Decision

South Australian Energy Transformation

Determination on dispute - application of the regulatory investment test for transmission

June 2019

AUSTRALIAN ENERGY REGULATOR

Inquiries about this publication should be addressed to:

Australian Energy Regulator
GPO Box 520
Melbourne Vic 3001

Tel: 1300 585165

Email: RIT@aer.gov.au
AER Reference: 65042

Contents

Executive Summary 4

1 Introduction 6

1.1 Who we are and our role in this process 6

1.2 The SAET RIT-T 6

1.3 The dispute 7

1.4 Structure of this document 8

2 RIT-T dispute resolution 9

2.1 Our dispute resolution process 9

2.2 Application of our dispute resolution process 12

2.3 Our assessment approach 13

3 AER assessment of RIT-T dispute 14

3.1 The basis of the dispute 14

3.2 AER's assessment 14

3.2.1 The SPS proposed as part of the preferred option 14

3.2.2 Likelihood that SPS is technically feasible 15

3.2.3 Modelling of market benefits 20

3.2.4 Consultation process 21

4 AER determination 22

Executive Summary

This document outlines the Australian Energy Regulator's (AER) determination in regard to a dispute, brought by the South Australian Council of Social Services (SACOSS), of ElectraNet's regulatory investment test for transmission (RIT-T) for its South Australian Energy Transformation (SAET) project.

The AER is the economic regulator for electricity transmission and distribution services in the National Energy Market (NEM). Our electricity-related powers and functions are set out in the National Electricity Law (NEL) and National Electricity Rules (NER).

We are responsible for developing, publishing and maintaining the RIT-T and accompanying RIT-T Application Guidelines (RIT-T Guidelines). The RIT-T is an economic cost–benefit analysis that is used by transmission businesses to assess and rank different electricity investment options. We are also responsible for determining RIT-T disputes raised by parties following the conclusion of the RIT-T process as set out in the NER. This requires the AER to consider whether the RIT-T proponent (in this case ElectraNet) applied the RIT-T in accordance with the National Electricity Rules (NER).

ElectraNet initiated a RIT-T consultation process in November 2016 to identify a project to reduce the cost of providing secure and reliable electricity to South Australia, while facilitating the long term transition of the energy sector across the NEM to low emission energy sources. ElectraNet published the Project Assessment Conclusions Report (PACR) for the SAET RIT-T on 13 February 2019.

The preferred option identified in the PACR involves constructing a new 330 kV interconnector between Robertstown in South Australia and Wagga Wagga in New South Wales. It also includes a 220 kV spur from Buronga in NSW to Red Cliffs in Victoria. The estimated cost is $1.53 billion with a completion date of 2022 to 2024.

SACOSS lodged a written notice[1] with the AER disputing[2] the conclusions made in ElectraNet's PACR published on 13 February 2019 (PACR) in relation to the application of the RIT-T for its SAET project.

SACOSS's concerns are two-fold. First, it considers that the PACR inadequately treated the risk of unintended consequences, specifically system security risks, associated with the assumed retirement of three South Australian gas plants (Torrens Island B, Osborne and Pelican Point) once the interconnector is energised. SACOSS contends that the PACR provided ‘very little’ detail in relation to the ability of the proposed Special Protection Scheme (SPS) to detect and manage system security risks associated with the loss of the Heywood interconnector or the proposed interconnector. It queried whether the assumed combined interconnector capacities would be achievable if the SPS is unable to be implemented as intended.

1 https://www.aer.gov.au/communication/aer-receives-notification-of-rit-t-dispute-from-sacoss

2 As permitted under National Electricity Rules (NER), clause (cl) 5.16.5(a)

The purpose of a SPS is to prevent overloading of either the Heywood or proposed interconnector as a result of the loss of the other. Without a reliable SPS, in circumstances where the remaining interconnector is overloaded, there is a risk of a state-wide system black event in South Australia.

SACOSS's second ground of dispute relates to ElectraNet's modelling of market benefits. It contend that the modelled market benefits of the preferred option are based on assumed combined interconnector capacities that may not be achievable if the SPS is unable to be implemented as intended; as raised above. Relatedly, SACOSS also claims that the question of whether the SPS is achievable or not does not form part of the sensitivity testing in the PACR.[3]

After considering these grounds of dispute, the AER's determination is that ElectraNet is not required to amend its PACR for the SAET RIT-T. In conducting our review:

1. We are satisfied that, based on the additional information provided by the Australian Energy Market Operator (AEMO) and ElectraNet and following further discussion with both as part of our dispute resolution process, the SPS proposed to manage the loss of either the Heywood or the proposed interconnector is technically feasible. We have formed this view on the basis that there is a high likelihood that the SPS will operate as intended because:

    - feasibility studies undertaken to date by ElectraNet and AEMO demonstrate it is highly likely that the proposed SPS can be developed and implemented to effectively manage system security risks and allow the combined interconnector limits assumed in the PACR to be achieved; and
    - the proposal to leverage the existing South Australian emergency protection scheme in developing the SPS provides further confidence that the SPS will operate as intended.

2. Given that there is a high likelihood that the SPS, if developed, will provide the services that the RIT–T proponent has claimed it can provide, we consider that the assumed combined interconnector limits used in the SAET RIT-T economic analysis are realistic.

