

PANEL DETERMINATION

Reliability Panel AEMC

FINAL DETERMINATION

System Restart Standard

12 April 2012

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About the AEMC

The Council of Australian Governments, through its Ministerial Council on Energy (MCE), established the Australian Energy Market Commission (AEMC) in July 2005. The AEMC has two principal functions. We make and amend the national electricity and gas rules, and we conduct independent reviews of the energy markets for the MCE.

About the AEMC Reliability Panel (Panel)

The Panel is a specialist body within the AEMC and comprises industry and consumer representatives. It is responsible for monitoring, reviewing and reporting on reliability, security and safety of the national electricity system and advising the AEMC in respect of such matters. The Panel's responsibilities are specified in section 38 of the National Electricity Law.

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Foreword

I am pleased to present the Reliability Panel's (Panel's) determination of the System Restart Standard (standard), which sets a benchmark and guidelines for the procurement of system restart ancillary services (SRAS) by the Australian Energy Market Operator (AEMO). The Panel has made this determination in accordance with the requirements under the National Electricity Rules (Rules). In making this determination the Panel has taken into account comments from stakeholders, arrangements for SRAS in other markets and the arrangements under the interim system restart standard (interim standard), which was published by AEMO in 2006.

The Panel notes that the interim standard was developed with input from stakeholders (and had been approved by the Panel) and considers that it has been working well to date. Our report sets out the considerations and analysis on each aspect of the standard. In this analysis the Panel noted that many of the provisions in the interim standard are consistent with arrangements in international markets.

The standard retains the key aspects of the interim standard with some clarifications and additions. These include:

- guidelines on strategic locations and diversity of SRAS - the interim standard provides that AEMO must consider diversity in electrical, technological and geographical characteristics of SRAS. The standard retains this criteria with the addition of fuel diversity as a specific criterion; and
- restoration timeframe and reliability of services - the interim standard sets out a 1.5 hour restoration timeframe and reliability standards of 90 per cent for primary restart services and 60 per cent for secondary restart services. The standard retains these provisions with some minor clarifications on the wording of the provision. In assessing these requirements, the Panel took into account recent clarifications that AEMO has made to its SRAS documents.

The standard remains largely unchanged from the draft standard published by the Panel in February 2012. An addition has been made to clarify that the restoration timeframes are 'target timeframes' to be used by AEMO for procurement of SRAS and are not operational timeframes to be achieved under black system conditions.

Under the Rules, the Panel may vary the standard between electrical sub-networks for technological or economic reasons. The Panel did not consider there were any reasons for the standard to be varied and, as such, has determined that the standard should apply equally to all regions.

In undertaking this review to determine the standard, the Panel noted that there were no provisions under the Rules for the Panel (or any other body) to undertake periodic review of the standard once it has been determined by the Panel. The Panel considers that there would be benefit in undertaking such periodic reviews as changes in technology and/or market arrangements may affect the benchmark and guidelines for the procurement of SRAS. As the AEMC may direct the Panel to undertake a review on

any relevant subject matter, the Panel will request the AEMC to consider issuing standing terms of reference for periodic review of the standard.

The Panel has determined that the standard shall be effective from 1 August 2013. This is to ensure that the new standard and this review process do not interfere with AEMO's current round of SRAS procurement. For future reviews the Panel will co-ordinate with AEMO to align the review and procurement processes to ensure that any changes to the standard may be captured in the latest round of SRAS procurement.

I would like to thank the stakeholders that have made submissions to this review process. The stakeholders' views and comments have assisted us with our considerations and assessments. I would also like to thank AEMO for the advice and information it has provided to us during this process.

Neville Henderson
Chairman, AEMC Reliability Panel
Commissioner, AEMC

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1 Introduction

In accordance with the requirements under the National Electricity Rules (Rules) the Reliability Panel (Panel) has undertaken this review to determine the System Restart Standard (standard). This report sets out the Panel's consideration on each element of the standard as well as other specific factors taken into account in making its decision. The standard is also outlined in this report.

1.1 Requirement for the review

The Australian Energy Market Commission (AEMC or Commission) made the National Electricity Amendment (System Restart Ancillary Services and pricing under market suspension) Rule and associated Rule determination in 2006. The Rule change related to the arrangements for the standards applying to the procurement of, and payment for, system restart ancillary services (SRAS).

A requirement introduced by the Rule change is that the Panel is required to determine the System Restart Standard for the acquisition of SRAS. The system restart standard would set out the requirements that are to be met by the Australian Energy Market Operator (AEMO) in acquiring sufficient SRAS to restart the power system following a major supply interruption. The Rules provide that the Panel is to determine the System Restart Standard 'as soon as practicable'.¹ Until such time as the Panel determined a System Restart Standard, the Rules required AEMO (NEMMCO at the time) to determine an interim system restart standard which would be approved by the Panel.² An interim system restart standard has been in place since November 2006.

The Panel acknowledges that, although the Rules require the Panel to determine the standard 'as soon as practicable', there has been a reasonable time lag from the time when the requirement was introduced to now. However, the Panel notes that AEMO undertook consultation in establishing the interim standards and that these interim standards were approved by the Panel (as required by the Rules).³ In addition, experience from the operation of the interim standard may assist the Panel in developing a meaningful standard. Given these considerations, and the relatively low probability of a 'black system' event occurring and that an event has not occurred in the national electricity market (NEM) to date, the Panel did not initiate this work until this time.

In September 2011, the AEMC provided the Panel with terms of reference to determine the System Restart Standard.⁴

1 Clause 8.8.3(a)(5) of the Rules.

2 Clause 11.2.1(b)(3) of the Rules.

3 Clause 11.2.1 of the Rules.

4 The terms of reference for this review is published on the AEMC Reliability Panel's website.

1.2 Black system conditions

In the event of a major supply interruption to the NEM such that a black system condition were to occur, most generating units could be expected to shut down. Such a condition would likely cause significant disruption to businesses and the broader community as a whole. In order to ensure the costs of a black system event are minimised, provisions need to be in place to provide for the restoration of the power system in a timely, orderly and effective manner.

To restore the power system following a black system event, generating units would need to be progressively restarted and load restored. However, most generating units require a source of electrical power to restore their auxiliary plant and restart. The provision of this emergency starting power is termed 'black start capability'.

Restarting the system in this situation is a highly complex and technical task that requires the coordination of many parties in the NEM, including AEMO, network service providers, generators and customers. Restarting generation units need to be matched with loads, and the frequency and voltage of the system must be carefully managed to ensure the system is restarted in a stable manner. AEMO and network service providers need to follow specific operating processes and procedures in a coordinated manner. As most generating units require a source of electrical power to restore their auxiliary plant and restart, having some generating units that have black start capability is an important consideration for the NEM.

1.3 System restart ancillary services (SRAS)

SRAS refers to these services that enable other generators to start up, which would then allow power to be progressively restored to the whole system in accordance with local system black procedures and AEMO's system restoration plans.

SRAS is sourced from generating units that have 'black start capability', which is commonly provided in the following ways:⁵

- inherent black start sources - generating units that can start without being connected to external power supplies such as some hydro generating units and some gas turbines;
- combination system restart sources - large generating units which can be started from a nearby small power station such as thermal power stations with adjacent black start gas turbine generating units; and
- trip to house load schemes (or islanding schemes) - large generating units that can disconnect from the transmission network and continue to supply their own auxiliaries or an isolated segment of system load.

