This is the second stage of the formal RIT-T process for 'Powering Sydney's Future'.

A reliable, affordable and sustainable electricity supply is essential for our way of life. If you live, work or operate a business in the Inner Sydney area, you are connected to one of the most critical parts of the electricity network.

The Inner Sydney area includes the Central Business District (CBD) which is a hub for economic activity, major transport infrastructure, industry and tourism. Increasingly, it is also home to a growing number of people attracted to shorter commutes, harbour views and the many benefits that city living has to offer. The Inner Sydney area provides a base for a number of major infrastructure and transport networks including road tunnels, airports, ports, train networks and data centres. These entities require a high level of electricity reliability and security to maintain services required for Sydney to operate as a major international city with many of these entities having large development / expansion plans under construction or scheduled for the near term.

Parts of the transmission and distribution networks which supply electricity to the Inner Sydney area were built in the 1960s and 1970s. Some of those assets are approaching the end of their serviceable lives. TransGrid and Ausgrid have been jointly working to identify the most economically viable solutions to ensure a reliable electricity supply to the Inner Sydney area is continued.

Publication of the Project Specification Consultation Report (PSCR) in October 2016 marked the first stage of the Regulatory Investment Test for Transmission (RIT-T) consultation process and set-out in detail the need for TransGrid and Ausgrid to take action, following earlier engagement with the community to ensure security of supply to Inner Sydney. This report, the Project Assessment Draft Report (PADR), marks the second stage of the RIT-T process and provides a summary of the submissions on the PSCR and an update on the preferred option for investment by TransGrid and Ausgrid.

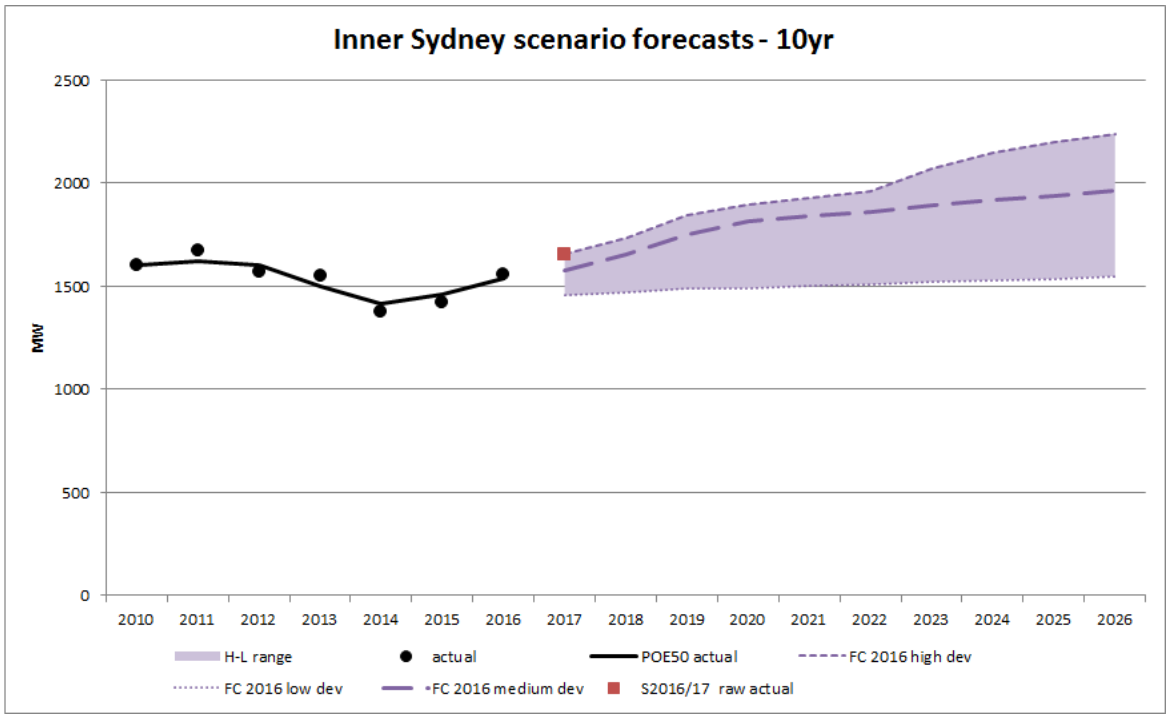
The overall RIT-T process is designed to inform stakeholders of the energy supply need and proposed options (both network and non-network) to address it, test the market for alternative and more efficient solutions, and explain to stakeholders the basis on which the preferred option has been selected.

