1).

70. We raised the question of whether our proposed changes comply with section 32(1) and got positive confirmation from Genesis Energy, Mercury and New Power (qualified with "it appears") with no dissenting submitters.

71. We consider that the proposed amendments comply with section 32(1) of the Act because they would help to promote the reliable supply by, and the efficient operation of, the electricity industry.

72. Ancillary services are critical to the reliable supply and efficient operation of the electricity system. For example, IR mean consumers are not impacted when a generation unit trips. Equally, they allow for the efficient use of large generation units and the HVDC to transfer

least cost generation between the two islands. In the absence of IR generation unit output, HVDC transfer levels would be limited to ensure disruption to the power system did not occur in the event of a tripping. Similarly, all ancillary services play a role in the efficient operation of the power system and its delivery of a safe, secure, and reliable supply of electricity to consumers. Therefore, improvements to the procurement of ancillary services, as discussed in the cost and benefits section below, directly contribute to promoting competition, reliability and efficiency as required under sections 15(1) and 32(1).

TRANSPOWER

Appendix A: Detailed Consultation Comments and Responses

Over Frequency Reserves (OFR)

Organisation	Comment	Transpower's Response
Genesis Energy	We caution that BESS capability to perform over frequency keeping (OFR) may be overstated as it is dependent on charge / discharge status at the time.	The System Operator is aware that BESS capability may be limited in its ability to perform OFR but the System Operator does recommend existing technology-specific barriers to entry for new technologies should be addressed as a priority to enable participation in existing energy and ancillary services markets.

Instantaneous Reserves (IR)

Organisation	Comment	Transpower's Response
Meridian Energy	The changes proposed to the monitoring requirements for instantaneous reserve at new clause B51.2 of the draft Procurement Plan would be onerous and could lead to significant cost increases for Meridian to provide this service. The proposed requirement is that: B51. The ancillary service agent must provide monitoring equipment that accurately measures and records the	The Procurement Plan sets out the minimum technical requirements for providing ancillary services. Any increases to minimum technical requirements are required to be set in the Procurement Plan. Any deviations to these technical requirements will be outlined in the individual ancillary service procurement contracts. Any increases to minimum requirements cannot be set on a case-by-case basis with Ancillary Service Agents as these are minimum technical requirements required for the System Operator to meet their PPOs.

Organisation	Comment	Transpower's Response
	instantaneous reserve response (in MW) from the ancillary service agent's IR equipment: B51.2 in the case of monitoring equipment used for generation reserve including battery energy storage systems: B51.2.1 for fast instantaneous reserve, at no greater than 0.1 second intervals commencing not less than 5 minutes prior to, and continuing until 5 minutes after, the UFE time; and B51.2.2 for sustained instantaneous reserve, at no greater than 0.1 second intervals commencing not less than 5 minutes prior to, and continuing until 60 seconds after, the UFE time, and then at no greater than 1 second intervals until 15 minutes after, the UFE time; and Meridian's revenue meters that carry out such recording are not likely capable of recording at this frequency of interval or for long enough before and after any under frequency event (UFE). We may be able to reconfigure our revenue meters but we do not currently know their limitations and to what extent reconfiguration might enable compliance with this increased monitoring requirement. In addition, higher frequency data would create larger file sizes and lead to data handling difficulties such as limitations on data transfer. This could add further costs. It is not clear to Meridian what benefit would result from this proposed change. To our knowledge, the data currently provided for monitoring purposes is sufficient. Meridian encourages Transpower to use the Procurement Plan to set out minimum monitoring requirements rather than aspirational data logging. Any increase on minimum	The System Operator is aware that some Ancillary Service Agents (if not most) currently have longer data sets already available and that others may only require reconfiguration of monitoring equipment to be compliant with these new requirements. The objective of these increases is to completely avoid any timestamp issues and to enable visibility of the reserve response as distinct from any other pre-event plant ramping. The System Operator does not currently have the ability to monitor ramp rates for compliance with ancillary services procurement contracts. Event response data is often offset and it is difficult to determine what is pre-event ramping and what is the actual generator response to an event. There have been many instances where one minute of pre-event data has not been sufficient to determine whether the response to the event was adequate and the System Operator has had to request further data from Ancillary Service Agents. While the System Operator acknowledges there may be additional costs borne by the provider and ultimately the end consumers, the System Operator is required to ensure they are getting value for money. In order to achieve this, the System Operator needs to able to determine generator compliance during an event. While to completely avoid any potential time stamping issues five minutes of pre- and post-event data is optimal, the System Operator is considering a reduced timeframe for pre- and post-event data capture that meets the needs of the System Operator. In response to consultation feedback, the System Operator will defer this change in order to determine how much of the generator fleet can reconfigure their equipment and whether a reduced timeframe for pre- and post- event data meets the needs of the System Operator.

Organisation	Comment	Transpower's Response
	requirements could be agreed with providers on a case-by-case basis through their contracts.	
Genesis Energy	Under proposed new paragraph B47, requirement for loads greater than 10 MW at a single point of connection to the grid, or greater than 20 MW at an aggregated location, to have analogue indications of the net & gross import & export indications. And where demand or supply changes data for those points.	See response to Simply Energy below.
Genesis Energy	Another consideration is whether there should be any differentiation between sources of reserve capability, for example BESS vs non-BESS.	The FSR Roadmap includes an investigation of changes to ancillary services. https://www.ea.govt.nz/documents/1980/Covering-Paper-FSR-Final-Roadmap-and-Phase-Three.pdf Further amendments to the Code, market system and Procurement Plan may be made as a result of this work.
Contact Energy	Appendix B – Key technical requirements for ancillary services a) Clause B52 refers to holding data for at least 60 days but generally the SO will request event data within 14 business days of an event, what is the rationale on this requirement? We suggest that this to be re-drafted to "30 business days" to align with clause B18 removing any unnecessary overheads on data storage equipment.	There is an incumbency on all ancillary services providers to provide event data within the required timeframes after an event. However, the System Operator is finding it problematic to attain event data and test data from ancillary service providers within the required timeframes. The objective of this proposed change was to provide comfort that event data would remain available even in the case of non-compliance with data provision timeframes. The requirement to provide event data within 5 business days from the data request will not change, nor will the timeframes for sending data, so providers are still able to provide the data within current timeframes. Participants have a vested interest themselves to correspond within the required timeframes to minimise data retention costs. There should be no additional overheads on data storage as data sets will remain manageable in size. In response to this feedback, the System Operator will defer this change in order to undertake further investigation of alternative options to address

Organisation	Comment	Transpower's Response
		this. Some of this investigation may relate to compliance options such as reduced payment to ensure that data is provided within the required timeframes. These compliance obligations would nullify the requirement to hold the data for the longer timeframes. Without the addition of a compliance obligation in the Code, the System Operator may be limited to using additional contractual management options such as the ability to reduce payment.
Simply Energy	Clause B47: Questions requesting clarity on these new clauses remained unanswered. Hard to provide specific feedback regarding this new clause as we are not sure what new requirements are being imposed or the impacts of these unknown requirements. We will provide more information in the cross-submission process once the questions have been answered. See questions received from Simply Energy later in this section.	As the New Zealand power system is being worked harder due to increasing electricity demand and the transition to a more renewable energy system, the need for accurate system security information is critical. The Transient Security Assessment Tool (TSAT) is a tool used by Transpower to analyse the security of the power system. Unlike the Reserve Management Tool which calculates the reserve requirements based on schedule information, TSAT requires accurate real-time data on available load to inform real time system security. Without accurate data, TSAT cannot calculate the amount of load available as underfrequency reserve and therefore the risk of post event under or over-frequency and therefore the potential for cascade failure of the power system. Currently the System Operator relies on IL offers and GXP level data to inform available load. The System Operator is therefore reliant on provider's assurances that reserves will be available during an event (as per the IL offer process) however, the System Operator has no visibility of non-delivery until post event analysis is complete in the subsequent weeks. If there is an error in offers e.g. they are not updated or they do not reflect what will be delivered, or if there is non-delivery of reserves for any reason, the System Operator does not have visibility of this non-delivery and therefore the level of risk to the power system. This not only makes managing the power system challenging but has the potential to lead to cascade failure.

Organisation	Comment	Transpower's Response
		Currently TSAT tool assumes that what is dispatched (not load that has been armed) will have tripped in order to calculate system risk and to determine the amount of OFR required and/or load that may need to be disarmed. This poses additional over-delivery risk as the TSAT tool currently cannot monitor the level of delivery from IL, and greater amounts of IL will be dispatched than need to be. The larger the difference between the actual and estimated load tripping, the larger the unknown IL behaviour and the bigger the risk. Additionally, the risk of over provision of over frequency arming may result. These risks are corrected with indications and measurements of contracted loads. Additionally, if IL offers are not updated during an event, the System Operator has no visibility of the contracted load which remains available to trip after an event. The requirement for measurements and indications of the net load available to respond to an event allows the System Operator to have confidence in the effectiveness of their TSAT risk assessment for system security and that IL will be available to trip in an event and has in fact done so. A single point of connection is a GXP. Analogue indications are MW indications of the amount of contracted load available to respond to an under-frequency event. Net load is the amount of contracted load which is available to respond to an event. Gross load includes additional load(s) that would be disconnected which would add no benefit to managing the power system. With load, the two values will almost always be the same. In response to feedback from industry, the System Operator is considering removing the requirement for Load gross MW measurements. There are two options for meeting the analogue indications requirement, which are live SCADA data or smart meter data. SCADA telemetered indications which will be required to be set up in a similar fashion to SCADA indications and measurements for generators as per the Code but will only require Load net MW and an armed for tripping status. Both

Organisation	Comment	Transpower's Response
		telemetered and smart meter data options will require connection to Transpower's systems, either via ICCP or webservices and an accuracy of ±2% unless otherwise agreed with the System Operator. In response to feedback from industry, the System Operator is considering allowing a dynamic calculation of the net MW available for tripping with the same connection and accuracy requirements. Customers who are directly connected to Transpower and where Transpower already have GXP SCADA in place will be subjected to additional requirements. GXP level data does not allow for adequate estimation of the contracted load(s) available to trip. Additionally, Transpower GXP data may not meet the performance obligations for monitoring equipment imposed on Ancillary Service Agents. In most cases net and gross load will be the same. The System Operator has decided to defer this change in order to consider whether a dynamic calculation or algorithm may be used in lieu of live SCADA data or smart meter data if the dynamic calculation is approved on or agreed with the System Operator. While the System Operator understands concerns around this change, there was a level of surprise around some of the consultation responses from companies which have indications and measurements fed to control rooms to ensure they have visibility in real time of what they have armed and available especially where new participants are willing to take on the additional costs of this change. Most of the data required will be available via the load smart meters and the provision of data will likely reduce post event data requirements. There will likely be a transition period for Ancillary Services Agents to meet these requirements.
Simply Energy	Clause B48.4 and B51.3.3: Questions requesting clarity on these new clauses remained unanswered.	In response to industry feedback, the System Operator will defer this change in order to understand concerns raised by submitters and to investigate how much of the IL fleet this may affect, and whether "grand mothering" may be appropriate for some older sites on a legacy basis.

Organisation	Comment	Transpower's Response
	On almost all Simply IL resources, we measure an incomer to an industrial site which has a mix of participating and non-participating assets. We do not measure every non-participating asset at a site and it would not be practical to do so. We accept there is a risk that a nonparticipating asset may affect the measured pre/post consumption data at a site and have a robust process to ensure that we account for that in how much load we offer at each site individually before we aggregate all sites in an offer. This clause, as written currently, would make it economically unviable for a lot of the existing IL resources in the market to participate, and would introduce a significant barrier for developing new IL. See questions received from Simply Energy later in this section.46	Paragraph B48.4 requires that data be available to enable a determination of the actual response of the contracted loads. The objective of this requirement is to mitigate the following: contracted loads may not be responding to an event and the System Operator does not have visibility of this as auxiliary sites may be responding. overlap or double counting of IL. Sites may be included at both the GXP level and at the site level which may result in adverse outcomes for non-network solutions and other programs of work. Recent changes around controllable load management for retailers, EDBs and aggregators may exacerbate these issues. The System Operator must ensure that New Zealand consumers are receiving services they are paying for by ensuring that physical delivery happens. Currently we do not account for any GXP level load(s) being part of another IL response. This needs to be rectified. Paragraph B51.3.3 states that monitoring equipment must accurately measure and records the response from the equipment " where possible, net of any demand or supply response from other sources at the same point of connection to the grid" so it is not mandatory.
Simply Energy	Clause B48.6: Questions requesting clarity on this new clause remained unanswered. There may be unintended consequences of this clause as drafted. In practice the System Operator permits IL sites to remain armed at all times. This will mean for any UFE where they are not dispatched, they will over deliver and potentially be in breach of this new clause.	The over provision of IL is likely to pose issues for the System Operator at some stage in the near future e.g. for over frequency. However, at this point in time the System Operator does not intend to penalise or manage the over provision of IL. The Procurement Plan draft has been reworked to ensure that this is clear.

