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Consistency of SAPN's Kangaroo Island RIT-D with the regulatory requirements

Final Report

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1. Introduction and key findings

1.1 Background

On 23 December 2016 SA Power Networks (SAPN) published its Final Project Assessment Report (FPAR) in relation to its application of the Regulatory Investment Test for Distribution (RIT-D) to the Kangaroo Island Submarine Cable. This report considered eight options for improving the security of supply to Kangaroo Island, in the context of the increasing likelihood of failure of the existing 33kV cable connecting Kangaroo Island to the mainland.

The identified need for the Kangaroo Island RIT-D is to maintain security of supply to Kangaroo Island, rather than for reliability corrective action. As such, for an option to pass the RIT-D it needs to have a positive net market benefit.

The FPAR identified option 1 (installing a new 33kV cable in 2018) as the option that satisfied the RIT-D.

On 23 January 2017, the Australian Energy Regulator (AER) received a dispute notice from the Commissioner for Kangaroo Island and the Kangaroo Island Council ('the disputing parties') in relation to the FPAR.

Under the National Electricity Rules (NER), parties may dispute conclusions made by the RIT-D proponent in the FPAR on the grounds that:¹

- the RIT-D proponent has not applied the RIT-D in accordance with the NER; or
- there was a manifest error in the calculation performed by the RIT-D proponent in applying the RIT-D.

The disputing parties consider that SAPN has not given full consideration to the community's preferred option (option 8 – installing a new 66kV cable, initially energised at 33kV), and in particular did not consider the additional benefits associated with this larger capacity option.²

In particular the disputing parties contend that the RIT-D assessment did not adequately take into account:

- option value;
- the reduction in losses that a larger capacity cable would provide; and
- other market benefits.

In relation to 'other market benefits' the attachment provided by the disputing parties notes that:

Further, SA Power Networks has assumed that the larger cable would not result in materially different behaviour in the wholesale market since the KI load is so small compared to the existing generation in the state or national markets. Local market benefits have not been included.

The contention of the disputing parties is that, had SAPN adequately considered the additional benefits associated with the 66kV option, this may have led it to identify this option as the preferred option under the RIT-D, as these additional benefits may outweigh the modest difference in costs between the two options.

¹ NER 5.17.5(a).

² Letter to Paula Conboy, Chair AER from Wendy Campana, Commissioner for Kangaroo Island, and Peter Clements, Mayor Kangaroo Island, 23 January 2017, 3rd paragraph, and attached Rationale for the Dispute.

The NER require that in making a determination on a dispute, the AER must only take into account information and analysis that the RIT-D proponent could reasonably be expected to have considered or undertaken at the time that it performed the RIT-D.³

1.2 Scope of this report

We have been asked to undertake an independent review of relevant material pertaining to the application of the RIT-D for the Kangaroo Island submarine cable, in order to identify:

- whether the RIT-D has been applied in accordance with the NER, the RIT-D itself and the AER's RIT-D Application Guidelines; and
- if it is found that SAPN incorrectly applied the RIT-D, whether this is likely to have materially affected the identification of the preferred option for this RIT-D assessment.

In undertaking this assessment we have reviewed the FPAR, the earlier Draft Project Assessment Report (DPAR), SAPN's excel model underpinning the NPV assessment in the RIT-D and the dispute notice. We have also held discussions for clarification with SAPN and the Kangaroo Island Council and Kangaroo Island Commissioner.

Following these discussions, the AER requested additional information from SAPN, including an assessment of the net market benefit of the 33kV cable option and the 66kV cable option (ie, options 1 and 8) under a 'high demand' growth scenario, in which the capacity of the 33kV cable is reached during the assessment period.

In addition to the matters specifically raised in the dispute, AER staff also asked us to provide our observations in relation to a number of other areas of this RIT-D application.

1.3 Key findings

[SAPN should have included a 'high demand' scenario in order to evaluate the potential option value of the 66kV option](#)

The larger 66kV option (option 8) would provide the flexibility to be upgraded to operate at 66kV if required in future, due either to a higher than forecast increase in demand on Kangaroo Island, or the development of substantial renewable generation on the island that was exported to the mainland. This flexibility gives rise to 'option value'.

The RIT-D requires consideration of option value, where it may be material to the RIT-D outcome for investments which are not reliability-driven. Given the relatively small difference in net market benefit between the 33kV and 66kV options (ie, less than 8%), quantifying the benefit associated with additional flexibility could potentially change the ranking between the two options.

The guidance provided by the AER is that option value is captured in the RIT-D analysis by adequately specifying options and scenarios. The RIT-D also directly requires scenarios to reflect 'any variables or parameters that are likely to affect the ranking of options'.

SAPN only considered two demand scenarios in the RIT-D analysis: flat and moderate growth (0.9% p.a.). The Kangaroo Island Council in its submission to the DPAR had provided information on various projects that may increase the demand for electricity on Kangaroo Island going forward.

In light of the above, SAPN could reasonably have been expected to include an additional scenario in the RIT-D analysis that reflected higher demand, in order to assess the extent of benefit (if any) associated with having the flexibility to operate the larger cable at 66kV. Such an assessment would include the costs of converting option 8 (and the on-shore Kangaroo Island network) to operate at 66kV, as well as the costs

³ NER 5.17.5(f)(1).

under the 33kV option (option 1) of the additional local generation or demand management that would be required in order to continue to enable demand to be met under such a high demand scenario.

However, additional analysis shows that inclusion of a high demand scenario does not alter the RIT-D outcome

The AER requested SAPN to assess the net market benefit of the 33kV and 66kV options under a 'high demand' scenario. SAPN's analysis adopted a demand growth rate of 4.5% p.a. across Kangaroo Island, under which the 33kV cable exceeds its 20 MVA limit in 2034/35 (year 19 of the 25 year evaluation period).

The analysis shows that the additional capital costs required to operate the 66kV option at 66kV outweighs the costs of additional local generation under the 33kV option and the additional benefit of lower losses under the 66kV option. We have undertaken a range of sensitivity tests on this analysis and found the conclusion to be robust.

As a consequence, inclusion of a high demand scenario would not change the outcome of the RIT-D assessment, as the 33kV option (option 1) would continue to have a greater net market benefit than the 66kV option (option 8), and so would continue to be the preferred option under the RIT-D.

It was reasonable for SAPN to not have included a 'generation export' scenario

The Kangaroo Island Council submission to the DPAR also highlighted the potential development of a renewable generation industry on the island. However, such generation investment is contingent on the ability of the generator to export power to the mainland at times when it exceeds local demand.

SAPN has indicated that export of local generation in excess of 24 MVA would require a 66kV capacity cable. The 66kV option therefore provides additional flexibility (option value) if this circumstance eventuates.

However, it does not appear that the 66kV option would be assessed as having a higher net market benefit than the 33kV option, under a 'higher generation export' scenario:

- the additional generation investment that would result from the higher capacity cable would enter the RIT-D assessment as an additional cost;
- in addition, SAPN has indicated that generation exports from Kangaroo Island of this magnitude would require upgrades to the mainland network (in the order of \$19m); and
- moreover, as discussed below, it is not clear that the current RIT-D arrangements require SAPN to also quantify the offsetting avoided fuel cost associated with the additional exports.

As a consequence, including a 'higher generation export' scenario appears unlikely to affect the ranking of the 33kV and 66kV options under the RIT-D, and so would not be material to the RIT-D outcome. It is therefore not unreasonable for SAPN to not have included this scenario in its RIT-D assessment.

SAPN's assessment of changes in losses is consistent with the RIT-D framework

We understand that a 66kV cable operated at 33kV has identical losses to a 33kV option. The benefit associated with avoided losses is therefore the same for options 1 and 8, until the 66kV cable is operated at 66kV.