Customer demand is increasing due to renewed activity within Inner Sydney

Customer demand in the Inner Sydney area continues to increase due to renewed economic activity. This is evident in the Summer 2016/17 peak demand, committed new customer connections and anticipated customer connections.

Figure E.1 shows the historical peak demand for Inner Sydney and the forecast for the next 10 years. Of particular note is the actual demand that occurred on the 10th February 2017, which was in line with the high forecast.

Figure E.1 Historical and forecast Inner Sydney peak demand growth



There was a strong response to the first stage from parties offering non-network solutions

In the PSCR, TransGrid and Ausgrid invited public submissions on potential credible non-network options that could meet the technical characteristics described. In response to this, eleven submissions were received from non-network proponents, offering a range of technologies.

The non-network options have been assessed by TransGrid and Ausgrid to see whether they:

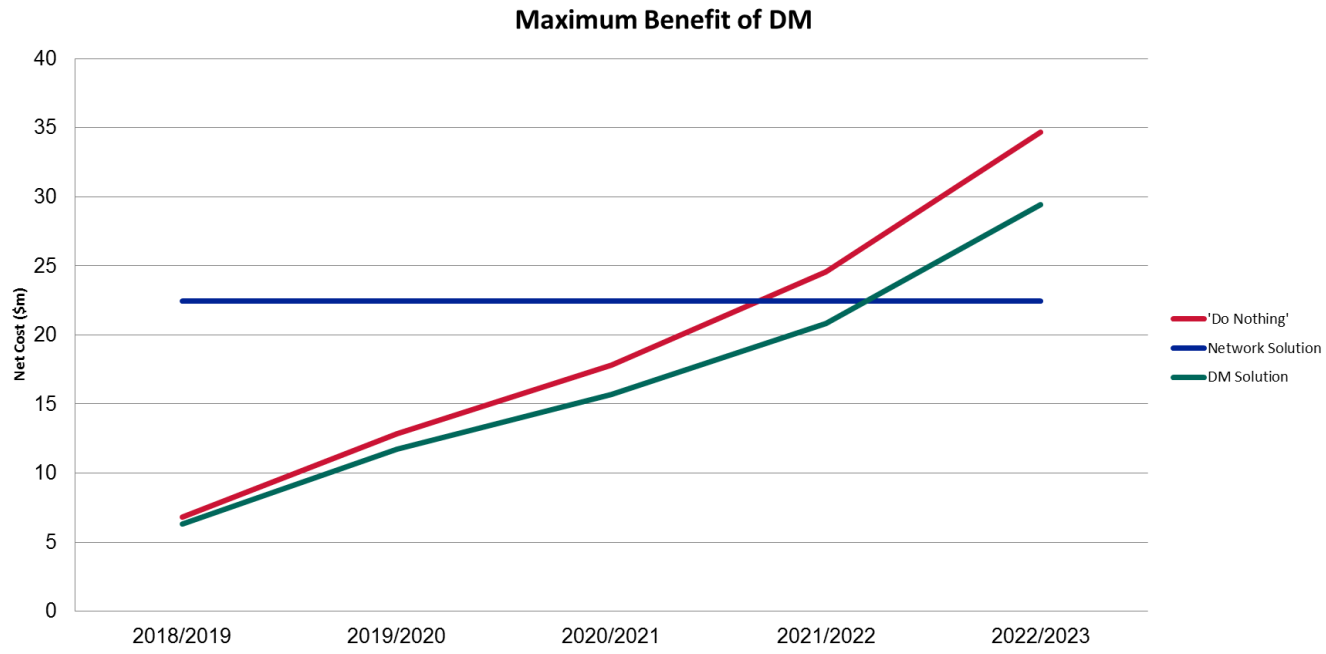
1. can assist in managing the risk of unserved energy[1] between now and when a network option can be commissioned; and
2. have the potential to defer the network investment.