⁵ As discussed in the final Rule determination for the National Electricity Amendment (System Restart Ancillary Services and pricing under market suspension) Rule 2006 and related Rule change proposal.

Under the Rules, AEMO is required to procure sufficient SRAS for the NEM.⁶ AEMO's responsibilities relating to SRAS include publishing details that are relevant to its procurement obligations such as the 'SRAS Description', 'SRAS Quantity Guidelines' and 'SRAS Tender Guidelines' (these documents are discussed further below in section 1.5.3). The Rules also set out two types of SRAS - primary restart services and secondary restart services. The SRAS Description must identify the SRAS that are to be considered primary and secondary restart services.⁷ Currently the SRAS Description provides that (italicised terms are defined in the SRAS Description):⁸

- primary restart service - 'involves supply from the *Service Provider's* generating units following a major supply disruption to *specified generating units* using a *Restart Path* to the *Delivery Point*' and '[t]he purpose of a primary restart service is to assist the *specified generating units* to restart following a major supply disruption'.
- secondary restart service - 'involves supply from the *Service Provider's* generating units following a major supply disruption using a *Restart Path* to the *Delivery Point*. In the case of a secondary restart service based on *TTHL* [trip to house load] scheme, the generating unit(s) providing the service would have a nameplate rating of less than 100MW, making it ineligible for a primary restart service' and '[t]he purpose of a secondary restart service is to assist the *notional specified generating units* to restart following a major supply disruption'.

The Panel notes that, in consultation with stakeholders, AEMO has recently amended the SRAS Description to clarify the provisions relating to primary and secondary restart services.

1.4 The System Restart Standard

AEMO is responsible for procuring sufficient SRAS for the NEM.⁹ The System Restart Standard, which the Panel is required to determine, provides the benchmark that defines what services AEMO should procure.¹⁰ In essence, the standard sets out the SRAS requirements for the market to efficiently minimise expected economic costs of a major supply interruption while balancing the costs of procuring SRAS. The standard provides consistency and clarity in the definition of SRAS in a way which achieves the

⁶ Clause 3.11.4A(b) of the Rules provides that 'AEMO must use reasonable endeavours to acquire system restart ancillary services'.

⁷ Primary and secondary restart services are defined in the Rules with respect to the reliability requirements of these services as set out in the System Restart Standard (or interim standard prior to the Panel's determination of a standard). In AEMO's interim standards, primary services are required to be assessed by AEMO to be likely to perform on more than 90 per cent of the occasions the service is called upon and secondary services more than 60 per cent of the occasions (AEMO 2006, op cit, pp. 9-10).

⁸ AEMO, SRAS Description, 11 November 2011, p. 7 and p. 10.

⁹ Clause 3.11.4A(b) of the Rules.

¹⁰ The specific requirements of the System Restart Standards as defined under the Rules are discussed in Chapter 3 below.

right balance between having sufficient guidance on the services to be procured and allowing AEMO appropriate discretion to carry out its functions. (The specific requirements of the standard are discussed in detail in Chapter 3.) The System Restart Standard does not define or specify the operational procedures to be followed by AEMO or market participants in the event of a black system condition.

AEMO must procure sufficient SRAS for the NEM in accordance with the requirements and guidelines as set out in the standard. For this reason, the standard must be clear and set out provisions that may be practically applied.

To ensure that the standard provides for sufficient SRAS to be procured by AEMO, it must include specific provisions as required by clause 8.8.3(aa) of the Rules. This clause states that the System Restart Standard must:

1. be consistent with the SRAS objective;¹¹
2. apply equally across all regions, unless the Panel varies the standard between electrical sub-networks to the extent necessary:
 - (a) to reflect any technical system limitations or requirements; or
 - (b) if the benefits of adopting the standard would be outweighed by the costs of implementing such a standard;
3. identify the maximum amount of time within which SRAS are required to restore supply to a specified level;
4. include guidelines on the required reliability of primary restart services and secondary restart services;
5. include guidelines to be followed by AEMO in determining electrical sub-networks, including the determination of the appropriate number of electrical sub-networks and the characteristics required within an electrical sub-network (such as the amount of generation or load, or electrical distance between generation centres, within an electrical sub-network); and
6. include guidelines specifying the diversity and strategic locations required of primary restart services and secondary restart services.

1.5 Current arrangements and advice from AEMO

1.5.1 Interim standards

Prior to the Panel's determination of the standard, the Rules require AEMO to put in place interim system restart standards.¹² In consultation with stakeholders and as

¹¹ The SRAS objective is discussed below in section 2.2.

¹² Clause 8.8.3(a)(5) of the Rules.

approved by the Panel, AEMO put in place the interim standards in November 2006. The interim standard is available on AEMO's website and it is also published under this project page on the AEMC Reliability Panel webpage.

In undertaking this review, the Panel has taken into consideration the provisions of the interim standard as discussed further in Chapter 3.

1.5.2 AEMO's advice

The Rules require that the Panel establish the System Restart Standard on the advice of AEMO.¹³ In September 2011, the Panel requested AEMO to provide advice on this matter. AEMO's advice is published on the AEMC's Reliability Panel webpage with this report. The Panel has taken AEMO's advice into consideration and, where relevant, specific issues raised in AEMO's advice are also discussed in this paper.

The Panel also notes that AEMO initiated consultation on its 'SRAS documents' in September and that AEMO aims to execute new SRAS agreements by the end of June 2012.¹⁴ The Panel has worked closely with AEMO throughout this review process to ensure that any issues raised in AEMO's consultations are taken into consideration by the Panel where appropriate. The Panel considers the final System Restart Standard should take effect from 1 August 2013 so that there would be no uncertainties for AEMO's current round of SRAS procurement and execution of agreements.¹⁵

1.5.3 AEMO's SRAS documents

The Panel notes that AEMO is required to develop and publish a number of guidelines in relation to specific areas defined under the standard.¹⁶ These guidelines would likely be more detailed than the standard and take into consideration specific implementation and operational issues. To clarify the provisions of the standard and the other guidelines and determinations that AEMO is required to publish, the specific provisions include that:

- the standard is to set out guidelines on the required reliability of primary restart services and secondary restart services, and AEMO is to develop the SRAS description that identifies whether a service is a primary or secondary restart service and the technical and availability requirements of each service (SRAS description);¹⁷

13 Clause 8.8.1(a)(1a) of the Rules.

14 AEMO's SRAS documents are discussed further in section 1.5.3 below.

15 The application of the new arrangements is discussed in section 4.1.2.

16 Detailed discussion of the content of the System Restart Standard is discussed in Chapter 3.

17 Clause 8.8.3(aa)(4) and clause 3.11.4A(d) of the Rules.

- the standard is to set out guidelines for determining electrical sub-networks, and AEMO is required to determine the boundaries of the electrical sub-networks;¹⁸ and
- the standard is to set out guidelines specifying the diversity and strategic locations required for SRAS, and AEMO is required to develop and publish the procedure for determining the number, type and location of SRAS for each electrical sub-network (SRAS quantity guidelines).¹⁹

AEMO is also required to develop and publish guidelines for undertaking modelling and assessment of the technical capabilities and physical testing of SRAS (SRAS guidelines).²⁰ In addition, AEMO is required to determine and publish ancillary services tender guidelines.²¹

The Panel's review relates to the determination of the standard only. To the extent required, the Panel has taken into consideration provisions in AEMO's SRAS documents in making its determination.