Analysis under a high demand scenario where the 66kV option is operated at 66kV should include the differential impact on losses. The additional analysis requested from SAPN of a high demand scenario did reflect the benefit of reduced losses once the 66kV option is operated at the higher voltage. However this additional benefit for the larger capacity option was outweighed by the higher costs associated with the conversion to 66kV, and so did not have a material impact on the RIT-D outcome.

SAPN's failure to propose 'other market benefits' is not inconsistent with the presumption under the current RIT-D arrangements.

The NER mandate a more limited list of market benefit categories for inclusion in the RIT-D than is required for the Regulatory Investment Test for Transmission (RIT-T). In particular, changes in fuel costs associated with different patterns of generator dispatch are deliberately excluded under the RIT-D.

The NER allow the RIT-D to include 'other market benefits' that the AER considers relevant. However, the AER did not include any additional market benefit categories in the RIT-D, and the AER's RIT-D Application Guidelines states that there are unlikely to be other market benefits associated with a RIT-D.

No RIT-D (or RIT-T) assessment to date has incorporated additional market benefit categories that have been formally approved by the AER. We are aware of only one RIT-D assessment that has included an assessment of avoided dispatch costs, although it does not appear that this was treated as an 'additional' benefit category for which AER approval was sought.⁴

As a consequence, there is a presumption under the current RIT-D framework that additional market benefit categories are unlikely to be relevant.

On this basis, we do not consider that SAPN's failure to propose additional benefit categories (in particular avoided fuel costs) is inconsistent with the RIT-D framework as it currently stands, and as it has been applied to date.

In addition, 'local market benefits' such as employment impacts, that cannot be measured as a cost or benefit to parties participating in the National Electricity Market (NEM), are explicitly excluded by the NER from the RIT-D assessment.

[Notwithstanding this conclusion, the RIT-D Application Guidelines and the process for proposing additional benefit categories would benefit from review](#)

The increasing prevalence of distribution-level generation and its potential to be adopted for 'edge of grid' applications, suggests that a review of the current RIT-D Application Guidelines in this area would be prudent, to ensure they remain fit for purpose.

Specifically, the AER guidance on the potential for other benefits to arise (in particular avoided fuel costs) could benefit from revision, including guidance on how to calculate this benefit.

The process by which additional relevant market benefit categories may be proposed and tested under the RIT-D may also warrant review. Consideration could be given to allowing both the AER and stakeholders to propose relevant categories, as well as the DNSP, which may better reflect the AEMC's original policy intent.

1.4 Structure of this report

The remainder of this report is structured as follows:

- Section 2 discusses the option value associated with the 66kV option (option 8), and concludes that SAPN should have incorporated an additional high demand scenario in the RIT-D assessment;
- Section 3 considers SAPN's assessment of losses for the 33kV and 66kV options;
- Section 4 discusses the process and guidance on the inclusion of 'other market benefits' in the RIT-D assessment, before concluding that SAPN's approach was not inconsistent with the current framework, but that the framework itself may benefit from review; and
- Section 5 provides additional commentary on aspects of the RIT-D assessment not directly related to the dispute.

⁴ United Energy, *Final Project Assessment Report for the Lower Mornington Peninsula Supply Area*, May 2016. See p. 47.

2. Consideration of the option value associated with the 66kV option (option 8)

Summary:

- The disputing parties contend that SAPN should have considered the 'option value' associated with the larger 66kV option, in the light of its moderate additional cost compared to the 33kV option.
- The larger 66kV option (option 8) would provide the flexibility to be upgraded to operate at 66kV if required in future, due to either a higher than forecast increase in demand, or the development of substantial renewable generation on Kangaroo Island that was exported to the mainland.
- Option value is one of the benefit categories set out in the NER. The AER in the context of the RIT-D Application Guidelines has said that option value can be incorporated in the RIT-D assessment through including appropriately specified options and scenarios. The RIT-D also directly requires a range of scenarios to be considered.
- SAPN could reasonably have been expected to include in the RIT-D analysis an additional scenario that reflected higher demand, in order to assess the extent of benefit (if any) associated with having the flexibility to operate the larger cable at 66kV:
 - > The Kangaroo Island Council in its submission to the DPAR provided information on various projects that may increase the demand for electricity on Kangaroo Island going forward.
 - > An assessment of a high demand scenario would include the costs of converting option 8 (and the on-shore Kangaroo Island network) to operate at 66kV, as well as the costs under the 33kV option (option 1) of additional local generation or demand management (DM) to ensure that demand is met, once the limit of the 33kV cable is reached.
- We therefore consider that SAPN's assessment was not consistent with the RIT-D requirements in that it did not adequately consider option value by not incorporating a suitable range of future scenarios – in particular a higher future demand scenario.
- The AER requested SAPN to assess the net market benefit of the 33kV and 66kV options under a 'high demand' scenario:
 - > SAPN's analysis shows that the additional capital costs required to operate the 66kV option at 66kV outweighs the costs of additional local generation under the 33kV option and the additional benefits of lower losses under the 66kV option. We have undertaken a range of sensitivity tests on this analysis and found the conclusion to be robust.
- SAPN's analysis indicates that inclusion of a high demand scenario would not change the outcome of the RIT-D assessment, as the 33kV option (option 1) would continue to have a greater net market benefit than the 66kV option (option 8), and so would continue to be the preferred option under the RIT-D.

'Option value' is one of the benefit categories listed in the NER (5.17.1(4)):

Any additional option value (where this value has not already been included in other classes of market benefits) gained or foregone from implementing the credible option with respect to the likely future investment needs of the National Electricity Market.

The disputing parties contend that SAPN did not adequately consider the benefit of the option value associated with the larger capacity cable. In discussions the parties identified the potential benefits associated with both:

- the ability of a larger capacity cable to meet substantial future load growth on Kangaroo Island; and

- the ability of a larger capacity cable to enable greater levels of energy export from Kangaroo Island, which in turn is likely to provide a greater incentive for the development of renewable generation on the island.

There are three distinct issues for consideration in this regard:

- Does the NER require SAPN to consider option value in the circumstances of the Kangaroo Island RIT-D?
- If so, did SAPN adequately incorporate option value into the analysis?
- If not, would the inclusion of option value be reasonably expected to materially alter the outcome of the Kangaroo Island RIT-D assessment?

2.1 Does the RIT-D require consideration of option value?

Option value is a benefit category explicitly listed under the NER. However, the NER requirements for the RIT-D differ from those for the RIT-T, in that there is greater flexibility for the DNSP to determine which benefits to include in a particular RIT-D assessment.

The AEMC explicitly acknowledged this greater flexibility when introducing the Rule changes associated with the RIT-D, where it characterised its proposed approach as:

applying a limited cost benefit approach under the RIT-D where DNSPs are provided with the option to quantify market benefits.⁵

The AEMC contrasted this 'limited' approach with the 'material cost benefit approach' required under the RIT-T. However, the AEMC also commented that:

In addition, the Commission considers any risk that a RIT-D proponent may not quantify market benefits where they are material, or may only assess those market benefits which validate their preferred option, would be reduced to some extent by requiring the proponent to set out their reasoning for their preferred option in the project assessment reports. In addition, the draft rule will provide stakeholders with the ability to raise disputes in relation to a RIT-D proponent's application of the RIT-D. This should also provide a discipline on relevant NSPs to consider and quantify any applicable market benefits where these are material or where they may alter the outcome of the RIT-D assessment.⁶

Notwithstanding the additional flexibility under the RIT-D in relation to the inclusion of benefit categories, the AEMC later clarified that where a RIT-D is undertaken for a non-reliability need, then all material market benefits should be quantified.⁷

The wording of the RIT-D itself, as developed by the AER (and the related discussion in the AER's final decision on the RIT-D), also puts this point beyond doubt:

5. Where the identified need is not for reliability corrective action, the preferred option must have a positive net economic benefit. Under these circumstances, a RIT-D proponent must quantify all classes of market benefits where the RIT-D proponent considers that:

- a. the applicable market benefits may be material; or
- b. the quantification of market benefits may alter the selection of the preferred option.