We are also of the view that early engagement between stakeholders and the proponent of a RIT-T, and full provision of information, is essential for the efficient and timely resolution of a RIT-T process. In this instance, it could have helped prevent this dispute.

3 https://www.aer.gov.au/communication/aer-receives-notification-of-rit-t-dispute-from-sacoss

1 Introduction

This chapter sets out the relevant background information to our determination on the dispute in relation to the SAET RIT-T, including a summary of the dispute and the dispute resolution process.

1.1 Who we are and our role in this process

The AER is the economic regulator for electricity transmission and distribution services in the NEM.[4] Our electricity-related powers and functions are set out in the NEL and NER.

We are responsible for developing, publishing and maintaining the RIT-T and accompanying RIT-T Guidelines.[5] The RIT-T is an economic cost–benefit analysis that is used by transmission businesses to assess and rank different electricity investment options.[6] The purpose of the RIT-T is to identify the credible option[7] which maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the market (the preferred option).[8] The RIT-T Guidelines provide guidance on the operation and application of the RIT-T.[9]

Transmission businesses must apply the RIT-T to proposed transmission investments specified in clause 5.16.3 of the NER. The RIT-T aims to promote efficient transmission investment decision making in the NEM and provide greater consistency, transparency and predictability.

1.2 The SAET RIT-T

ElectraNet initiated a RIT-T consultation process in November 2016 to reduce the cost of providing secure and reliable electricity to South Australia, while facilitating the long term transition of the energy sector across the NEM to low emission energy sources.

ElectraNet published the PACR for the SAET RIT-T on 13 February 2019[10]. The preferred option identified in the PACR involves constructing a new 330 kV interconnector between Robertstown in South Australia and Wagga Wagga in New South Wales. It also includes a 220 kV spur from Buronga in NSW to Red Cliffs in Victoria.

---

4 In addition to regulating transmission and distribution in the NEM and Northern Territory, we also monitor the wholesale electricity and gas markets to ensure suppliers comply with the legislation and rules, taking enforcement action where necessary, and regulate retail energy markets in Queensland, New South Wales, South Australia, Tasmania (electricity only) and the ACT.

5 https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/rit-t-and-rit-d-application-guidelines-2018

6 The current RIT-T, version 1.0, was published by the AER on 29 June 2010.

7 A credible option is defined in NER, cl. 5.15.2(a) as an investment option that (a) addresses the identified need; (b) is commercially and technically feasible; and (c) can be implemented in sufficient time to address the identified need. A credible option is also an option that is identified as a credible option in accordance with paragraphs (b) or (d) of cl. 5.15.2 (as relevant).

8 NER, cl. 5.16.1(b)

9 AER, Regulatory Investment Test for Transmission Application RIT-T Guidelines, December 2018,

10 ElectraNet, South Australian Energy Transformation (SAET) RIT-T, PACR, 13 February 2019

The interconnector would provide up to 800 MW of capacity. When combined with the Heywood interconnector, ElectraNet modelling estimates that transfer capacity from Victoria and NSW to SA would be 1300 MW.

The PACR estimates that the interconnector would deliver net market benefits of $900 million over 21 years. One of the market benefits claimed in the PACR is wholesale market fuel cost savings of over $100 million per year as soon as the interconnector is energised. The interconnector would allow New South Wales coal generators to supply South Australian customers in place of relatively expensive gas fired generators in South Australia. The interconnector provides further benefits by providing diverse low-cost renewable generation sources to help service New South Wales demand going forward, particularly as existing coal-fired generators retire. The PACR also claims that the proposed new interconnector is expected to avoid substantial capital costs associated with enabling greater integration of renewables in the NEM.[11]

ElectraNet has proposed an SPS to provide system security in the event of unplanned outages of either the Heywood interconnector or the proposed interconnector. The SPS would trigger a battery response and some load shedding (100 MW and up to 400 MW, respectively) to avoid a SA state-wide system black event[12]

The estimated cost of the preferred option is $1.53 billion with a completion date of 2022 to 2024.[13]

1.3 The dispute

On 15 March 2019, the AER received a written notice from SACOSS disputing the assessment and conclusions in the PACR[14].

The concerns raised by SACOSS in the dispute notice can be separated into two grounds. First, SACOSS considers that the PACR does not adequately address system security risks associated with the assumed retirement of three South Australian gas plants (namely Torrens Island B, Osborne and Pelican Point). SACOSS contends that the PACR provides ‘very little’ detail about the ability of the proposed SPS to detect and manage system security risks associated with the loss of the Heywood or the proposed interconnector Specifically, SACOSS' notice raises a question as to whether the SPS is likely to be implemented as intended, and thus whether the assumed interconnector capacities are achievable.

SACOSS's second ground of dispute relates to the modelling of market benefits. SACOSS contends that the modelled market benefits of the preferred option are based on assumed combined interconnector capacities that may not be achievable if the SPS is unable to be implemented as intended and that the PACR did not include sensitivity testing on those capacities.

11 ElectraNet, Project Assessment Conclusion Report for SAET RIT-T, February 2019, p. 3-4.

12 The loss of either the Heywood or the new interconnector is considered to be a non-credible contingency and the SPS is expected to be available at all times to maintain system stability.