1.6 Review process and consultation

The Panel initiated this review in November 2011 with the publication of an issues paper.²² The issues paper outlined the purpose of the review, provided some background information and set out a series of questions to facilitate consultation. Consultation on the Issues Paper closed on 2 December 2011 and four submissions were received. The issues raised were considered by the Panel in its draft determination and a summary of the issues raised, and the Panel's considerations, are set out in Appendix B.

The Panel published its draft determination in February 2012, which included a draft standard (together referred to as 'the draft report').²³ Consultation on the draft report closed on 23 March 2012. Three submissions were received and they were from Macquarie Generation, Origin Energy and the Private Generators. Where relevant, issues raised in the submissions are discussed throughout this report and a summary of the issues raised are also set out in Appendix B.

The Panel planned to hold a public meeting on 11 April 2012 and registrations for the public meeting was open for four weeks. However, no registrations were received and consequently the public meeting was cancelled.

18 Clause 8.8.3(aa)(5) and clause 3.11.4B(b).

19 Clause 8.8.3(aa)(6) and clause 3.11.4A(f).

20 Clause 3.11.4A(e) of the Rules.

21 Under clause 3.11.5(b) of the Rules, AEMO must determine and publish tender guidelines in respect of non-market ancillary services. The Rules provides that AEMO may publish separate guidelines for network control ancillary services and system restart ancillary services, which AEMO has elected to do.

22 AEMC Reliability Panel, System Restart Standard, Issues Paper, 4 November 2011, Sydney.

23 AEMC Reliability Panel, System Restart Standard, Draft Determination, 24 February 2012, Sydney.

1.7 Structure of the paper

The remainder of this determination is structured as follows:

Chapter 2 Determination of the System Restart Standard - sets out the Panel's consideration in making the standard;

Chapter 3 Elements of the Standard - sets out the specific aspects of the standard and the Panel's consideration in determining each aspect; and

Chapter 4 Other considerations - sets out the other factors that the Panel considers are relevant to its decision including the implementation date of the standard and the on-going requirement for periodic review of the standard.

2 Determination of the System Restart Standard

This Chapter sets out the Panel's considerations in making the System Restart Standard.

2.1 The Reliability Panel's determination of the standard

In accordance with the provisions under clauses 8.8.1(a)(1a) and 8.8.3(a)(5) of the Rules, the Panel has determined the System Restart Standard. As required by the Rules, the Panel has sought, and considered, advice from AEMO in making this determination.

2.2 The Reliability Panel's considerations

In making its determination of the System Restart Standard, the Panel has taken a number of factors into consideration including:

- consistency of the standard with the SRAS objective;²⁴
- application of the interim standard to date;
- stakeholder submissions on the issues paper and the draft report;
- AEMO's advice; and
- AEMC's System Restart Ancillary Services and pricing under market suspension Rule determination (and relevant consultant reports).²⁵

2.3 Consistency with the SRAS objective

The Rules require that the standard must be consistent with the SRAS objective, which states:²⁶

“The objective for system restart ancillary services is to minimise the expected economic costs to the market in the long term and in the short term, of a major supply disruption, taking into account the cost of supplying system restart ancillary services, consistent with the national electricity objective.”

The SRAS objective refers to the minimisation of the expected economic costs of a supply disruption. However, the economic cost of a black start event could be difficult to estimate although it could potentially be very significant. For example, the black system event that occurred in north-east USA and parts of southern Canada in 2003,

²⁴ The SRAS objective is discussed in section 2.3.

²⁵ AEMC, National Electricity Amendment (System Restart Ancillary Services and pricing under market suspension) Rule 2006, Rule Determination, 20 April 2006.

²⁶ The SRAS objective is set out in clause 3.11.4A(a) of the Rules.

which affected 50 million customers over a two-day period, was estimated to have cost the economy US\$10b.²⁷

Instead of attempting to estimate the potential costs of a black start event, the Panel has considered whether the standard is consistent with the SRAS objective in terms of whether the standard inhibits the standard economic efficiency criteria that applies to the procurement of SRAS. That is:²⁸

- Static efficiency - whether SRAS is being provided by the lowest cost operators;
- Dynamic efficiency - whether SRAS is being provided by the lowest cost operators over time; and
- Allocative efficiency - where there is an appropriate amount of SRAS being purchased.

The Panel considers that the standard does not inhibit the efficiency criteria. With respect to static efficiency criterion the process under the Rules requires AEMO to procure SRAS through a competitive tender process, which promotes static efficiency. As discussed further in Chapter 3, the standard also sets targets that are clear and consistent with those applied internationally and thus it promotes dynamic efficiency as it does not unnecessarily exclude any potential SRAS providers from offering their services.

The standard also does not inhibit allocative efficiency as it provides targets that are realistic and achievable; as well as providing transparent guidelines for AEMO to set boundaries of electrical sub-networks and transparent guidelines on diversity of services. That is, the standard provides clear guidelines to allow AEMO to carry out its role in procuring SRAS. As AEMO is a well-informed decision maker and undertakes open and consultative processes to set the relevant detailed SRAS provisions, the standard also promotes allocative efficiency in this regard. For these reasons, the Panel considers that the standard is consistent with the SRAS objective.

The Panel notes that, in its submission on the Issues Paper, Snowy Hydro submits that it would be of benefit for the Panel to undertake a 'marginal cost/marginal benefit analysis as key input' for setting the standard.²⁹ Although the Panel agrees in principle that such an analysis would provide useful information on the costs and benefits of SRAS, the Panel considers that it would not be practical to carry out such an analysis at this time. A marginal cost/benefit analysis would need to be based on many assumptions that may be difficult to quantify. As such, the outcomes of such a study would likely be subjective and potentially inaccurate. Given this, the Panel's assessment of the standard is with respect to the economic efficiency criteria principles.

²⁷ Combined Heat and Power Partnership, Calculating Reliability Benefits, US EPA, 2010.

²⁸ These efficiency concepts are discussed in the Firecone report to the AEMC: Firecone Ventures Pty Ltd, Review for the AEMC of the proposed NEMMCO Rule change for System Restart Ancillary Services, Final Report, December 2005, p. 11.

²⁹ Snowy Hydro, submission on the Issues Paper, 6 December 2011, p. 2.

The Panel also notes that, in submissions on the Issues Paper, Origin notes that the current annual costs of SRAS at \$36.7m is a very small percentage of the NEM's annual spot revenue, which was around \$7.4b for the last financial year;³⁰ and that Alinta notes the services provided are reasonably priced.³¹

2.4 System Restart Standard

The Panel has determined the standard, which incorporates specific elements as required under clause 8.8.3(aa) of the Rules.³² The standard is provided in Attachment A of this report and separately published on the AEMC Reliability Panel website. The specific considerations relating to each element of the standard is discussed in detail in Chapter 3.

30 Origin Energy, submission on the Issues Paper, 2 December 2011, p. 1.

31 Alinta Energy, submission on the Issues Paper, 2 December 2011. p. 1.

32 The specific elements of the standard as required under the Rules are discussed in section 1.4.

3 Elements of the standard

This chapter sets out the Panel's consideration of each element in the standard.

