COMPARISON OF ELECTRANET'S 2015 TAPR PROJECTS AND THE PLAN ACCEPTED BY THE AER

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AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

IMPORTANT NOTICE

Purpose

This document compares the projects proposed in ElectraNet's 2015 Transmission Annual Planning Report with the plan accepted by the Australian Energy Regulator for ElectraNet's current regulatory period (2013–18), and provides AEMO's view on the results of this comparison.

AEMO's comparison and assessment focuses on transmission network projects that fall into the project categories reported in ElectraNet's 2015 TAPR: augmentation, connection, security/compliance, and replacement.

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This publication has been prepared by AEMO using information available at 15 July 2015.

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EXECUTIVE SUMMARY

The projects ElectraNet proposed in its 2015 Transmission Annual Planning Report (TAPR) for the current regulatory period are in line with the reliability and security requirements set out in both the National Electricity Rules (NER) and the South Australian Electricity Transmission Code (ETC).

There are differences between the plan proposed in ElectraNet's 2015 TAPR and the plan accepted by the Australian Energy Regulator (AER)[1] for ElectraNet's current regulatory period (2013–18), as shown in Table 1.

The differences largely arise from reductions in the connection point forecasts and from the reporting coverage considered by ElectraNet**:**

- ElectraNet's revised revenue proposal and the AER's final decision were based on an updated version of SA Power Networks' 2012 10% Probability of Exceedance (POE) connection point forecasts, while ElectraNet's 2015 TAPR is based on the 10% POE forecasts detailed in ElectraNet's South Australian Connection Point Forecasts Report (SACPFR), published in February 2015.
- The forecasts in ElectraNet's 2015 SACPFR are much lower than SA Power Networks' 2012 forecasts. For example, the aggregated forecast for the Adelaide metropolitan region in the 2017–18 summer is 2,543 MW according to SA Power Networks' 2012 connection point forecasts, but is only 2,076 MW in ElectraNet's 2015 SACPFR.

The lower connection point forecasts have resulted in ElectraNet cancelling several key projects in the plan accepted by the AER. Four small additional projects, requiring less investment than the cancelled projects, are proposed in the 2015 TAPR for implementation in the current regulatory period. Table 1 summarises the key project differences between the plan proposed in ElectraNet's 2015 TAPR and that accepted by the AER.

Table 1: Key project differences between the 2015 TAPR and the plan accepted by the AER

Statistical information	Number of projects	Comments (if any)
Projects accepted by AER in 2013	39	
2015 TAPR projects in the current regulatory period	36	Includes projects completed since the current regulatory period began.
Projects accepted by AER but cancelled or deferred beyond the current regulatory period	7	
Additional projects proposed for commissioning within the current regulatory period	4	Includes two projects for Riverland region transmission network reinforcement (proposed in 2014 TAPR); one project for installation of Eyre Peninsula islanding control scheme (proposed in 2015 TAPR); one project for the redesign and replacement of Murraylink control scheme (proposed in 2015 TAPR).

[1] In this report, the description "the plan accepted by the AER" refers to ElectraNet's revised capital expenditure (capex) proposal for its current regulatory period (2013–18), less the Fleurieu Peninsula reinforcement land acquisition proposal.

There are also differences between the plan proposed in ElectraNet's 2015 TAPR and its 2014 TAPR. The demand forecasts in ElectraNet's 2015 SACPFR are lower than the forecasts detailed in ElectraNet's 2014 TAPR (for example, the aggregated forecast for the Adelaide metropolitan region in the 2017–18 summer is 2,335 MW according to ElectraNet's 2014 TAPR, but is 2,076 MW in ElectraNet's 2015 SACPFR). As a result, nine network augmentation and connection projects proposed in the 2014 TAPR have been cancelled or deferred beyond the next 10 years in the 2015 TAPR. Low cost alternatives to the potential market benefit projects flagged in the 2014 TAPR have also been incorporated.

In general, compared to the 2014 TAPR, ElectraNet's 2015 TAPR reflects an increased focus on maximising the utilisation of existing network capability by implementing low cost network augmentations.

A summary of the key project differences between the 2015 and 2014 TAPRs is provided in Table 2.

Table 2: Key project differences between ElectraNet's 2015 and 2014 TAPRs

Statistical information	2015 TAPR projects	2014 TAPR projects
Total projects in the current regulatory period	36[a]	37[a]
Total projects in the next regulatory period (2018−23)	18	13
Total projects for completion in 2024 and later	0	5
Total projects subject to connection application or market benefit analysis	14	10

[a] Including projects completed since the start of the current regulatory period. For projects in the TAPR with a commissioning date of 2018 or later, the phases of expenditure are assumed to be in line with those detailed in ElectraNet's revised revenue proposal.

In December 2014, AEMO published independent transmission connection point demand forecasts for South Australia.[2] AEMO's and ElectraNet's forecasts reconcile well at an aggregate level. Although there are differences between the two forecasts at individual connection points, such differences were not found to impact on project needs.

ElectraNet's 2015 TAPR does not:

- Attempt to provide a comprehensive report on all capital expenditure (capex) projects. Rather, it focuses on how ElectraNet plans to comply with both the NER and the ETC. AEMO notes that ElectraNet is entitled to make decisions on its capex program based on the latest information available, and is not obliged to follow the plan set out in the previous TAPR or the plan accepted by the AER.
- Account for recently announced future generation withdrawals in South Australia. AEMO notes that ElectraNet is currently reviewing its project proposals in light of the recently announced retirement of Northern Power Station.

[2] AEMO. *2014 AEMO Transmission Connection Point Forecasting Report for South Australia*. Dec 2014. Available at: http://www.aemo.com.au/Electricity/Planning/Forecasting/AEMO-Transmission-Connection-Point-Forecasting/~/media/Files/Other/forecasting/Connection%20Forecasting/2014%20AEMO%20Transmission%20Connection%20Point%20Forecasting%20Report%20for%20South%20Australia.ashx. Viewed: 18 September 2015

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TABLES

1 – BACKGROUND

This chapter provides background on the AER's regulatory determinations and the TAPRs prepared by transmission network service providers (TNSPs). In particular, Section 1.2 outlines the impact of any differences between the AER's regulatory determinations and ElectraNet's 2015 TAPR.[3] Section 1.3 describes the extent to which AEMO and ElectraNet collaborate on transmission network planning.

1.1 ElectraNet's revenue determination

The regulatory framework established by the NER is an ex-ante framework, meaning that the revenue TNSPs are allowed to earn is based on expected future costs (rather than historic costs).

The AER undertakes a detailed review of the TNSP forecast expenditure to form a view on the costs that a prudent network operator could be expected to incur over the next five years. As part of this process, the AER may form a view about which proposed capital projects are efficient, and which are unnecessary. However, TNSPs are under no obligation to invest according to the AER's decision.

This review process results in an AER decision on the maximum allowed revenue that a TNSP may recover over the relevant regulatory period. The TNSP decides how to spend the allowed revenue.

This regulatory framework creates an incentive for TNSPs to incur lower costs than the revenue target set by the AER: TNSPs are allowed to earn revenue in accordance with the AER's decision, even if their actual costs are lower than anticipated.

1.1.1 Overview of the AER's decision on forecast capex

Table 3 provides a timeline of the AER's most recent regulatory determination process for ElectraNet. Note that ElectraNet's revised revenue proposal and the AER's final decision were based on an updated version of SA Power Networks' 2012 connection point demand forecasts, whereas the 2015 TAPR used the forecasts detailed in ElectraNet's 2015 SACPFR.[4]

Table 3: Timeline of ElectraNet's 2013–18 regulatory determination and 2015 TAPR

Date	Action
31 May 2012	ElectraNet submits revenue proposal[5]
30 November 2012	AER releases draft decision[6]
16 January 2013	ElectraNet submits revised revenue proposal[7]
30 April 2013	AER releases final decision[8]
May 2015	ElectraNet releases 2015 TAPR

[3] ElectraNet. *South Australian Transmission Annual Planning Report*. May 2015. Available at: http://www.electranet.com.au/assets/Reports-and-Papers/2015-Transmission-Annual-Planning-Report.pdf. Viewed: 18 September 2015.

[4] ElectraNet. *South Australian Connection Point Forecasts Report*. February 2015. Available at: http://www.electranet.com.au/assets/Reports-and-Papers/2015-SA-Connection-Point-Forecast.pdf. Viewed: 18 September 2015.

[5] ElectraNet. *Transmission Network Revenue Proposal (2013–18).* 31 May 2012. Available at: http://www.aer.gov.au/system/files/ElectraNet%20Revenue%20Proposal%20.pdf. Viewed: 18 September 2015.