Organisation	Comment	Transpower's Response
	Over delivery has long been accepted by the SO. Will this continue? Or will you start issuing compliance breaches if Providers deliver >1MW more than dispatched? See questions received from Simply Energy later in this section.	
Simply Energy	Clause B50.4.1: 50+/-.1Hz is too onerous for the NZ grid for 60 seconds. Should be expanded to +/-0.2Hz. Unclear how 60s of pre-event data will solve the timing issue. We believe that BESS should be subject to the same GPS synced time constraint as IL.	The System Operator will defer this change to consider whether this methodology is workable. This requirement is an existing requirement for IL in the Procurement Plan. The System Operator needs to understand how this relates to BESS but wishes to remind providers that this is an existing Procurement Plan requirement. BESS is subject to the same GPS synced time constraint as IL.
Simply Energy	Clause B1.2 (sic): New Clause Requiring 10 mins plus of 100ms data This new requirement seems far in excess of what will be required and will impose considerable limitations on the meteorology that can be used to record load at this type of resource due to the local storage requirements that will be required within the meter. This will impose significant additional costs to participation. The answer to our question that has been published online only references the 5 minutes of pre-event data. Clause 51.1.2.1 requires 5 minutes of pre-event and 5 minutes of post-event data. That is 600s of 100ms data recording frequency power and time. Or 18,000 points of data. This entire data set must be able to be stored locally in the event that communication errors prevent the data being sent over the air to our software platform. There are no limitations regarding how much we can store on our software platform,	Because there is no paragraph B51.1.2.1, the System Operator previously interpreted the referred paragraph number as paragraph B51.1.2 which relates to IL. The post-event requirements for data capture for IL have not changed from the current Procurement Plan requirements for monitoring equipment (B43.2) to capture the reserve response until the reserve response ends which is defined in the Code for SIR as at least 15 minutes (unless a new dispatch instruction is given beforehand). The requirement for 5 minutes of post event FIR data is to avoid timestamp issues which are often present in generator data and to capture plant ramp times as GPS clocks are not always accurate. See further details in response to Meridian above. The System Operator require 100ms data to ensure that BESS (generators) are compliant with the performance requirements as set out in B50. The resolution of the data must be adequate to provide visibility of the response of the BESS and therefore this requirement is a function of the speed at which the equipment can respond in an event. Some equipment

Organisation	Comment	Transpower's Response
	but there are practical limitations regarding how much can be stored locally. The justification provided is "to avoid timestamp issues which are often present in generator data and to capture plant ramp times" There is already a requirement in the procurement doc that data be timestamped using GPS to ensure accuracy; and We do not believe ramp times require 100ms accuracy We would like to engage further on this topic before it is encoded within the Procurement Plan	is capable of responding in full in 100ms. The System Operator must be able to determine when the equipment started to respond. For slower equipment a dispensation may be appropriate.
Simply Energy	Clause B53: New Clause related to submission templates Recommend adding "or otherwise agreed" to this clause to allow for flexibility where mutually beneficial. We would also like to see some restrictions as to how and when the System Operator changes the template, as this has happened multiple times in the last 2 years.	The System Operator has updated the testing template for IL to allow for a level of automation in processing these changes as there are numerous additions of individual sites each month. There have not been numerous changes to the event data template but rather the System Operator is working with providers to ensure that data is provided in line with the current Procurement Plan and Code obligations. The System Operator is currently working through automating part of the Under-Frequency Event process and there will be further changes required to allow for this however the data requirements will align with those set out in the Procurement Plan and Code. The Procurement Plan wording has been amended to "as otherwise agreed" to capture where mutually beneficial.
Simply Energy	Clause B59+ B59.1 + B60 + B60.1.1+ B60.1.2: All are new clauses related to AUFLS Response to questions indicate the intent is not to limit Instantaneous Reserve and obligation will be with the	The intent of these updates is to ensure the reliable and efficient provision of both IR and AUFLS. The updates reflect both existing obligations under the current ancillary service contracts (see paragraph 3.2 of the Instantaneous Reserve schedule) and the Code. We have included these changes in the Procurement Plan to provide consistency between the ancillary services documentation and to draw attention to the Code

Organisation	Comment	Transpower's Response
	AUFLS provider to ensure any IR on their feeders is excluded from their calculations. Overall, it feels like the Procurement Plan for Ancillary Services is not the right place to manage considerations for AUFLS compliance. Ensuring any Instantaneous Reserves are excluded from AUFLS calculations and compliance should be managed within the AUFLS technical requirements (ATRs). IR providers must advise an EDB of any new IL load contracted to the SO. So the EDB will always be aware of the loads and feeders that have participating IL. However, as an Ancillary services agent we are never aware of what feeders have been allocated as an AUFLS feeder. The current drafting of this clause has material impacts in the ability for new IL to be built. It introduces both a major barrier and risk to an Ancillary services agent, that at any point an EDB could reclassify a feeder that supplies an IL resource as an AUFLS feeder. That would force the customer and Ancillary services agent to stop offering that customers load as IL to the market. AUFLS providers have alternative options to meet their requirements, so if ATRs managed correctly, system security is not at risk. We do not believe the procurement plan should put a limitation on IR agents, other than to ensure that the EDB is aware that the load is participating as IL and should be removed from their AUFLS calculations.	obligations. We do not believe any additional obligations or restrictions have been placed by the inclusion of these updates. The existing Code obligations require: The connected asset owner (EDB) to calculate demand net of IL (Sch. 8.3 Technical Code B cl. 7(7)), and Ancillary Service Agents providing IL to inform the connected asset owner (EDB) of the details of the IL on their network. In combination with Sch. 8.3 Technical Code B cl. 7(17) these obligations are designed to ensure AUFLS provisions requirements are met. Through the provisions within the IR contracts the System Operator seeks to ensure the product they are procuring will deliver as required and as paid for. This is an obligation on the System Operator and is not unreasonable. Submitters appear to have misinterpreted aspects of the changes believing the changes to be more impactful than they are. Specifically: the impacts of B59 and B60 is limited to a trading period by trading period assessment not in perpetuity. In this way they are no more onerous than the Code obligations around the accuracy of IR offers. Again, this is not unreasonable, physical delivery is a key requirement of all ancillary services, and the impact of B59 and B60 is limited by B60.1 only applying to 'IR equipment'. IL would only be excluded from participation if the IR equipment was also the delivery mechanism for AUFLS or another demand response scheme. For example, if a connected asset owner provides AUFLS by arming relays on distribution feeders IL could be provided from load on that feeder if the 'IR equipment' used to deliver the IL was distinct to the AUFLS relay on the feeder.

Organisation	Comment	Transpower's Response
		The System Operator acknowledges the drafting of B60 could be improved. We have amended the drafting for inclusion in our change recommendation to: B60. For the avoidance of doubt, the Ancillary Service Agent may not offer any IR equipment that: B60.1 has been armed for AUFLS or which is armed for any other load shedding agreement; or B60.2 may be dynamically/remotely armed to meet the AUFLS obligations by the network owner.
Simply Energy	Clause B59.2: New Clause related to participation in other Demand Response programmes Questions requesting clarity on this new clause remained unanswered. Additional definitions might be required here. We would expect that any load that has signed up to a non-transmission solution (NTS), or EDB Demand Response programme, such as the proposed Upper South Island NTS or Powerco Mount Maunganui NTS, would also be able to be bid into Instantaneous Reserves until such time as it is called on via those alternative programmes We understand the load cannot do both at the same point in time, so once called by the NTS, the load would be removed from the IR bids. In this scenario, the consideration is the bid volumes provided need to be kept accurate, not whether the asset is participating in any alternative programmes which may call on that load to be shed.	This question was answered on the website prior to consultation close. This paragraph is already in the current ancillary service procurement contracts. Ancillary Service Agents will need to manage their different contracts and obligations and meet their bid and offer accuracy obligations in Code. Hot water will not be excluded from being offered as reserves.

Organisation	Comment	Transpower's Response
	NB: This current drafting would also stop any hot water from being bid as IL, as via differencing bids all Hot Water is mandated to be available for load shedding to the SO to manage a scarcity pricing event. Additionally, a large chunk of this hot water is now also participating in daily load shifting managed by Retailers.	
Simply Energy	Clause B64 and definition of "aggregated load": New Clause related to Testing for IL Questions requesting clarity on this new clause remained unanswered. In our situation we have Independent Resources that operate and are assessed and reported independently from each other. When bidding via WITS, we do aggregate them and bid them at a single node. Are these supposed to be captured by the new definition and associated Clause B64 Do you mean this new definition to capture Industrial sites that may have multiple feeders to site (i.e. Multiple ICPs), but operate from a control perspective as a single site? Please provide clarity as to whether these examples are expected to be tested every 12 or 24 months: Example 1: Industrial site submitted to SO and assessed as a single resource. Supplied via a ring main (2 ICPs) but a single customer control system and single set of IR equipment. Example 2: 50 Independently assessed and approved "resources" that are aggregated and bid at a single North Island node (i.e. the Simply Portfolio).	The intention of this change is to ensure that loads which are not tested at the individual resource be tested more frequently than loads which are tested at the individual resource. The System Operator is concerned with the level of contractual non-compliance and failure of delivery of reserves in past events. Increasing the testing regime for loads which are tested at the GXP will add an additional measure of assurance for the System Operator. In response to consultation feedback, the System Operator will defer this change in order to determine whether the change adequately captures the intention and if a rework of the paragraph is required so that the thresholds for testing are based on testing rather than contracting locations.

Organisation	Comment	Transpower's Response
	See questions received from Simply Energy later in this section.	
Simply Energy	Clause B72: "Time delay" Please provide further clarity to what you mean by "time delay"? Is this in reference to the "hold delay"?	Time delays include hold delays or other time delays in the response that occur in the measurement systems such as sampling cycle or sampling rate.

Black Start (BS)

Organisation	Comment	Transpower's Response
Meridian Energy	Increased data logging requirements The changes proposed to the testing requirements for black start at new clause B111 of the draft Procurement Plan would also be onerous and could lead to significant cost increases for Meridian to provide this service. The proposed requirement is that: B111. The ancillary service agent must ensure that during a baseline test or on-demand test of black start, the monitoring equipment accurately measures and records the active power, active power setpoint, reactive power, generator speed, generator terminal voltage, generator voltage setpoint and gate position for the black start generating unit. This data must: B111.1 be measured and recorded (in a time tagged manner) over intervals no greater than 0.02 seconds;	The testing requirements for BS in paragraph B111 have not changed from the current ancillary service procurement contract requirements. Providers must ensure that they can meet the testing requirements agreed to in their individual ancillary services procurement contracts. The Procurement Plan sets out the minimum technical requirements for providing ancillary services. Any deviations to these technical requirements will be outlined in the individual ancillary service procurement contracts. Meridian have met the technical requirements in previous BS testing. In response to consultation feedback, the System Operator is deferring this change in order to determine if a data logger can be used to record setpoints, generator speed, and gate position at 100ms.

Organisation	Comment	Transpower's Response
	B111.2 commence not less than 6 seconds prior to the test and ending not less than 60 seconds after the response has stabilised to a steady state; and B111.3 be held by the ancillary service agent for a period of not less than 2 years. Meridian logs setpoints, generator speed, and gate position at 100ms (not 20ms as proposed) because this data is recorded internally in the PLC of a generator unit, not via an external datalogger. Meridian suggests this clause be amended to required recording of electrical signals at 20ms and all other signals at 100ms for practicality.	
Meridian Energy	Meridian also seeks clarification in the drafting of the proposed amendment that the monitoring requirements and high-speed (20ms) data logging is only required for one generator unit (not all at the station) as this is done via a manually connected external datalogger.	During a baseline test or on-demand test, the monitoring equipment must measure and record the required data at each unit which is tested for BS. The number of units tested must be agreed with the System Operator. The change has been deferred as detailed above.
Meridian Energy	Alternatively, Transpower could consider not including this change in the Procurement Plan. Recording requirements could instead be agreed with service providers through the tender and contracting process. This could take the form of a Schedule of data logging and equipment testing requirements agreed by the parties based on the specifics of each provider.	The Procurement Plan sets out the minimum technical requirements needed to ensure that the System Operator can meet their PPOs. Any deviations to these technical requirements will be outlined in the individual ancillary service procurement contracts. The System Operator will consider adding an appendix to capture the data logging and equipment capabilities of the individual stations however the Procurement Plan will continue to set the minimum requirements.
Meridian Energy	Clarification of baseline test requirements In Meridian's opinion, clause B109 in the draft Procurement Plan should be amended to clarify that a baseline test or on-demand test of black start need not require a full station	The testing requirements for BS testing have not changed from the current ancillary services Procurement Plan (current paragraph B86) therefore the costs of a full station shutdown are assumed to be already included in previous ancillary services tender submissions.