3.1 Time to restore supply

Summary of key points

The Panel's determination of the standard is consistent with the interim standard and specifies the target timeframe to restore supply at 1.5 hours to re-supply and energise the auxiliaries of the power station/s. The Panel considers that this timeframe is an achievable target and provides a guide for AEMO in its procurement of SRAS. The Panel has taken into consideration that this timeframe is consistent with the provisions in other markets and that submissions from some stakeholders supported the current provisions.

The Panel also considers that the measures against the 'peak load' be retained as they provide a clear and measurable target.

3.1.1 Rules requirement

The Rules require that the standard 'must identify the maximum amount of time within which system restart ancillary services are required to restore supply to a specified level'.³³ The Panel had acknowledges that in practice, the timeframe for the restoration of supply following a black system event would be affected by a number of factors including the location of the supply interruption, the nature of the disruption as well as the types of ancillary services that may be available.³⁴ Taking this into account, the Panel noted that any restoration timeframes set out in the standard should be considered 'target timeframes'.

3.1.2 How the interim standard meets this requirement

The interim standard sets out that restart services should be procured for each electrical sub-network sufficient to:³⁵

- 'Re-supply and energise the auxiliaries of power stations within 1½ hours of a major supply disruption occurring such that there would be sufficient capacity to meet 40% of the peak demand in the affected electrical sub-network'; and

³³ Clause 8.8.3(aa)(3) of the Rules.

³⁴ The concept of restoration timeframes was discussed in more detail in the issues paper and draft report.

³⁵ AEMO 2006, op cit, p. 5.

- 'Restore generation and transmission within the affected electrical sub-network such that 40% of the electrical sub-network's peak demand could be supplied within four hours of a major supply disruption occurring'.

In the interim standard AEMO notes that there are no guarantees whether timeframes for restoration of supply may be met given a major supply disruption as it would be affected by a number of factors.³⁶ For this reason, the interim standard includes the requirement for the re-supply and energisation of the auxiliaries of power stations.³⁷ AEMO believes the target of 1.5 hours to restore supply to the levels specified is broadly achievable.³⁸ AEMO also believes that the target to restore 40 per cent of peak demand of an affected sub-network is an effective benchmark as a 40 per cent restoration marks the point at which most of the available network paths would need to have been restored.³⁹ The restoration timeframe was set giving consideration to modelling undertaken of prospectively contracted restart services.⁴⁰

3.1.3 Stakeholder submissions

Issues raised in submissions on the issues paper were discussed in detail in the draft report and are summarised here in Appendix B.

Submissions on the draft report and draft standard did not raise any comments on the proposed restoration timeframe of 1.5 hours and the use of 'peak load' as a measurable target. However, Macquarie Generation noted that the standard itself did not explain that the restoration timeframe was a 'target' to be applied in the procurement of SRAS and not an operational target to be achieved during a black system condition.⁴¹ Macquarie suggests that the standard should be clarified.⁴²

3.1.4 Panel's considerations

Restoration timeframe

As discussed in the Issues Paper, the Panel considers the purpose of the standard should be to set a restoration timeframe target. This is consistent with AEMO's approach in the interim standard where the restoration timeframe is based on the amount of time to re-supply and energise the auxiliaries of power stations within 1.5 hours. This provides a clear and definite timeframe that is broadly achievable. The target also appears consistent with the technical capabilities set for black start units in other markets, such as in the Pennsylvania-New Jersey-Maryland (PJM) market where

³⁶ AEMO 2006, op cit, p. 6.

³⁷ *ibid*, p. 7.

³⁸ *ibid*

³⁹ *ibid*

⁴⁰ *ibid*, p. 17.

⁴¹ Macquarie Generation, submission on the draft report, 19 March 2012, p. 1.

⁴² *ibid*

there is a target of 90 minutes for black start units to re-energise.⁴³ As discussed above in section 1.2, the Panel considers that given the number of factors that could affect the time to restore the system if a black system event did occur, it would not be practical to specify a definite time in which the system should be restored. In addition, the purpose of the standard is to set a standard to guide the procurement of SRAS and not to set any specific operational requirements.

The interim standard also refers to the restoration of demand to a level at which most of the available network paths would need to have been restored within four hours (i.e. 40 per cent of peak load). This is a useful consideration as it provides a benchmark of the time in which services may be restored and potentially limits the amount of unserved energy in a black system event. However, the Panel considers minor clarifications to the wording of the requirements in the interim standard could be made.

Procurement of SRAS and practical application of the standard

The Panel notes that, as with other criteria set out in the standard, this restoration timeframe benchmark is to assist AEMO with the procurement process. It does not directly determine the actual time that would be required to restart the system following a black system event. This approach is consistent with the provision in other markets where generally there are no specific time limits set for the restoration of the system following a black system event.

In the AEMC's rule determination on system restart ancillary services, the AEMC noted that it 'would expect one of the factors that the Reliability Panel would take into account in defining [the restoration timeframe] would be the ability for [AEMO] to practically apply the standard as part of the procurement process'.⁴⁴ The Panel considers that a restoration timeframe target based on the time to re-energise auxiliaries and in reference to peak load are measurable and may be practically applied.

In regards to the issue raised by Macquarie Generation, the Panel agrees that the standard itself should clarify that the restoration timeframe is a target timeframe to be applied by AEMO in the procurement process and not an 'operational' restoration target to be achieved in the event of a black system condition. Additions have been made to the standard to provide this clarification.

⁴³ In accordance with section 4.6.10 of the PJM Balancing Operations, a generation unit providing black start services 'must have the ability to close the output breaker to a dead bus within 90 minutes'.

⁴⁴ AEMC 2006, National Electricity Amendment (System Restart Ancillary Services and pricing under market suspension), Rule Determination, 20 April 2006, p. 19.

3.2 Guidelines on required reliability of SRAS

Summary of key points

The Panel has determined that the reliability for primary restart services and secondary restart services be set at 90 per cent and 60 per cent respectively, consistent with the interim standard. The reliability of 90 per cent for primary restart services is a 'high' standard and is consistent with provisions in other markets. The reliability of secondary restart services do not need to be as high as primary services and there is no evidence to suggest that the current 60 per cent reliability level set in the interim standard is inappropriate or unjustly excludes any services from being considered. In addition, the Panel considers the provision in the interim standard that specifically allows SRAS services to be considered 'in combination' should be retained.

3.2.1 Rules requirement

The Rules require that the standard 'must include guidelines on the required reliability of primary restart services and secondary restart services'. AEMO is required under the Rules to publish a description of each type of SRAS (the SRAS description) and the description of primary and secondary services must be in accordance with the guidelines for these services under the standard (among other things).

As outlined above in section 1.3, the reliability of primary and secondary restart services are to be set in the standard whereas the actual detailed description of the services are determined by AEMO, in consultation with stakeholders, and set out in the SRAS Description.

3.2.2 How the interim standard meets this requirement

The interim standard sets out that:⁴⁵

- Primary restart services: are required to be assessed by AEMO to be likely to perform on more than 90 per cent of the occasions the service is called upon to deliver the service; and
- Secondary restart services: are required to be assessed by AEMO to be likely to perform on more than 60 per cent of the occasions the service is called upon to deliver the service.

The interim standard also provides that individual restart services could be considered in combination to meet a higher level of reliability than the individual service.