⁵ AEMC, *Review of National Framework for Electricity Distribution Network Planning and Expansion, Final Report* 23 September 2009, p. 48.

⁶ AEMC *Draft Rule Determination, National Electricity Amendment (Distribution Network Planning and Expansion Framework) Rule*, June 2012, footnote 350 p. 92. This view is also set out in the earlier AEMC *Review of National Framework for Electricity Distribution Network Planning and Expansion, Final Report* 23 September 2009, p. 48-49.

⁷ AEMC *Final Rule Determination, National Electricity Amendment (Distribution Network Planning and Expansion Framework) Rule*, October 2012, p. 81.

The Kangaroo Island RIT-D is assessing options that improve system security, rather than being driven by reliability corrective action. As such, SAPN is required to quantify any market benefits that may be material or may alter the selection of the preferred option.

In the case of the larger 66kV option (option 8), the difference in capital costs between the two options is relatively small. Inclusion of the additional benefit associated with the 66kV option due to the flexibility that the larger option provides in meeting changes in future circumstance (ie, the 'option value') could therefore potentially change the rankings between the two top ranked options in the assessment, and so potentially the outcome of the RIT-D assessment.

On this basis, we conclude that SAPN should have considered option value in its RIT-D assessment.

2.2 Did SAPN adequately consider option value in the Kangaroo Island RIT-D assessment?

The AER's RIT-D Application Guidelines state (A.6):

We consider that option value is likely to arise where there is uncertainty regarding future outcomes, the information that is available in the future is likely to change and the credible options considered by the RIT-D proponent are sufficiently flexible to respond to that change.

SAPN does not mention option value in the FPAR. However, the guidance provided by the AER is that option value will be adequately incorporated in the RIT-D where a suitable range of options (involving multiple stages) and scenarios are incorporated. That is, option value is not required to be identified as a separate category in the RIT-D analysis.

Specifically, the AER RIT-D Application Guidelines (A.6) state:

We consider that appropriate identification of credible options is capable of capturing any option value, thereby meeting the requirement to consider option value as a class of market benefits under the RIT-D.

The discussion elsewhere in the Application Guidelines (section 8) expands on this point to note that where options involve several stages, that can be implemented as required to respond to 'changing market developments or scenarios', then the RIT-D assessment effectively incorporates option value.

Similarly, in the AER's Final Decision in relation to the RIT-D Application Guidelines, the AER states that:

We consider that RIT-D proponents should treat option value similar to the RIT-T. If performed properly, a cost-benefit analysis should capture option value in the identification of credible options and scenario analysis.⁸

Although it may not be expressed as clearly as it could be in the RIT-D Application Guidelines, the related AER commentary does make clear that in order to adequately account for option value, the RIT-D assessment needs to incorporate both options that reflect a staged number of investments, and scenarios that relate to when later stages of the investment would be triggered.

The question of whether SAPN adequately considered option value in the RIT-D analysis therefore becomes one of whether it included an adequate range of different scenarios in the assessment – and in particular scenarios in which the higher capacity of the 66kV option would be required.

We note that the RIT-D itself (para 20) requires that the number and choice of reasonable scenarios must reflect 'any variables or parameters that are likely to affect the ranking of the credible options'. Therefore the

⁸ AER, *Regulatory investment test for distribution and application guidelines, Final Decision*, August 2013, section 2.14.1.

issue of whether or not the range of scenarios considered by SAPN was reasonable would remain, even if 'option value' was not explicitly included in the list of RIT-D benefits.

2.3 What additional scenarios should have been incorporated?

The FPAR states that:⁹

The twenty five year (25) evaluation period for this FPAR is driven by the need to obtain the most cost effective development(s) over a reasonable time frame, allowing for uncertainties associated with future network development, load and generation patterns.

And further that:¹⁰

Any proposed non-network solution is to be designed for this period in line with expectations to meet forecast load and any step load changes in customer demand due to major developments on Kangaroo Island.

However, the scenarios adopted by SAPN haven't fully tested these uncertainties.

2.3.1 Higher demand scenario

SAPN included two demand scenarios in its RIT-D analysis: flat demand and 'moderate' 0.9% p.a. growth.

The FPAR (and the DPAR) makes references in a number of places to having considered 'potential step load changes in customer demand on Kangaroo Island'.¹¹ However, in discussions SAPN clarified that the 'moderate' load growth scenario only reflects customer committed spot loads (which have been reduced by 50% to account for uncertainty in customer demand and potential peak load diversity, in line with SAPN's standard forecasting practice),¹² and does not include any additional spot loads that are not currently committed.

In its submission to the DPAR, the Kangaroo Island Council commented that future demand growth on Kangaroo Island may be 'off-trend' compared with AEMO's latest forecasts of continuing demand declines across the state. In particular, a number of local development projects are underway following approval to expand air access to the island. The Kangaroo Island Council referenced its latest Economic Outlook in support of its view.

The Kangaroo Island Council's Economic Outlook includes a number of developments, currently at different stages of progression. These are summarised in Table 2.1 below.

In discussions, the Kangaroo Island Commissioner and the Kangaroo Island Council also noted that SA Water previously indicated to them that its contingency plan for any future drought on the island would be to install mobile desalination plants, which would further increase electricity demand.

In material provided to the AER, SAPN has stated a view that only two of the listed projects (Kangaroo Island Golf Course and the American River Resort) could be considered as spot loads that may cause peak demand to exceed the 0.9% growth rate. However neither of these spot have been included in the moderate load growth scenario, as they are not committed.

⁹ FPAR, p. 10.

¹⁰ FPAR, p. 10.

¹¹ FPAR p. 12 and p. 33; DPAR p. 12.

¹² As set out in SAPN's 2016 Distribution Annual Planning Report, p. 36.

Table 2-1 Potential new spot loads on Kangaroo Island

Project	Description
American River Resort and Marina/Wharf Development	\$35 million resort which includes a marina at American River. Has been given major project status by the South Australian Government.
Golf Course, Club House and Resort	International golf course and resort, on the southeast coast of Kangaroo Island.
Kangaroo Island Airport Upgrade	Airport upgrade will allow direct non-stop flights from major cities. Federal and State Government funded.
Acacia Apartments	Small apartment complex which will also include conference facilities.
Aurora Ozone Hotel	Extension of the current hotel by 45 rooms. This would provide a significant boost to accommodation capacity during peak season.
Bickfords Distillery Development (Kingscote Wharf)	An unsolicited bid/proposal is being developed for a new distillery and microbrewery.
Emu Bay Housing Development and Holiday Village	78 residential allotments and an adjacent Holiday Village which will be individual villas and can accommodate 200 or more guests.
Forestry Port	The forestry operators on Kangaroo Island are considering an option to develop a shared port facility to accommodate bulk shipping services. This would be used for timber export and other freighted goods. A development application is yet to be submitted.
Kingscote Wharf Precinct Development	There are plans that this State-owned land in the main township be made available to the private sector for development with a number of parties showing interest.

Source: *The Kangaroo Island Economic Development Outlook, Office of the Commissioner for Kangaroo Island, 2016*

The role of the scenario analysis in the RIT-D is to test the robustness of the option rankings (particularly the identification of the preferred option) to variations in key assumptions. These assumptions may in some cases appropriately reflect the upper or lower bound of feasible values for that parameter. In the case of demand, the scenarios adopted need not correspond with the standard approach that SAPN takes in developing its demand forecasts (ie, spot loads limited to committed projects, and reduced by 50% to reflect diversity¹³).