13 ElectraNet, Project Assessment Conclusion Report for SAET, February 2019, , p. 5-6.

14 https://www.aer.gov.au/communication/aer-receives-notification-of-rit-t-dispute-from-sacoss

1.4 Structure of this document

This document sets out our determination on the dispute including the reasons for the determination.

The decision is structured as follows:

- Chapter two sets out our dispute resolution process and how it relates to the present dispute.
- Chapter three sets out our assessment of the application of the RIT-T by ElectraNet.
- Chapter four sets out our determination on SAET RIT-T dispute.

2 RIT-T dispute resolution

2.1 Our dispute resolution process

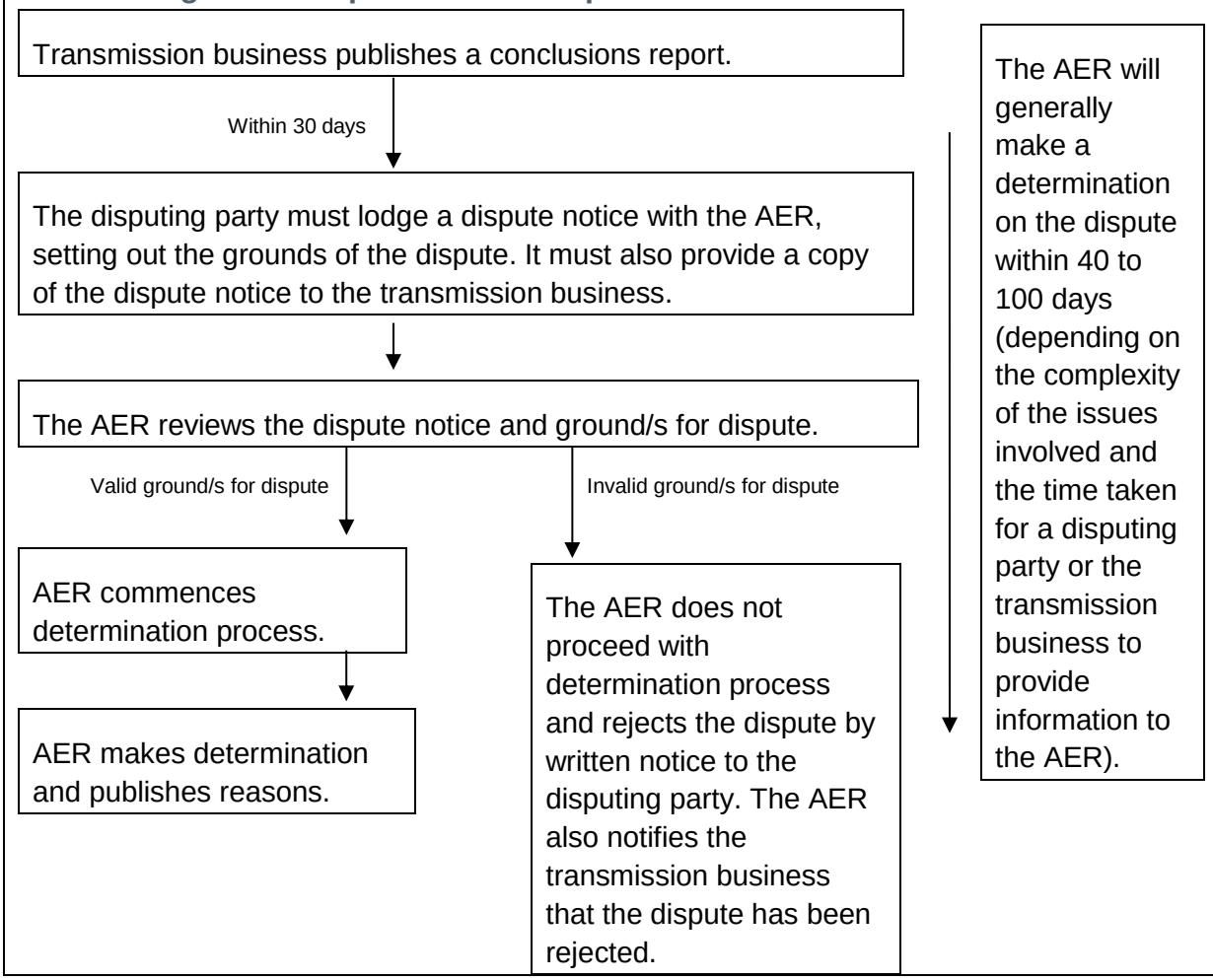
The AER is responsible for determining RIT-T disputes raised by parties following the conclusion of the RIT-T consultation process as set out in the NER. In accordance with clause 5.16.5(c) of the NER, certain parties may raise a dispute in relation to the conclusions made in the PACR by a RIT-T proponent by lodging a written notice to the AER within 30 days of the publication of the PACR.

Clause 5.16.5(a) of the NER identifies Registered Participants, the AEMC, Connection Applicants, Intending Participants, AEMO and interested parties as parties eligible to lodge a dispute notice. As stated above, a dispute may be raised in relation to the conclusions made by the RIT-T proponent in the PACR on the grounds that:[15]

- the RIT-T proponent has not applied the RIT-T in accordance with the NER;
- the basis on which the RIT-T proponent has classified the preferred option as being for reliability corrective action; or
- whether the preferred option will have a material inter-network impact.