In the interim standard AEMO notes that it is not aware of any practicable study to determine the 'correct' reliability for restart services. In making the interim standard,

⁴⁵ AEMO 2006, op cit, pp. 9-10

the reliability of the services was set in a 'deterministic manner'. AEMO believes that thresholds meet the presumed community expectations and should be reasonably achievable with current technology and processes.⁴⁶

3.2.3 Stakeholder submissions

Issues raised in submissions on the issues paper were discussed in detail in the draft report and are summarised here in Appendix B.

The draft report proposed that the standard should retain the provisions for reliability as outlined in the interim standard. Submissions on the draft report did not raise any issues with the proposed arrangements.

3.2.4 Panel's considerations

Reliability and availability of services

The Panel notes that in practice AEMO applies a 'combined reliability and availability' measure. The Panel understands that AEMO considers the combined availability and reliability requirement indicates the likelihood that a service would be capable of successfully delivering the service should it be required – that is 'would it be available and, if so, will it work'. AEMO considers that this concept of reliability is consistent with the system restart standard, as the concept under the standard relates to whether a service is likely to perform. AEMO determines the combined reliability and availability factor for a service by giving consideration to testing statistics submitted by SRAS providers with their annual testing report providing evidence of the periods that the service was available and details relating to attempted starts and the number of unsuccessful attempts. The information relating to the methodology for determining SRAS reliability is set out in the SRAS Assessment Guidelines, which AEMO develops in accordance with the consultation procedures under the Rules.

The Panel notes that provisions in other markets use availability measures such as a 90 to 95 per cent service availability in the UK market and a 90 per cent availability in the Texas market.⁴⁷ Although the measure in the system restart standard is reliability rather than availability, the Panel notes that the 90 per cent value is consistently applied in other markets. Also, as AEMO has raised, the Panel agrees that the concept of reliability under the System Restart Standard relates to whether a service is likely to perform and therefore the Panel considers that the interim standard is consistent with availability requirements used in other markets. On this basis, the Panel considers that a 90 per cent reliability level is to be adopted for primary services given that primary services should demonstrate a high degree of reliability and 90 per cent is an acceptable benchmark.

⁴⁶ AEMO 2006, op cit, p. 11.

⁴⁷ The National Grid Company, An Introduction to Black Start, February 2001, p. 4.

Primary services should provide a 'high' level of reliability while secondary services, by nature of the definition, do not need to be as reliable as primary restart services however they should still be sufficiently reliable. In considering the appropriate level of reliability for secondary services, the Panel took into account the fact that there does not generally appear to be specific provisions for 'secondary' services in other markets. There is often a trade-off between the reliability and price of services and the Panel has not received any evidence to suggest that a 60 per cent reliability level for secondary services is inappropriate.

Combining SRAS

The interim standard provides for services to be considered in 'combination'. The Panel considers that this provision provides additional flexibility and options to AEMO, which would benefit consumers by providing additional competition in the provision of SRAS. The Panel understands there have been issues raised by stakeholders about requiring clarity in the definition of what constitutes 'combined services'. AEMO has advised the Panel that in its recent determination of the amended SRAS documents it has provided clarification on these issues. The clarifications include noting that combined units would need to be capable of being allocated to the same electrical sub-network and provide similar roles in power system restoration. The units would not need to have common ownership but evidence of appropriate agreements between the SRAS provider and the other party would need to be accepted by AEMO. The Panel also notes that AEMO has made other clarifications in its SRAS documents following from its recent consultations such as amendments to the definition of 'specified generating unit' to clarify the relevant requirements.

The ability for services to be combined provides flexibility to AEMO's procurement process and increases competition. For these reasons the Panel has determined that this provision also be included in the system restart standard. However, consistent with the requirement for AEMO to define the services under the SRAS Description, AEMO should be required to specifically clarify and define the criteria for services to be combined under the SRAS Description.⁴⁸

3.3 Variation of the standard between regions

Summary of key points

The Panel has determined that the standard is to apply equally to all electrical sub-networks. Stakeholders did not raise any issues on this particular matter and the Panel is not aware of any reasons why the standard should be varied for any electrical sub-networks.

⁴⁸ Under the Rules AEMO is required to consult on any amendments to the SRAS Description.

3.3.1 Rules requirement

The Rules require that the standard ‘must apply equally across all regions, unless the Reliability Panel varies the system restart standard between electrical sub-networks to the extent necessary:⁴⁹

“(A) to reflect any technical system limitations or requirements; or

(B) if the benefits of adopting the system restart standard would be outweighed by the costs of implementing such a standard.”

3.3.2 How the interim standard meets this requirement

The interim standard applies equally across all sub-networks. AEMO had noted that the Rules provide for the Reliability Panel to vary the system restart standard and AEMO did not believe it had any authority to propose an interim standard that varied across sub-networks.⁵⁰

3.3.3 Stakeholder submissions

Submissions on the issues paper and the draft report did not raise any issues on whether the standard should be varied for different electrical sub-networks.

3.3.4 Panel's considerations

As set out in the Rules, the standard may only be varied for technical or economic reasons. The Panel has determined that the standard shall apply equally in all electrical sub-networks as the Panel is not aware of any technical or economic reasons that would require the standard to be varied for an electrical sub-network. The Panel has taken into consideration that stakeholders have not raised any issues on this matter and that, in other markets, any specific system restart arrangements typically apply generally. However, the Panel notes that should there be any changes or developments in the market in the future that can affect the application of the standard in an electrical sub-network, the provisions of the standard should be reviewed. (The requirement for periodic review of the standard is discussed further in Chapter 4.)

The Panel understands that there may be a greater number of potential SRAS providers in some electrical sub-networks compared to others. In theory, a greater number of potential SRAS providers would lead to higher levels of competition, and likely achieve more competitive results ensuring that the market is paying efficient prices. Although the Panel requested comments from stakeholders on this issue, no evidence has been provided to suggest that competition in any particular electrical sub-network is inefficient, or that the prices paid for SRAS services are inefficient.

⁴⁹ Clause 8.8.3(aa)(2) of the Rules.

⁵⁰ AEMO 2006, op cit, p. 4.

3.4 Guidelines for determining electrical sub-networks

Summary of key points

The Panel has determined that the guidelines in the interim standard for determining electrical sub-networks be adopted as they have assisted AEMO to establish the current boundaries. AEMO's determination of the boundaries was completed in consultation with stakeholders and the Panel is not aware of any deficiencies in the current provisions.

3.4.1 Rules requirement

The Rules require that the standard 'must include guidelines to be followed by AEMO in determining electrical sub-networks, including the determination of the appropriate number of electrical sub-networks and the characteristics required within an electrical sub-network (such as the amount of generation or load, or electrical distance between generation centres, within an electrical sub-network)'.⁵¹

3.4.2 How the interim standard meets this requirement

The guideline in the interim standard for determining the boundaries for electrical sub-networks sets out that the electrical sub-networks will be determined by taking into account, but not limited by, the following factors:⁵¹

- 'the number and strength of transmission corridors connecting an area to the remainder of the power system;
- 'the electrical distance (length of transmission lines) between generation centres;
- 'a significant quantity of generation in an area, of the order of 1000MW or more;
- 'a significant quantity of load in an area, of the order of 1000MW or more.'

The interim standard also noted that '[g]eneration centres will be deemed sufficiently remote from each other to warrant consideration of separate sub-networks, if the transmission network between those centres is likely to take in excess of two hours to fully re-energise following a major supply disruption'.⁵²

In determining these guidelines, AEMO took into consideration the factors set out in the AEMC's rule determination on system restart services and pricing under market suspension as well as outcomes from the SRAS review conducted by AEMO (NEMMCO at the time).