Organisation	Comment	Transpower's Response
	shutdown if the provider is able to otherwise demonstrate that the black start equipment is able to start without power being obtained from the grid or any local network. The current drafting specifying that a full station shutdown will be required "unless the system operator determines otherwise" leaves too much scope for an individual exercising that discretion to impose far greater costs on the provider for a full station shutdown. There is a significant difference between a baseline test of Aviemore station's black start capability as opposed to Aviemore's diesel generator. In the absence of a clarification that reduces that discretion, Meridian may need to build the cost of a full station shutdown into future black start tenders. Alternatively, Meridian would seek that any future ancillary service contract for black start set out how Transpower's discretion will be exercised by agreeing what a baseline test will involve.	The Procurement Plan sets out the minimum requirements for BS testing so Ancillary Service Agents must already be meeting these requirements. Discretion is applied consistently in that the minimum requirements for testing must be met by all providers and any deviations from this must still demonstrate performance meets these minimum requirements. There may be other instances where the System Operator determines that a full station shutdown is not required, however testing for BS must still demonstrate the minimum performance requirements for BS testing. Discretion is applied only where BS testing can successfully demonstrate the performance requirements can be met without a full station shutdown and where the System Operator is satisfied that carrying out the BS testing in this manner will not cause other issues such as risks to the grid. The System Operator maintains the right to determine whether BS testing requires a full station shutdown.
Meridian Energy	Frequency of baseline tests Clause B106 of the draft Procurement Plan says "The ancillary service agent must conduct and pass a baseline test of each item of black start equipment at least once every 6 weeks…" This conflicts with the later statement in clause B108 of the draft Procurement Plan, which says "the system operator may require the ancillary service agent to conduct a baseline test of black start no more than once every 1 year." This inconsistency should be resolved. Given the 6-week testing requirement, an ability to request another baseline test once a year would seem to add little of value. It may be that clause B108 intends to provide for no more than one "on-demand test" per year. If that is the case, then the language of "on-demand test" should be used (as defined in	The testing programme for BS has not changed. Paragraph B106 refers to testing of BS equipment which is defined in the Procurement Plan as the diesel generators or auxiliary hydro plant capable of livening a black start generating unit isolated from the grid. The frequency of testing for BS equipment is every six weeks. Paragraph B108 refers to testing of BS which is a Code defined term which refers to the service required to enable a generating unit that is isolated from the Grid to be made live and electrically connected to the Grid. The frequency of testing for BS is no more than once a year. The System Operator will update the wording to make it clear that the intention is that testing will be no more than one additional test per rolling 12-month period.

Organisation	Comment	Transpower's Response
	the Procurement Plan) rather than referring to baseline tests again in a seemingly contradictory manner. If retained, the drafting of "no more than once every 1 year" is also unclear. The drafting should clarify whether the intention is that: there be no more than one additional test per rolling 12-month period; or there be no more than one additional test per calendar year. The latter interpretation could lead to additional testing in quick succession, for example in December and January.	
Genesis Energy	Provision of test data and verification of performance within 15 days of tests for black start under paragraph B112.	The requirement for test data to be provided to the System Operator after a BS test is 5 business days in the draft Procurement Plan. This should be 15 days to be consistent with other ancillary services and current practices. There is no timeframe specified for the verification of performance. The Procurement Plan wording has been updated to 15 business days.
Genesis Energy	Under proposed changes to paragraph B106, this would require 6 weekly testing of black start equipment and notification to SO within 5 days of the test results, retesting after change of equipment. We seek clarification as to whether changes will be required to current systems to go via POCP. This area has significantly higher overheads due to additional testing and reporting requirements. We also seek clarification as to whether this only applies to equipment typically waiting on standby, for example a diesel generation unit used for start-up power supply. We do not think the requirement would be necessary for generation units that run continuously, as in the event of a failure the	Paragraph B106 refers to testing of BS equipment which is defined in the Procurement Plan as the diesel generators or auxiliary hydro plant capable of livening a black start generating unit isolated from the grid. The test results must be notified to the System Operator within 5 days. The form of notification should be an email to the System Operator mailbox. Changes to current POCP processes will not be required. The Procurement Plan wording has been updated to make it clear that notification will be via email to the System Operator mailbox.

Organisation	Comment	Transpower's Response
	impact to black start capability would be notified to the System Operator. One suggestion would be to add the load data to the ICCP or other TP data transfer.	
Contact Energy	Appendix B – Key technical requirements for ancillary services b) Clause B100 refers to "the ancillary service agent must use reasonable endeavours to provide additional services", what additional services is the SO referring to? These specific services should be listed in this clause to enable the agent to assess whether they are achievable or not.	Clause B.100 places no additional obligations on BS providers. The obligations contained in clause B.100 are the same as those placed by Section 8 of the BS schedule of the current ancillary services procurement contracts. Providers must ensure that they can meet their obligations agreed to in their individual ancillary services procurement contracts. Additionally, the additional services that may be required by the System Operator during a blackout are undetermined until such an event occurs, and an Ancillary Service Agent is only required to use reasonable endeavours to provide these additional services.
Contact Energy	Appendix B – Key technical requirements for ancillary services c) Clause B110 refers to "test the operation of any remote grid synchronisation breaker". A maloperation of this test or sequence can cause significant damage to the agent's plant. In the absence of the SO providing an indemnity to the agent and having adequate insurance in place to cover any damage caused, the agent is taking on all of the risk, this also relates to our response in item 1 a) above. The following additional drafting should be added - "or alternatively, if requested by the System Operator, allow the System Operator to test the operation of a Remote Synchronisation Breaker under no-load (selected to test), or the operation of the Remote Synchronisation relay(s) can be tested.	No load testing or dummy synch testing does not adequately test the grid synchronisation breaker and therefore the BS capability. The System Operator is deferring this change while in order to investigate the points raised by Contact Energy in more detail.

Voltage Support (VS)

73. No comments were received relating to VS.

Frequency Keeping (FK)

Organisation	Comment	Transpower's Response
Genesis Energy	The proposal for back-up Single Frequency Keeping to be available continuously except during allowed outages or not dispatched (new paragraph B5). We would like to clarify if this means backup SFW must be offered continuously. There is a risk that, if the requirements to ensure sites providing back-up SFK are available continuously (except for during allowable outages) is overly restrictive, this may preclude Genesis from being able to provide this service due to the nature of our plant and dependency on fuel availability.	Back-up SFK is currently paid an availability fee regardless of any unavailability during the month. This change ensures that availability fees are paid only for available units. There is no obligation for back-up SFK to be offered however for the purpose of payment for this service, back-up SFK must be available continuously unless on an allowed outage. For outages that are not allowed outages there will be a reduction in payment for this service.
Genesis Energy	Under paragraph B38, requirement for end-to-end testing of frequency keeping every 6 months (was previously 4 years for Multiple Frequency Keeping), or have demonstrated compliance via operational performance to the satisfaction of the SO.	The current frequency of testing for MFK is inadequate to ensure that only tested plant is contracted for MFK. The majority of MFK providers offer FK at least every six months so it is unlikely that testing will be required. However, if testing is required, it is limited to being dispatched for FK and responding with an adequate response rate. If for some reason a provider is out of the market for a period longer than 6 months, the testing also mirrors the normal provision of MFK.
Genesis Energy	Under paragraph B38.2, requirement to perform end-to-end testing for frequency keeping if ancillary service equipment is changed.	The System Operator must ensure that New Zealand consumers are receiving services they are paying for by ensuring that physical delivery happens. This change is aligned with all other ancillary services.

Organisation	Comment	Transpower's Response
NewPower Energy	Specifically for frequency keeping, BESS would respond faster than existing generation, providing more support to the system, however, is disincentivised from participating due to offer size requirements and electricity price volatility, which may not be covered by the fee.	The Authority has announced they are going to start development of an integrated standby ancillary service in the form of a five-minute variability management tool. This work will redefine the existing MFK product into a five-minute variability tool. Operational tools and the Procurement Plan will be updated as a result of this work. See https://www.ea.govt.nz/projects/all/managing-peak-electricity-demand/
NewPower Energy	Currently services such as MFK are provided by generation units regulating their output. BESS in contrast would work in a bi-directional manner, working as generation and demand. Controlled loads (such as EV charging) work as demand. This increases the price risk for demand, as the price is only limited by scarcity pricing, whereas generation price risk is limited to $0, much closer to the usual price range for power and is more of an opportunity cost.	Presently, a BESS providing MFK can only do so in a uni-directional manner - acting as a generator. The point raised however is one which will need careful consideration in any future re-design of FK arrangements. Specifically, if and how the additional financial risk demand-side provision (including BESS operating bi-directionally) of FK face from electricity purchases to manage 'over-frequency' should be mitigated by market design. We note the Authority has announced a decision to repurpose the existing MFK service to manage five-minute variability of intermittent generation. The point raised concerning equitable provision of FK services is noted for the ancillary service design discussions undertaken when this Authority project is initiated.

General Comments

Organisation	Comment	Transpower's Response
Meridian Energy	The proposed changes appear broadly reasonable. However, Meridian has concerns regarding proposed changes to the technical requirements for ancillary services, in particular	Any amendments to technical requirements are in line with the requirements for the System Operator to meet their PPOs and/or the terms of the policy statement and so that the System Operator can

Organisation	Comment	Transpower's Response
	black start and instantaneous reserves. These concerns are detailed below. In general, the changes raise the bar on technical requirements for monitoring and testing. In Meridian's opinion some of these changes could result in significant costs for ancillary service providers, meaning potentially higher costs to Transpower, and ultimately consumers, to procure those services. At worst, participants could be deterred from offering certain ancillary services as a result. Meridian encourages Transpower to: consider the costs and benefits of increasing the technical requirements in the Procurement Plan consider whether the requirements in the Procurement Plan should be minimum technical requirements with any increased technical requirements better considered in individual ancillary service contracts that can account for the unique characteristics of the relevant equipment or service provider.	continue to manage the power system securely and to maximise the benefits of ancillary services. The Procurement Plan has been updated to align with the current ancillary service procurement contracts. There are no changes to current testing or reporting requirements for BS with the exception of a requirement for email notification of the results of diesel generators or auxiliary hydro plant testing. The Procurement Plan sets out the minimum technical requirements for ancillary services. Any deviations from the Procurement Plan are considered within the individual ancillary services procurement contracts but the System Operator must use reasonable endeavours to follow the processes in the Procurement Plan when procuring ancillary services. individual contracts must be consistent across providers and must enable the System Operator to meet their PPOs. Any increases to minimum requirements cannot be set on a case-by-case basis with Ancillary Service Agents. Deviations cannot be granted which do not maintain the minimum standards. There are additional requirements for IR, which have been addressed elsewhere.
Genesis Energy	We have concerns with some of the proposed changes – our main concern is that these proposed changes will add cost and administrative burden to ancillary service agents. Some the (sic) proposed changes will require additional work to price these ancillary services contracts by technical staff due to additional reporting and testing requirements	The Procurement Plan has been updated to align with the current ancillary service procurement contracts. There are no changes to current testing or reporting requirements for BS, with the exception of a requirement for email notification of the results of diesel generators or auxiliary hydro plant testing. There are additional requirements for IR, which have been addressed elsewhere.

Organisation	Comment	Transpower's Response
	(particularly to meet the requirements under black start and reserve response areas). This will raise barriers to entry and may deter parties from seeking to provide ancillary services. It will be key for the System Operator to strike the best balance between improved transparency and rigor while also minimising costs as much as is possible.	
Genesis Energy	The proposed changes of concern to us are as follows: proposal to add a requirement for providers to complete a 'pre-contract technical review' as part of the assessment methodology for frequency keeping, instantaneous reserve, over frequency reserve, voltage support, black start.	The System Operator will not add additional reporting and testing requirements unless it is necessary to ensure the System Operator can meet their PPOs and requirements in the policy statement including managing the power system securely. All ancillary services currently undergo a pre-contractual technical review before a contract is issued. This is not a new requirement but formalises the current process.
Genesis Energy	A list of requirements for consulting and advising the SO for planned outages on units linked to providing ancillary services. We note Schedule 8.3, Technical Code D already caters for the SO to assess the impact of outages.	With the exception of backup SFK and OFR, the requirements for consulting and advising the System Operator for planned outages have not changed from the current ancillary service procurement contract requirements. Providers must ensure that they can meet the requirements agreed to in their individual ancillary services procurement contracts. The addition of outage requirements for backup SFK provides consistency with other non-market ancillary services and ensures that the System Operator is not paying for backup SFK which is not available.
Genesis Energy	One additional suggestion we have is for the System Operator to consider (with the Electricity Authority) whether it needs the discretion to put in place day-ahead security	Any security of supply contracts to ensure supply of generation to meet demand are not related to ancillary services and are therefore not covered in the Procurement Plan.

Organisation	Comment	Transpower's Response
	contracts to bring on Huntly Rankine units where Genesis does not intend to otherwise commit these units. We understand this would require a Code change.	'Ancillary service' is defined in the Code as Black Start, Over Frequency Reserve, Frequency Keeping, Instantaneous Reserve or Voltage Support.
Contact Energy	General Feedback Contact generally supports and agrees with the objectives of the need to change the existing procurement plan so that the System Operator (SO) can continue to meet its Principal Performance Objectives (PPOs), and to integrate and maximise the benefits of Battery Energy Storage Systems (BESS) within the power system and electricity market. We acknowledge that updates are required to manage power system security, but there needs to be balanced approach taken such that the proposed changes shouldn't cause a barrier to both new and existing market participants from entering ancillary service contracts.	Any amendments to technical requirements are in line with the requirements for the System Operator to meet their PPOs and/or the terms of the policy statement and so that the System Operator can continue to manage the power system securely and to maximise the benefits of ancillary services. The System Operator will continue to take a balanced approach to ensure that any proposed changes do not cause a barrier for new and existing market participants from entering the ancillary services procurement contracts.
Contact Energy	Methodologies for net purchase quantity assessments a) Clauses 27, 32, 35, 38, and 41 all refer to entering an ancillary service procurement contract with the system operator "on terms acceptable to the system operator". These are bilateral contracts and should be agreed and contracted "on terms that are acceptable to both parties subject to meeting all agreed technical requirements". This section needs to	The System Operator need not be obligated to enter into contracts with all providers. As per Code clause 8.45(2), the System Operator is the principal in any contract it enters into with an Ancillary Service Agent. Likewise, parties cannot be compelled to accept the terms of the contracts and must be "prepared to enter into an ancillary service procurement contract.