15 NER, cl. 5.16.5(a)

Figure A: Dispute resolution process



A dispute notice may not be raised about any issues in the PACR which the RIT-T treats as externalities or relate to an individual's personal detriment or property rights.[16] The AER's RIT-T Guidelines provide guidance on the information that should be included in a dispute notice.[17] The RIT-T Guidelines also provide a summary of the RIT-T dispute resolution process. This summary has been reproduced as Figure A above.[18]

After considering the dispute notice and any other relevant information, we must either reject the dispute or make and publish a determination. If we decide to reject the dispute, we must:

- reject the dispute by written notice to the disputing party if we consider that the grounds for the dispute are misconceived or lacking in substance; and
- notify the RIT-T proponent that the dispute has been rejected.[19]

16 NER, cl. 5.16.5(b)
17 AER, December 2018, Regulatory Investment Test for Transmission (RIT-T) Application Guidelines p. 74
18 AER, December 2018, Regulatory Investment Test for Transmission (RIT-T) Application Guidelines p.75
19 NER, cl. 5.16.5(d)(1) and (2)

If we do not reject the dispute, we must make and publish a determination that:

- directs the RIT-T proponent to amend the matters set out in the PACR; or
- states that, based on the grounds of the dispute, the RIT-T proponent will not need to amend the PACR.[20]

We must decide whether a dispute is valid and resolve the dispute within:

- 40 days of receiving the dispute notice; or
- an additional period of up to 60 days where we notify interested parties that additional time is required to make a determination because of the complexity or difficulty of the issues involved.[21]

In making a determination on the dispute, we:

- must only take into account information and analysis that the RIT-T proponent could reasonably be expected to have considered or undertaken at the time it performed the RIT-T;
- must publish our reasons for making the determination;
- may disregard any matter raised by the disputing party or the RIT-T proponent that is misconceived or lacking in substance; and
- must specify a reasonable timeframe for the RIT-T proponent to comply with the AER's direction to amend the matters set out in the PACR.[22]

Under clause 5.16.5(f)(3) of the NER, we may request additional information regarding the dispute from the disputing party and/or the RIT-T proponent. The disputing party or the RIT-T proponent (as the case may be) must provide any additional information as soon as is reasonably practicable.[23]

A request for additional information will automatically extend the period of time for making a determination by the amount of time it takes the relevant party to provide the requested information, provided that:

- we make the request for additional information at least seven days prior to the expiry of the relevant period; and
- the RIT-T proponent or disputing party provides the information within 14 days of receipt of the request.[24]

20 NER, cl. 5.16.5(d)(3)
21 NER cl. 5.16.5(d)
22 NER, cl. 5.16.5(f)
23 NER, cl. 5.16.5(h)
24 NER, cl. 5.16.5(i)

2.2 Application of our dispute resolution process

We received a written dispute notice from SACOSS on 15 March 2019. Clause 5.16.5(c) of the NER requires a dispute notice to be provided to us within 30 days of the date of the publication of the PACR. As the PACR was published on 13 February 2019, SACOSS met the deadline for raising a valid dispute.

After an initial assessment, we considered that the dispute notice was not misconceived or lacking in substance and that it adequately specified the grounds of the dispute. The concerns raised in the dispute notice are summarised in section 1.3 above.

To better understand the concerns raised by SACOSS, we met with SACOSS and ElectraNet on 25 and 26 March 2019, respectively.

On 1 April 2019 we wrote to AEMO seeking advice on;

- the feasibility of an SPS as proposed for the interconnector;
- design studies of the SPS undertaken to date; and
- other measures required to manage system security.

We sought information from AEMO because of its role as national planner, the work it undertook on the interconnector in developing the Integrated System Plan, and its input into ElectraNet's planning processes.

This information is necessary to understand whether the modelled transfer capacity for the proposed interconnector could be realised while maintaining system security in South Australian. This is necessary to understand whether the modelled market benefits in the RIT-T are realistic. The modelled market benefits assumed in the RIT-T would be substantially lower in the absence of a workable SPS. A copy of our letter and AEMO's response, dated 8 April 2019, are available on our website.[25]

On 2 April 2019 we wrote to ElectraNet seeking further information on the SPS, including but not limited to:

- the analysis and process involved in the development of the SPS; and
- the technical requirements of the SPS.

A copy of our letter and ElectraNet's response, dated 10 April 2019, are available on our website.[26]

After assessing the information provided by AEMO and ElectraNet we sought further information on 16 May and 17 May 2019. A copy of our letters and AEMO's and ElectraNet's responses dated 16 May 2019 and 22 May 2019, respectively, are available on our website.[27]

---

25 AER information request to AEMO, 1 April 2019 and AEMO response to AER information request, 7 April 2019.

26 https://www.aer.gov.au/about-us/dispute-resolution

27 ibid

Prior to receiving responses to the above information requests, we met with AEMO and ElectraNet to discuss the nature of the further information required to inform our assessment against the grounds of the dispute.

2.3 Our assessment approach

In accordance with the NER, our review of this dispute was a compliance assessment against the RIT-T requirements, focusing on the grounds of the dispute. In particular, we conducted a review as to whether ElectraNet applied the RIT-T in accordance with the NER.[28]

Accordingly, our assessment focused on identifying whether:

- the SPS proposed as part of the preferred option is technically feasible(?), such that it can operate as intended to mitigate the system security risks that may otherwise arise in consequence of the proposed interconnector; and
- ElectraNet, in estimating the magnitude of market benefits, utilised a market dispatch modelling methodology that incorporated a realistic treatment of the network constraints and losses, including in respect of the interconnector transfer capacities.