51 AEMO 2006, op cit, p. 12.

52 ibid

3.4.3 Stakeholder submissions

Issues raised in submissions on the issues paper were discussed in detail in the draft report and are summarised here in Appendix B.

The draft report considered that the provisions in the interim standard were appropriate. Submissions on the draft report did not raise any issues with the guidelines for determining electrical sub-networks.

3.4.4 Panel's considerations

The Panel notes that the guidelines under the standard should provide sufficient guidance to AEMO to allow it to determine the appropriate number of electrical sub-networks. The Panel also notes that in many other markets, 'regions' are based on transmission operator regional boundaries or determined by the system operator. This approach of setting out guidelines in the standard provides additional clarity and transparency on the determination of electrical sub-networks.

The Panel has taken into consideration that AEMO has determined the current electrical sub-networks in accordance with the criteria as set out in the interim standards and in consultation with stakeholders. Given that stakeholders have been involved in this process and that the Panel is not aware of any specific issues or deficiencies with the current provisions, we consider that the existing requirements under the interim standards are appropriate to guide AEMO in determining electrical sub-networks.

In making this determination, the Panel also considered the possibility of allowing sub-network boundaries to overlap where one of the main potential advantages would be allowing a system restart service to provide services to more than one sub-network. This could provide efficiencies and have a possibility of lowering the overall cost of SRAS for the market. However, allowing electrical sub-network boundaries to overlap would likely affect operational procedures to restore an electrical sub-network in the event of black system conditions and would need to be assessed by AEMO and stakeholders on a sub-network by sub-network basis. These operational factors would need to be taken into consideration.

On balance, the Panel considers that sub-networks should be uniquely defined and electrical boundaries should not overlap. However, AEMO should take advantage of any flexibility in the supply of SRAS where it could be obtained effectively and efficiently from suppliers in adjacent sub-networks. The Panel notes that AEMO currently permits an SRAS to be utilised in more than one electrical sub-network. The Panel considers that AEMO can clarify in its SRAS documents the factors it would take into consideration in assessing whether an SRAS could be applied in an adjoining electrical sub-network.

3.5 Guidelines on strategic locations and diversity of SRAS

Summary of key points

The Panel has determined that the guidelines for strategic location and diversity of restart services include guidelines on electrical, technological, geographical and fuel diversity. This would be consistent with the interim standards with the addition of 'fuel' as a specific, separate criterion.

3.5.1 Rules requirement

The Rules require that the standard 'must include guidelines specifying the diversity and strategic locations required of primary restart services and secondary restart services'.

3.5.2 How the interim standard meets this requirement

The guideline set out under the interim standard for specifying the diversity of restart services are diversity with respect to electrical, technological and geographical characteristics.⁵³

- Electrical: '[i]t is important that there is an appropriate degree of independence between the services, in particular regarding any potential single points of electrical or physical failure. Consideration should be given to the potential for a major power system disturbance to adversely affect more than one service'.
- Technological: [d]iversity of technologies should also be considered to minimise the reliance of services on a common attribute. For example, a restoration strategy may be less robust if the services all relied on gas supplies or all services were trip-to-house load'.
- Geographical: '[w]here there is potential for a natural disaster such as a severe bad weather event or earthquake or other event to adversely affect services that are closely located by geography, consideration should be given to achieving geographic diversity'.

The interim standard also discusses that any strategic location for primary restart services would need to be well placed both geographically and electrically to facilitate power system restoration.⁵⁴

3.5.3 Stakeholder submissions

Issues raised in submissions on the issues paper were discussed in detail in the draft report and are summarised here in Appendix B.

⁵³ AEMO 2006, op cit, p. 14.

⁵⁴ ibid, pp. 14-15.

The draft report considered that the provisions in the interim standard were appropriate with the addition of fuel diversity as a separate criterion. Submissions from Origin Energy and the Private Generators on the draft report support the addition of fuel diversity.⁵⁵

3.5.4 Panel's considerations

Diversity in SRAS is required to ensure sufficient redundancy and prevent the system from being vulnerable to a single point of failure. A certain level of independence should exist between the SRAS procured for the NEM.

The Panel has acknowledged the importance of fuel diversity in the provision of SRAS. Although fuel diversity appears to be addressed by the interim standard in the description for 'technological' diversity, the Panel considers it is of value to specifically include fuel as a separate category. The Panel also considers that this goes towards addressing the issue raised by Alinta regarding the growing integration of the gas and electricity markets (as discussed further below in Chapter 4). Depending on the availability of SRAS based on different fuel sources, adding a specific fuel criterion could impact on the overall costs of SRAS in particular sub-networks. However, the Panel notes that the fuel diversity is just one of the factors that needs to be considered and that in the procurement of SRAS, AEMO is required to take into account achieving the SRAS objective.

⁵⁵ Origin Energy, submission on the draft report, 23 March 2012, p. 1; Private Generators, submission on the draft report, 23 March 2012, p. 1.

4 Other considerations

The Panel has taken into consideration a number of other issues during the review process, which are discussed further in this chapter.

4.1 Effective date and transitional considerations

The Panel considers that its determination of the standard should not interfere with the existing processes being undertaken by AEMO to procure SRAS.

4.1.1 AEMO's current procurement process

As discussed in Chapter 1, AEMO undertook consultation from September 2011 on its SRAS Documents and in November 2011 sought 'expressions of interest' for providing SRAS. The Panel understands that AEMO has issued requests for tender in March 2012 with a view to finalising SRAS contracts to apply from July 2012. Given the work that has been undertaken by AEMO and market participants in accordance with the current provisions under the interim standard, the Panel considers that the final System Restart Standard should not come into force until after July 2012 to provide regulatory certainty for the current round of procurement.

4.1.2 Application of new arrangements

The Panel considers that it is likely AEMO will be required to review its SRAS documents to ensure that it is consistent with the final System Restart Standard. To allow sufficient time for this review to be conducted, the Panel proposes that the System Restart Standard be effective from 1 August 2013. Until that time, the interim standard will continue to apply. This timeframe takes into consideration that AEMO has recently completed a review of its SRAS documents and that AEMO and participants would have had time to consider the impacts of the new standard as well as any learning from the latest round of SRAS procurement. However, on an on-going basis (in periodic reviews of the standard as discussed below), there should be alignment of the Panel's review process and AEMO's SRAS procurement such that changes to the standard may be captured more immediately in the latest round of SRAS procurement. The Panel will co-ordinate with AEMO on the timing of future reviews.

The Panel notes that the submission from the Private Generators on the draft report supports an implementation date of 1 August 2013 for the standard.⁵⁶

4.2 Periodic review of the standard

Currently the Rules require that the Panel establish the System Restart Standard, however there are no specific provisions requiring the Panel to undertake regular

⁵⁶ Private Generators, submission on the draft report, 23 March 2012, p. 1.

reviews of the standard. The Panel considers that there would be benefit in undertaking periodic review of the standard.

4.2.1 Benefits of periodic review

As discussed above, the purpose of the standard is to set a 'benchmark' for the requirements and procurement of SRAS. Although, once established, these provisions should not need to be varied significantly, the Panel considers that changes in market arrangements and technology could impact the standard in the future. For example, developments in technology may impact restoration timeframe targets or the criteria for determining electrical sub-networks; and changes in the generation and load profiles of regions may affect the ways in which electrical sub-network boundaries should be determined. For these reasons, the Panel considers that periodic review of the standard should be completed.