Given the submission made by the Kangaroo Island Council and the evidence presented in relation to the potential for additional spot load development on Kangaroo Island, as well as the context of the new airport development and the South Australian government’s continuing focus on tourism development on Kangaroo Island, it would appear reasonable to expect SAPN to have considered whether a ‘high demand’ scenario would materially affect the rankings under the RIT-D assessment.

This would be consistent with the AER RIT-D Application Guidelines, which include the example of an additional ‘high demand’ scenario, where this may affect the ranking of the credible options:¹⁴

The analysis shows that, in the event that growth in energy and peak demand is higher than forecast, the ranking of net economic benefit between the two credible options may change.

¹³ SAPN 2016 *Distribution Annual Planning Report*, p. 36.

¹⁴ AER *RIT-D Application Guidelines, August 2013*, Example 13.

Therefore, it would be worthwhile for the RIT-D proponent to adopt additional reasonable scenarios with varying levels of forecast demand in its assessment of the credible options.

Would including a high demand scenario change the outcome under the RIT-D?

Given the relatively small difference in net market benefit between the 33kV and 66kV options (ie, less than 8%), quantifying the benefit associated with additional flexibility could potentially change the ranking between the options.

Undertaking the assessment of options 1 and 8 under a high demand scenario would provide transparency in relation to whether the additional flexibility provided by option 8 is expected to provide sufficient benefit in the event of a substantial peak demand increase on Kangaroo Island to outweigh the moderate increase in upfront capital cost required. This assessment would respond directly to the issues raised by the Kangaroo Island Council in its submission on the DPAR, and would take into account the information on potential spot load development provided.

We consider that this analysis is required under the NER and the RIT-D, and that SAPN's RIT-D analysis is therefore not consistent with the RIT-D requirements.

We understand from discussions with SAPN that if demand were to reach the 33kV capacity, then additional investment would be required under option 8 to enable the cable to be operated at 66kV. This would include both the necessary substation upgrades, and also upgrading the existing 33kV network on the island itself to operate at 66kV. These additional costs should be reflected in the NPV assessment under a 'high demand' scenario.

Similarly, the assessment of option 1 (33kV) under the high demand scenario should include the additional costs that would be incurred once the capacity of the 33kV cable has been reached, to ensure that demand continues to be met. We understand from SAPN that a local generation or demand management solution would likely be the most cost effective at that point.

Differences in losses between operating at 33kV and 66kV should also be taken into account in this assessment (if the results indicate that it could be material to the selection of the preferred option).

Finally, in the event that the relative rankings of options 1 and 8 changed under a high demand scenario, it would be necessary to consider the relative weighting that should be assigned to this scenario in the RIT-D analysis.¹⁵ One way of addressing this would be to assess what weighting would be necessary in order to make option 8 the preferred option under the RIT-D – and to then see whether such a weighting is realistic given the current uncertainties.

Because of the nature of the analysis required, we are not able to re-run the RIT-D assessment with the higher demand forecast in order to determine whether it would affect the identification of the preferred option under the RIT-D. Instead, in order to understand the materiality of including an additional high demand scenario, the AER requested SAPN to assess the net benefit of the 33kV and 66kV options under such a scenario. SAPN's analysis adopted a demand growth rate of 4.5% p.a. across Kangaroo Island, under which the 33kV cable exceeds its 20 MVA limit in 2034/35 (ie, year 19 of the 25 year evaluation period).

SAPN's analysis included:

- network augmentation prior to 2034/35 under both option 1 and option 8 to accommodate the higher load growth:
 - > these included substation upgrades, new 33kV voltage regulators at Penneshaw and American River; overhead powerline thermal capacity upgrades for most lines between Cape Jervis and Kingscote

¹⁵ Where the relative ranking of options 1 and 8 does not change, then the weight applied to the high demand scenario becomes immaterial to the outcome of the RIT-D.

- demand management costs for option 1 from 2035, once the capacity of the 33kV cable has been reached:
 - > the cost has been based on the cost of operating the existing Kingscote generators at peak demand times, at \$600/MWh
 - > additional network augmentations would also be required, and have been included in the assessment.
- network augmentation costs for option 8 associated with energising the cable to 66kV in 2034, in conjunction with a new 66kV powerline backbone from Cape Jervis to American River.
- additional market benefit for option 8 associated with lower losses once the cable is operated at 66kV.

SAPN's analysis shows that the additional capital costs required to operate the 66kV option at 66kV outweighs the costs of additional local generation under the 33kV option, and the benefits of lower losses under the 66kV option. Option 1 (33kV) remains the preferred option under the high demand scenario.

We have undertaken a range of sensitivity tests on this analysis, using the NPV model provided by SAPN. In particular we have tested the sensitivity of the results to: different discount rates; 50% lower network capex costs for option 8; lower fuel costs for the demand management component of option 1 and changes in the timing at which the capacity of the 33kV cable is reached. Notwithstanding that our findings for some sensitivities necessarily remain indicative,¹⁶ we found the conclusion on the relative ranking of the two options to be robust.

Moreover, the sensitivities that lead to a reduction in relative net benefit between options 1 and 8 are those where the capacity of the 33kV cable is reached *later* (rather than earlier) – thereby deferring the timing at which the additional costs are incurred - which would reflect peak demand growth *below* the 4.5% adopted by SAPN for this scenario. Speculation in relation to additional peak demand growth above the 4.5% assumed by SAPN therefore becomes irrelevant, as higher demand scenarios would bring the timing of additional expenditure forward, increasing the net benefit of the 33kV option relative to the 66kV option.

Based on the analysis provided by SAPN, and our interrogation of that analysis, we conclude that inclusion of a high demand scenario would not change the outcome of the RIT-D assessment. The 33kV option (option 1) would continue to have a greater net market benefit than the 66kV option (option 8), and so would continue to be the preferred option under the RIT-D.

2.3.2 Kangaroo Island generation development scenario

In discussions, the disputing parties have clarified that one potential benefit from a larger capacity cable is the ability to operate at 66kV to facilitate greater exports of renewable energy from Kangaroo Island than could be accommodated by a 33kV cable.

There are a number of parties considering the potential for local generation on Kangaroo Island. The feasibility of these investments has been highlighted by the recent ARENA study.¹⁷

The FPAR notes that there is the potential opportunity to export surplus energy to South Australia's grid.¹⁸ The ability to export power from Kangaroo Island is an important consideration for parties thinking of developing renewable generation on Kangaroo Island, as they would need to be operating even when there is limited local load, in order to earn payments under the Renewable Energy Target (RET) scheme.

¹⁶ In particular, changes in the time at which the capacity of the 33kV cable is reached may change the nature as well as the timing of associated capital works, as well as the total quantity of demand management required. Our indicative assessment has kept the quantum of both network augmentation and demand management the same, whilst changing the timing of both and extrapolating for future periods as necessary in the case of demand management.

¹⁷ UTS Institute for Sustainable Futures, *Towards 100% Renewable Energy for Kangaroo Island, Report prepared for ARENA, Renewables SA and Kangaroo Island Council, Final Report, 2016.*

¹⁸ FPAR, p. 36

Assessing the options under a scenario where there is substantial development of generation on Kangaroo Island, including a substantial export component, would identify whether there is an additional benefit to building the larger 66kV cable.

SAPN has stated in additional information provided to the AER that they consider that large scale generation on Kangaroo Island will require extensive network augmentation and is unlikely to be economic over 20MVA. Consequently, SAPN assigned a probability of zero to the likelihood of generation triggering an upgrade of the cable to 66kV. That is, they did not undertake this analysis as they assigned a probability of zero to the scenario occurring.

Would including a generation export scenario change the outcome under the RIT-D?