We met with SACOSS to ensure that we fully understood the grounds of dispute raised in its notice.

28 NER, cl.5.16.5(a)

3 AER assessment of RIT-T dispute

This section outlines our compliance assessment of ElectraNet's application of the RIT-T for the SAET project in response to the dispute notice we received.

3.1 The basis of the dispute

The basis of the dispute is set out in section 1.3.

3.2 AER's assessment

As outlined in section 2.3, we have assessed the issues raised by SACOSS in its dispute notice to determine whether ElectraNet applied the RIT-T in accordance with the NER. Specifically, we have considered whether:

1. the SPS is technically feasible such that the preferred option, of which it forms part, is a credible option[29]; and
2. the preferred option includes an effective SPS, or properly explored how system security issues could impact on network constraints and the assumed market benefits in the RIT-T analysis.[30]

3.2.1 The SPS proposed as part of the preferred option

We consider that the SPS is a necessary part of the preferred option as the information in the PACR indicates that ElectraNet requires the preferred option to include an SPS because:

- the need for an SPS as part of all of the credible options was discussed in the project specification consultation report (PSCR);
- the PACR and the accompanying 'Cost estimate report' included the costs of an SPS as part of an aggregate sum[31]; and
- the economic evaluation accompanying the PACR includes the costs of an SPS.

The following details on the SPS are included in the PACR:

- All network options in the PACR include an SPS. In the market modelling, combined interconnector power transfer limits of 1,300 MW are assumed. However, this is on the basis that at that level of transfer, following the loss of either interconnector, the operation of a SPS will keep the remaining interconnector intact and allow the continued stable operation of the SA power system.
- The SPS will be designed to shed some load (or generation if exports from South Australia are occurring) along with some battery response. The SPS would trigger

29 The 'preferred option' must be a 'credible option' under NER clause 5.16.1.

30 The preferred option must reflect realistic network constraints under RIT-T clause 11.

31 See 'other costs' under table 17 in ElectraNet, *SAET RIT-T PACR*, 13 February 2019 and under table 2 in ElectraNet, *SAET RIT-T cost estimate report*, 13 February 2019.

batteries and some limited load shedding (or generator tripping) to avoid a SA state-wide system black event.

- The scope of the SPS will be different to the recently deployed System Integrity Protection Scheme (SIPS) in that the current SIPS scheme is focussed on managing the loss of multiple generators in SA during extreme wind periods, to prevent separation from the NEM.

The 'Network technical assumptions report' accompanying the PACR explained the following assumptions about the SPS:

- A 400 MW limit of post-contingent load-shedding has been set as the upper limit for the SPS. This is about 15 per cent of peak demand and about 30 per cent of average demand in SA, which ElectraNet assesses as a manageable amount of load shedding. The upper limit of load shedding is required when imports are very high, which is associated with higher demand periods.
- As well as load-shedding, a high-speed response from grid-scale batteries can be utilised. It is assumed that a 100 MW response from the operational Hornsdale and Dalrymple battery is available.
- Under high SA export conditions the loss of an interconnector can trigger up to 500 MW of load shedding.

3.2.2 Likelihood that SPS is technically feasible

The purpose of the RIT-T is to identify the credible option which maximises the present value of the net economic benefit to all those who produce, consume and transport electricity in the market.[32]

Both the NER, and the RIT-T Guidelines, published by the AER under 5.16.2(a) of the NER, define a credible option as an option that[33]:

- addresses the identified need, that is, achieves the objective that the RIT-T proponent seeks to achieve by investing in the network;
- is commercially and technically feasible; and
- can be implemented in sufficient time to meet the identified need.

Further, the RIT-T Guidelines state that:[34]

> An option is technically feasible if there is a **high likelihood** that it will, if developed, provide the services that the RIT–T proponent has claimed it could provide for the purposes of the RIT–T assessment. In providing these services, the option should also comply with relevant laws, regulations and administrative requirements [emphasis added].

32 NER, cl. 5.16.1(b)

33 AER, Regulatory Investment Test for Transmission (RIT-T) Application Guidelines, December 2018, p. 16. This is consistent with the definition in cl. 5.15.2(a) of the NER.

34 ibid, p. 18

We consider that the technical feasibility of the SPS is relevant to the grounds of review raised by SACOSS. This is because the proposed interconnector introduces system security risks in the event of non-credible[35] loss of either the existing Heywood interconnector or the proposed interconnector. When imports into South Australia are high, the loss of one of the inter-connectors may overload the remaining interconnector causing it to trip. This may lead to system instability, separation of South Australia from the NEM and a SA state-wide system black event.[36] The inclusion of the SPS is designed to mitigate this risk. SACOSS raised concerns that the PACR provides little detail on the SPS and the risks associated with the scheme.[37] Given the role of the SPS in determining the credibility of the options proposed by ElectraNet in its PACR, our assessment focused on the technical feasibility of the SPS and whether there is a high likelihood that the SPS will work as intended.[38]

The concerns raised by SACOSS highlight the impact of the SPS on the benefits of the proposed interconnector. If the SPS cannot be implemented as intended to maintain system security through timely load and generation shedding, it may be necessary to manage system security risks in South Australia by reducing the power transfer capabilities of the proposed interconnector. This would reduce the modelled benefits in the SAET RIT-T assessment. Alternatively, if it is not feasible to rely on load shedding for the SPS on import into SA to manage system security risks in South Australia, further investment may be required (such as a 400 MW grid scale battery energy storage system). The impact of the SPS on the power transfer capabilities of the proposed interconnector, and the assumed market benefits which are dependent on that power transfer capability, are considered further in section 3.2.3 below.