Organisation	Comment	Transpower's Response
	be drafted to reflect those conditions, or the updated drafting removed.	
Contact Energy	Methodologies for net purchase quantity assessments b) Clauses 29, 33, 36, 39, and 42 refer to the agent providing those services being subject "a pre-contract technical review, as part of which the party may be required to complete one or more tests at the party's cost". Generally, this requirement will apply to new plant and for efficiency purposes these technical reviews are best carried out during commissioning with any specific test requirements for individual services detailed in the commissioning plan template. Reference should be made to the relevant commissioning or test plan process in the procurement plan.	The pre-contract technical review is required for all ancillary services including those which do not undertake a commissioning process. Though these tests will likely be carried out during the generator commissioning period, the tests are not part of commissioning a generator and will therefore not be included in the commissioning plan template.
NewPower Energy	One of the Procurement Plans stated goals is to set out the technical requirements and key contractual terms applying to each service. With the objective of the proposed amendment to improve the treatment of BESS and better reflect their characteristics and abilities, NEL feels this has been a missed opportunity to consider what new technologies such as distributed generation and BESS can provide to the electricity system, through reviewing the contractual terms to align with technical and operational capabilities of these assets.	The FSR Roadmap includes an investigation of changes to ancillary services. https://www.ea.govt.nz/documents/1980/Covering-Paper-FSR-Final-Roadmap-and-Phase-Three.pdf Further amendments to the Code, market system and Procurement Plan may be made as a result of this work.

Organisation	Comment	Transpower's Response
NewPower Energy	Question 1: Do you support our proposal to amend the Procurement Plan? NEL supports the proposal to amend the procurement plan. We believe the review could have done more in reviewing its technical requirements and contractual terms to encourage more participation from distributed generation and BESS.	The System Operator are open to suggestions to encourage more participation from Distributed Energy Resources (**DER**) and BESS. The System Operator requests that NewPower respond to the Authority's upcoming BESS consultation, and they propose further changes to the technical requirements and contractual terms in the next Procurement Plan review.
NewPower Energy	Question 3: Are there alternative means to any of the individual amendments proposed that you consider better meet the proposal objectives? If so, please describe the alternative and why you prefer it. With the emergence of new technology such as BESS, distributed generation and controllable load, product design could take a first principles approach. This approach could determine whether there are more efficient ways of providing services, which will result in improved reliability and more efficient operation of the electricity industry. For example, BESS may provide faster and more accurate response in the frequency keeping market, however the pricing structure and exposure to energy price fluctuations in the current contract pricing structure may disincentivise its participation.	The FSR Roadmap includes an investigation of changes to ancillary services. https://www.ea.govt.nz/documents/1980/Covering-Paper-FSR-Final-Roadmap-and-Phase-Three.pdf Further amendments to the Code, market system and Procurement Plan may be made as a result of this work.

Organisation	Comment	Transpower's Response
NewPower Energy	Question 4: Are there any other amendment options we should consider? Please explain your preferred option in terms consistent with the Authority's statutory objective in the Electricity Industry Act 2010. As described above, NEL believe this may be an opportunity for a fuller review of technical requirements considering the role emerging technologies may play.	The FSR Roadmap includes an investigation of changes to ancillary services. https://www.ea.govt.nz/documents/1980/Covering-Paper-FSR-Final-Roadmap-and-Phase-Three.pdf Further amendments to the Code, market system and Procurement Plan may be made as a result of this work.
NewPower Energy	Question 8: Are there any other amendment options we should consider? Please explain your preferred option in terms consistent with the Authority's statutory objective in the Electricity Industry Act 2010. With the acknowledgement of how quickly technology and the power system are changing; it would be good to undertake a first principles review of the existing ancillary service tools and redesign them in a way which would be asset agnostic for both generation and demand to enable more competition in the market and drive more efficient delivery of the services.	The Future Security and Resilience (FSR) Roadmap includes an investigation of changes to ancillary services. https://www.ea.govt.nz/documents/1980/Covering-Paper-FSR-Final-Roadmap-and-Phase-Three.pdf Further amendments to the Code, market system and Procurement Plan may be made as a result of this work.
Simply Energy	Questions Submitted: A number of questions submitted to the System Operator during the consultation period remain unanswered. The questions that were answered were only provided circa 5 hours prior to the deadline and so an extension was requested, but this extension was declined. Responses provided	The System Operator acknowledges that one question with multiple sub-points remained unanswered ahead of the deadline. The remaining questions were unable to be answered as they were not simply points of clarification but were in the System Operator's opinion, points of submission to the consultation. In answering these

Organisation	Comment	Transpower's Response
	have been done so without full knowledge of the intent of the System Operator and with limited time to digest the impact of proposed changes and we would hope further consultation is undertaken.	ahead of the consultation period, the System Operator felt there may have been an unfair advantage to Simply Energy. The remaining question has been answered in this report and the change to the Procurement Plan that it relates to has been deferred. The System Operator intends to engage with submitters on these topics soon.
Simply Energy	Specific Feedback relating to proposed changes: Questions: Can the System Operator please provide a formal response to all questions asked prior to the deadline for cross-submissions. This will give Simply Energy, and all other parties submitting, a chance to respond to the additional information provided by the System Operator, before the Procurement Plan is finalised. See questions received from Simply Energy later in this section.	
Simply Energy	Clause C29: Test Guidelines As per response to Clause B53, we would like to see some guardrails introduced as to how these guidelines are changed, given experiences over the past 2 years.	System Operator testing guidelines are updated frequently in response to Code and policy updates and to ensure best practice. The System Operator must update the testing guidelines so that the System Operator can continue to meet its PPOs and manage the power system securely and to maximise the benefits of ancillary services.

Questions received from Simply Energy

74. The questions below were received from Simply Energy during the consultation period. Where appropriate, questions and answers were published on the Transpower website prior to the end of the consultation period. The remaining questions were included in Simply Energy's submission and have been responded to in the table above.

Section	Question
Definition: aggregated loads Clause B64	Can you please provide more clarity regarding what is intended to be captured under the "aggregated load" definition and associated new Clause B64. Do you mean aggregated from an IR Equipment perspective? Or bid perspective? In our situation we have Independent Resources that operate and are assessed and reported independently from each other. When bidding via WITS, we do aggregate them and bid them at a single node. Are these supposed to be captured by the new definition and associated Clause B64? Finally, do you mean this new definition to capture Industrial sites that may have multiple feeders to site (i.e. Multiple ICPs), but operate from a control perspective as a single site? Example 1: Industrial site submitted to SO and assessed as a single resource. Supplied via a ring main (2 ICPs) but a single customer control system and single set of IR equipment. Example 2: 50 Independently assessed and approved "resources" that are aggregated and bid at a single North Island node (i.e. the Simply Portfolio)
B46.3: BESS 5MW	Can you please clarify whether the 5MW threshold is related to the nameplate capacity of the inverter? Or the approved Capacity of the resource? Assumption here by us is that the SO will approve a 3MW BESS for up to 6MW of capacity, because of being able to go from full charge to full discharge.
B47: New rules for 10MW single connections or 20MW aggregated	1. Is "single point of connection" referring to an ICP? Or GXP? Or other? 2. Please provide more clarity about what would be considered an "aggregated location". GXP? Network? Other? 3. What is "analogue indications"? 4. How would requirements need to be provided? 5. What are definitions of gross / net 6. Would customers who are directly connected to Transpower and where Transpower already have GXP SCADA in place be subjected to additional requirements?

Section	Question
	NB: "Grid" has been bolded in the Clause but is not included in the Definitions. Might also be worth adding some of the above terms to the definitions. This will directly impact Simply, so it would be great to be provided a lot more detail as to what your desired outcome is and what we would be required to build to meet that outcome.
B48.4 and B51.3.3: New requirements to meter non-participating assets	Is this meant to be a mandatory requirement? Or can an Ancillary services provider manage the risk of those other sources of demand/generation through how we bid to the market? This clause, as written currently, would make it economically unviable for a lot of the existing IL resources in the market to participate, and would introduce a significant barrier for developing new IL.
B48.6: +/- 1MW limit	Over delivery has long been accepted by the SO. Will this continue? Or will you start issuing compliance breaches if Providers deliver >1MW more than dispatched?
B51.2: 10 minutes data	Can you please provide rationale why you require 600s of data for BESS, when IL is 75s? At 0.1s intervals, the current drafting for BESS would result in 18000 data points to be captured, which is going to cause real issues with memory and storage at the IR equipment and is not practical with the existing hardware Simply has available to it. NB: There are no storage considerations in our head end software, but we must be able to store that data at the local device in case there are comms issues that prevent that data being sent from the local device to our head end software.
B59+ B59.1 + B60 + B60.1.1+ B60.1.2: AUFLS considerations	What is the intent/expectation here for industrial loads, that may be on a AUFLS feeder from the EDB? Are you contractually requiring an Ancillary Service provider from not offering this load in as IL and prioritising the EDB's decision to include it on an AUFLS feeder? Or would the SO require the EDB to exclude the load from that site which is participating in Ancillary services from their AUFLS calculations, thereby incentivising and prioritising participation in IL? Noting the AUFLS provider has alternative options to meet their requirements (i.e. SO can have both more IL and compliant AUFLS under this scenario). We understand the concerns related to Hot Water being bid as IL and needing to be excluded from AUFLS calculations and assume this is why the clause was drafted the way it is. However, it has implications for C&I IL load. The current drafting of this clause has material impacts in the ability for new IL to be built. It introduces both a major barrier and risk to an Ancillary services agent, that at any point an EDB could reclassify a feeder that supplies an IL resource as an AUFLS feeder. That would force the customer and Ancillary services agent to stop offering that customers load as IL to the market.

Section	Question
	We must advise an EDB of any new IL load contracted to the SO, so the EDB will always be aware of the loads and feeders that have participating IL. However, as an Ancillary services agent we are never aware of what feeders have been allocated as an AUFLS feeder. Overall, it feels like the Procurement Plan for Ancillary Services is not the right place to manage considerations for AUFLS compliance. Ensuring any Instantaneous Reserves are excluded from AUFLS calculations and compliance should be managed within the AUFLS technical requirements (ATRs).
B59.2: Load Shedding	Are you intending to stop any load from value-stacking both Ancillary Services and other NTS or Demand Response programmes? Additional definitions might be required here. We would expect that any load that has signed up to a non-transmission solution (NTS), or Demand response programme, such as the proposed Upper South Island NTS, would also be able to be bid into Instantaneous Reserves until such time as it is called on via those alternative programmes. Obviously, the load cannot do both at the same point in time, so once called by the NTS, the load would be removed from the IR bids. In this scenario, the consideration is the bid volumes provided being accurate, not whether the asset is participating in any alternative programmes which may call on that load to be shed. NB: This current drafting would also stop any hot water from being bid as IL, as via differencing bids all Hot Water is mandated to be available for load shedding to the SO to manage a scarcity pricing event

Cross-Submissions

75. One cross-submission was received from Enel X. The table below details their comments, including listing the party to which they were responding, where relevant. The comments have been addressed in the table above Appendix A: Detailed Consultation Comments and Responses.

Responding to (organisation)	Responding to (comment)	Enel X Comment
Meridian	"…In Meridian's opinion some of these changes could result in significant costs for ancillary service providers, meaning potentially higher costs to Transpower, and ultimately consumers, to procure those services."	Enel X agree with Meridian that the proposed changes are likely to increase costs for ancillary service providers, and in the absence of lower cost new entrants will see higher IR costs flow through to consumers.
Meridian	"…Meridian encourages Transpower to: • consider the costs and benefits of increasing the technical requirements in the Procurement Plan"	Enel X agree with Meridian's sentiment that it's not clear what demonstrable performance issues the technical changes to IR are attempting to address and why Transpower believe a quantitative analysis is not practical. Enel X would appreciate further details of the qualitative approach used to evaluate the proposed amendments and the performance uplift to the status quo.
Contact	"….but there needs to be balanced approach taken such that the proposed changes shouldn't cause a barrier to both new and existing "market participants from entering ancillary service contracts."	Enel X share Contact's concerns that a 'balance' between service specifications and essential system services needs may not have been achieved in the proposed amendments to IR technical requirements.
Simply Energy	"….Hard to provide specific feedback regarding this new clause as we are not sure what new requirements are being imposed or the impacts of these unknown requirements."	Enel X endorse Simply Energy's concern that the proposed clause is unclear, particularly the reference to 'analogue indications'. Who would be monitoring such indicators and where from? What is demonstrable need this proposed amendment is addressing?

Responding to (organisation)	Responding to (comment)	Enel X Comment
Simply Energy	"….We do not measure every nonparticipating asset at a site and it would not be practical to do so."	Enel X support Simply Energy's concern regarding the 'practical' limit of measuring responses from non-participating assets. The amended clause has the potential to adversely impact the viability of IL resources able to participate in the market. Enel X have processes in place to protect the integrity of IR response verification.
Simply Energy	"….Questions requesting clarity on this new clause remained unanswered."	Enel X agree with Simply Energy that the proposed clause is unclear in its drafting, and the link to clause 13.68(a) of the Code, which specifies that ancillary service agents need not comply with dispatch instructions varying by less than 1MW from the most recently followed instruction, is not immediately apparent.
Simply Energy	"…50+/-.1Hz is too onerous for the NZ grid for 60 seconds."	Enel X share some concerns that a measurement window restricted to 50+/0.1Hz for 60 seconds may materially offset the 'counterfactual' pre-event real power assessment from the actual underfrequency event. Enel X suggest Transpower consider limiting the maximum interval between the pre-event data and the underfrequency event to ensure the 'counterfactual baseline' remains contemporaneous with the underfrequency event.