[6] AER. *Draft Decision – ElectraNet Transmission determination 2013–14 to 2017–18*. November 2012. Available at: http://www.aer.gov.au/system/files/ElectraNet%202013%20-%20AER%20-%20draft%20decision%20-%2030%20November%202012.pdf. Viewed: 18 September 2015.

[7] ElectraNet. *Transmission Network Revised Revenue Proposal (2013–18)*. 16 January 2013. Available at: http://www.aer.gov.au/system/files/ElectraNet%20-%20Revised%20revenue%20proposal%202013-19%20-%2021.1.13.pdf. Viewed: 18 September 2015.

[8] AER. *Final Decision – ElectraNet Transmission determination 2013–14 to 2017–18*. April 2013. Available at: http://www.aer.gov.au/system/files/AER%20-%20final%20decision%20for%20ElectraNet%27s%202013-18%20regulatory%20control%20period%20-%2030%20April%202013_0.pdf. Viewed: 18 September 2015.

The AER did not accept ElectraNet's proposed total forecast capex of $750.1 million for the 2013–18 regulatory control period, detailed in its revised proposal. It approved a substitute forecast of $690.7 million, which it considered adequate to efficiently manage ElectraNet's transmission network.[9]

The AER's final decision accepted the following capex categories in ElectraNet's revised capex proposal[10]:

- Network capex:
  - Augmentation.
  - Connection.
  - Security/compliance.
  - Inventory and spares.
- Non-network capex:
  - Business information technologies (IT).
  - Buildings and facilities.

The AER did not accept ElectraNet's revised proposal for the following capex categories:

- Network capex:
  - Land and easement.
  - Replacement.
  - Refurbishment.

Where the AER did not accept ElectraNet's revised capex proposal, it provided a substitute capex forecast.

The AER's changes to the replacement and refurbishment categories were not associated with a specific project. Rather, the AER made changes to reflect a prudency adjustment and trade-offs between operating expenditure and capex. A prudency adjustment occurs when the regulator applies a percentage reduction to a category of expenditure to reflect the regulator's view of the efficient costs necessary to be incurred by a prudent operator.

For the land and easement category, the AER undertook a detailed technical review of each proposed project.

ElectraNet is not obliged to implement the plan accepted by the AER.

1.2 ElectraNet's TAPR

1.2.1 Role of the TAPR

The transmission planning regime established under Chapter 5 of the NER requires TNSPs to publish a TAPR by 30 June each year. TAPRs are intended to reflect the results of TNSPs' latest planning processes at the time of publication, and the relevant planning results are subject to change according to changing circumstances.

TNSPs are not constrained to act in accordance with their TAPRs in making investment decisions or submitting regulatory proposals to the AER.

1.2.2 Scope of the TAPR

Matters that must be addressed in TNSP TAPRs are listed in rule 5.12.2(c) of the NER.

The NER do not require TAPRs to comprehensively address all aspects of a TNSP's capex program. Rather, TAPRs focus on a subset of capex categories related to a TNSP's planning functions.

[9] AER. *Final decision – ElectraNet Transmission determination 2013–14 to 2017–18*. April 2013. Available at: https://www.aer.gov.au/system/files/AER%20-%20final%20decision%20for%20ElectraNet%27s%202013-18%20regulatory%20control%20period%20-%2030%20April%202013_0.pdf (Page 24). Viewed: 18 September 2015.

[10] ElectraNet. *Transmission Network Revised Revenue Proposal (2013–18)*. 16 Jan 2013. Page 28. Available at: http://www.aer.gov.au/system/files/ElectraNet%20-%20Revised%20revenue%20proposal%202013-19%20-%2021.1.13.pdf. Viewed: 18 September 2015.

Table 4 sets out the capex categories included in and excluded from ElectraNet's 2015 TAPR. All capex categories listed are considered as part of the AER's revenue determination process.

Table 4: Capex categories reported in ElectraNet's 2015 TAPR

Included in the TAPR[11]	Included in the plan accepted by the AER but not included in the TAPR[12]
• Augmentation (including market benefit project proposals) • Connection • Security/compliance • Replacement	• Inventory and spares • Land and easement • Business information technologies (IT) • Buildings and facilities

This report focuses on the capex categories included in the TAPR (see Section 2.1).

1.2.3 Interpretation of differences between the revenue determination and TAPR

Differences between ElectraNet's TAPR and the capex forecasts submitted by ElectraNet as part of the AER's revenue determination may arise for any of the following reasons:

- The capex forecasts have different reporting coverage.
- ElectraNet responds to the incentives created by the regulatory framework.
- Circumstances change.

Given that TNSPs are not obliged to follow either their TAPR capex forecast or the AER's revenue determination capex forecast, differences between the two are not necessarily cause for concern.

However, there is value in monitoring how the capex forecasts compare. Significant, consistent discrepancies between the TAPR and the capex forecasts set out in TNSPs' regulatory proposals may signal flawed planning processes or business incentives, involving an over-estimation of revenue requirements.

1.3 Collaboration between AEMO and ElectraNet on transmission network planning

This section provides a summary of how AEMO provides input into transmission network planning issues in South Australia.

National Transmission Network Development Plan

As the national transmission planner, AEMO is responsible for publishing the National Transmission Network Development Plan (NTNDP). The NTNDP is an independent strategic plan offering nationally consistent information about transmission capabilities, congestion, and investment options, for a range of plausible market development scenarios.

AEMO works closely with ElectraNet in developing the NTNDP, through formal and informal consultation. The NTNDP incorporates ElectraNet's current network and its committed development plans. It includes discussion on the key transmission network projects proposed in ElectraNet's TAPR and the impact of these projects on relevant transmission flow paths.

In accordance with NER requirements, ElectraNet considers the strategic plan outlined in the NTNDP in its TAPR.

[11] ElectraNet's 2015 TAPR does not report on all the projects proposed in the plan accepted by the AER, even those which fall into the categories reported in the 2015 TAPR, as this is not required by the NER.

[12] AER. *Final decision – ElectraNet Transmission determination 2013–14 to 2017–18*. April 2013. Available at: https://www.aer.gov.au/system/files/AER%20-%20final%20decision%20for%20ElectraNet%27s%202013-18%20regulatory%20control%20period%20-%2030%20April%202013_0.pdf (Page 24). Viewed: 18 September 2015.

AEMO review of ElectraNet's draft Regulatory Investment Test–Transmission document

As part of its normal planning procedures, ElectraNet gives AEMO the opportunity to review and comment on draft Regulatory Investment Test–Transmission (RIT–T) documents before publication. While AEMO reviews the draft documents and provides comments, ElectraNet remains the sole author and owner.

AEMO and ElectraNet joint planning studies

When the need arises, AEMO and ElectraNet carry out joint planning studies to identify the preferred solution to relieve limitations that may impact network planning in both Victoria and South Australia. Four joint planning studies recently completed are:

- South Australian Interconnector feasibility (completed in February 2011).[13]
- South Australia – Victoria (Heywood) Interconnector Upgrade (approved by the AER in September 2013).[14]
- Planning studies on the Murraylink transfer/Riverland region supply issue.[15]
- Renewable generation integration studies.[16]

AEMO and ElectraNet joint planning meetings

AEMO and ElectraNet hold regular joint planning meetings on network planning-related issues. Regular meeting agenda items include updates and discussions on the following:

- Connections in South Australia and Victoria.
- South Australian and Victorian TAPRs.
- South Australian and Victorian RIT–Ts.
- The NTNDP.
- Demand forecasts.
- Other planning issues.

AEMO review of ElectraNet's draft TAPR

As part of its normal planning procedures, ElectraNet gives AEMO the opportunity to review and comment on the draft TAPR before publication. While AEMO conducts a high-level review and provides feedback for consideration, ElectraNet remains the sole author and owner.

AEMO review and endorsement of ElectraNet's Network Capability Incentive Parameter Action Plan

In December 2012, the AER introduced a network capability component in the Service Target Performance Incentive Scheme (STPIS) for transmission network service providers. It is designed to encourage efficient network capability from existing assets when and where most needed to improve customer or wholesale market outcomes.

TNSPs are required to submit a Network Capability Incentive Parameter Action Plan (NCIPAP) to the AER for approval. As part of the process, they are required to consult with AEMO in developing the plan to determine the expected benefits associated with each proposed project and seek AEMO's endorsement.

As part of the NCIPAP process, AEMO collaborated with ElectraNet in 2014–15 to identify options and quantify market benefits of potential NCIPAP projects for implementation within ElectraNet's current regulatory period (2013–18). AEMO conducted independent analysis of network limitations, considering historical congestion, future network flows, and reliability and security implications. This has led to prioritising NCIPAP projects to deliver the best value for money for customers.