Evidence to support the feasibility of the SPS

In considering SACOSS's contention that little information was provided about the SPS, we note that the PACR provided some information as to the nature of the operation of the SPS. Specifically, the PACR states that:[39]

> The scheme will require topology based signals along with power flows across each interface to be continuously transmitted to the central processor for real time pre-processing.
>
> When an event occurs, rapid and appropriate response will ensure that the system returns to a new secure state without any risk of cascade tripping of the remaining interconnector. This scheme will utilise the available communication network and dedicated hardware to direct and process the response ……
>
> It may also be noted that the overview of the scheme is indicative and is subject to change following detailed design.

35 A non-credible loss or contingency event is defined under clause 4.2.3(e) of the NER which includes double circuit transmission line failure.

36 ElectraNet, Response to follow-up information request, 17 May 2019

37 SACOSS, SAET RIT-T Notice of Dispute, 15 March 2019

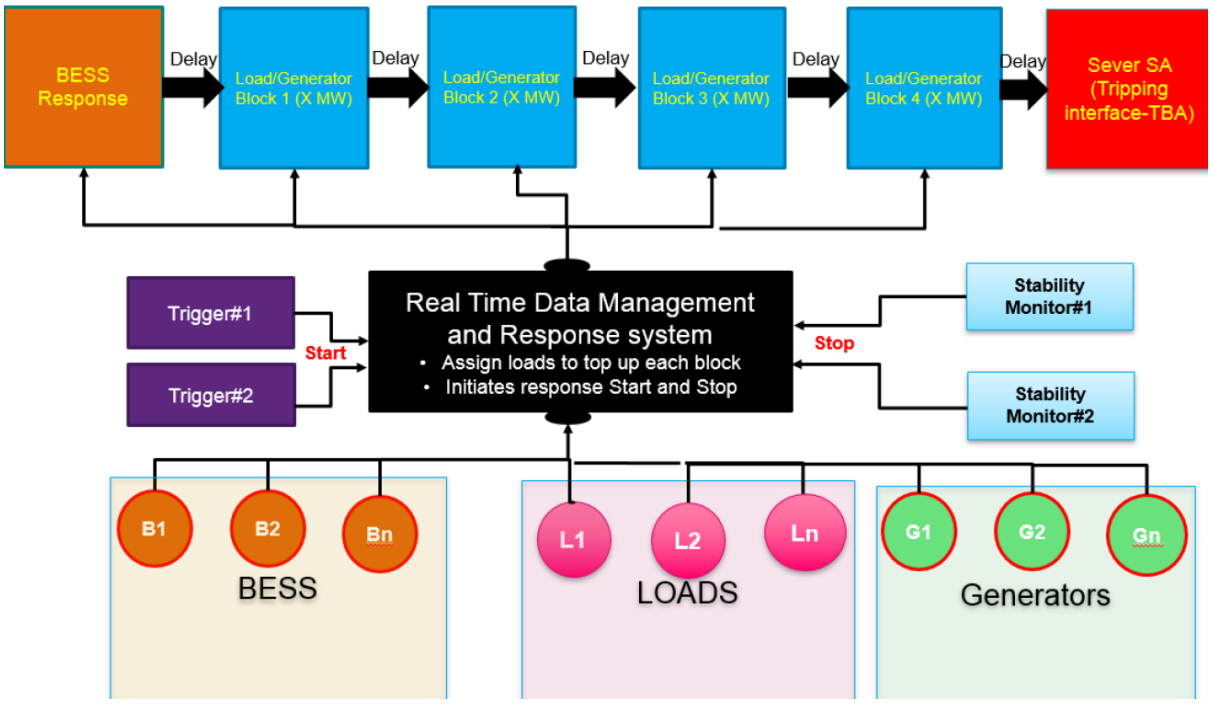
38 AER, Regulatory Investment Test for Transmission (RIT-T) Application Guidelines, December 2018, p. 18

39 ElectraNet, SAET RIT-T, Network Technical Assumptions Report, February 2019, p.37

As part of our assessment, we sought information from ElectraNet about the analysis and the processes undertaken to date, including information about the technical requirements of an SPS to meet South Australia system security requirements.[40]

ElectraNet provided further details in support of the concept design (refer to Figure 1).

Figure 1: Concept design of the SPS



Source: ElectraNet response to AER information request, 10 April 2019

Specifically, in response to our 2 April information request, ElectraNet initially advised that the key features of the SPS include the following:[41]

- Real time monitoring of load and battery storage to determine the available response at any given time. Response options include load shedding in pre-defined blocks and BESS (grid scale battery) supply. BESS responses will be prioritised over load shedding.
- Monitoring of system stability to determine when to stop the load shedding/generation tripping after the system returns to a secure state.