Unlike the case of the higher demand scenario, there are a number of factors that suggest that the larger 66kV option may not have a greater market benefit under this scenario, even if it were triggered, and therefore that the inclusion of this scenario may reasonably not be expected to alter the outcome of the RIT-D assessment:

- The 33kV cable already provides generation export capacity, sufficient for 24MVA of exports. Additional local generation would be used to meet local demand first, increasing the effective export capacity (particularly where local demand grows);
- To the extent that additional generation development on Kangaroo Island is contingent on a larger capacity cable, then the capital and operating costs of this generation would be included as an additional cost in the RIT-D analysis associated with the 66kV option (under the category 'impact on other parties');
- Additional network augmentation costs on the mainland would be required to enable the physical export of generation from Kangaroo Island. Information provided to the AER by SAPN shows the estimated cost of this investment at around \$19.3m (where exports exceed 24MVA over a 66kV cable);
- Under the current RIT-D arrangements, it is not clear that the avoided costs associated with displaced NEM generation dispatch would be included as a benefit in the RIT-D assessment (see section 4); and
- In the absence of clear proposals, the size, timing and nature of future renewable generation remains highly speculative, making this a difficult scenario to define. Under the RIT-D, a weight would also need to be attached to this scenario, which may be relatively low, given current uncertainties.

In light of the above, it does not appear inconsistent with the RIT-D arrangements for SAPN to have not included an additional generation export scenario in its RIT-D analysis. It is also unlikely that including such a scenario would materially affect the outcome of the RIT-D analysis.

3. Inclusion of losses

Summary:

- The RIT-D includes losses as a market benefit category.
- A 66kV cable operated at 33kV has identical losses to a 33kV option.
 - > The benefit associated with avoided losses is therefore the same for options 1 and 8, until the 66kV cable is operated at 66kV
- The additional analysis requested from SAPN of a high demand scenario also includes the benefit of reduced losses for the 66kV option once it is operated at the higher voltage:
 - > This additional benefit is outweighed by the additional costs associated with the 66kV option.

The RIT-D includes losses as a market benefit category.

The disputing parties highlighted that in the FPAR the benefit from reduced losses ascribed to the 33kV and 66kV options is the same, despite the greater reduction in losses associated with a larger capacity cable. They consider that the difference in the reduction in losses between different capacity options should have been taken into account in the RIT-D analysis.

We understand that a 66kV cable operated at 33kV has identical losses to a 33kV cable. The benefit associated with avoided losses is therefore the same for options 1 and 8, until the 66kV cable is operated at 66kV.

In the scenarios that SAPN considered in the FPAR, both option 1 and option 8 are operated at 33kV. There is therefore no difference in the extent of losses (and therefore this element of the market benefit) between the options.

In a 'high demand' scenario in which the cable component of option 8 becomes operated at 66kV, the difference in losses between option 1 and option 8 may then be relevant to include in the analysis, to the extent that it is of an order of magnitude to affect the rankings of the options.

The additional analysis requested from SAPN in relation to a high demand scenario did reflect the benefit of reduced losses once the 66kV option is operated at the higher voltage. However SAPN's analysis showed that the additional benefit for the larger capacity option (of \$1,785 in NPV terms) was outweighed by the higher costs associated with the conversion to 66kV, and so did not have a material impact on the RIT-D outcome.

4. Inclusion of 'other market benefits'

Summary:

- The disputing parties contend that SAPN did not adequately consider whether there are 'other market benefits' associated with the larger 66kV network option that should have been incorporated in the analysis.
 - > In particular avoided NEM dispatch costs were not included in the assessment of the non-network options, nor were 'local market benefits' (such as the increase in employment on Kangaroo Island).
- The NER mandate a more limited list of market benefit categories for inclusion in the RIT-D than for the RIT-T.
 - > This includes the deliberate exclusion of changes in fuel costs associated with different patterns of generator dispatch, as these were considered by the AEMC to be less relevant to distribution-level augmentations.
- The NER allow the AER to include 'other market benefits' in the RIT-D that it considers relevant:
 - > However, the AER's RIT-D Application Guidelines state that there are unlikely to be other market benefits associated with a RIT-D.
 - > The RIT-D and the RIT-D Application Guidelines allow a DNSP to propose additional benefit categories for inclusion, prior to the publication of the non-network options report (NNOR), but require the AER to approve these categories in advance.
 - > No RIT-D (or RIT-T) assessment to date has formally incorporated additional benefit categories (although one RIT-D application has included changes in NEM dispatch costs).
- The RIT-D Application Guidelines and statements made by the AEMC in developing the NER provisions that introduced the RIT-D, set up a presumption that additional benefit categories are unlikely to be relevant.
- On this basis, we do not consider that SAPN's failure to propose additional benefit categories (in particular avoided fuel costs) is inconsistent with the RIT-D framework as it currently stands, and as it has been applied to date.
 - > It is therefore not the case that SAPN could reasonably have been expected to undertake this analysis, based on the information and guidance available to it at the time it applied the RIT-D.
 - > The RIT-D framework does not allow the DNSP to propose additional benefit categories after the NNOR has been published, including in response to stakeholder submissions.
 - > In addition, 'local market benefits' such as employment impacts, that cannot be measured as a cost or benefit to parties participating in the NEM, are explicitly excluded by the NER from the RIT-D assessment.
- Notwithstanding this conclusion, the increasing prevalence of distribution-level generation and its potential to be adopted for 'edge of grid' applications, suggests that a review of the current RIT-D Application Guidelines in this area would be prudent, to ensure they remain fit for purpose.
- We also suggest that the process by which additional relevant market benefit categories may be included in the RIT-D is reviewed, with consideration given to allowing both the AER and stakeholders to propose relevant categories as well as the DNSP.

The final point raised in the dispute is whether the RIT-D assessment should also have included 'other market benefits'.

The NER include a list of benefits that the DNSP may include in the RIT-D. In addition to the specific items listed, there is a general provision that would allow the DNSP to include 'any other class of market benefit determined to be relevant by the AER'.¹⁹

The RIT-D itself expands on this:

The AER will consider a class of market benefit relevant if the RIT-D proponent has determined it to be relevant a [sic] required class of market benefit and we have agreed to it in writing before the RIT-D proponent makes its non-network options report available to other parties. [...] (Para 7(h))

The disputing parties refer to impacts on the wholesale market and 'local market benefits' as examples of potential 'other market benefits' that could have been included in the analysis. In discussions the disputing parties clarified that:

- 'local market benefits' could include the impact on employment on Kangaroo Island; and
- avoided fuel costs associated with generation sourced from the NEM is a potential benefit that could have been included in assessing the options involving local generation/DM solutions. The disputing parties consider that this would enable an 'apples with apples' comparison between these non-network options and the network options (ie, including both distribution and generation costs in the assessment of both options).

In considering this issue we have taken into account:

- the process and guidance provided in the NER, the RIT-D and the RIT-D Application Guidelines in relation to the inclusion of 'other benefits';
- the rationale for the exclusion of 'changes in dispatch costs' as a market benefit category in the RIT-D;
- the scope of the costs and benefits that can be included in the RIT-D assessment; and
- whether, based on the above, SAPN could reasonably have been expected to include 'other market benefits' in the RIT-D assessment, ie whether by not including these benefits SAPN's assessment is non-compliant with the RIT-D framework.

4.1 Process and guidance on including 'other market benefits'

The RIT-D requires that the DNSP considers whether a credible option could deliver the classes of market benefit specified in the NER.

The list of benefit categories set out in the NER for the RIT-D are more limited than those for the RIT-T. In particular, the following benefit categories were deliberately not included in the equivalent NER provisions for the RIT-D:²⁰

- changes in fuel consumption arising through different patterns of generation dispatch;
- changes in ancillary services costs; and
- competition benefits.

The first of these benefit categories (changes in dispatch costs) is one of the benefit categories the disputing parties have raised as potentially relevant for the Kangaroo Island RIT-D. Although this benefit category

¹⁹ 5.17.1(c)(4)(viii).