[13] Available at: http://www.electranet.com.au/assets/Uploads/interconnectorfeasibilitystudyfinalreport.pdf. Viewed: 18 September 2015.
[14] Available at: http://www.aer.gov.au/system/files/Heywood%20RIT-T%20determination_0.pdf. Viewed: 18 September 2015.
[15] See Section 5.2 of ElectraNet's 2015 TAPR.
[16] Available at: http://www.aemo.com.au/Electricity/Planning/Integrating-Renewable-Energy. Viewed: 18 September 2015.

The AER accepted AEMO's endorsement of ElectraNet's NCIPAP projects and priority order.[17]

ElectraNet's NCIPAP includes four low cost network augmentation projects and two planning study projects for implementation within the current regulatory period (2013–18). The four network augmentation projects are:

- Upper South East uprating.
- Lower South East uprating.
- Riverland uprating.
- Robertstown – Waterloo East uprating.

Although these projects are not reported in the 2015 TAPR, they are reported as potential market benefit projects in the 2014 TAPR. AEMO also understands from ElectraNet that these projects were not reported in the 2015 TAPR because at the time of the 2015 TAPR publication, ElectraNet's NCIPAP was pending the AER's approval.

The AER approved ElectraNet's NCIPAP in May 2015 and AEMO understands that the projects are being implemented.

[17] AER. *Final decision - Early application of the network capability component of the service target performance incentive scheme for ElectraNet*. Available at: http://www.aer.gov.au/system/files/AER - final decision - ElectraNet early application of the network capability component_0.pdf (Table 1). Viewed: 18 September 2015.

2 – TRANSMISSION NETWORK COMPARISON AND ASSESSMENT

2.1 Scope and assumptions

This chapter compares the projects proposed in ElectraNet's 2015 TAPR with the plan accepted by the AER for ElectraNet's current regulatory period, and provides AEMO's view on the results. It also considers differences between ElectraNet's 2015 and 2014 TAPRs, and outlines the potential impact of recently announced generation withdrawals on the projects proposed in ElectraNet's 2015 TAPR.

AEMO's comparison and assessment focuses on the transmission network projects that fall into the project categories reported in ElectraNet's 2015 TAPR: augmentation, connection, security/compliance, and replacement.

As noted in section 1.2.2, the TAPRs only include a subset of the TNSPs' overall capex. This report does not include the capex project categories that are not reported in ElectraNet's 2015 TAPR. These categories are: land and easement, inventory and spares, business information technologies (IT), and buildings and facilities.

This report is also limited to projects with costs estimated at above $1 million in both ElectraNet's revised capex proposal and its 2015 TAPR.

2.2 Augmentation projects

This section outlines AEMO's key observations relating to its comparison of the transmission network augmentations proposed in ElectraNet's 2015 TAPR with those proposed in the plan accepted by the AER for the current regulatory period (2013–18). Table 5 in Appendix A provides detailed comments for each project.

Projects proposed in the 2015 TAPR within the current regulatory period

The transmission network augmentations proposed in ElectraNet's 2015 TAPR within the current regulatory period are not identical to those proposed in the plan accepted by the AER.

A number of projects proposed in the plan accepted by the AER have been cancelled or deferred beyond the next 10 years.[18] The key project affected is the Torrens Island Transformer Upgrade, which was deferred beyond the next 10 years in ElectraNet's 2015 TAPR (and 2014 TAPR). Compared to the 2014 TAPR, the 2015 TAPR saw one more network augmentation project cancelled or deferred beyond the next 10 years (Hummocks 132 kV capacitor).

Within the current regulatory period, there is no new augmentation project proposed in the 2015 TAPR. The 2015 TAPR includes the two small projects proposed in the 2014 TAPR for augmenting the transmission capacity between the Robertstown and North West Bend.

For reasons outlined in Section 1.3, the NCIPAP projects were not reported in the 2015 TAPR. Following the AER's approval of ElectraNet's NCIPAP in May 2015, ElectraNet is working to implement these projects.

AEMO's assessment found that, in general, adjustments made to the 2015 TAPR within the current regulatory period reasonably reflect the demand forecasts detailed in ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia.[19] AEMO considers ElectraNet's adjustments to be appropriate.

[18] ElectraNet's TAPR outlook period is 10 years.

[19] AEMO. *2014 AEMO Transmission Connection Point Forecasting Report for South Australia*. Dec 2014. Available at: http://www.aemo.com.au/Electricity/Planning/Forecasting/AEMO-Transmission-Connection-Point-Forecasting/~/media/Files/Other/forecasting/Connection%20Forecasting/2014%20AEMO%20Transmission%20Connection%20Point%20Forecasting%20Report%20for%20South%20Australia.ashx. Viewed: 18 September 2015.

2015 TAPR projects beyond the current regulatory period

One network augmentation project was newly proposed in ElectraNet's 2015 TAPR for commissioning beyond the current regulatory period. This project is for implementing real-time ratings across ElectraNet's transmission network. All other network augmentation projects proposed in the 2014 TAPR beyond the current regulatory period were excluded from ElectraNet's 2015 TAPR.

Based on the demand forecasts detailed in ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia, AEMO considers the network augmentation projects proposed in the 2015 TAPR, beyond the current regulatory period, reflect the network needs.

The energy industry is continuing to evolve, with increasing penetration of rooftop photovoltaics (PV), emergence of battery storage, and withdrawals of existing thermal generation. Given the changes that the energy industry is likely to continue facing over the next five to 10 years, AEMO highlights that the need for network augmentation and the augmentation options must be reviewed annually, based on updated demand forecasts, asset condition information, and other relevant changes.

Market benefit projects

Fourteen market benefit projects are proposed in ElectraNet's 2015 TAPR. This project category includes the projects that are subject to market benefit analysis and the projects that are subject to connection application. Some of these projects are the same as those proposed in the 2014 TAPR, and some are newly proposed in the 2015 TAPR. AEMO notes that some proposals are conceptual in nature with uncertain scope, and will presumably be further clarified in future TAPRs. In general, AEMO supports detailed studies to quantify the benefits of those proposed projects.

For completeness, Table 6 in Appendix A lists the augmentations that form part of the plan accepted by the AER, but are not directly related to the transmission network and are not reported in ElectraNet's 2015 TAPR. These projects are mainly related to communication systems, monitoring systems, and other minor augmentations.

2.3 Connection projects

The connection projects proposed in ElectraNet's 2015 TAPR are not identical to those proposed in the plan accepted by the AER. AEMO notes that the project for installing the second 275/66 kV transformer at Mount Barker South has been cancelled or deferred beyond the next 10 years. ElectraNet has also proposed, in the 2015 TAPR, to cancel the Baroota Substation Upgrade project. Table 7 in Appendix A provides a comparison of the connection projects in each document, including detailed comments for each project. AEMO's key observations are:

- Cancellation of the second 275/66 kV transformer at Mount Barker South.

  Based on the demand forecasts detailed in ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia, the existing firm transformer capacity at Mount Barker/Mount Barker South should be sufficient to support the demand in the Mount Barker/Mount Barker South area for the duration of the ten year outlook period. High level AEMO analysis shows there will still be about 40 to 50 MW spare transformer capacity supplying the Mount Barker/Mount Barker South area towards the end of the 10-year outlook period. It is unlikely that there will be need for further augmentations in the foreseeable future.

- Proposed cancellation of the Baroota Substation Upgrade project.

  In accordance with the South Australian Electricity Transmission Code (ETC), the Baroota connection point needs to be upgraded from ETC Category 1 to ETC Category 2 supply reliability from 1 December 2017.

  The requirement stipulated in the existing ETC is the result of the ETC review undertaken in 2010. Recent economic analyses undertaken by ElectraNet and AEMO have found that upgrading supply reliability from Category 1 to Category 2 at Baroota connection point from 1 December 2017 is no longer justified, considering the changes in consumption since 2010.

As a result, ElectraNet wrote to ESCOSA proposing that the Commission amend the ETC to remove the reclassification of the Baroota Connection Point to Category 2, from 1 December 2017. AEMO also conveyed the same message to ESCOSA in early 2015 as part of the ETC review.

On 14 August 2015, the Commission released a discussion paper proposing an amendment to the Electricity Transmission Code, to remove the requirement for ElectraNet to upgrade the Baroota exit point.[20] The Commission will make a final decision in late October 2015.

2.4 Security/compliance projects

A comparison of key security/compliance projects with a direct impact on transmission network performance is provided in Table 8 in Appendix A. The table also contains detailed comments on each project.