The Panel notes that, in its submission on the draft report, the Private Generators supported the introduction of the requirement for a periodic review of the standard, it also considered that:⁵⁷

“... while there is clearly benefit to be gained from reviews of past performance, there is also potential cost in imposing changes to standards impacting on service providers. Any changes should therefore be carefully considered for the potential cost to existing or new system restart service providers, and should be timed so as to not interfere with existing contracts, or the tender process.”

The Panel agrees that it would not be desirable for a change in the standards to impact any existing contracts or on-going tender processes and, for this reason, would not expect any future reviews or changes to the standard to have such an impact. The Panel also notes that the setting of the standard and procurement of SRAS by AEMO is guided by the SRAS objective and more broadly by the National Electricity Objective. These provisions require the Panel and AEMO to consider how changes potentially impact on costs and ability to achieve efficient outcomes. The Panel would also consult with stakeholders in undertaking any review of the standard.

4.2.2 AEMC direction to undertake review

Currently under the Rules, the AEMC may direct the Panel to undertake reviews on relevant matters. The Panel considers that this could include a direction to undertake a review of the System Restart Standard. The Panel will liaise with the AEMC to request that it considers providing the Panel with a standing terms of reference for periodic review of the standard to be undertaken. Given AEMO's SRAS procurement terms of 5 years, it would appear reasonable that a review of the standard could be undertaken at least every five years.

⁵⁷ Private Generators, submission on draft report, 23 March 2012

4.3 Growing integration of gas and electricity markets

In its submission on the Issues Paper, Alinta notes that ‘the growing integration of the energy market, in particular gas and electricity, means the implications of a gas supply event need to be considered in the context of black start and in the order in which SRAS providers may be called upon’.⁵⁸ The Panel agrees that generally there can be interdependencies between various energy market sectors that could impact the operation of the market. In respect to influences on SRAS, the Panel has taken this into consideration in requiring AEMO to consider fuel diversity in its procurement of SRAS (as discussed above in section 3.5). At this stage the Panel is not aware of any other specific issues that could affect the procurement of SRAS more generally. However, should any potential issues arise in the future, the Panel considers that this would be identified through the periodic review of the standard that the Panel is recommending.

⁵⁸ Alinta Energy, *op cit*, p. 2.

Abbreviations

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
Commission	See AEMC
NEM	national electricity market
Panel	Reliability Panel
PJM	the Pennsylvania-New Jersey-Maryland market
Rules	National Electricity Rules
SRAS	system restart ancillary services
standard	System Restart Standard (unless otherwise stated)

A System Restart Standard

1. Introduction

This System Restart Standard (standard) was determined by the Reliability Panel (Panel) in accordance with clauses 8.8.1(a)(1a) and 8.8.3 of the National Electricity Rules (Rules). The purpose of this standard is to provide guidance and set a benchmark to assist the Australian Energy Market Operator (AEMO) in procuring sufficient system restart ancillary services (SRAS) to meet the requirements of the National Electricity Market (NEM). This standard is effective from 1 August 2013.

2. Requirements of the standard

The requirements of the standard are specified under clause 8.8.3(aa) of the Rules, which states that (italicised terms are defined under the Rules):

“The system restart standard must:

1. be consistent with the SRAS objective referred to in clause 3.11.4A(a);
2. apply equally across all *regions*, unless the *Reliability Panel* varies the *system restart standard* between *electrical sub-networks* to the extent necessary:
 - (a) to reflect any technical system limitations or requirements; or
 - (b) if the benefits of adopting the *system restart standard* would be outweighed by the costs of implementing such a standard;
3. identify the maximum amount of time within which *system restart ancillary services* are required to restore *supply* to a specified level;
4. include guidelines on the required reliability of *primary restart services* and *secondary restart services*;
5. include guidelines to be followed by AEMO in determining *electrical sub-networks*, including the determination of the appropriate number of *electrical sub-networks* and the characteristics required within an *electrical sub-network* (such as the amount of generation or *load*, or electrical distance between *generation centres*, within an *electrical sub-network*);
6. include guidelines specifying the diversity and strategic locations required of *primary restart services* and *secondary restart services*.”

In making its determination of the standard, the Panel detailed the factors considered in its decision in AEMC Reliability Panel 2012, System Restart Standard, Final Determination, 12 April 2012. Consistency of the standard with the SRAS objective is

explained in this report and the final decision with respect to the other requirements under clause 8.8.3(aa) are outlined below.

3. Applicability of the standard in electrical sub-networks

This standard shall apply equally across all regions and electrical sub-networks.

4. Restoration timeframe

For each electrical sub-network, AEMO shall procure SRAS sufficient to:

- re-supply and energise the auxiliaries of power stations within 1.5 hours of a major supply disruption occurring to provide sufficient capacity to meet 40 per cent of peak demand in that sub-network; and
- restore generation and transmission such that 40 per cent of peak demand in that sub-network could be supplied within four hours of a major supply disruption occurring.

The restoration timeframe represents the 'target timeframe' to be used by AEMO in the procurement process. It is not a specification of any operational requirement that should be achieved in the event of a black system condition.

5. Reliability of services

Primary restart services shall have a reliability of 90 per cent.

Secondary restart services shall have a reliability of 60 per cent.

Services may be considered in combination to meet a higher level of reliability than the individual service.

AEMO will determine the manner in which reliability will be assessed, and clarify the provisions for combining services, in accordance with the requirements under the Rules.

6. Guidelines for the determination of electrical sub-networks

AEMO shall determine the boundaries for electrical sub-networks without limitation by taking into account the following factors:

- the number and strength of transmission corridors connecting an area to the remainder of the power system;
- the electrical distance (length of transmission lines) between generation centres;
- the quantity of generation in an area, which should be in the order of 1000MW or more; and
- the quantity of load in an area, which should be in the order of 1000MW or more.

7. Guidelines for specifying the diversity and strategic location of services

There shall be diversity in the SRAS procured by AEMO to provide an appropriate level of independence between the services procured. AEMO shall consider diversity of the services by taking into account the following guidelines:

- Electrical - diversity in the electrical characteristics shall be considered particularly with respect to whether there would be a single point of electrical or physical failure;
- Technological - diversity in technologies shall be considered to minimise the reliance of services on a common technological attribute;
- Geographical - diversity in geography shall be considered to minimise the potential impact of geographical events such as natural disasters; and
- Fuel - diversity in the type of fuel utilised by services shall be considered to minimise the reliance on one particular fuel source.

B Summary of submissions

Issues paper submissions

Issues raised in submissions on the issues paper are summarised in the table below. Four submissions were received from: Alinta Energy, Origin Energy, Snowy Hydro and Transend.