The assessment results indicate that non-network solutions can assist in reducing the risk of unserved energy prior to when a network option can be commissioned.

The responses by non-network proponents have also allowed TransGrid and Ausgrid to assess the benefits of coupling these technologies with a deferred network solution, to assess whether such an option could provide an overall greater net benefit to the market. TransGrid and Ausgrid have incorporated a new credible option that uses non-network solutions to defer the eventual network option by one year. Deferral of the network investment by two years or more using non-network solutions was found to be not cost effective. This is shown in Figure E.2.

[1]Unserved energy is the electricity demanded by consumers but not able to be supplied.

Figure E.2 Pre-investment unserved energy risk against demand management and network option costs



Note:

1. **'Do Nothing' is the pre-investment risk.**
2. **Demand Management and Network costs are the annualised cost of solutions plus any post-investment risk.**

TransGrid and Ausgrid consider that the interest from non-network proponents represents an exciting opportunity and the deferral will be the largest electricity transmission capital cost deferral due to non-network solutions in the NEM to date.

Nine credible options have been identified and assessed, covering a range of network and non-network technologies

TransGrid and Ausgrid have considered a range of options and their ability to address the risk of supply disruption for consumers. Both network and non-network solutions have been considered as potential credible options for this RIT-T analysis – in particular:

- a range of **network options** has been included in the RIT-T assessment; and
- **non-network option components** have been incorporated into the assessment of all network options identified in the PSCR. A new option (Option 7) has been included in this PADR to assess whether non-network components can efficiently defer the timing of network investment.

The credible network options considered differ principally based on:

- whether two new 330 kV cables are built together, or in stages; and
- whether Cable 41 is remediated, operated without remediation (including at a lower voltage), or retired.

None of the credible options assessed in this RIT-T are expected to have a material inter-network impact.

Table E.1 presents a summary of the credible options identified and assessed as part of this PADR, outlining the various components and stages[2] for each option.

Table E.1 Credible options considered as part of this report

Option	Description	NPV ($m 2016/17)
1	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Install two 330 kV cables in stages, retire Cable 41 and decommission Ausgrid cables in two stages	7,938
2A	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Operate Cable 41 at 132 kV, install two 330 kV cables in stages and decommission Ausgrid cables in two stages	7,945
2B	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Operate Cable 41 at 330 kV with rating of 426 MVA, install two 330 kV cables in stages and decommission Ausgrid cables in one stage	7,924
3A	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Install two 330 kV cables at once, retire Cable 41 and decommission Ausgrid cables in one stage	7,934
3B	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Install two 330 kV cables at once, operate Cable 41 at 330 kV with rating of 426 MVA and decommission Ausgrid cables in one stage	7,933
4	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Remediate Cable 41, install two 330 kV cables in stages and decommission Ausgrid cables in one stage	7,876
5	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Remediate Cable 41, install two 330 kV cables at once (initially operating at 132 kV) and decommission Ausgrid cables in two stages	7,879
6	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Remediate Cable 41, install two 330 kV cables at once and decommission Ausgrid cables in one stage	7,887
7	A combination of non-network solutions to manage the risk of unserved energy before the network option can be commissioned. Non-network support initially and then a deferred install of two 330 kV cables at once, operate Cable 41 at 330kVwith rating of 426 MVA and decommission Ausgrid cables in one stage	7,936

The installation of additional new 132 kV cables as an alternative to new 330 kV cables was considered in earlier stages of the assessment and has not been considered further in this PADR. Multiple 132 kV cables would be required to provide the necessary network capacity to supply

[2] Each of the 'Stages' are independent sequential phases of works.