Two new control scheme projects, not in the plan accepted by the AER, are proposed in the 2015 TAPR for implementation in the current regulatory period. The two projects are to:

- Install Eyre Peninsula islanding control scheme to minimise interruptions to customers.
- Redesign and replace the Murraylink control scheme owned by ElectraNet.

AEMO understands that the detailed scopes of the two control scheme projects are yet to be worked out. AEMO expects that ElectraNet will carry out detailed investigations in developing the specific scopes of these control schemes, to ensure the projects comply with the requirements of both the NER and the ETC.

In addition, nine projects are proposed in ElectraNet's 2015 TAPR (in the 'Security/Compliance' project category) for implementation in the next regulatory period (2018–23). One of these projects was proposed in the 2014 TAPR, the others were newly proposed in the 2015 TAPR. In general, AEMO notes that these projects are expected to contribute towards improving the reliability, security and safety of electricity supply in South Australia, or providing market benefits by relieving potential constraints. AEMO supports detailed studies so that electricity consumers will not be paying more than necessary for a reliable, secure and safe electricity supply over the long term.

For completeness, Table 9 in Appendix A provides a comparison of security/compliance projects that are not expected to directly affect network performance.

2.5 Replacement projects

Table 10 in Appendix A provides a detailed comparison of the network replacement projects proposed in ElectraNet's 2015 TAPR with the plan accepted by the AER. It includes comments on some key projects.

The comparison shows that the network replacement projects proposed in the 2015 TAPR for the current regulatory period (2013–18) generally align with the plan accepted by the AER. It is worth noting however that the timing of several projects has been advanced by one to two years, compared to that reflected in the plan accepted by the AER.

One exception is the Kanmantoo Substation replacement project, which has been cancelled or deferred beyond the next 10 years. The timing proposed in the plan accepted by the AER was driven by the need to augment the transformer capacity in tandem with the replacement to meet demand growth. Due to the considerable reduction in demand forecast at Kanmantoo Substation since 2012, asset condition has become the only driver of Kanmantoo substation replacement.

AEMO cannot comment on the timing of condition-driven asset replacement, due to lack of asset condition information.

The network replacement projects proposed in ElectraNet's 2015 TAPR for beyond the current regulatory period are asset condition-based. The timings are indicative and are subject to economic analysis.

[20] ESCOSA. *Proposed Variation to Clause 2.4.1 of the Electricity Transmission Code – Discussion Paper*. Available at: http://www.escosa.sa.gov.au/Publications/DownloadPublication.aspx?id=3218&versionId=3421. Viewed: 18 September 2015.

For completeness, Table 11 in Appendix A provides a comparison of non-network replacement and refurbishment projects. No comments are provided for these projects.

2.6 Key differences between the 2015 and 2014 TAPRs

ElectraNet's 2015 TAPR is based on the 10% Probability of Exceedance (POE) demand forecasts detailed in ElectraNet's 2015 SACPFR, while ElectraNet's 2014 TAPR is based on ElectraNet's 2014 10% POE demand forecasts, detailed in its 2014 TAPR. ElectraNet's 2015 forecast is lower than the 2014 forecast. For example, the aggregated forecast for the Adelaide metropolitan region in the 2017–18 summer is 2,335 MW according to ElectraNet's 2014 TAPR, but is 2,076 MW in ElectraNet's 2015 SACPFR.

As a result, nine network augmentation and connection projects proposed in the 2014 TAPR have been cancelled or deferred beyond the next 10 years in the 2015 TAPR. Low cost alternatives to the potential market benefit projects flagged in the 2014 TAPR have also been incorporated.

In general, compared to the 2014 TAPR, ElectraNet's 2015 TAPR reflects an increased focus on maximising the utilisation of existing network capability by implementing low cost network augmentations.

More details about the differences between ElectraNet's 2015, 2014 and 2013 TAPR projects are provided in Appendix A.

2.7 Potential impact of announced generation withdrawals on projects proposed in ElectraNet's 2015 TAPR

AEMO notes that ElectraNet's 2015 TAPR does not account for the recently announced retirement of Northern Power Station, and the announced withdrawals of Torrens Island 'A' Power Station and Pelican Point Power Station unit 2.

The announced withdrawals of Torrens Island 'A' Power Station and Pelican Point Power Station unit 2 are unlikely to have an impact on the security and reliability of supply in South Australia, however additional projects may be required due to the recently announced retirement of Northern Power Station. AEMO understands that ElectraNet is currently reviewing its project proposals in light of these announcements.

AEMO's review has identified three replacement projects, proposed for Leigh Creek Coalfield substation and Leigh Creek South substation (see Table 10), which will be impacted by the announced retirement of Northern Power Station. ElectraNet has advised that it is currently reviewing the need for, and scope of, the three projects.

APPENDIX A – PROJECT COMPARISON AND ASSESSMENT DETAILS

Table 5: Network augmentation comparison

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
Torrens Island Transformer Upgrade.	2019	14.1	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)		The need to upgrade the Torrens Island transformers was driven by demand growth in the western suburbs of Adelaide. Based on connection point demand forecasts provided in ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia, Western Suburbs transformer capacity limitation is not expected to arise within 10 years. ElectraNet's proposal to defer this project beyond 10 years reflects the needs of the network.
Reactive Plant Control Systems.	2018	3.9	2018 [2017] (Not included in 2013 TAPR)	<5 [<5] (NA)	The purpose of this project is to automate the switching of the reactors and capacitors and some relevant transformer tapping to improve voltage control in the transmission network.
Hummocks 132 kV Capacitor Bank.	2018	4.8	Not included in 2015 TAPR [2021] (2021)	NA [<5] (4.2)	The need for this capacitor for reactive power support is mainly driven by total demand growth on the Yorke Peninsula, but is also affected by demand growth in Port Pirie, Bungama, and Baroota. Based on the connection point forecasts reported in ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia, AEMO considers that ElectraNet's proposal to defer this project beyond 10 years reflects the needs of the network.
Weather Stations for Dynamic Line Rating.	2016	2.0	2016 [2016] (Not included in 2013 TAPR)	<5 [<5] (NA)	The implementation of dynamic line ratings may release market benefits under some system operating conditions. This project is for facilitating the future implementation of dynamic line ratings. It will not have any impact on the network until dynamic line ratings are applied.

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Cultana 275/132 kV Augmentation.	2015	23.6	NA – Completed [Completed[21]] (2014)	NA [NA] (72.0)	This project has been completed.
Tailem Bend 132 kV Reactive Power Support.	2014	1.6	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)		The connection point demand forecasts detailed in ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia show negative growth at Tailem Bend within the next 10 years. AEMO considers that ElectraNet's proposal to defer this project beyond 10 years reflects the needs of the network.
Kadina East 132 kV Capacitor Bank.	2014	2.2	NA-Completed [Completed] (2013)	NA [NA] (4.3)	This project has been completed.
Reinforce the lower Eyre Peninsula by constructing a double circuit 275 kV line from Cultana – Yadnarie – Port Lincoln in a staged approach. Establish 275/132 kV substations at Yadnarie and Port Lincoln. Install 100 MVAr capacitor bank at Yadnarie and SVC at Port Lincoln. **In future, convert the Port Lincoln to Yadnarie 132 kV line for sub-transmission purposes. This significant augmentation is currently being deferred by the use of the Port Lincoln generators to manage this line overload.**	Not included in ElectraNet's capex proposal but included in its contingent project proposal.		Subject to connection application [Subject to connection application.] (Subject to connection application)	150–300 [450–750] (548.0)	This proposal is one of the contingent projects accepted by the AER for the current regulatory period. The existing transmission network on the Eyre Peninsula may need to be augmented if ElectraNet receives a major new load connection application on the Eyre Peninsula.

[21] Except for a minor scope of works for reconfiguring the 132 kV networks.