This information is limited in that the principles of the design concept for an SPS are not sufficient to demonstrate the high likelihood that the SPS could be implemented as intended.

In consequence, we sought further information to clarify whether feasibility studies, including response timeframes for operation of the SPS, had been undertaken.

40 AER information request to ElectraNet, 2 April 2019
41 ElectraNet, Response to AER information request, 10 April 2019

ElectraNet subsequently provided clarification on the system security concerns raised by SACOSS and, in particular, the technical feasibility of an SPS for the preferred option in the SAET RIT-T[42]:

- ElectraNet states that power system studies have been undertaken for various conditions to test the operation of the SPS and ensure the South Australian power system remains connected securely with the NEM, without causing any other technical issues which may put system security at risk.[43] Specifically, ElectraNet advises that all simulation studies undertaken to date have indicated that the system is secure following the SPS action and that all system technical parameters are within limits.
- This was evidenced in ElectraNet's follow up response which provided study outcomes from feasibility studies that ElectraNet conducted in the PSS/E simulation environment.[44] ElectraNet advises that these studies assumed load shedding of 400 MW. The studies also assume BESS response of 100 MW from the loss of either interconnector under maximum combined interconnector import conditions into South Australia, and 500 MW of generation tripping while exporting from South Australia.
- ElectraNet advises that these feasibility studies have used an SPS response time of 370ms from fault inception. ElectraNet also advises this response time will be optimised during detailed design and implementation of the SPS. AEMO considers that the 'control action timings' assumed for the proposed SPS are realistic and achievable.[45]
- In our discussions with ElectraNet, ElectraNet noted that in order to meet the timings of the SPS, load shedding would have to be carried out at the transmission level[46]. ElectraNet advised that at this stage sufficient BESS and load shedding capability has been identified to meet the minimum requirements of the scheme.[47] Notably, ElectraNet has already contracted with the Hornsdale battery storage system to provide 70 MW of emergency response. ElectraNet also advised that the Office of Technical Regulator (OTR) South Australia and AEMO have indicated that sufficient load tripping points are expected to be available to support 400 MW of load shedding.

The technical feasibility of the proposed SPS is supported by AEMO. AEMO states that detailed feasibility studies have demonstrated the capability of an SPS to achieve interconnector transfer levels as outlined in the SAET RIT-T.[48] AEMO concludes that:[49]

> These studies also demonstrated that a high-speed control scheme, making use of load or generation tripping along with some battery response, could be used to quickly reduce power flows on the remaining interconnector back to satisfactory levels, and

42 ElectraNet, Response to AER information requests, 10 April 2019 and 17 May 2019
43 ElectraNet, Response to AER follow-up Information request, 17 May 2019
44 ibid
45 AEMO, Response to AER follow-up information request, 16 May 2019
46 Note that if load shedding occurs at the transmission level, then all load connected at the transmission level will be interrupted. This differs from automatic under frequency load shedding (UFLS), which generally occurs at the distribution level. This allows for discrimination between individual loads so that some customers, are not interrupted.
47 ElectraNet, Response to AER follow-up Information request, 17 May 2019
48 AEMO, Response to AER information request, 7 May 2019
49 AEMO, Response to AER follow-up information request, 16 May 2019

> thereby prevent the cascade tripping of the remaining interconnectors. This concept is fundamentally quite similar to how the existing SIPS operates.

AEMO also states that the speed at which an SPS can respond is fundamental to the design process and recent international and national experience demonstrates that a modern SPS (similar to the proposed scheme in the SAET RIT-T) can respond within 100ms to 200ms, well within the 370ms timeframe used in feasibility studies for the SPS. This was further evidenced in AEMO's follow up response which cited examples from the Ecuadorian and Georgian power systems of control schemes capable of operating in under 200ms.[50]

AEMO notes:[51]

> …..It is AEMO's view that the studies completed to date by both ElectraNet and AEMO have used reasonable assumptions in determining the capabilities of an interconnector control scheme, and that the combined interconnector limits used in the economic analysis in the SAET RIT-T are appropriate.

Historical experiences of protection schemes

As part of our assessment of the feasibility of the SPS, we considered ElectraNet's historical experience in implementing protection schemes similar to the proposed SPS.

ElectraNet advised that its historical experiences in devising protection schemes demonstrate their capacity to provide power system security in SA. ElectraNet notes that learnings from the following schemes will be used in developing the SPS for the new interconnector. These schemes include the:[52]

- implementation of the SIPS in December 2017 following the SA system black event in 2016; and
- development of a Wide Area Protection Scheme (WAPS) following the recommendation by AEMO in its Power System Frequency Risk Review (PSFRR) in June 2018 to enhance performance of the existing SIPS.

The SIPS is designed to detect the non-credible loss of multiple generation units in South Australia and respond to avoid separation of the South Australian power system from the NEM.[53] It achieves this by first triggering a battery response followed by load shedding if required. The SIPS requires the availability of 200 MW of load shedding.[54] AEMO states that the operating times obtained from commissioning tests confirms the accuracy of the simulation (feasibility) models used to design the scheme.[55]

---

50 AEMO, Response to AER follow-up information request, 16 May 2019

51 ibid

52 ElectraNet, Response to AER follow-up Information request, 17 May 2019

53 ibid

54 ElectraNet assessed a number of transmission connected load points to determine availability of load for tripping as part of their implementation of the SIPS. In this process, ElectraNet advise it was able to achieve 180 to 250 MW of load to be available for tripping.