²⁰ The RIT-D does include an additional benefit category ('changes in load transfer capability and the capacity of embedded generators to take up load') that is not included in the RIT-T.

would be routinely considered under the RIT-T, it was deliberately excluded from the list of benefits to be routinely considered in the RIT-D.

The AEMC commented at the time that:²¹

Our recommendations provide that a more limited list of market benefits should be considered under the RIT-D than what is required under the RIT-T, which is consistent with the characteristics of distribution investments.

As noted above, the NER does allow the RIT-D assessment to include 'other market benefits' that the AER has determined to be relevant. At the time that the RIT-D arrangements were introduced into the NER, the AEMC emphasised the AER's role in identifying these relevant 'other benefits', rather than leaving this to the preserve of the DNSP.²²

In the RIT-D Application Guidelines, the AER commented that it is unlikely that additional classes of market benefit will need to be considered for RIT-D assessments:²³

We consider this list of market benefit classes to be sufficiently extensive. It would be difficult to propose any additional class of market benefit that would have a material impact and/or be specific to the NEM. For this reason, we do not propose any additional class of market benefit.

If a RIT-D proponent quantifies an additional class of market benefit in its RIT-D assessment, we will consider it. However, a RIT-D proponent must receive approval from the AER before it makes its non network options report available to other parties.

That is, the AER has not itself to date identified any other market benefits that the DNSP should consider as a matter or course in applying the RIT-D.

The RIT-D does make provision for the RIT-D proponent to identify 'other market benefits' that it considers may be potentially relevant to a particular RIT-D assessment. Where a DNSP does identify another market benefit category as potentially relevant, it needs to seek the AER's approval to include that benefit category, prior to publishing its NNOR.²⁴ The RIT-D framework does not allow the DNSP to propose additional benefit categories after the NNOR has been published. This means that under the current regulatory framework the DNSP has no formal scope to include an additional benefit category in response to stakeholder submissions on its DPAR.

Based on the guidance provided in the AER's RIT-D Application Guidelines, and the discussion by the AEMC at the time the RIT-D was introduced, we do not consider that there is a clear presumption created under the RIT-D for SAPN to have considered the inclusion of additional market benefit categories.

This conclusion is further supported by the more flexible nature of consideration of benefits under the RIT-D, compared with the RIT-T (discussed in section 2.1 above). In addition, we are not aware of any examples of additional market benefit categories having being formally included in RIT-D (or RIT-T) assessments to date.²⁵ Appendix A.1 provides a summary of the RIT-D applications we have reviewed in reaching this conclusion.

²¹ AEMC, *Review of National Framework for Electricity Distribution Network Planning and Expansion*, Final Report 23 September 2009, p. 60.

²² Australian Energy Market Commission 2012, *Distribution Network Planning and Expansion Framework, Rule Determination*, 14 June 2012, Sydney p. 156-157. This is discussed further in section 4.4.

²³ AER *RIT-D Application Guidelines*, August 2013, Section 10.

²⁴ Or prior to publishing a notice that it determines that there will not be a non-network option that is a credible option, and so will not be publishing a NNOR (under 5.17.4(d)).

²⁵ We discuss below the United Energy RIT-D assessment that did include changes in NEM dispatch costs, but note that this was not subject to a formal request to the AER to include this as an additional benefit category.

4.2 Treatment of non-electricity market benefits

Non-electricity market benefits (such as the 'local market benefits' referred to in the dispute notice) are excluded from the RIT-D under the NER.

The NER make clear that the purpose of the RIT-D is to identify the credible option that maximises the net economic benefit 'to all those who produce, consume and transport electricity in the National Electricity Market'.²⁶

The NER explicitly exclude a broader consideration of costs and benefits:²⁷

[...] any market benefit or cost which cannot be measured as a market benefit or cost to persons in their capacity as Generators, Distribution Network Service Providers, Transmission Network Service Providers or consumers of electricity must not be included in any analysis under the regulatory investment test for distribution.

This provision is also reflected in the RIT-D itself (para 11).

As a consequence, 'local market benefits' not directly connected with the electricity market, such as an increase in employment on Kangaroo Island, or the benefits associated with the ability to deploy a fibre optic cable as part of the 66kV option, are not able to be incorporated as benefits in the RIT-D assessment.

SAPN's RIT-D assessment is therefore consistent with the RIT-D requirements in not having quantified such local market benefits.

4.3 Dispatch cost benefits

Differences in fuel costs associated with different patterns of generator dispatch is a category of market benefit that falls within the scope of electricity market benefits. The displacement of mainland generation with generation sourced on Kangaroo Island would result in a different pattern of dispatch. Differences in dispatch costs would also arise where generation was exported from Kangaroo Island to the wholesale market.

However, as set out above, this particular class of benefit was deliberately not included in the NER as one of the benefits to be routinely considered under the RIT-D (in contrast to the arrangements for the RIT-T).

In order to have formally included this benefit category in the RIT-D analysis, SAPN would need to have sought approval from the AER that this category was relevant to include in this RIT-D. As discussed above, the AER Application Guidelines suggest that additional benefit categories are unlikely to be necessary. There is no specific discussion in the Application Guidelines in relation to dispatch cost benefits, and situations in which it may be relevant to consider these benefits.

We are aware of one example of a RIT-D assessment that has included dispatch cost benefits.²⁸ There does not appear to have been a formal request to the AER for inclusion of this benefit category in this case. As such, it appears that this is somewhat of an anomaly under the current arrangements. Dispatch costs were not discussed in any of the other 11 RIT-D applications that we have reviewed, even where these RIT-D applications included generation and battery non-network options (see Appendix A.1).

Our conclusion is therefore that the presumption created by the RIT-D arrangements, and in particular the AER RIT-D Application Guidelines, as well as the practice of other DNSPs to date, is that other benefit categories (including dispatch costs) do not need to be incorporated in the RIT-D analysis. We do not therefore consider that SAPN's failure to consider differences in dispatch costs represents non-compliance with the RIT-D arrangements.

²⁶ NER 5.17.1(b).

²⁷ NER 5.17.1(c)(8)

²⁸ United Energy *Final Project Assessment Report for the Lower Mornington Peninsula Supply Area* May 2016. See section 8.1.2.

4.4 RIT-D requirements and AER Guidelines would benefit from review

Notwithstanding our conclusion above in relation to SAPN's compliance with the current RIT-D arrangements, we consider that the matters raised by the disputing parties have identified a number of aspects of the RIT-D and the RIT-D Application Guidelines which would benefit from review.

For 'edge of grid' developments (such as the Kangaroo Island RIT-D assessment), it is possible that non-network options may result in a benefit in relation to the 'avoided fuel consumption costs' associated with local generation substituting for generation that would otherwise be sourced from the wholesale market. We agree with the Kangaroo Island Council's contention that inclusion of this 'avoided fuel cost benefit' would result in an 'apples for apples' comparison between non-network options (which may incorporate both generation and distribution) and network options (which under the RIT-D framework as it has been applied to date only include distribution costs). As discussed above, this 'avoided fuel cost' benefit would be captured under a RIT-T assessment.

In the light of the increased likelihood of non-network options being considered for edge-of-grid solutions, as well as the increasing prominence of distributed generation more generally, it may be appropriate for the AER to consider whether the guidance in its RIT-D Application Guidelines remains fit for purpose. In particular, it may be appropriate for the current guidance on the inclusion of 'other benefits' to be revised to set out circumstances in which avoided fuel costs may become a relevant benefit category, together with guidance on how such benefits could be quantified.