Responding to (organisation)	Responding to (comment)	Enel X Comment
Simply Energy	"…will impose considerable limitations on the metrology that can be used to record load at this type of resource due to the local storage requirements that will be required within the meter. …", and "…We would like to engage further on this topic before it is encoded within the Procurement Plan."	Enel X are somewhat concerned that the proposed clause could clash with practical data storage limitations in IR metering systems, particularly where a participant chooses to use sub-100ms sampling intervals. It would be counterproductive for participants to reduce time step resolution in pursuit of greater record length. Enel X support Simply Energy's call for further engagement with industry on this matter.
Simply Energy	"…We do not believe the procurement plan should put a limitation on IR agents, other than to ensure that the EDB is aware that the load is participating as IL and should be removed from their AUFLS calculations."	The most significant concern that Enel X shares with the consultation responses centres on the additional clause B59 & B60 obligations to ensure that Interruptible Load (IL) resources and Automatic Underfrequency Load Shedding (AUFLS) resources remain separated. Placing the onus on the ancillary services agent to be fully informed of the commitments and operational intent of third parties, including the EDB, before making reserve offers has the potential to remove large amounts of IL from the market as ancillary serve agents avoid the risk of non-compliant offers based on incomplete information. These proposed amendments risk increasing IR prices with costs ultimately passed through to consumers. Enel X share Simply Energy's view that the proposed clauses seeking to protect the integrity of the AUFLS may discourage IR participation. The ancillary services agent has limited capability to maintain the visibility of third party (e.g. EDB) actions that may bring IR and AUFLS resources into conflict. Transpower's proposed approach risks reduced IL

Responding to (organisation)	Responding to (comment)	Enel X Comment
		participation, higher costs for consumers, and perversely an increased risk that an AUFLS response is required.

Appendix B: Deferred Matters

76. This table provides a list of matters which have been deferred. Full comments and responses can be found in Appendix A: Detailed Consultation Comments and Responses.

Organisation	Comment	Transpower Response
Genesis Energy Simply Energy Enel X	Genesis Energy was concerned about the costs that would result from the proposed new paragraph B47 requirement for loads greater than 10 MW at a single point of connection to the grid, or greater than 20 MW at an aggregated location, to have analogue indications of the net & gross import & export indications. Simply Energy and Enel X both also raised issues with paragraph B47; Simply Energy raised specific questions relating to implementation and clarity of this new requirements which Enel X endorsed.	The System Operator has decided to defer this change in order to consider whether a dynamic calculation or algorithm may be used in lieu of live SCADA data or smart meter data if the dynamic calculation is approved on or agreed with the System Operator. While the System Operator understands concerns around this change, there was a level of surprise around some of the consultation responses from companies which have indications and measurements fed to control rooms to ensure they have visibility in real time of what they have armed and available especially where new participants are willing to take on the additional costs of this change. Most of the data required will be available via the load smart meters and the provision of data will likely reduce post event data requirements. There will likely be a transition period for Ancillary Services Agents to meet these requirements.
Contact Energy	Contact Energy submitted that – in relation to Appendix B – Key technical requirements for ancillary services a) – that paragraph B52 be amended from 14 business days to 30 business days to align with paragraph B18 removing any unnecessary overheads on data storage equipment.	In response to this feedback, the System Operator will defer this change in order to undertake further investigation of alternative options to address this. Some of this investigation may relate to compliance options such as reduced payment to ensure that data is provided within the required timeframes. These compliance obligations would nullify the requirement to hold the data for the longer timeframes. Without the addition of a compliance obligation in the Code, the System Operator may be limited to using additional

Organisation	Comment	Transpower Response
		contractual management options such as the ability to reduce payment.
Contact Energy	Contact Energy also submitted an alternative wording to paragraph B110 which would allow testing of the operation of a remote synchronisation breaker under no-load.	The System Operator is deferring this change while in order to investigate the points raised by Contact Energy in more detail.
Meridian Energy Simply Energy	Meridian Energy has concerns regarding proposed changes to the technical requirements for ancillary services, the changes raise the bar on technical requirements for monitoring and testing. In Meridian's opinion some of these changes could result in significant costs for ancillary service providers, meaning potentially higher costs to Transpower, and ultimately consumers, to procure those services Meridian suggested this paragraph be amended to required recording of electrical signals at 20ms and all other signals at 100ms for practicality.	In response to consultation feedback, the System Operator is deferring this change in order to determine if a data logger can be used to record setpoints, generator speed, and gate position at 100ms.
	Meridian also highlighted that proposed changes to pre- and post-event data requirements might be onerous and could lead to significant cost increases. Meridian is unsure if their revenue meters are configurable to the extent required and is concerned with the cost of file sizes and data transfer limitations. Simply Energy echoed Meridian's concerns about pre- and post-event data requirements… "seems far in excess of what will be required and will impose considerable limitations on the meteorology that can be used to record load at this type of resource due to the local storage requirements that will be required within the meter. This will impose significant additional costs to participation".	While to completely avoid any potential time stamping issues five minutes of pre- and post-event data is optimal, the System Operator is considering a reduced timeframe for pre- and post-event data capture that meets the needs of the System Operator. In response to consultation feedback, the System Operator will defer this change in order to determine how much of the generator fleet can reconfigure their equipment and whether a reduced timeframe for pre- and post- event data meets the needs of the System Operator.

Organisation	Comment	Transpower Response
Simply Energy	Simply Energy requested clarity… "regarding what is intended to be captured under the "aggregated load" definition and associated new Clause B64.	In response to consultation feedback, the System Operator will defer this change in order to determine whether the change adequately captures the intention and if a rework of the paragraph is required so that the thresholds for testing are based on testing rather than contracting locations.
Simply Energy	Simply Energy questioned the clarity of new paragraphs B48.4 and B51.3.3 (IR) and raised concerns of economic viability and the introduction of a barrier for developing new IL. Enel X supported Simply Energy's concerns and the practicality of measuring non-participating assets.	In response to industry feedback, the System Operator will defer this change in order to understand concerns raised by submitters and to investigate how much of the IL fleet this may affect, and whether "grand mothering" may be appropriate for some older sites on a legacy basis.
Simply Energy	Simply Energy and Enel X both raised concerns regarding the restrictive measurement window for determination of pre-event power in paragraph B50.4.1.	The System Operator will defer this change to consider whether this methodology is workable. This requirement is an existing requirement for IL in the Procurement Plan. The System Operator needs to understand how this relates to BESS but wishes to remind providers that this is an existing Procurement Plan requirement.

Appendix C: Details of proposed changes to the Procurement Plan including costs and benefits or proposed changes

Changes to definitions

Definition	Description of change	Objective	Benefits	Costs
Allowed outage	Definition updated to include only outages of relevant equipment	To provide clarity.	Clarity.	None.
Baseline test	Definition of baseline test updated to refer to Appendix B.	Terms relating to testing have been slightly redefined and updated throughout the document, in order to achieve better clarity with regards to testing regimes.	Clarity.	None.
Black start equipment	Minor wording update.	Make definition clearer and more specific.	Clarity.	None.
Black start generating unit	Reference to generating unit amended to defined term 'black start generating unit'.	Allows isolation of black start generating unit.	Clarity and specificity.	None.
Circuit breaker equipment	New definition required for clarity.	Part of a set of changes which add definitions for several sub-types of equipment, to ensure terminology is clear and specific throughout the Procurement Plan.	Clarity and specificity.	None.
Code	Added 'in which this procurement plan is incorporated by reference under clause 8.42(1)'.	Procurement Plan incorporated by reference in the Code.	Clarity and completeness.	None.

Definition	Description of change	Objective	Benefits	Costs
Control equipment	Definition of OFR control equipment now included. The pre-existing definition was for FK only.	Provision of OFR also requires the use of different types of control equipment.	Clarity and specificity.	None.
Droop	New definition to specify that the droop or control system is proportional to frequency.	Allows for clarity on the droop referred to in relation to BESS.	Provide additional relevant definition to assist readers, especially where this relates to newer technologies.	None.
End-to-end test	Previously end-to-end tests were defined for IL only. The definition has been updated to be generic so that it may apply to any ancillary service. Added wording to clarify the purpose of end-to-end tests.	Completeness and clarity around different types of testing required.	Clarity.	None.
FK gate closure	Definition of 'gate closure' amended to 'FK gate closure'.	Avoids confusion with Code definition for gate closure which contains different timeframes for various technologies.	Clarity.	None.
Frequency keeping equipment	New definition which incorporates all equipment but excludes monitoring equipment.	Part of a set of changes which add definitions for several sub-types of equipment, to ensure terminology is clear and specific throughout the Procurement Plan.	Clarity and specificity.	None.
Gate closure	Definition replaced with 'FK gate closure'.	Definition removed.	Clarity.	None.
IR equipment	New definition which incorporates all technology types but excludes monitoring equipment.	Part of a set of changes which add definitions for several sub-types of equipment, to ensure terminology is clear and specific throughout the Procurement Plan.	Clarity and specificity.	None.

Definition	Description of change	Objective	Benefits	Costs
OFR equipment	New definition which incorporates circuit breakers, control and arming equipment and indication.	Part of a set of changes which add definitions for several sub-types of equipment, to ensure terminology is clear and specific throughout the Procurement Plan.	Clarity and specificity.	None.
OFR site	New definition to capture the use of multiple units or systems for providing OFR.	To provide a clear distinction between OFR equipment and an OFR site which may have multiple units.	Clarity and specificity.	None.
On-demand test	Definition reworded for clarity.	No change to meaning. Ensure term is clearly defined, especially as other terms relating to testing have been modified.	Clarity.	None.
Pre-event real power	New definition captures capability of BESS to charge and discharge.	Current definition of pre-event real power output are not relevant for BESS.	Provides completeness.	None.
Required frequency	Definition removed.	This term is no longer used in the Procurement Plan due to a wording change.	Housekeeping.	None.
Trip frequency	Minor wording change for readability.	Readability.	Readability.	None.
Trip time	Minor wording change for readability. Also remove wording relating to frequency used if trip frequency is undefined.	Clarity.	Clarity.	None.
Voltage support equipment	Wording changed for better clarity and to specify that monitoring equipment is not included in the definition.	Clarity and specificity.	Clarity and specificity.	None.