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Rebuild Robertstown – North West Bend – Berri as high capacity 275 kV AC double circuit line. Extend network into Victoria or New South Wales.	Not included in ElectraNet's capex proposal but included in its contingent project proposal.	Subject to market benefit analysis [2024] (Subject to market benefit analysis)	NA [200–400] (226.0)	This proposal is one of the contingent projects accepted by the AER for the current regulatory period (excluding the work scoped in Victoria or New South Wales). The need was mainly driven by the potential limitation to the Riverland region supply. This potential limitation has been addressed by ElectraNet's committed projects and NCIPAP projects for uprating the existing 132 kV lines in the Riverland region.
Rebuild Davenport–Brinkworth–Para 275 kV as a high capacity 275 kV AC double circuit line with twin conductors.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to market benefit analysis [Subject to market benefit analysis] (Subject to market benefit analysis)	NA [300–400] (350.0)	This project would significantly increase transmission line capacity between the Adelaide and Port Augusta areas. Net market benefit is likely to arise from significant loads and/or generation development in the Northern South Australia region, especially in the Upper North and Eyre Peninsula areas. The need and timing are subject to market benefit analysis.
String the vacant side of the 275 kV double circuit line between Tailem Bend and Tungkillo and establish a third 275 kV circuit between Para and Tungkillo.	Not included in ElectraNet's capex proposal but included in its contingent project proposal.	Subject to market benefit analysis [Subject to market benefit analysis] (Subject to market benefit analysis)	25–50 [40–60] (150.0)	This proposal is one of the contingent projects accepted by the AER for the current regulatory period. The augmentation would facilitate new generation injection at Tepko or Tailem Bend, and increase the Heywood Interconnector transfer. The need and timing are subject to market benefit analysis.

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Work has been initiated to explore either an increase in the amount of contracted generation or a demand-side solution to cover the balance of load at Port Lincoln.	Not included in ElectraNet's capex proposal or its contingent project proposal.		Not included in 2015 TAPR [2024] (2018–20)	NA [NA] (NA)	The limitation of the existing transmission network on the Eyre Peninsula is managed by generation support at Port Lincoln. The existing generation support agreement expires in December 2018. ElectraNet needs to explore non-network solutions to continue to manage the network limitation and a new network support agreement needs to be in place by the end of 2018. Both ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia show negligible changes in demand at Port Lincoln in the next 10 years. Under the current demand forecast, there is unlikely to be the need to increase the level of contracted support beyond the existing level within the next 10 years.
Install 1 x 12 MVAr 132 kV PoW switched capacitor bank at Kadina East.	Not included in ElectraNet's capex proposal or its contingent project proposal.		Not included in 2015 TAPR [2023] (2023)	NA [<5] (3.3)	Both ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia show minimal demand growth at Kadina East in the next 10 years. Additional reactive support requirement at Kadina East is not expected within the next 10 years.
Rebuild Kincraig Substation with 2×60 MVA transformers.	2021	2.1	Not included in 2015 TAPR [2023] (2023)	NA [35–50] (37.0)	Neither ElectraNet's 2015 SACPFR nor AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia show any material growth of demand at Kincraig substation. The need for augmenting the supply capacity of Kincraig substation is not expected to arise within the next 10 years.

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Heywood Interconnector Upgrade.	Not included in ElectraNet's capex proposal, but included in its contingent projects proposal.	2016 [2016] (2016)	40–50 [40–50] (63.0)	This is a contingent project accepted by the AER for the current regulatory period. In early September 2013, the AER released its determination on the Heywood RIT–T, which approved the preferred option (developed jointly by AEMO and ElectraNet) as fulfilling the requirement of the RIT–T.[22] The AER made its contingent project decision in March 2014 and approved the incremental revenue for the project requested by ElectraNet. The project is now a committed project and is being implemented. The reduction in the project cost is due to the AER's March 2014 decision to exclude decommissioning of the Keith – Tailem Bend No 1 132 kV line and the Snuggery–Keith 132 kV line from the scope of the contingent project decision. The cost estimates are for ElectraNet's scope of works.
Implement dynamic line ratings on the Robertstown-North West Bend #1 and Robertstown-MWP3 -MWP2 -MWP1-North West Bend 132 kV line, to increase available Murraylink transfers from South Australia into Victoria.	Not included in ElectraNet's capex proposal but the potential need of augmentation was flagged in its contingent project proposal.[23]	2015 [2014] (Not included in 2013 TAPR)	NA [<2] (NA)	Based on the findings of the joint planning study between ElectraNet and AEMO (in its role as Victorian transmission planner), ElectraNet can no longer rely on Murraylink imports into South Australia to meet ETC supply reliability requirements in the Riverland region. Upgrading of the supply capacity of the 132 kV lines between Robertstown and North West Bend will result in supply reliability in the Riverland region meeting ETC requirements in the medium term, and increases the availability of Murraylink transfers from South Australia to Victoria.
Uprate the Robertstown-North West Bend #1 132 kV line to 100 ˚C line clearances.	Not included in ElectraNet's capex proposal but the potential augmentation need was flagged in its contingent project proposal.[24]	2015 [2015] (Not included in 2013 TAPR)	<3 [<3] (NA)	Same comment as above.

[22] Available at: http://www.aer.gov.au/system/files/Heywood%20RIT-T%20determination_0.pdf. Viewed: 18 September 2015.
[23] Available at: http://www.aer.gov.au/system/files/AER%20-%20final%20decision%20for%20ElectraNet%27s%202013-18%20regulatory%20control%20period%20-%2030%20April%202013_0.pdf (Table B.4; page 2015). Viewed: 18 September 2015.
[24] Available at: http://www.aer.gov.au/system/files/AER%20-%20final%20decision%20for%20ElectraNet%27s%202013-18%20regulatory%20control%20period%20-%2030%20April%202013_0.pdf (Table B.4; page 2015). Viewed: 18 September 2015.

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Install a second 160 MVA 275/132 kV transformer at Templers West and turn in the Templers–Roseworthy 132 kV line to Templers West.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Not included in 2015 TAPR [2024] (Beyond 2013 TAPR outlook period)	NA [20–45] (NA)	Both ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia show much lower forecasts for Barossa Valley towards the end of the next 10 years, compared with the forecasts detailed in ElectraNet's 2014 TAPR. Additional 275/132 kV transformer at Templers West is not expected to be required in the next 10 years.
Install 2 x 15 MVAr 132 kV capacitor banks at Angas Creek.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Not included in 2015 TAPR [2024] (Beyond 2013 TAPR outlook period)	NA [5–10] (NA)	Both ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia show negligible changes in demand at Angas Creek in the next 10 years. Additional reactive support requirement at Angas Creek is not expected within the next 10 years.
Further incremental upgrade to the Riverland corridor (uprate multiple existing transmission assets).	Not included in ElectraNet's capex proposal or its contingent project proposal.	Not included in 2015 TAPR [Subject to market benefit analysis]. (Not included in 2013 TAPR)	NA (<5) (NA)	This project is not reported in the 2015 TAPR. The project is in ElectraNet's NCIPAP approved by the AER in the middle of May 2015[25] (NCIPAP project name: Riverland uprating). AEMO understands from ElectraNet that this project is not reported in the 2015 TAPR because at the time of the 2015 TAPR publication, ElectraNet's NCIPAP was pending the AER's approval.
Line uprating and dynamic line ratings between Heywood and Tailem Bend.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Not included in 2015 TAPR [Subject to market benefit analysis.] (Not included in 2013 TAPR)	NA [<5] (NA)	This project is not reported in the 2015 TAPR. The project is in ElectraNet's NCIPAP approved by the AER in middle of May 2015 (NCIPAP project name: Lower South East uprating). AEMO understands from ElectraNet that this project is not reported in the 2015 TAPR because at the time of the 2015 TAPR publication, ElectraNet's NCIPAP was pending the AER's approval.

[25] AER. *Final decision – Early application of the network capability component of the service target performance incentive scheme for ElectraNet*, May 2015. Available at: http://www.aer.gov.au/system/files/AER%20-%20final%20decision%20-%20ElectraNet%20early%20application%20of%20the%20network%20capability%20component_0.pdf (Table 1, page 2). Viewed: 18 September 2015.