We also note that the AEMC's earlier recommendations in relation to allowing 'other benefits' to be incorporated in the RIT-D placed emphasis on the AER's role (rather than the DNSP) in identifying those benefits, due to the relatively limited consultation that may occur in relation to a RIT-D application:²⁹

The Commission notes that the RIT-D process, unlike the RIT-T process, does not require DNSPs to prepare a project specification consultation report for all distribution projects subject to the RIT-D. In addition, while DNSPs are required to prepare a non-network options report for certain projects, there is not a requirement for DNSPs to consult on the relevance or materiality of market benefits in that report (although DNSPs may do so if they consider it appropriate).

Therefore, given the absence of a mechanism to ensure the orderly introduction of other classes of market benefits into the RIT-D, and the absence of a process for consultation on their relevance and materiality, the Commission does not consider it appropriate to provide DNSPs with an opportunity to introduce additional classes of market benefits into the RIT-D. The draft rule therefore removes this provision and includes a new provision providing the AER with discretion to add to the list of market benefits, where appropriate.

In the event, the AER in developing the RIT-D and the RIT-D Application Guidelines has introduced an expectation that there are unlikely to be relevant additional benefit categories, but has also moved the emphasis back to DNSPs being able to propose additional benefit categories. However, the requirement that the DNSP identify the additional benefit category and seek the AER's written agreement prior to starting the consultation process, means that stakeholders (and, indeed, the AER) have no ability to propose additional benefit categories, or to challenge the DNSP's decision not to include additional benefit categories for a particular RIT-D application.

Further consideration of these interactions may make the RIT-D more fit for purpose in this regard, and may better reflect the AEMC's original policy intent.

²⁹ Australian Energy Market Commission 2012, *Distribution Network Planning and Expansion Framework, Rule Determination*, 14 June 2012, p. 156-157.

5. Commentary on other areas

As part of our review we have identified a number of areas of the Kangaroo Island RIT-D analysis that warrant comment. AER staff have also raised a number of issues on which they have sought our opinion.

These issues do not relate to matters identified in the dispute notice, although some have been raised by the disputing parties in discussions.

Commentary has been included in the light of the potential precedent for other RIT-D applications, and as matters on which the AER may wish to expand or clarify in any review of its RIT-D Application Guidelines.

5.1 Selection of an appropriate base case

The FPAR adopted as the 'base case' for the analysis 'replacement on failure of the cable' (option 2). This is not strictly a 'do nothing' base case, which would instead reflect the failure of the cable, and the resulting unserved energy that would then be expected to occur.

In the DPAR SAPN included the full cost of each of the options, but then only the relative benefits of each option compared with option 2, with the consequence that the overall net benefit for each option was negative. The approach in the FPAR of assessing both the costs *and* the benefits of each option relative to the same base case is more appropriate, and is consistent with the RIT-D requirements.

We also consider that the choice of the 'failure then replacement' option (ie option 2) as the base case is appropriate.

This approach is not inconsistent with the RIT-D requirements, although the discussion in the AER's RIT-D Application Guidelines could be amended to make this clearer.

The NER provide greater flexibility under the RIT-D to select the base case, compared with the NER requirements for the RIT-T which require the options to be assessed against a case where no credible option is implemented by the TNSP (ie, a 'do nothing' base case). This flexibility is reflected in the wording of the RIT-D itself.

The AER Final Decision on the RIT-D discusses how the choice of a base case other than 'do nothing' may be appropriate for reliability augmentations:

Our final decision is that RIT-D proponents be allowed to select one credible option to serve as the base case against which other credible options are compared. This may involve comparing credible options against a 'do nothing' base case.³⁰

The rationale provided for this approach was 'to simplify the required analysis and avoid the need to formulate a 'do nothing' base case where such an outcome is not feasible [..]'.

Although the discussion of adopting an alternative base case to 'do nothing' is in the context of reliability augmentations, there is nothing in the RIT-D, the RIT-D Application Guidelines or the discussion in the AER's Final Decision that explicitly restricts the flexibility to choose an alternative base case to reliability augmentations.

The AER RIT-D Application Guidelines state that:

'where the identified need is for reliability corrective action, there may be no need to establish a base case where no credible option is implemented.'

³⁰ AER, *Regulatory investment test for distribution and application guidelines, Final Decision*, August 2013, section 2.3.1

This does not explicitly preclude adopting an alternative base case for non-reliability investments, especially in a case where there is similarly no need to establish a base case where no credible option is implemented.

For the majority of 'market benefit' RIT-D applications, a 'do nothing' option may be a realistic option, and so would need to be included in the analysis as the base case.

However, where the investment options being considered have been triggered by the need to replace an investment, a 'do nothing' option may not be realistic. The Kangaroo Island RIT-D is a good example of this. Adopting option 2 as the base case is consistent with the treatment of reliability augmentations, ie, there is no value in estimating a non-realistic base case (which in this case would be to assume that Kangaroo Island would not be supplied with electricity following failure of the cable).

On a related point we note that SAPN has excluded common costs in its RIT-D analysis. This is fine in this instance, as these common costs would also be included in option 2 (ie, the replacement case), so their exclusion from all options does not affect whether or not the alternative options have a positive net market benefit. However, for other RIT-D assessments where the base case is the 'do nothing' option', the full costs of each option should be included, in order to demonstrate that the option has a positive market benefit compared to doing nothing.

5.2 Scenarios and sensitivity assessment

5.2.1 Transparency of scenarios and scenario weightings

There is a lack of transparency in relation to scenarios and scenario weightings in the Kangaroo Island RIT-D FPAR.

The RIT-D requires (para 6) that the market benefit for each credible option be calculated by assessing the benefit for each 'relevant reasonable scenario', and then weighting these benefits by the probability of each relevant reasonable scenario occurring.

The FPAR does not contain a clear description of the different scenarios that have been considered in the RIT-D analysis – in contrast to RIT-D applications by other DNSPs. The parameters that have been varied can be deduced from the discussion in section 10.3 of the FPAR and the detailed 'raw sensitivity analysis results' presented in Attachment 1. However inclusion of a table setting out the parameters for each scenario would have provided a more appropriate degree of transparency.

In addition, the FPAR does not discuss the weightings applied to the different scenarios. This information can only be obtained from reviewing the macros contained in SAPN's NPV spreadsheet. This is not best practice and, again, reduces the transparency of the analysis.

We have confirmed with SAPN that the various scenarios were given equal weightings. Given the consistency of the project rankings across all of the scenarios tested, the weighting of the different scenarios would not in this case have affected the overall RIT-D outcome. However, in other RIT-D assessments, the scenario weightings may affect the RIT-D outcome, and so should be directly discussed.

5.2.2 'One at a time' sensitivity analysis

SAPN has varied only one parameter in each of the scenarios/sensitivities it has tested.

SAPN commented in additional clarification material provided to the AER that it did not examine situations in which multiple extreme values were present (eg, high discount rate, low VCR and high cost of losses) as it felt this combination would be unlikely to occur and therefore the low probability to be assigned to them would not materially impact the outcome.

Our review of other RIT-D assessments has highlighted that a similar one-at-a-time approach to sensitivity analysis has been adopted in the majority of other RIT-D assessments (see Appendix A.1). A minority of

RIT-D assessments have adopted scenarios in which more than one parameter is varied – to test the overall robustness of the RIT-D outcome.

We have used SAPN's NPV model to investigate whether varying more than one parameter as part of a sensitivity test could affect the top ranked option – specifically whether option 8 or option 5 (the top-ranked non-network option) could emerge as the top-ranked option overall. We found that this was not the case. As a consequence, SAPN's one at a time sensitivity approach did not have a material impact on the outcome of this particular RIT-D analysis.

However, for other RIT-D analysis, a broader approach to sensitivity testing may be more appropriate. It may be apposite for the AER to review its RIT-D Application Guidelines in this regard.