55 AEMO, Response to AER follow-up information request, 16 May 2019

In order to determine which loads are suitable for the SIPS, a load selection process was developed.[56] Throughout the process of designing and implementing the SIPS ElectraNet consulted with AEMO, SA Power Networks, the Office of the Technical Regulator (OTR) and the South Australian Government.[57] The SIPS was subsequently commissioned in December 2017 with the battery component commissioned in December 2018. Given the emergency response associated with the SIPS scheme has been implemented (including load selection), we expect that a similar process will be followed in developing the SPS. ElectraNet has advised us that preliminary discussions have already occurred.

We understand that ElectraNet's WAPS project, which is an upgrade to the SIPS, is currently under development in consultation with AEMO. Unlike the SIPS, the WAPS will use real-time monitoring and pre-processing of information to provide a rapid response to an event that provides a risk of an interconnector tripping. These features of the WAPS are directly relevant to the proposed SPS and will provide a basis for the operation of the SPS in the unlikely event of a loss of Heywood or the proposed new interconnector.

Summary of findings

In conclusion, in accordance with 3.2.2 of the RIT-T Guidelines, we are satisfied that the preferred option is credible (technically feasible) in that there is a high likelihood that the SPS will, if developed, provide the system security services that the RIT–T proponent has claimed.

We have reached this conclusion based on further information that has been provided by ElectraNet and AEMO on the outcomes of feasibility studies that have been undertaken to date.[58] These feasibility studies indicate that the proposed SPS would be effective in maintaining system security in South Australia following a non-credible loss of either the Heywood or the proposed interconnector when the system is under maximum import into South Australia.

In forming this view we also have taken into account ElectraNet's and AEMO views that the development of the SPS will evolve from the work already undertaken in implementing the SIPS and in the development of the WAPS. As highlighted above, achievability of these schemes provides confidence that there is a high likelihood that the proposed SPS would provide the services as intended and claimed by ElectraNet in its PACR.

3.2.3 Modelling of market benefits

SACOSS in its grounds of dispute states that the modelled market benefits in the PACR are based on assumed interconnector capacities that may not be achievable if the SPS is unable

56 ElectraNet, Response to AER follow-up Information request, 17 May 2019

57 AER meeting with ElectraNet, 8 May 2019

58 We further note that we consider, in accordance with clause 5.16.5(f) of the NER that this further information and feasibility studies all comprise information and analysis that ElectraNet could reasonably have been expected to undertake a the time it performed the RIT-T.

to be implemented as intended and that the PACR did not include sensitivity testing on those capacities.[59]

In assessing this ground of dispute we focused on whether the market benefits modelled for this RIT-T include a realistic treatment of network constraints. The RIT-T requires that, in estimating the magnitude of market benefits, a market dispatch modelling methodology must incorporate a realistic treatment of the network constraints unless the TNSP can provide reasons why this methodology is not relevant in the PADR.[60] In the case of the SAET RIT-T, if the proposed SPS does not work as intended, system security issues may have to be managed by lower import limits, and the combined 1300 MW import limit (network constraint) modelled for Heywood and the proposed interconnector may not be achievable. The modelled market benefits would consequently be reduced.

In the absence of an SPS, AEMO as the market operator, would reduce the transfer capacity of the proposed interconnector to as low as 250 MW to prevent overloading of a fully loaded Heywood interconnector. This would reduce the combined transfer capacity to around 900 MW rather than the assumed transfer capacity of 1300 MW assumed in the market modelling.

However, as discussed above, we are satisfied that the further information provided by ElectraNet (and AEMO) provides a high likelihood that the SPS will operate as intended, such that the assumed market benefits reflect realistic network constraints. We are also satisfied that sensitivity analysis on the effectiveness of the SPS is not necessary on the basis that the further information provides a high likelihood that the SPS will operate as intended.

3.2.4 Consultation process

While we consider that there is a high likelihood that the SPS can operate as intended, we note the limited information available to stakeholders in the RIT-T consultation process. This dispute may have been avoided if more detailed information about the SPS was provided by ElectraNet in the PACR, including details about the feasibility studies undertaken to date, the SIPS scheme, development work on the WAPS scheme and details on the implementation of the SPS.

At the same time there appeared to be scope for greater engagement between SACOSS and ElectraNet through the process. We encourage stakeholders to fully participate in RIT-T processes before considering alternatives such as the 5.16.6(a) dispute resolution process. Early engagement between stakeholders and the proponent of a RIT-T, and fuller provision of information, is essential for the efficient and timely resolution of a RIT-T process.

59 SACOSS, SAET RIT-T notice of dispute, 15 March 2019

60 AER, Regulatory Investment Test for Transmission (RIT-T), Clause 11 (b), June 2010

4 AER determination

In accordance with clause 5.16.5(d)(3)(ii) of the NER, our determination is that ElectraNet is not required to amend its PACR.

We are satisfied that ElectraNet's application of the RIT-T for the SAET project is in accordance with the NER in relation to the grounds of review raised by the disputing party (SACOSS) in the dispute notice.