Changes to all other sections

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
Introduction					
3.3	**3.3**	Removed reference to clause 8.44B of the code.	This section of the code has been repealed. Relates to process for adoption of changes to the Procurement Plan.	Consistency with latest version of Code.	Reduced costs for Ancillary Service Agents.
Ancillary services to purchase					
6	**7**	Requirements to maintain frequency time error within 5 seconds and as close as possible to zero have been removed.	Requirement for System Operator to manage frequency time error removed from the Code.	Consistency with the latest version of the Code.	Reduced costs for Ancillary Service Agents.
Principles applied in making net purchase quantity assessments					
Sub heading	**Sub heading**	Expanded acronym 'PPOs' to full wording (principal performance obligations).	Provides clarity.	Clarity.	No change.
12	**13**	Reference to clause 7.2C removed.	Requirement for System Operator to manage frequency time error to be removed from the Code.	Consistency with the latest version of the Code.	Reduced costs for Ancillary Service Agents.
Assessment methodology for frequency keeping					
26	**27**	Clarification that ancillary service contracts are entered into on terms acceptable to the System Operator.	This wording makes clear that the System Operator enter into contracts based on their broader obligations for delivery of Ancillary Services.	Clarity.	No change.
28	**29**	Pre-technical review now includes the potential requirement to complete testing.	Greater transparency and promoting better industry understanding of requirements for technical reviews/testing.	Clarity.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
Assessment methodology for instantaneous reserve					
31	**32**	Clarification that ancillary service contracts are entered into on terms acceptable to the System Operator.	This wording makes clear that the System Operator enter into contracts based on their broader obligations for delivery of Ancillary Services.	Clarity.	No change.
	33 (new paragraph)	New paragraph. States the need for IR providers to complete a pre-contract technical review. Provides high level information on what this is likely to involve.	Greater transparency and promoting better industry understanding of requirements for technical reviews/testing.	Additional detail on testing requirements.	No change.
Assessment methodology for over frequency reserve					
33	**35**	Clarification that ancillary service contracts are entered into on terms acceptable to the System Operator.	This wording makes clear that the System Operator enter into contracts based on their broader obligations for delivery of Ancillary Services.	Clarity.	No change.
	36 (new paragraph)	New paragraph. States the need for OFR providers to complete a pre-contract technical review. Provides high level information on what this is likely to involve.	Greater transparency and promoting better industry understanding of requirements for technical reviews/testing.	Additional detail on testing requirements.	No change.
Assessment methodology for voltage support					
35	**38**	Clarification that ancillary service contracts are entered into on terms acceptable to the System Operator.	This wording makes clear that the System Operator enter into contracts based on their broader obligations for delivery of Ancillary Services.	Clarity.	No change.
	39 (new paragraph)	New paragraph. States the need for VS providers to complete a pre-contract technical review.	Greater transparency and promoting better industry understanding of requirements for technical reviews/testing.	Additional detail on testing requirements	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
Assessment methodology for black start					
37	**41**	Clarification that ancillary service contracts are entered into on terms acceptable to the System Operator.	This wording makes clear that the System Operator enter into contracts based on their broader obligations for delivery of Ancillary Services.	Clarity.	No change.
	42 (new paragraph)	New paragraph. States the need for BS providers to complete a pre-contract technical review. Provides high level information on what this is likely to involve.	Greater transparency and promoting better industry understanding of requirements for technical reviews/testing.	Additional detail on testing requirements.	No change.
Tendering					
41	**46**	'24 months' updated to '2 years'.	Provides consistency.	Consistency.	None.
Technical requirements and key contracting terms					
56	**61**	Add 'subject to paragraph 63'.	Clarify relationship between this paragraph (requirement for System Operator to endeavour to include key terms in contracts) and paragraph 63 (exceptions when part of the grid is islanded).	Clarity.	None.
Arrangements for unanticipated procurement of ancillary services					
61	**66**	Reference to clause "8.43A(1) or 8.44A(1)" of the Code has been removed. The Code has been amended and the relevant clause is now 7.13(1).	Housekeeping to maintain consistency with the latest version of the Code.	Consistency with latest version of Code	None.
System operator reporting to the Authority					
62.3	**67.3**	Add reference to clause 3.13 of the Code. This paragraph already referenced clause 3.14.	Clause 3.14 relates to reporting to the Authority; clause 3.13 relates to the self-review that this reporting should be based on. Adding this reference is for	Clarity.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
			completeness and ease of referencing, as it is best to read these two clauses together to properly understand the requirements on the System Operator.		
Appendix A – Bases for procuring ancillary services					
Over frequency reserve, voltage support and black start					
A15.1	**A15.1**	Paragraph updated to allow for different technologies to tender for OFR.	With changing technologies, it is no longer assumed that all OFR will be provided by generating units, so wording throughout the Procurement Plan has been updated accordingly.	Allow different technologies to tender for OFR.	No change.
Appendix B – Key technical requirements for ancillary services					
Performance requirements and technical specifications for frequency keeping					
B2	**B2**	Removal of sub-paragraphs specifying relevant paragraphs for specific FK products.	Removes duplication.	Improves readability	None.
B3.4 (paragraph removed)		Requirement to maintain frequency time error within 5 seconds have been removed and replaced with a best endeavours requirement to manage frequency time error a close as possible to zero.	Requirement for System Operator to manage frequency time error to be removed from the Code.	Consistency with the latest version of the Code.	Reduced costs for Ancillary Service Agents.
B3.5 (paragraph removed)		Requirement to return frequency time to zero have been removed.	Requirement for System Operator to manage frequency time error to be removed from the Code.	Consistency with the latest version of the Code.	Reduced costs for Ancillary Service Agents.
B4	**B4**	Defined term 'grid frequency error' replaces 'deviation of the grid frequency'.	Housekeeping.	Provides clarity.	None.
	B5 (new paragraph)	New paragraph. Describes requirement for back-up SFK to be continuously available,	New availability performance requirement for back-up SFK.	Allows payment to be withheld for non-performance.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		except under circumstances described in this paragraph.			
B7	**B8**	Added requirement for personnel to be trained operators of the control equipment for the relevant FK units and other minor wording updates.	Provides consistency with other ancillary services.	Provides completeness.	No change as is already an obligation.
Back-up SFK outages					
	B9 - B12 (new paragraphs)	New section outlining the arrangements around back-up SFK outages.	To provide certainty around various elements of outages at FK sites (see detail below for each paragraph). Outages of MFK sites are not applicable as MFK is settled in the market.	Provides consistency and completeness.	No change.
	B9 (new paragraph)	Details circumstances in which outages will not be considered to affect the Ancillary Service Agent's compliance with performance requirements for SFK.	Provides clarity around how outages affect fulfilment of performance requirements. Provides consistency with other reserve outage paragraphs and ancillary services procurement contracts.	Provides consistency and completeness.	No change.
	B10 (new paragraph)	Adds requirement for ancillary services agent to use reasonable endeavours to minimise outages.	Provides consistency with other reserve outage paragraphs and ancillary services procurement contracts.	Provides consistency and completeness.	No change.
	B11 (new paragraph)	Requirements to communicate with the System Operator around planned outages outlined in this paragraph.	Provides clarity and detail on these requirements.	Provides consistency and completeness.	No change as obligations to record outages are already in place.
	B11.4 (new paragraph)	Adds requirement for ancillary services agent(s) to update POCP with information about any planned or anticipated outages.	Provides consistency with other reserve outage paragraphs and ancillary services procurement contracts. Ensures that SFK payments are accurate.	Provides consistency and completeness.	No change as obligations to record outages are already in place.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
	B12 (new paragraph)	Requirements to communicate with the System Operator around unplanned outages outlined in this paragraph.	Provides clarity and detail on these requirements.	Provides consistency and completeness.	No change.
Monitoring requirements for frequency keeping					
B8.1 - B8.3 (paragraphs removed)		Removal of sub-paragraphs specifying relevant paragraphs for specific FK products.	Removes duplication.	Improves readability	None.
B9.3 (paragraph removed)		Requirement for monitoring equipment to measure frequency time error has been removed.	Requirement for System Operator to manage frequency time error removed from the Code.	Consistency with the latest version of the Code.	Reduced costs for Ancillary Service Agents.
B10.3 (paragraph removed)		Requirement for monitoring equipment to measure frequency time error has been removed.	Requirement for System Operator to manage frequency time error to be removed from the Code.	Consistency with the latest version of the Code.	Reduced costs for Ancillary Service Agents.
B13	**B18**	Timeframe for holding FK data has been extended from 15 business days following the end of the month to 30 days.	Provides consistent timeframes for holding data.	Reduce risk of data being lost e.g. if an issue is not immediately identified. Gives more time for issues to be identified and data obtained from system.	No change.
B15	**B20**	Paragraph updated with additional requirement that operators of monitoring equipment are trained in accordance with good industry practice.	Provides completeness and consistency with other ancillary services.	Completeness.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
Offer requirements for frequency keeping					
B17	**B22**	The approved information system has been removed and replaced with the WITS trading platform or trading manager if applicable.	The approved information system concept has been removed from the Code. All IR offers, revisions/cancellations of them, and confirmations are now required to be submitted through WITS or a back-up system specified by the WITS manager (clauses 13.51 and 13.52 of the Code).	Consistency with the latest version of the Code.	None.
B17	**B22**	Requirement to have a valid and enforceable ancillary service contract in order to offer FK.	This is already a requirement in practice. Added for completeness/clarity.	Completeness.	No change.
B20	**B25**	Removal of reference to approved information system and updated wording to align with Code requirements for offering reserves.	The approved information system has been removed and replaced with the WITS trading platform or trading manager if applicable.	Consistency with the latest version of the Code.	None.
B21	**B26**	Updated wording to allow for cancellation of offers.	Updated wording to align with Code requirements for offering reserves.	Consistency with the Code.	None.
	B27 (new paragraph)	Requirement for revisions and cancellations of offers for FK to be through the WITS trading platform or trading manager if applicable.	The approved information system has been removed and replaced with the WITS trading platform or trading manager if applicable.	Consistency with the latest version of the Code.	None.
B22	**B28**	Updated wording to allow for revision or cancellation of offer. Gate closure detail replaced with defined term 'FK gate closure'. Removal of requirement for monthly written report.	Updated wording to align with Code requirements for offering reserves.	Consistency with the Code.	None.
B23	**B29**	Requirement for revisions and cancellations of offer for FK to be through the WITS	The approved information system has been removed and replaced with the	Consistency with the latest version of the Code.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		trading platform or trading manager if applicable.	WITS trading platform or trading manager if applicable.		
B24	**B30.2 (new paragraph)**	Addition of requirement for offers to be submitted only with a valid and enforceable contract.	Consistent with IR offers.	Provides consistency and completeness.	No change.
B25	**B31**	FK offers for both MFK and SFK are required to be subject to minimum and maximum MW bands.	Housekeeping.	Provides clarity.	No change.
	B32 (new paragraph)	Added requirement for FK offers to be made only for FK sites which have been tested and assessed for performance or have demonstrated operational performance.	Provides assurance that FK site(s) are compliant with performance requirements ahead of being offered.	Provides completeness.	No change.
	B33 (new paragraph)	States that if an offer is made without correct testing having been carried out, then this constitutes a failure to meet the relevant performance requirements.	Ensure requirements are clear and comprehensive.	Provides clarity.	No change.
Dispatch requirements for frequency keeping					
B27	**B35**	Requirement to maintain frequency time error within 5 seconds and as close as possible to zero have been removed.	Requirement for System Operator to manage frequency time error to be removed from the Code.	Consistency with the latest version of the Code.	Reduced costs for Ancillary Service Agents.
B28	**B36**	Wording changes for better clarity.	Clarity.	Clarity.	None.
	B37 (new paragraph)	Requirement added for block or station dispatch group or group of load sources to meet performance requirements for SFK at the relevant FK site(s).	Ensures that delivery of FK is at the relevant tested FK site(s) when dispatch is the block or station dispatch group.	Completeness.	No change.
Testing requirements for frequency keeping					
Heading	**Heading**	Removal of 'Special' from heading. These testing requirements are not in addition to	Simplification of wording.	Conciseness.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		other testing required under the ancillary services contracts.			
B29 (paragraph removed)		Paragraph removed as requirements for testing ahead of offering are laid out in an earlier section.	Removes duplication.	Improves readability	None.
B30	**B38.1**	Testing timeframes for MFK shortened to six monthly unless FK has been demonstrated satisfactorily.	Aligns with requirements for SFK and ensures regular testing of FK sites(s) which have not demonstrated operational performance in the previous six months.	Reduces risks and ensures testing requirements are comprehensive.	Cost increases should be minimal even with increased frequency of testing as performance requirements can be satisfied by simply offering the FK service.
	B38.2 (new paragraph)	Requirement to perform an end-to-end test after any change(s) to equipment used to provide FK.	Ensures testing requirements are comprehensive.	Provides completeness and consistency with other reserve products.	No change.
B31 (paragraph removed)		Reference to testing of trained operators removed.	Removes duplication of requirement for trained operators to be available to meet dispatch instructions which are specified in Code clause 13.84.	Provides clarity.	None.
	B39 (new paragraph)	Requirement to perform a baseline test immediately after any change(s) to equipment used to provide FK.	Provides completeness and consistency with other reserve products.	Ensure testing requirements are comprehensive; provide maximum	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
				clarity on testing requirements.	
B32 (paragraph removed)		Removal of redundant paragraph.	Housekeeping.	Provides clarity.	None.
B33	**B40**	Minor wording and terminology updates.	Improve clarity and specificity. Ensure terminology is used consistently throughout the document. No change to actual practices required as a result of these changes.	Clarity and readability.	No change.
B34	**B41**	Specific tests removed and replaced with generic testing. Other minor wording updates.	Improve clarity. No change to actual practices required as a result of these changes.	Clarity and readability.	No change.