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Strengthen the Mid North 275 kV network.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to market benefit analysis. [Subject to market benefit analysis]. (Not included in 2013 TAPR)	<5 [<5] (NA)	These projects would facilitate the connection of future generation connection (mainly renewable generation connection) to the transmission network in the mid-north region. AEMO supports further investigations into the market benefit of these proposals. AEMO notes that the two proposals are conceptual in nature. AEMO expects ElectraNet to clarify the proposals in future TAPRs.
Reconfigure the Mid North 132 kV network.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to market benefit analysis. [Subject to market benefit analysis] (Not included in 2013 TAPR)	<5 [NA] (NA)	
Tie Davenport–Robertstown 275 kV at Belalie substation.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to market benefit analysis [Subject to market benefit analysis.] (Not included in 2013 TAPR)	NA [NA] (NA)	These projects would facilitate future generation connection (mainly renewable generation connection) to the transmission network in the mid-north region. AEMO supports further investigations into the market benefit of these proposals.
Tie Robertstown–Para 275 kV at Tungkillo substation.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to market benefit analysis [Subject to market benefit analysis.] (Not included in 2013 TAPR)	NA [NA] (NA)	

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Complete roll out of weather stations at monitoring locations across the network and complete validation of real-time line ratings on specific circuits.	Not included in ElectraNet's capex proposal or its contingent project proposal.	2018-2023 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	The implementation of dynamic line ratings may release market benefits due to reduced generation congestion at times of high demand or high wind generation. AEMO supports further investigation into the market benefit of this proposal.
Reinforce the Yorke Peninsula by constructing a single circuit 275 kV line from Blyth West to Hummocks and install a single 200 MVA 275/132 kV transformer at Hummocks substation.	Not included in ElectraNet's capex proposal but included in its contingent projects proposal.	Subject to connection application [Not included in 2014 TAPR] (Not included in 2013 TAPR)	40–55 [NA] (NA)	The existing 132 kV network on the Yorke Peninsula needs to be augmented to enable connection of step load growth. An appropriate augmentation option needs to be identified based on economic analysis.
Increase the capacity of the Robertstown 275/132 kV transformers by upgrading various items of plant and apply short term loading limits to the Robertstown 160 MVA 275/132 kV transformers.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to connection application [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	Under the scenario of significant wind farm connection to the 275 kV lines between Robertstown and Davenport, increasing the capacity of Robertstown 275/132 kV transformer may release market benefits due to reduced generation congestion at times of high wind generation. AEMO supports further investigation into the market benefit of this proposal.
Uprate the Robertstown – North West Bend #2 and the North West Bend – Monash #2 132 kV lines to 100 ˚C line clearances and install two switched 15 MVAr 132 kV capacitor banks at Monash.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to market benefit analysis [Not included in 2014 TAPR] (Not included in 2013 TAPR)	10–18 [NA] (NA)	AEMO understands from ElectraNet that the component of this project relating to uprating of the 132 kV lines to 100 ˚C is now included in ElectraNet's NCIPAP approved by the AER in middle of May 2015[26] (NCIPAP project name: Riverland uprating). Installation of the proposed capacitor banks would further increase the Riverland region 132 kV network transfer capability. This would further increase available Murraylink transfers, particularly in the direction of South Australia to Victoria. AEMO supports further investigation into the market benefit of this proposal.

[26] AER. *Final decision – Early application of the network capability component of the service target performance incentive scheme for ElectraNet,* May 2015. Available at: http://www.aer.gov.au/system/files/AER%20-%20final%20decision%20-%20ElectraNet%20early%20application%20of%20the%20network%20capability%20component_0.pdf (Table 1, page 2). Viewed: 18 September 2015.

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Increase the capacity of the 275 kV lines between Tungkillo and Heywood by upgrading various items of plant (e.g. remove line traps, replace current transformers, change current transformer ratios) and apply dynamic line ratings to these lines.	Not included in ElectraNet's capex proposal or its contingent project proposal.	Subject to market benefit analysis [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	AEMO understands from ElectraNet that this proposal is for upgrading the Heywood Interconnector transfer capability in addition to the Upper South East uprating project and the Lower South East uprating project in ElectraNet's NCIPAP. This project would further increase the thermal transmission capacity of the Heywood Interconnector. AEMO supports further investigation into the market benefit of this proposal.

Table 6: Other augmentations (including communication systems, monitoring systems, and other minor augmentations)

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)
OPSWAN Implementation 2012–14.	2014	1.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Transmission Line Inspection Data Analysis Tool.	2016	1.4	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
OPSWAN Implementation 2014–16.	2016	1.8	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
IT OCS Software 2014–16.	2017	1.3	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Engineering Systems Enhancements 2015–17.	2016	2.0	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Common Information-Connectivity Model.	2015	1.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Substation Automation and Alarm.	2017	1.8	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
One IP substation Network.	2018	9.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Telecommunications Network Optimisation Stage 2.	2018	1.5	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)
South East Backbone Telecoms Stage 2.	2015	1.8	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Magill Telecoms Bearer.	2015	9.5	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	

Table 7: Comparison of connection projects

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
Baroota Substation Upgrade.	2018	17.2	2017 [2017] (2017)	[5–10] 20–25 (14.8)	Under the existing ETC, this project is required to be commissioned by 2017 in order to upgrade Baroota supply from ETC category 1 to ETC category 2. The requirement of the existing ETC is the result of an ETC review undertaken in 2010. Recent economic analyses undertaken by ElectraNet and AEMO have found that upgrading supply reliability from Category 1 to Category 2 at Baroota connection point from 1 December 2017 is no longer justified. AEMO's own analysis results confirm ElectraNet's findings. As a result, ElectraNet wrote to ESCOSA proposing that the Commission amend the ETC to remove the reclassification of the Baroota Connection Point to Category 2 from 1 December 2017. AEMO also conveyed the same message to ESCOSA in early 2015 as part of the ETC review. On 14 August 2015, the Commission released a discussion paper proposing an amendment to the Electricity Transmission Code, to remove the requirement for ElectraNet to upgrade the Baroota exit point. The Commission will make a final decision in late October 2015. Subject to the Commission's final decision to vary the requirement for Category 2 reliability from 1 December 2017 at Baroota, ElectraNet will cancel this project. In conjunction, ElectraNet will replace plant in poor condition at Baroota substation and implement flood mitigation measures.
Mount Barker South 275/66 kV Transformer.	2021	2.2	Not included in 2015 TAPR [2022] (2023)	NA [10–20] (10.4)	Based on the demand forecasts detailed in ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia, there will still be about 40 to 50 MW spare transformer capacity for supplying the Mount Barker/Mount Barker South area towards the end of the next 10 years. Augmentation is unlikely to be required.
Dalrymple North.	2017	24.1	2016 [2016] (2016)	14–16 [20–25] (21.0)	This project is required to be commissioned by 2016 to upgrade Dalrymple supply from ETC category 1 to category 2.

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Hummocks 132/33 kV Transformer Upgrade.	2014	4.7	NA- Completed [Completed] (2013)	NA NA (11.0)	This project has been completed.
Waterloo Substation Replacement.	2014	5.5	NA – Completed Completed (2014)	NA [NA] (43.0[27])	This project has been completed.
Whyalla Terminal Substation Replacement.	2015	1.1	NA – Completed [Completed] (2013)	NA [NA] (NA)	This project has been completed.
Munno Para New 275/66 kV Substation.	2015	33.7	2015 [2015] (2015)	30–35 [30–40] (42.6)	This project has been completed.
Rebuild Angas Creek substation with two 60 MVA 132/33 kV transformers.	Not included in ElectraNet's capex proposal or its contingent proposal.		Not included in 2015 TAPR [2024] (Beyond 2013 TAPR outlook period)	NA [25–40] (NA)	Both ElectraNet's 2015 SACPFR and AEMO's 2014 Transmission Connection Point Forecasting Report for South Australia show negligible demand change at Angas Creek in the next 10 years. Augmentation is unlikely to be required.

[27] Waterloo Substation Replacement was split into two projects in ElectraNet's capex proposal: one under the connection category, and the other under the replacement category.

Table 8: Comparison of security/compliance projects directly affecting network performance

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
South East Circuit Breaker (CB) Upgrade.	2017	8.8	2015 [2016] (2017)	5–10 [5–10] (8.0)	AEMO understands that the breaker arrangement in both South East and Tailem Bend makes it difficult to secure outage and maintenance windows. AEMO considers both proposals reflect the network needs.
Tailem Bend Substation Upgrade.	2020	1.2	2016 [2016] (2019)	10–18 [10–18] (16.0)	ElectraNet has advised that the total project cost estimate for the Tailem Bend Substation upgrade project is $16 million. In 2014, ElectraNet also advised that: • The plan in the revised capex proposal is to complete the Tailem Bend Substation upgrade project in the next regulatory period (2018–23), and $1.2 million reflects the component of the total project cost estimate that was forecast to be outlaid in the current regulatory period (2013–18). • ElectraNet decided to advance the timing of this project so the Tailem Bend Substation can be upgraded around the same time that the Heywood Interconnector upgrade is commissioned. This approach would require most project expenditure to be incurred in the 2013–18 regulatory period. AEMO considers that there is benefit in this approach, as it will potentially reduce interconnector line outage requirements during implementation.
Upper North Voltage Control Scheme.	2015	3.1	2016 [2016] (Not included in 2013 TAPR)	<5 [<5] (NA)	The existing control schemes in the Eyre Peninsula and Upper North need to be reviewed after the Cultana reinforcement projects, which, among other things, includes breaking the 132 kV mesh between the Eyre Peninsula and Upper North regions.
Regional Control Scheme.	2018	6.5	2018 [2018] (Not included in 2013 TAPR)	5–10 [5–10] (NA)	New control schemes or existing control scheme enhancements are required in a number of supply regions to ensure compliance with network security requirements and to minimise load shedding as required by the ETC.