Stakeholder	Issue/Comment	Reliability Panel Response
Time to restore supply		
Alinta Energy	Alinta considers that 'flexibility around target timeframes would appear suitable'. It further considered that 'where providers are capable of provid[ing] services in excess of target timeframes these should be identified and rewarded where justified'.	In response to the issue raised by Alinta on rewarding services that exceed target timeframes, the Panel notes that, where all other factors are equal, a service that provides a higher degree of certainty in being able to achieve the target timeframe would be considered more favourably and therefore would more likely be awarded an SRAS contract. As discussed above in sections 1.2 and 3.1.4, the actual time to restore services are subject to many factors, there can be limited certainty of actual restoration times. Therefore, if a number of services meet the restoration target, it is questionable whether rewarding a provider that can exceed the target will actually reduce the overall unserved energy in a black start event. For this reason, the Panel considers there would be no efficiency gains in rewarding providers that can exceed the restoration target.
Origin	Origin notes that it considers the current interim standard is generally suitable.	The Panel notes Origin's comment.
Snowy Hydro	Snowy Hydro considers that a target timeframe 'provides weak incentives for all relevant bodies' and that the Panel 'should instead set a specific timeframe ... that is economically determined based on the SRAS objective which must be achieved in the event of a Black System	As discussed in sections 1.2 and 3.1.4, the Panel does not consider that it would be appropriate to specify an operational timeframe within which the power system must be restored given that the actual restoration requirements in a black system would

Stakeholder	Issue/Comment	Reliability Panel Response
	event'.	be subject to a wide range of variables.
Transend	Transend notes that it supports the current timeframes in the interim standard and supports AEMO's advice to the Panel noting that the restoration timeframes were to guide acquisition of SRAS and considers that 'a more relaxed standard can extend the restoration times following a major supply disruption'.	The Panel notes Transend's comments.
Reliability of SRAS		
Alinta Energy	In its submission, Alinta notes that there are benefits in requiring a high level of availability and reliability from SRAS providers but it also offers a countervailing view that 'such high standards may rule out options that may be capable of providing services at a lower level of availability'	The Panel notes that no potential SRAS providers have submitted that their potential services are being excluded and the Panel is not otherwise aware of there being insufficient secondary services available in the NEM.
Origin Energy	While the review is timely, Origin considers that the current standard delivers an appropriate level and mix of primary and secondary restart services.	The Panel notes Origins comments and that it has determined to adopt the provisions in the interim standards on the reliability of SRAS.
Snowy Hydro	The current definitions in the interim restart standard are vague and do not attempt to quantify the reliability of a service providers' SRAS.	The definition of the reliability of SRAS is discussed in section 3.2. The Panel notes that the reliability/availability levels in the standard for primary services are consistent with levels applied in other markets. The Panel also notes that AEMO has detailed process to outline how it tests and determines the reliability of services.
Guidelines for determining electrical subnetworks		
Alinta Energy	Alinta submits that although it 'agrees that the existing sub-networks are appropriate', it notes that it 'would not be averse to additional redundancy being built-in via overlapping sub-networks and additional services being provided from adjacent sub-networks in the case of an extreme event'	The Panel notes that AEMO currently considers potential flexibility in SRAS by considering the potential for services to be provided by SRAS providers in adjacent sub-networks. Further discussion is outlined in section 3.4.

Stakeholder	Issue/Comment	Reliability Panel Response
Diversity of SRAS		
Alinta Energy	Alinta notes that ‘technological diversity and geographical disparity are key considerations in selecting services across sub-networks’. Alinta also notes that the growing integration of the energy markets and further consideration of such matters is warranted going forward.	As discussed in section 3.5, the Panel agrees that technological and geographical diversity needs to be considered as well as electrical and fuel diversity. Including fuel diversity goes towards acknowledging the growing integration of the energy markets.
Origin Energy	There is a balance between the costs and services required to restore the electricity system in that timely window and the cost for the necessary SRAS mix.	The Panel agrees that there is a balance between costs and restoration of the system in a timely manner. The Panel notes that AEMO is required to take into consideration the SRAS objective in carrying out its obligations.
Testing requirements for SRAS providers		
	<p>Transend considers the costs of testing could be insurmountable for a registered participant contemplating a primary restart service that utilises NSP assets to form a ‘restart path’ between generators offering the primary SRAS.</p> <p>The mandated testing regime requires the primary SRAS provider to demonstrate its ability to deliver the service under normal network conditions when the restart path is utilised for a shared purpose. To dedicate this restart path for the exclusive use of the SRAS provider(s) is likely not to be practical for the NSP without affecting supply, reliability or security of the network.</p>	The Panel acknowledges that testing of SRAS is an important aspect of providing these services. However, the Panel notes that under clause 3.11.4A(e) of the Rules, AEMO is required to determine the specific testing requirements for SRAS providers and that AEMO does so in consultation with stakeholders (the SRAS Guidelines). AEMO is also required to consider the SRAS objective in carrying out its obligations in relation to SRAS procurement. Given that there are specific Rules requirements for AEMO to consult with stakeholders on testing requirements and the Rules acknowledge AEMO’s operational expertise in these matters, the Panel considers that these issues relating to details of the testing requirements are outside the scope of the standard. However, the Panel will raise these comments from stakeholders with AEMO for its further consideration.
Alinta Energy	Testing obligations on SRAS providers are necessary but onerously costly. Appropriate provisions must be made to ensure that all relevant testing costs are valued and necessary	

Draft report submissions

Issues raised in submissions on the draft report are summarised in the table below. Three submissions were received from: Macquarie Generation, Origin Energy and the Private Generators (AGL Energy, Alinta Energy, Energy Brix, Intergen, International Power GDF Suez, LYMMCO, NRG Gladstone, Origin Energy and TRUenergy).

Stakeholder	Issue/Comment	Reliability Panel Response
General comments		
Origin Energy	Origin supports the draft determination. Notes that, fortunately, there have been no system black incidences to test the effectiveness of the regime. While untested, Origin supports the consistency between the interim and draft standard with the standard unambiguous in expectations and requirements.	The Panel notes the comments.
Private Generators	Notes that the draft determination essentially adopts the current interim standard as the final standard and that this is supported as the interim standard has been in use for over five years and has largely been found to be suitable by both AEMO and the system restart service providers.	The Panel notes the comments.
Time to restore supply		
Macquarie Generation	Macquarie Generation is concerned that the draft determination discusses the concepts of target timeframes and effective benchmarks with regard to the restoration timeframes, yet neither of these terms appear in the standard itself. The standard should be clearer on this to avoid the risk of conveying an unrealistic expectation of system restoration.	The Panel agrees with these comments and have amended the standard to provide clarification. Additional discussion is outlined in section 3.1.

Stakeholder	Issue/Comment	Reliability Panel Response
Diversity of SRAS		
Origin Energy	Origin welcomes the inclusion of fuel diversity in services. Recognising the diversity of energy supply in creating electrical energy acknowledges the diversity in generation supply across the NEM.	The Panel notes these comments. Additional discussion on the fuel diversity is outlined in section 3.5.
Private Generators	The inclusion into the standard of a requirement for AEMO to consider fuel diversity of potential system restart services is welcome, particularly with the expected growth in gas-fired generation sources.	
Implementation of standard		
Private Generators	Before the final standard comes into effect, it is important that AEMO completes the current system restart tender process, and then review all the relevant documentation for consistency with the final standard. The proposal outlined in the draft determination to delay the effective date of the final standard to 1 August 2013 would appear to be suitable to provide for these requirements.	The Panel notes the comments.
Periodic review of the standard		
Private Generators	Any changes to the standard should be carefully considered for their potential cost to existing or new system restart service providers, and should be timed so as to not interfere with existing contracts, or the tender process.	Discussion on this issue is outlined in section 4.2.