B35	**B42**	Minor wording updates.	Improves clarity.	Clarity and readability.	No change.
Instantaneous reserve					
Performance requirements and technical specifications for instantaneous reserve					
B36	**B43**	'Equipment' has been replaced with new defined term 'IR equipment'.	Provide specific and consistent terminology across the document.	Provides clarity.	None.
B37	**B44**	'Equipment' has been replaced with new defined term 'IR equipment' and paragraph amended for consistency with other sections.	Provide specific and consistent terminology across the document.	Provides clarity.	None.
B37.2	**B44.1**	Added requirement for personnel to be trained operators of the IR equipment and other minor wording updates.	Provides completeness and consistency with other ancillary services.	Completeness and consistency.	No change.
	B44.3 (new paragraph)	Paragraph relocated from paragraph B37.7 below.	Paragraph moved up because it is a pre-dispatch requirement.	Provides clarity.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
	B45 (new paragraph)	Paragraph relocated from paragraph B38 below.	Paragraph moved up because it sets the scene for the performance requirements that follow.	Provides clarity.	None.
B37.2.1 & B37.2.2	**B46.1.1 & B46.1.2**	Paragraph reworded with conditional phrasing moved from sub-paragraphs to main paragraph.	Provides completeness and consistency with other reserve products. Removes duplication.	Provides clarity.	None.
B37.3 & B37.4	**B46.2**	Paragraphs merged and reference to IL provided by BESS removed.	Performance requirements for BESS have been characterised individually.	Provides clarity.	No change.
	B46.3 (new paragraph)	New performance requirements for BESS systems of no more than 5 MW.	Smaller BESS systems will have the option to either comply with the requirements for IR equipment providing IL, or those for larger battery systems.	Provides greater flexibility for smaller systems.	No change.
	B46.4 (new paragraph)	New performance requirements for BESS systems larger than 5 MW. Additionally, removes the requirement for utility scale BESS to await load restoration instruction after an event.	Provide specific, technically appropriate requirements for BESS.	Ensure requirements are clear, technically possible for this technology, and also consider any potential issues specific to this technology that may not apply to other technologies.	Reduced costs for Ancillary Service Agents with removal of requirement for phone restoration.
B37.5 & B37.6	**B46.5**	North Island and South Island connection requirements combined into one paragraph and reference to IL provided by BESS removed.	Removes duplication. Performance requirements for BESS have been characterised individually.	Provides clarity and removes duplication.	None.
B37.7		Paragraph relocated to new paragraph B45.3 above.	Moved for clarity and avoidance of repetition (as some sections have now been rewritten to be technology-	Ease of reading.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
			specific, but this particular paragraph applies to all technologies). No change of content.		
B38 (paragraph removed)		Paragraph relocated to new paragraph B46 above.	Moved for better flow. No change of content.	Ease of reading.	None.
B39 (paragraph removed)		Paragraph relocated to assessment of performance requirements (paragraph 50.4) for generation reserve not provided by BESS.	This paragraph relates to inertial response, which is not applicable to BESS.	Ensures requirements are suitable for the technologies to which they apply.	None.
Assessment of performance requirements for interruptible load other than that provided by battery energy storage systems					
B40	**B47**	Removal of reference to IL provided by BESS.	Requirements for BESS have been characterised in a separate section.	Clarity.	None.
B40.3	**B47.3**	Paragraph reworded for better flow. 'Equipment' replaced with new defined term 'IR equipment'.	Provides ease of use.	Provide specific and consistent terminology across the document.	No change.
B40.4 (paragraph removed)		Paragraph removed as analysis is done at the site/GXP level and then summed up to the aggregate level.	Remove unnecessary requirement.	Completeness.	No change.
	B47.4 (new paragraph)	Performance during an under-frequency event can be used to inform contracted values.	Event data is considered appropriate for performance assessment.	Consistency with the Code.	Reduced costs for Ancillary Service Agents.
	B47.5 (new paragraph)	In assessing performance during an event, the System Operator must allow for a response to be below 1 MW of the dispatched quantity.	For consistency with clause 13.68(a) of the Code, which specifies that Ancillary Service Agents need not comply with dispatch instructions varying by less than 1 MW from the most recently followed instruction.	Consistency with the Code.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
B41.1	**B47.6**	Paragraph amended for better flow. No material changes to the paragraph.	Provides ease of use.	Simplified wording.	No change.
Assessment of performance requirements for generation reserve not from battery energy storage systems					
Heading	**Heading**	Removal of reference to IL provided by BESS.	Requirements for BESS have been characterised in a separate section.	Provides clarity.	None.
B42	**B48**	Removal of reference to IL provided by BESS. 'Equipment' has been replaced with new defined term 'IR equipment' and other minor wording changes.	Requirements for BESS have been characterised in a separate section.	Provides clarity.	No change.
	B48.4 (new paragraph)	Paragraph moved from paragraph 39 and amended to remove reference to Code definitions of FIR and SIR.	Provides logical flow and ease of use.	Simplified wording.	No change.
B42.4.1	**B49.5.1**	Pre-event calculation must be taken at a steady state before an under-frequency event to account for timing errors.	Calculation methodology updated to reflect current practice.	Consistency with actual practice.	None.
B42.4.2 (paragraph removed)		Deleted paragraph relating to calculation of maximum delivered quantity.	Reserve response is determined by comparison of IR equipment's actual response with the asset capability modelled response. Maximum delivered quantity is not used to determine compliance.	Consistency with actual practice.	No change.
Assessment of performance requirements for instantaneous reserve from battery energy storage systems					
	B49 (new paragraph)	New paragraph outlining the assessment of performance requirements for BESS.	Clearly outline situations where this paragraph applies (i.e. BESS not being treated as IL).	Provide detailed, technically appropriate requirements for BESS.	No change.
	B49.1 (new paragraph)	Reserve response is determined by comparison of IR equipment's actual	Equivalent to paragraph B50.2 for generation reserve.	Provide detailed, technically appropriate	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		response with the asset capability modelled response.		requirements for BESS.	
	B49.2 (new paragraph)	ACS modelled response is the expected response for the frequency profile of the event, the pre-event real power output and the amount of FIR dispatched.	Equivalent to paragraph B50.2 for generation reserve, however, note that the specific requirements and wording here have been modified to make them appropriate for the different technology.	Provide detailed, technically appropriate requirements for BESS.	No change.
	B49.3 (new paragraph)	The actual response is calculated as the change in real power from pre-event real power.	Equivalent to paragraph B50.3 for generation reserve except this is a change and not additional real power output to allow for injection and offtake.	Provide detailed, technically appropriate requirements for BESS.	No change.
	B49.4 (new paragraph)	The System Operator must provide details of the assessment of delivery of FIR in an under-frequency event is requested to do so.	Equivalent to paragraph B50.6 for generation reserve.	Provide detailed, technically appropriate requirements for BESS.	No change.
Monitoring requirements for instantaneous reserve					
B43	**B50**	Paragraphs amended to refer to new defined term 'IR equipment' rather than 'equipment'.	Provide specific and consistent terminology across the document.	Provides clarity.	None.
B43	**B50**	Monitoring requirements for IL and generation reserve have been differentiated.	Provides clarity.	Provides clarity.	No change.
B43	**B50.2.2 (new paragraph)**	New paragraph outlining requirements for generation reserve monitoring equipment.	Allows for differentiation of generation reserve and IL monitoring requirements.	Provides clarity.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
B43.3	**B50.3.1**	New requirement for locally measured frequency to be ±0.01 Hz resolution.	Provides level of detail of measurement accuracy required for monitoring equipment.	Provides clarity.	Most monitoring equipment should already be capable of meeting this requirement however if that is not the case, there may be costs associated with upgrading or reconfiguring equipment.
B43.4	**B50.3.2**	'GPS' has been amended to 'GPS clock'.	Housekeeping.	Provides clarity.	None.
	B50.3.3 (new paragraph)	New requirement to provide monitoring equipment which is net of demand or supply from other sources at the same grid connection point if possible.	Allows for accurate monitoring of performance requirements.	Ensure performance is monitored accurately and that data provision requirements are comprehensive and clear.	As this is best endeavours only, there should be no additional costs.
	B52 (new paragraph)	Data provision to be aligned with the 'trip time' and in the format specified by the System Operator for IL data unless otherwise agreed with the System Operator.	Standardisation of data sets allows for consistency and ease of processing data for compliance with performance requirements.	Enable faster and more accurate processing of data.	No change to current practice.
	B55	Minor rewording of paragraph.	Readability. No change to meaning.	Readability.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
Offer requirements for instantaneous reserve					
B49	**B57.2**	Paragraphs amended to refer to new defined term 'IR equipment' rather than 'equipment'.	Provide specific and consistent terminology across the document.	Provides clarity.	No change.
	B58 (new paragraph)	Added requirement for IL offers to exclude loads that may be shed for AUFLS or other manual load shedding agreement.	Avoids double counting of loads in both contingent and extended contingent response.	Better accuracy and reliability.	No change from current requirements.
	B59 (new paragraph)	Provide further detail on loads that may not be offered, relating to AUFLS and other load shedding agreements.	Clarity on IR equipment that may not be offered.	Clarity and completeness.	No change from current requirements.
	B59 (new paragraph)	Code clause 8.54B of Part 8 requirement for Ancillary Service Agent to provide IL information to the asset owner or grid owner within 10 business days of entering into an ancillary services procurement contract.	Provides assurance that loads offered into the reserves market will not also be included in AUFLS provisions.	Better accuracy and reliability.	No change from current requirements.
	B61 (new paragraph)	Specifies conditions that must be met in order for an Ancillary Service Agent to make a reserve offer.	Clarifies requirements. This is in line with existing practices, so is not expected to require any additional work from providers.	Clarity and completeness.	No change.
	B62 (new paragraph)	Specifies provisions that will apply if paragraph B60 is breached.	Ensure clarity on when the provisions will apply.	Clarity.	None.
Testing requirements for instantaneous reserve					
Heading	**Heading**	Removal of 'Special' from heading. These testing requirements for OFR are not in addition to other testing required under the ancillary services contracts.	Simplification of wording.	Clarity.	None.
B50	**B63**	Paragraph restructured for better clarity. Removal of reference to IL provided by BESS.	Testing requirements for BESS can be either IL tests or generation reserve tests.	Provides clarity.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
	B63.2 (new paragraph)	Paragraph relocated from paragraph B53. Requirement to perform a test after any change to equipment.	Provides completeness and consistency with other reserve products.	Completeness and consistency.	No change.
B52	**B65**	Requirement to conduct and 'pass' a test.	Provides better clarity. In practice, the requirement is already treated as a requirement to pass the test, not only to conduct it.	Clarity.	No change.
	B65.3 (new paragraph)	Paragraph relocated from paragraph B53. Requirement to perform a test after any change to equipment.	Relocated for better readability. No change to actual requirements.	Readability.	No change.
B53 (paragraph removed)		Paragraph moved to paragraphs B65.2 and B67.3.	Relocated for better readability. No change to actual requirements.	Readability.	None.
B54	**B66**	Paragraph restructured for better flow.	Readability. No change to meaning.	Readability.	None.
	B66.3 (new paragraph)	Governor settings and other settings must be agreed before testing.	Provides assurance that machines will behave as expected.	Ensures technical requirements are clearly described and comprehensive.	No change.
	B66.4 (new paragraph)	Settings must not be changed without System Operator approval.	Provides assurance that machines will behave as expected.	Ensure comprehensive technical requirements.	No change.
B55	**B67**	Minor rewording of the paragraph.	Readability.	Readability.	None.
B56	**B68**	Types of testing removed. Generic 'test' retained.	For clarity and ease of understanding.	Provides clarity.	No change.
	B69 (new paragraph)	Requirement to perform a test after any change to monitoring equipment.	Align Procurement Plan with actual practice and provide maximum clarity on expectations and requirements.	Provide clear and comprehensive guidance on testing requirements.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
B57	**B70**	Paragraph amended for better flow. No material changes.	Readability.	Readability.	None.
	B71	Test or performance data must include an indication of any time delays.	If data provided has unknown time delays, this can create issues for the System Operator in interpreting the data and at worst under-delivery in an event.	Ensure accurate analysis is possible time frames for delivery of FIR and SIR are met.	None.
B58 (paragraph removed)		Paragraph moved to paragraph B63 in section outlining offering requirements above.	Ease of readability.	Readability.	None.
B59 (paragraph removed)		Paragraph removed as redundant.	Does not result in any change to actual requirements.	Clarity.	None.
Over frequency reserve					
Performance requirements and technical specifications for over frequency reserve					
	B72 (new paragraph)	Addition of paragraph outlining the requirement to maintain equipment and that operators of equipment are trained in accordance with good industry practice.	Provides completeness and consistency with other ancillary services.	Completeness.	No change.
B60	**B73**	Paragraph amended removing reference to relay equipment for provision of OFR. Replacement of 'relay equipment' with an 'OFR site that provides over frequency reserve by tripping'.	Performance requirements apply to the combination of relay equipment response times and circuit breaker response times ('over-frequency equipment') unless otherwise specified.	Clarity.	No change.
B60.1	**B73.1**	Arming of 'relay equipment' specified.	Provides clarity and completeness.	Completeness.	No change.
B60.1	**B73.1**	Inclusion of 'circuit breaker equipment' in the allowable timeframes for the disconnection of generating unit(s) during an event.	In line with performance requirements for disconnection of generating unit(s) during an event.	Completeness.	No change.
B60.1	**B73.1**	'Generating unit' replaced with 'OFR site'.	New definition provides clarity.	Clarity.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
B60.1	**B73.1**	'Half a second' replaced with '0.5 seconds'.	Provides consistency.	Consistency of units used throughout document.	None.
B60.1	**B73.1**	Defined term 'required frequency' removed and replaced with contract location of frequency measurement at which generating unit(s) are disconnected.	Provides ease of use.	Clarity.	None.
B60.1	**B73.1**	Reiteration of inclusion of 'circuit breaker equipment' in the allowable timeframes for the disconnection of generating unit(s) during an event.	Provides clarity.	Clarity.	No change.
B60.3 (paragraph removed)		Paragraph removed and replaced with paragraph B77.	Provides clarity and consistency with other reserve products.	Consistency between products.	None.
B60.4 (paragraph removed)		Paragraph removed and replaced with paragraph B74.	Provides consistency.	Consistency.	None.
B61 (paragraph removed)		Paragraph removed and replaced with paragraph B78.	Provides consistency with other reserve outage paragraphs. Conditions under which outages may occur are now specified in new paragraphs B78 – B81.	Consistency between ancillary services.	None.