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Install additional 275 kV circuit breaker at Kilburn to complete the mesh.	Not included in ElectraNet's capex proposal or its contingent project proposal.	2018–23 [2022] (Not included in 2013 TAPR)	<5 [<5] (NA)	An additional 275 kV circuit breaker at Kilburn can help to improve the security and reliably of supply to Northfield.
Install Eyre Peninsula islanding control scheme to minimise interruptions to customers.	Not included in ElectraNet's capex proposal or its contingent project proposal.	2018 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	The project will minimise interruptions to customers on the lower Eyre Peninsula when the lower Eyre Peninsula is islanded or disconnected from the rest of the network.
Redesign and replace the Murraylink control scheme owned by ElectraNet.	Not included in ElectraNet's capex proposal or its contingent project proposal.	2018 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	AEMO understands from ElectraNet that the existing Murraylink control scheme owned by ElectraNet is reaching the end of expected technical life, and the design of the existing control schemes are not in line with good utility practices.
Install two switched 50 MVAr 275 kV reactors at Para.	Not included in ElectraNet's capex proposal or its contingent project proposal.	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	5–10 [NA] (NA)	AEMO understands that managing high voltage issues under light or medium load conditions is becoming more and more challenging. Currently such high voltage issues are managed by 275 kV cable switching actions. This project will help to improve the situation.
Install a 275 kV circuit breaker and associated equipment on the Robertstown exit at Canowie substation.	Not included in ElectraNet's capex proposal or its contingent project proposal.	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	This project will avoid the disconnection of Hallett wind farm upon tripping of Canowie–Robertstown 275 kV line. AEMO supports further investigation into the market benefit of this proposal.
Uprate the Snuggery to Blanche to Mount Gambier 132 kV transmission line and associated low-rated primary plant.	Not included in ElectraNet's capex proposal or its contingent project proposal	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	AEMO understands from ElectraNet that this project will enable the existing Snuggery to Blanche to Mount Gambier 132 kV lines to be securely operated at existing ratings. ElectraNet also clarified that this project may include an opportunistic uprating, to allow increased South East generation output during outages of the South East – Snuggery 132 kV line. If analysis indicates a net market benefit for uprating this line, the project will be re-allocated to the augmentation category.

Project description	Revised capex proposal	2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment
Install an additional 132 kV circuit breaker and associated equipment at Blanche substation.	Not included in ElectraNet's capex proposal or its contingent project proposal	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	These projects are expected to contribute towards improving the reliability, security, and safety of electricity supply in South Australia, or providing market benefits by reducing constraints on generators. AEMO supports detailed economic analysis to quantify the reliability and market benefits of these projects.
Install a meshed 132 kV bus with four exits and associated primary and secondary equipment at or adjacent to the existing Murray Bridge – Hahndorf pumping station #3 site.	Not included in ElectraNet's capex proposal or its contingent project proposal	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	10–15 [NA] (NA)	
Install a single 275 kV circuit breaker and associated equipment between the 275 kV busses at Robertstown substation.	Not included in ElectraNet's capex proposal or its contingent project proposal	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	5–10 [NA] (NA)	
Implement full single pole reclosing capability on the 132 kV circuits in the Mid North region.	Not included in ElectraNet's capex proposal or its contingent project proposal	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	
Implement full single pole reclosing capability on the 132 kV circuits in the South East region.	Not included in ElectraNet's capex proposal or its contingent project proposal	2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	<5 [NA] (NA)	

Table 9: Comparison of security/compliance projects (others)

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)
Security and Video System Consolidation and Development.	2014	1.4	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Magill/East Terrace Cable Joint Monitoring.	2018	4.3	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
ICT Security 2014–16.	2016	1.1	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Network Arial Laser Survey.	2018	4.8	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Radial Supply Reliability Improvement.	2018	3.6	Not included in 2015 TAPR [2017] (Not included in 2013 TAPR)	NA [<5] (NA)
Substation Perimeter Video Monitoring and Security.	2018	9.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
IEC 61850 Training & Development Facility.	2015	2.7	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Fire and Security Systems Upgrade to SDM Standard.	2014	1.4	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
Happy Valley Transformer Noise Mitigation.	2015	3.0	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Transmission Line Design.	2016	8.9	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Standards Major Review.	2016	1.7	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Uprate the Bungama to Baroota 132 kV line to meet the required rating of 49 ˚C using Australian clearance standards.	Not in capex proposal or contingent project proposal	NA	2018 [2018] (Not included in 2013 TAPR)	<5 [<5] (NA)
Install, upgrade or replace transformer oil containment systems and associated equipment at various sites, where assessment indicates a clear need.	Not in capex proposal or contingent project proposal	NA	2018 [2018] (Not included in 2013 TAPR)	5–10 [5–10] (NA)
Create a high voltage switching training facility to improve training standards across all aspects of high voltage switching.	Not in capex proposal or contingent project proposal	NA	2018 [Not included in 2014 TAPR] (Not included in 2015 TAPR)	5–10 [NA] (NA)

Table 10: Comparison of network replacement projects

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment (if any)
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
Millbrook Pump Station.	2018	13.2	2017 [2017] (2013–18)	10–15 [8–12] (12.0)	
Para SVC Secondary System Replacement.	2018	16.4	2016 [2013–18] (2013–18)	12–20 [10–18] (15.0)	
Kanmantoo Substation Upgrade.	2018	14.8	Not included in 2015 TAPR [2022] (2018–23)	NA [<5] (13.0)	
Mannum Pump Station No 1.	2018	17.2	2017 [2016] (2013–18)	10–15 [10–15] (16.0)	
Mannum Pump Station No 2.	2018	15.6	2017 [2016] (2013–18)	8–12 [10–15] (15.0)	
Mannum Pump Station No 3.	2018	11.8	2017 [2016] (2013–18)	8–12 [8–12] (11.0)	
Morgan Whyalla Pump Station No 1.	2017	23.0	2016 [2016] (2013–18)	12–16 [10–15] (22.0)	
Morgan Whyalla Pump Station No 2.	2017	16.0	2016 [2016] (2013–18)	15–20 [10–15] (15.0)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment (if any)
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
Morgan Whyalla Pump Station No 3.	2017	12.5	2016 [2015] (2013–18)	10–15 [8–12] (12.0)	
Morgan Whyalla Pump Station No 4.	2017	12.9	2016 [2015] (2013–18)	10–15 [8–12] (12.0)	
Neuroodla Asset Replacement.	2015	11.0	2015 [2015] (2013–18)	6–8 [4–8] (7.0)	This project has been completed.
Mount Gunson Substation Replacement.	2015	11.2	2015 [2015] (2013–18)	6–8 [4–8] (7.0)	This project has been completed.
Unit Asset replacement.	2018	36.1	2013–18 [2013–18] (Not in TAPR)	50–60 [40–50] (NA)	This item relates to numerous small projects rather than a single large project.
Waterloo Substation Replacement.	2014	14.2	NA – Completed [Completed] (2013)	NA [NA] (43.0[28])	This project has been completed.
Whyalla Terminal Substation Replacement.	2015	6.1	NA – Completed [Completed] (2013)	NA [NA] (NA)	This project has been completed.

[28] Waterloo Substation Replacement was split into two projects in ElectraNet's capex proposal: one under the connection category, and the other under the replacement category.