On a more minor note, SAPN has undertaken a non-symmetrical sensitivity analysis on its network capital costs of 75% and 133%. This approach is not best practice, and means that the expected value of the capital costs is more than 100%. We have tested the impact of adopting this range using SAPN's NPV model, and found that it is non-material to the outcome of this RIT-D analysis.

5.3 Risk-adjusted calculation of costs

We confirmed with SAPN that the costs included in the FPAR for both the 33kV cable and the 66kV cable have both been based on the results of a formal tender. That is, the tender issued by SAPN called for firm prices for both the 33kV cable and the 66kV cable.

AER staff have asked us whether SAPN's approach to calculating the expected cost of those elements of the options that include a replacement cable is consistent with the RIT-D. SAPN refers in the FPAR to its probability-weighted approach.³¹ We have also reviewed the calculation in SAPN's NPV model.

In essence, SAPN has calculated the expected cost associated with cable replacement in any one year, based on the cost of the cable replacement and the assumed probability that it will fail in a given year, based on its age.

The assumed probability is an input into the model, based on a probability distribution. This has been scaled up to account for the current age of the cable, such that the probabilities still sum to one over the remaining life of the asset.

We consider SAPN's calculation of the probability-weighted replacement cost to be appropriate, and consistent with the RIT-D framework.

5.4 Treatment of back-up generation

The FPAR notes that the existing Kingscote generators are available to all network and non-network options as a back-up, if one element of the option fails.³²

The non-network options included in the RIT-D analysis were required to represent a complete solution. As a consequence, diesel generation was included as part of each of the non-network options, to address the intermittency issues associated with the renewable generation components of those options. The inclusion of the diesel generation component increases the cost of the non-network options.

Use of the Kingscote generators to address intermittency in the non-network solutions would reduce the overall security of supply to Kangaroo Island, as the Kingscote generators would then no longer be available as a back-up in case an element of the non-network solution failed.

³¹ FPAR p. 42.

³² FPAR p. 16 and p. 18.

As such, the approach taken in the RIT-D analysis in relation to the Kingscote generators appears appropriate.

5.5 Capital costs for the cable options

The disputing parties have highlighted the broad range of costs for the undersea cable quoted in the NNOR, of \$45m, with a potential range of +10% and -50%.

In the DPAR and the FPAR the cost of the undersea cable has come down to \$21.9m.

AER staff have asked us whether the range of costs quoted in the NNOR and the consequent substantial reduction in the cost estimate could have affected the incentives for stakeholders to respond to the NNOR.

We note that quoting such a wide and non-symmetrical cost range in the NNOR is not best practice. A more typical approach would be to quote a cost range +/- 30% - as illustrated by the other RIT-D applications we have reviewed (see Appendix A.1).

SAPN has explained in clarification discussions with the AER that the reason for the wide range, and the wider band for cost reduction, was due to information from the tender process for the cable being received just prior to release of the NNOR, which indicated unexpectedly lower costs. SAPN had not completed its assessment of the tenders in order to have sufficient confidence in the lower end of the range at the time that the NNOR was published.

The substantive issue is whether quoting a range this wide, and where actual cable costs came in at the lower bound of that range, would have affected the non-network proposals SAPN received.

We consider that the range quoted by SAPN may have resulted in more non-network proponents being incentivised to submit proposals, as participants may have judged that they would be cost competitive at the higher end of the range quoted by SAPN:

- given that there were several non-network proponents, we would also expect the proponents to have submitted their best offers, in order to be competitive;
- conversely, if SAPN had quoted a lower figure, that was then exceeded in the final cable costing, this would have been likely to discourage non-network proponents from participating.

However, off-setting this may have been a perception by the non-network proponents that the wide range provided too great a degree of uncertainty, discouraging their participation.

On balance, we do not consider that the \$45m quoted by SAPN would have materially affected the non-network proposals SAPN received.

5.6 Other

We also tested the following sensitivities, using SAPN's NPV model, which were found to not materially affect the outcome of the RIT-D assessment:

- a 50% reduction in all non-cable network costs included for option 5 (the top-ranked non-network option) – reflecting the substantial decrease in cable costs from the earlier estimate;
- sensitivity in relation to assumed cable life – we tested 25 and 35 years, compared to SAPN's non-varying assumption of 30 years;
- sensitivity in relation to expected cable repair time – both to a weighted average repair time of 11.1 months³³ and an 'extreme' assumption of 3 months.

³³ This reflects the discussion in SAPN's Distribution Annual Planning Report that SAPN expects that there is a 90% probability that a Kangaroo Island cable failure would be catastrophic (requiring a 12 month repair time) and a 10% probability of minor failure (requiring a 3 months repair time).

In its clarification SAPN noted that it had tested differences in the assumed cable life, which was found not to change the ranking of options out to an assumed life of 39 years (against a central assumption of 30 years). This assessment was not discussed in the FPAR. The transparency of the RIT-D assessment would have been improved if SAPN had included a brief commentary on the other variables it had tested and found not to materially affect the outcome of the RIT-D.

Finally, we note SAPN's comment in the FPAR in relation to the calculation of the benefit associated with 'changes to other parties costs'³⁴. This is a benefit category included in the NER for the RIT-D, relating to the impact of a credible option of the pattern of investment in the wider NEM, including (but not necessarily limited to) other generation investment. SAPN comments in the FPAR that their interpretation of this clause is that:

[..] the party must be identifiable (ie an actual party as distinct from a potential party).

This interpretation is not consistent with the RIT-D, or the RIT-D Application Guidelines. The RIT-D explicitly refers to 'modelled projects' being 'hypothetical projects', which should be included in the market development scenarios. Although not material for this RIT-D assessment, it is relevant to note that compliance with the RIT-D would require the broader interpretation to be adopted in future RIT-D assessments.

³⁴ SAPN, FPAR, p. 39.

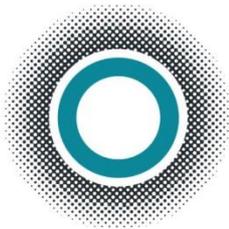
A1.1 Summary of other DNSP RIT-D assessments

The table below summarises key features from our review of the methodologies adopted by other DNSPs in their RIT-D assessments.

Table A-1: Summary of other DNSP RIT-D assessments

DNSP	RIT-D	Date	Generation dispatch/other benefits	Non-network options considered	CAPEX interval	Scenario Analysis
Powercor	Melton and Bacchus Marsh	September 2016	None proposed	Only non-network option withdrawn before final report		Different combinations of variable values
Jemena	Flemington Electricity Supply	December 2016	None proposed	An option for demand side management and an option for battery storage	± 30%	One-at-a-time
Jemena	Sunbury – Diggers Rest	January 2017	None proposed	An option for demand side management and an option for battery storage	± 30%	One-at-a-time
United Energy	Lower Mornington Peninsula	May 2016	NEM generation dispatch	An option for demand side management and an option for embedded generation	± 30%	One-at-a-time
United Energy	Notting Hill	December 2016	None proposed	An option for demand side management	± 30%	One-at-a-time
United Energy	Dromana	October 2014	None proposed	None considered	± 30%	One-at-a-time
Endeavour	Box Hill	March 2016	None proposed	None considered	± 10%	Different combinations of variable values
Endeavour	Leppington North	October 2016	None proposed	None considered	± 10%	Different combinations of variable values
AusGrid	Beaconsfield to Belmore Park	May 2016	None proposed	Demand side management in conjunction with network upgrades		One-at-a-time
Ergon	Charlton Area	September 2015	None proposed	None considered		Not specified
Ergon	Gracemere	May 2016	None proposed	Embedded generation in conjunction with network upgrades	± 20%	One-at-a-time
Ergon	Emerald	November 2016	None proposed	Embedded generation	± 30%	One-at-a-time

Source: HoustonKemp analysis of DNSP RIT-D documentation – accessed from DNSP websites



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