	B74 (new paragraph)	New paragraph for 'OFR site that is a battery energy storage system or provides over frequency reserve by fast ramping'.	Allows for new technology to tender for OFR.	Provides clear terms under which BESS will be able to provide ancillary services.	No change.
	B74.1 (new paragraph)	New requirement for fast ramping or BESS to automatically reduce real power within 0.5 seconds of the grid frequency rising	Allows for new technology to tender for OFR.	Provides clear terms under which BESS will be able to	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		above the frequency specified in the ancillary service contract.		provide ancillary services.	
	B74.2 (new paragraph)	New requirement for fast ramping or BESS to reduce real power at the ramp rate specified in the ancillary service contract.	Allows for new technology to tender for OFR.	Provide clear terms under which BESS will be able to provide ancillary services.	No change.
	B75 (new paragraph)	Replaces paragraph B60.3. Replacement of exceptions to availability with currently defined term 'allowed outage'.	Provides clarity and consistency with other reserve products.	Consistency between ancillary services.	None.
Over frequency reserve outages					
	B76 (new paragraph)	New paragraph specifying the conditions under which outages will not be considered in assessing compliance.	Provides consistency with other reserve outage paragraphs and ancillary services procurement contracts.	Consistency between ancillary services and better reflect actual arrangements currently in place.	No change.
	B77 (new paragraph)	Addition of requirement to endeavour to minimise the frequency of any outage(s).	Provides consistency with other reserve outage paragraphs and ancillary services procurement contracts.	Consistency between ancillary services and better reflect actual arrangements currently in place.	No change.
	B78 (new paragraph)	Addition of paragraph specifying how ancillary services agent inform the System Operator of planned outages and ensuring that POCP is kept updated.	Provides consistency with other reserve outage paragraphs and ancillary services procurement contracts. Ensures that OFR payments are accurate.	Clarity and completeness.	No change.
	B79	New paragraph specifying requirement for Ancillary Service Agents to inform the System Operator as soon as reasonably	Provides consistency with other reserve outage paragraphs and ancillary services procurement contracts.	Clarity and completeness.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		practicable of unexpected outages and to use reasonable endeavours to continue to provide OFR.			
Monitoring requirements for over frequency reserve					
B62	**B80**	Amended wording to specify monitoring equipment is required for each OFR site.	Provide maximum clarity on monitoring requirements.	Clarity and completeness.	No change.
B62.1	**B80.1**	Amended wording replacing 'at all times' with 'continuously'.	Minor wording change for readability.	Housekeeping.	None.
B62.2	**B80.2**	'Relay equipment' replaced with 'control equipment'.	Ensures wording is consistent throughout document.	Housekeeping.	None.
B62.2	**B80.2**	Amended wording to remove testing as exception to availability.	Already included in definition of 'allowed outage'.	Clarity - removes duplication.	No change.
B62.3	**B80.3**	Addition of requirement for each equipment operator to be trained.	Provides consistency with other services.	Consistency between products. Clarity of requirements.	No change to current requirements.
Testing requirements for over frequency reserve					
Heading	**Heading**	Removal of 'Special' from heading. These testing requirements for OFR are not in addition to other testing required under the ancillary services contracts.	Simplification of wording.	Conciseness.	None.
B63	**B81**	Qualifying statement added for tripping units offering OFR.	Separate OFR provided by tripping from OFR provided by fast ramping or BESS. This allows the requirements for each to be more clearly laid out, as there are differences in the testing requirements.	Clarity.	No change.
B63	**B81**	Addition of requirement to pass a baseline test in order to meet performance requirements.	Provides completeness and consistency with other reserve products.	Clarity.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
B63	**B81**	Replacement of 'relay equipment' with 'over-frequency equipment'.	Testing requirements include all time delays in the equipment including the operation time of the equipment and circuit breakers, on delay, and trip coil supervision.	Clarity.	None.
B63.1 (paragraph removed)		Removal of provision for System Operator to allow lessened testing requirements for 'over-frequency equipment'.	Provides clarity. Less frequent testing of OFR equipment adopted previously has removed the need for this paragraph.	Housekeeping - update needed to reflect actual requirements agreed and in place.	No change.
B63.2 (paragraph removed)		Paragraph replaced with paragraph B83.1.1.	Reflects previous amendments to testing requirements. Aligns with ancillary service procurement contracts.	Housekeeping - update needed to reflect actual requirements agreed and in place.	None.
B63	**B81.1**	Intervals between end-to-end tests extended to 4 years.	Reflects previous amendments to testing requirements. Aligns with ancillary service procurement contracts.	Housekeeping - update needed to reflect actual requirements agreed and in place.	Reduced costs for Ancillary Service Agents.
	B81.1.1 (new paragraph)	Paragraph replaces existing paragraph B63.2. Operational performance of generating units replaced with OFR equipment. Demonstration of compliance through operational performance of over frequency equipment extended to 4 years.	In line with changes to paragraph B83.1.	Housekeeping - update needed to reflect actual requirements agreed and in place.	Reduced costs for Ancillary Service Agents.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
	B81.1.2 (new paragraph)	New requirement for Ancillary Service Agents to provide data for verification of meeting performance requirements for 'end-to-end tests' through operation performance.	Provides completeness by ensuring that data is available for verification of performance.	Provide maximum clarity on testing requirements.	Reduced compliance costs for Ancillary Service Agents if providing data.
	B81.1.3 (new paragraph)	Requirement to perform a baseline test immediately after any change(s) to equipment used to provide OFR.	Provides completeness and consistency with other reserve products.	Ensure testing requirements are comprehensive; provide maximum clarity on testing requirements.	No change.
	B82 (new paragraph)	Allowance for circuit breaker timing tests to be carried out with or separately to other end-to-end testing.	Provides clarity around testing requirements.	Provide maximum clarity on testing requirements.	No change.
	B83 (new paragraph)	New requirement for 'baseline testing' of monitoring equipment to include arming/disarming indications and remote enabling/disabling control in addition to a review of each trip circuit and relay configuration at sites which provide OFR by tripping.	Provides completeness. Ensures any changes made to over frequency equipment which may require end-to-end testing are reported to the System Operator.	Ensure testing requirements are comprehensive; provide maximum clarity on testing requirements.	No change.
	B84.1 (new paragraph)	New requirement for fast ramping or BESS to conduct and pass an end-to-end test yearly unless compliance has been demonstrated and verified through compliant operational performance	Provide clear requirements for testing of fast ramping and BESS.	Provide testing requirements for fast ramping and BESS.	Reduced compliance costs for Ancillary Service Agents if data verified.
	B84.2 (new paragraph)	New requirement for fast ramping or BESS to conduct and pass an end-to-end test	Provides completeness. Ensures any changes made to over frequency	Provide testing requirements for	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		immediately following any change to equipment used to provide OFR.	equipment which may require end-to-end testing are reported to the System Operator.	fast ramping and BESS.	
B64	**B85**	Testing to meet performance requirements extended to include end-to-end testing.	Adds end-to-end testing to this paragraph. This paragraph specifies what the testing must do; end-to-end testing should be included for completeness.	Completeness.	No change.
B64	**B85**	Removal of reference to 'relay equipment' and inclusion of both 'OFR equipment' and 'OFR site'.	Provides completeness.	Completeness.	None.
B64	**B85**	Removal of provision for System Operator to allow lessened testing requirements for 'over-frequency equipment'.	Provides clarity. Less frequent testing of OFR equipment adopted previously has removed the need for this paragraph.	Housekeeping - update to reflect actual requirements agreed and in place.	No change.
B65	**B86**	Removal of specific test from wording.	Provides completeness and consistency with other reserve products.	Consistency between products.	No change.
B66	**B87**	Removal of specific tests from wording.	Provides ease of use and extends requirement for test data to end-to-end tests.	Provide maximum clarity on testing requirements.	No change.
B66	**B87**	Verification of meeting performance requirements now required in the OFA Test Form.	Reference to OFA Test Form provides completeness.	Completeness.	No change.
Voltage support					
Performance requirements and technical specifications for voltage support					
B69.1	**B90.1**	Change 'at all times' to 'continuously'. Instead of detailing the outage provisions,	Clarity.	Clarity.	No change.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		reference the new section which discusses outages in more detail.			
B69.3	**B90.3**	Minor wording updates for readability.	Provides consistency with other ancillary services.	Consistency between services; improved readability.	No change.
Monitoring requirements for voltage support					
B70	**B91**	Removed reference to testing to align with other Ancillary Services.	Clarity.	Clarity.	None.
Special testing requirements for voltage support					
B71	**B92**	Remove 'equipment used to provide or monitor'.	Better readability with no change in effect.		None.
B73	**B94**	Specific test replaced with generic testing.	Better readability with no change in effect.		None.
B74	**B95**	Insert 'relevant' before 'performance requirements'.	For clarity.	Clarity.	None.
Black start					
Performance requirements and technical specifications for black start					
	B96 (new paragraph)	Addition of paragraph outlining the requirement to maintain equipment and that operators of equipment are trained in accordance with good industry practice.	Provides completeness and consistency with ancillary services procurement contracts.	Completeness.	No change from current practice.
B75	**B97**	Paragraph amended to refer to new defined term 'black start' rather than general term 'such services'.	Provides clarity.	Clarity.	None.
B75.1	**B97.1 - B97.8**	Paragraphs amended to refer to new defined term 'black start generating unit' rather than 'generating unit'.	Provides clarity.	Clarity.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
	B97.4 (new paragraph)	Requirement for remaining black start generating units to progressively synchronise to the network busbar.	Provides completeness.	Completeness.	No change.
B75.4	**B97.5**	Paragraph reworded for better flow.	Housekeeping.	Clarity.	None.
B75.5	**B97.6**	Paragraph reworded slightly and reactive capability updated to reactive 'power' capability.	Housekeeping.	Clarity.	None.
B75.6	**B97.7**	'Network voltage' amended to 'grid voltage'.	Housekeeping.	Clarity.	None.
B75.7	**B97.8**	Paragraph amended to refer to 'grid' frequency.	Housekeeping.	Clarity.	None.
B76	**B98**	Paragraph amended to refer to new defined term 'black start generating unit' rather than 'generating unit'.	Housekeeping.	Clarity.	None.
B76.1	**B96.1**	Sentence restructured for better flow.	Housekeeping.	Clarity.	None.
B76.3 (paragraph removed)		Folded into the performance requirement outlined in paragraph B100.1.	Provides clarity.	Clarity.	None.
B76.6 (paragraph removed)		Paragraph replaced with new paragraph B98.	Housekeeping.	Clarity.	None.
	B99 (new paragraph)	Addition of paragraph for provision of additional services over and above BS service.	Provides completeness and consistency with ancillary services procurement contracts.	Clarity.	None.
	B99 (new paragraph)	Addition of paragraph for payment of costs for additional services over and above BS service.	Provides completeness and consistency with ancillary services procurement contracts.	Clarity.	No change from current practice.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
Black start outages					
B77	**B100**	Conditions under which outages will not be considered in assessing compliance have been extended to the generating unit. Wording amended slightly for logical flow. Inclusion of black start generating units as well as equipment.	Provides consistency and completeness.	Clarity.	No change to current practice.
B79.1	**B102.1**	Capitalisation removed from principal performance obligations.	Housekeeping.	Clarity.	None.
B79.2	**B102.2**	This paragraph has been amended slightly for logical flow. 'Twelve' and 'two' replaced with numerical '12' and '2'. No functional changes have been made to this paragraph.	Provides consistency and completeness.	Clarity.	None.
B79.3	**B102.3**	Duration of programme of works updated to 'expected duration' of programme of works for notification purposes.	Provides clarity.	Clarity.	None.
B80	**B103**	Word 'paragraph' replaces word 'clause'.	Housekeeping.	Clarity.	None.
	B104.4 (new paragraph)	Requirement to notify System Operator upon completion of an outage moved from deleted paragraph B82.	Removes duplication in paragraph B82.	Clarity.	No change.
Monitoring requirements for black start					
B82 (paragraph removed)		Removal of paragraph as requirements for unexpected outages are stated previously.	Removes duplication.	Clarity.	None.
Testing requirements for black start					
Heading	**Heading**	Removal of 'Special' from heading. These testing requirements are not in addition to	Simplification of wording.	Clarity.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
		other testing required under the ancillary services contracts.			
B83	**B105**	Paragraph restructured for better flow. Addition of requirement for tests to be carried out immediately after any change to equipment and System Operator to be notified within 5 business days of testing.	Readability and addition of timeframe for better clarity.	Clarity.	No change to current requirements.
B86	**B107**	12 months replaced with 1 year.	Provides consistency.	Consistency.	None.
	B110 (new paragraph)	New requirement for the Ancillary Service Agent to retain test data for a period of 2 years.	Clarify requirements for data retention.	Completeness.	None.
	B111 (new paragraph)	New requirement for the Ancillary Service Agent to provide the System Operator with test data within 15 business days.	Provides completeness and consistency with ancillary services procurement contracts.	Completeness.	None.
Appendix C – Key contracting terms for ancillary service procurement contracts					
Rights to terminate					
C9.2 (paragraph removed)		Removed to align with actual practice. This requirement is not currently reflected in the ancillary service contracts.	Align with actual practice.	Consistency with actual practice.	None.
Limitation of liability					
C16	**C16**	Minor wording change to fix a grammatical error.	Readability. No change to meaning.	Improved readability	None.
C17	**C17**	Throughout paragraph, replace '12 month' with '1 year'.	For consistency of style throughout the document. No change to meaning.	Improved readability	None.
Force majeure					
C20	**C20**	Change 'must' to 'may' before phrase 'be able to rely on force majeure in certain circumstances'. Change 'limit any liability' to 'provide relief from any liability'.	To more closely align with the force majeure provisions in the contracts.	Consistency with actual practice.	None.

Existing Paragraph #	New Paragraph #	Description of Change	Objective	Benefits	Costs
Tests					
	C29 (new paragraph)	Add requirement for Ancillary Service Agent to comply with test guidelines published by the System Operator.	Align Procurement Plan with actual practice and provide maximum clarity on expectations and requirements.	Provide clear and comprehensive guidance on testing requirements.	In practice, Ancillary Service Agents already comply with these guidelines, so no additional costs are expected to be incurred.
New long term contracts					
C33	**C34**	This paragraph previously applied only to OFR, VS and BS. Added back-up SFK to the list of services to which it applies.	This paragraph relates to availability fees, which also apply to back-up SFK, so it should be included here.	Completeness.	None.
C33.2	**C34.2**	Change '12 months' to '1 year'.	For consistency of style throughout the document. No change to meaning.	Improved readability	None.
All		Throughout document, 'Hertz' has been changed to 'Hz'.	Consistency with standard terminology.	Consistency.	None.