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment (if any)
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
TIPS 66 kV Section Secondary Systems Upgrade.	2014	10–15 (1.2)	NA – Completed [Completed] (2013)	NA [NA] (NA)	This project has been completed.
Para 275 KV Secondary Systems & Minor Primary Plant Replacement.	2016	30.3	2016 [2016] (2015)	48–52 [40–50] (NA)	ElectraNet has clarified in the 2014 TAPR and 2015 TAPR that the scope of this project has been extended to cover the unit asset replacement required in 2013–18.
National Grid Metering Current Transformer and Voltage Transformer (NGM CT, VT) and Meter Replacements.	2018	16.4	2015 [2015] (2013–18)	<5 [<5] (14.0)	Based on the 2014 TAPR and 2015 TAPR, ElectraNet has now split this project into two parts: Part 1 for meter replacement, and Part 2 for NGM CT, VT replacements. The cost estimate provided in the 2014 TAPR is for Part 1. Part 2 will be implemented as part of the unit asset replacement required in 2013–18, which is not referenced in the 2015 TAPR (less than $3 million at an individual site).
Replace secondary systems, selected primary plant and associated infrastructure at TIPS A 275 kV Substation.	Not in capex proposal		NA – Completed [Completed] (2013)	NA [NA] (NA)	This project has been completed.
Replace the existing secondary systems at Happy Valley with modern day equipment and minor poor condition plant.	Not in capex proposal		Not included in 2015 TAPR [2018–23] (2018–23)	NA [15–20] (17.0)	
Replace the existing primary and secondary plant at Dry Creek with modern day equipment.	Not in capex proposal		Not included in 2015 TAPR [2018–23] (2018–23)	NA [8–12] (20.0)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment (if any)
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
Rebuild the Murray Bridge to Hahndorf pumping station No 1 substation to modern-day standards and replace the 132/11 kV transformers.	Not in capex proposal		Not included in 2015 TAPR [2018–23] (2018–23)	NA [10–15] (18.0)	
Rebuild the Murray Bridge to Hahndorf pumping station No 2 substation to modern-day standards and replace the 132/11 kV transformers.	Not in capex proposal		Not included in 2015 TAPR [2018–23] (2018–23)	NA [5–10] (12.0)	
Rebuild the Murray Bridge to Hahndorf pumping station No 3 substation to modern-day standards and replace the 132/11 kV transformers.	Not in capex proposal		Not included in 2015 TAPR [2018–23] (2018–23)	NA [8–12] (16.0)	
Rebuild the Keith Substation when it is economic to do so.	Not in capex proposal		Not included in 2015 TAPR [Not included in 2014 TAPR] (2018–23)	NA [NA] (32.0)	
Rebuild the Mount Gambier Substation when it is economic to do so.	Not in capex proposal		Not included in 2015 TAPR [Not included in 2014 TAPR] (2018–23)	NA [NA] (31.0)	
Replace selected primary and secondary plant at Brinkworth substation with modern day equipment.	Not in capex proposal		Not included in 2015 TAPR [2018–23] (Not included in 2013 TAPR)	NA [10–15] (NA)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment (if any)
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
Replace selected primary and secondary plant at Yadnarie substation with modern day equipment.	Not in capex proposal		Not included in 2015 TAPR [2018–23] (Not included in 2013 TAPR)	NA [5–10] (NA)	
Transmission line refurbishment to renew line asset components and extend line life (in various regions).	Not in capex proposal		2018-23 [2018–23] (Not included in 2013 TAPR)	100–130 [50–80] (NA)	
Program of unit asset replacements at various substations.	Not in capex proposal		2018–23 [2018–23] (Not included in 2013 TAPR)	20–30 [20–40] (NA)	
Replace 400-500 protection scheme relay assets.	Not in capex proposal		2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	30–40 [NA] (NA)	
Replace the existing reactors with two new 33 kV reactors at Leigh Creek Coalfield substation.	Not in capex proposal		2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	10–15 [NA] (NA)	Subsequent to ElectraNet's publication of the 2015 TAPR, Alinta Energy announced that Leigh Creek coal mine would not operate beyond March 2017.[29] AEMO understands that ElectraNet is currently reviewing the need and scope of these proposals (including the proposed transformer replacement at Leigh Creek South substation) in light of Alinta Energy's announcement.
Replace the existing transformers with two new 132/33 kV transformers at Leigh Creek Coalfield substation.	Not in capex proposal		2018–23 (Not included in 2014 TAPR] (Not included in 2013 TAPR)	10–15 [NA] (NA)	

[29] Alinta Energy. *Flinders Operations Closure Update*, 30 July 2015. Available at: https://alintaenergy.com.au/about-us/news/flinders-operations-closure-update; Viewed: 18 September 2015.

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)		AEMO comment (if any)
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)	
Replace the existing transformers with two new 132/33 kV transformers at Leigh Creek South substation.	Not in capex proposal		2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	10–15 [NA] (NA)	
Replace the existing transformers with two new 132/33 kV transformers at Mannum substation.	Not in capex proposal		2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	10–15 [NA] (NA)	
Replace the existing 50 MVA transformer with a new 25 MVA 132/33/11 kV transformer at Mount Gambier substation.	Not in capex proposal		2018–23 [Not included in 2014 TAPR] (Not included in 2013 TAPR)	4–8 [NA] (NA)	

Table 11: Comparison of non-network replacement projects

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)
Energy Management System Upgrade 2013–18.	2017	2.1	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Control System Virtualisation.	2015	1.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Para To Davenport Line Hazard Mitigation.	2017	33.7	2018 [2018] (Not in TAPR)	40–60 [40–50] (NA)
South East Substation to Heywood Telecommunications Bearer.	2015	7.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Magill/East Terrace Cable Pit Construction.	2018	1.5	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
OPSWAN Replacement 2013–15.	2016	1.5	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Operational Logging and Fault Investigation Systems.	2016	1.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Yadnarie – Port Lincoln Backbone Telecommunications Links.	2015	5.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Asset Condition Online Monitoring Equipment Replacement.	2018	11.8	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)
OPSWAN Replacement 2015–17.	2017	1.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
OSI PI Technology Upgrade.	2016	1.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Tel Asset Replacement: Metro Region.	2016	3.6	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Tel Asset Replacement: Eastern Hills Region.	2017	1.1	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Tel Asset Replacement: Mid North Region.	2017	3.2	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Tel Asset Replacement: Upper North Region.	2017	1.6	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Tel Asset Replacement: Eyre Region.	2017	1.9	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Tel Asset Replacement: South East Region.	2018	2.4	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
IT OCS software 2016–18.	2019	1.4	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)
Riverland Telecoms Bearer.	2015	4.1	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
VOIP Network Refresh.	2018	2.0	Not included in 2015 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	
Penola West to South East Line Refurbishment.	2017	2.5	Not included in 2015 TAPR [2015] (Not in 2013 TAPR)	NA [<5] (NA)
Tailem Bend to Keith No 2 Line Refurbishment.	2018	5.8	2015 [2015] (Not in 2013 TAPR)	5–10 [5-10] (NA)
Brinkworth to Mintaro Line Refurbishment.	2018	5.0	2015 [2015] (Not in 2013 TAPR)	5–7 [8–12] (NA)
Magill to Happy Valley Line Refurbishment.	2017	3.5	Completed [2015] (Not included in 2013 TAPR)	NA [<5] (NA)
Cultana to Stony Point Line Refurbishment.	2018	3.1	Not included in 2014 TAPR [Not included in 2014 TAPR] (Not included in 2013 TAPR)	

Project description	Revised capex proposal		2015 TAPR proposal [2014 TAPR proposal] (2013 TAPR proposal)	
	Timing	Cost estimate ($m)	Timing	Cost estimate ($m)
Planned replacement program to remove battery chargers from service and replace with modern, fit-for-purpose equipment.	Not in capex proposal		2018 [2013–18] (Not included in 2013 TAPR)	<5 [5-10] (NA)
Replace obsolete online asset condition monitoring equipment.	Not in capex proposal		2018–23 [2013–18] (Not included in 2013 TAPR)	10–15 [10–15] (NA)
Replace substation lighting and associated infrastructure at sites where hazards exist.	Not in capex proposal		2018–23 [2013–18] (Not included in 2013 TAPR)	4–8 [4–8] (NA)
Replace AC auxiliary supply equipment, switchboards and cabling at 13 substations.	Not in capex proposal		2018 [2013–18] (Not included in 2013 TAPR)	<5 [<5] (NA)

ABBREVIATIONS

Abbreviation	Expanded name
AC	Alternate Current
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
capex	Capital Expenditure
CB	Circuit Breaker
CT	Current Transformer
ESCOSA	Essential Services Commission of South Australia
ETC	South Australian Electricity Transmission Code
ICT	Information Communication Technologies
IEC	International Electrotechnical Commission
IP	Internet Protocol
IT	Information Technologies
MVA	Megavolt Amperes
MVAr	Megavolt Amperes reactive
MW	Megawatts
NCIPAP	Network Capability Incentive Parameter Action Plan
NEFR	National Electricity Forecasting Report
NER	National Electricity Rules
NGM	National Grid Metering
NTNDP	National Transmission Network Development Plan
OPSWAN	Operational Wide Area Network
POE	Probability of Exceedance
PoW	Point on Wave
SACPFR	South Australian Connection Point Forecasts Report
STPIS	Service Target Performance Incentive Scheme
SVC	Static VAR Compensator
TAPR	Transmission Annual Planning Report
Tel	Telecommunication
TIPS	Torrens Island Power Station
TNSP	Transmission Network Service Provider
VT	Voltage Transformer
VOIP	Voice Over Internet Protocol