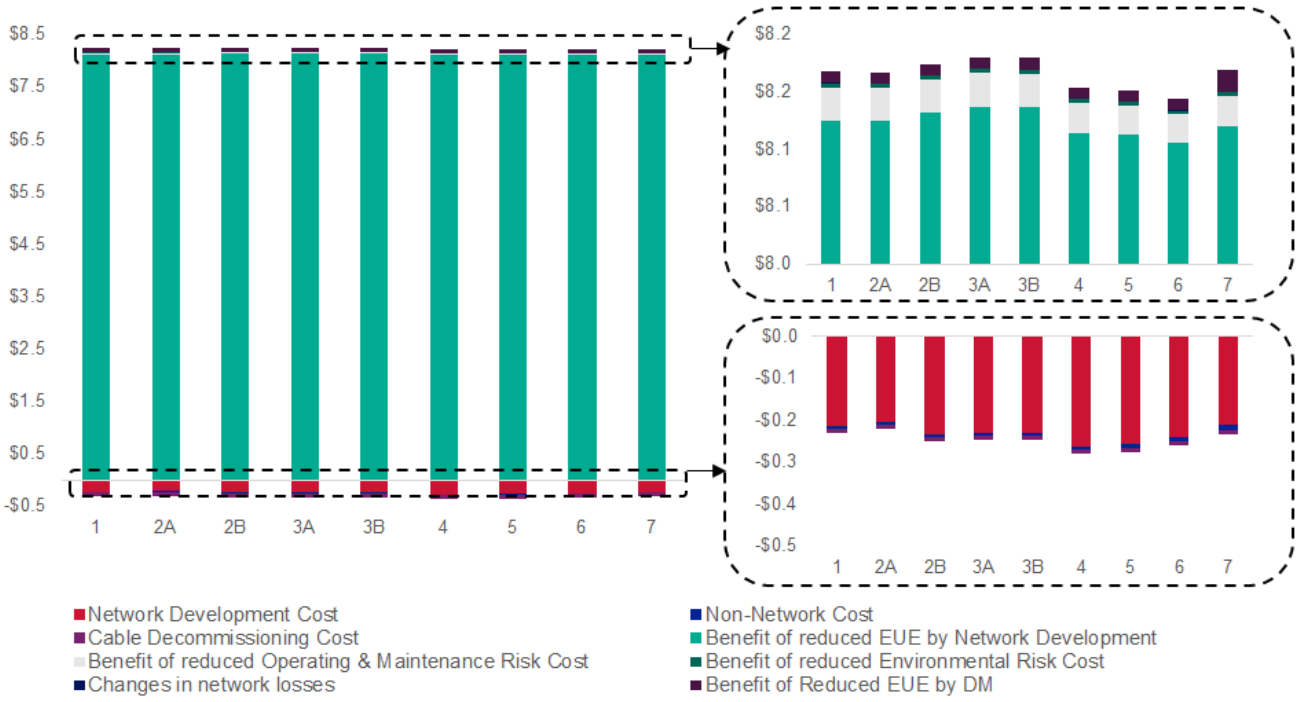
customer demand and cater for the decommissioning of existing Ausgrid cables. Earlier analysis has shown that this is not as economically efficient as the installation of the two proposed 330 kV cables.

The date requiring a major investment under a network option is 2021/22 (as identified in the PSCR). This can be deferred to 2022/23 using non-network solutions under Option 7.

All options will deliver sufficient net benefits and non-network solutions are able to efficiently defer the preferred network option by one year

The RIT-T NPV assessment shows that all credible options can be expected to deliver significant net market benefits, when compared to the 'do nothing' option. This is particularly the case for the central and high scenarios where options are estimated to deliver between $8 billion and $80 billion of net benefits. Benefits to the market arise primarily due to the fact that all credible options avoid substantial unserved energy to the inner area of Australia's largest city. Figure E.3 shows the breakdown of costs and benefits estimated.

Figure E.3 Breakdown of costs and benefits estimated – Central Scenario ($B 2017/18)



Option 7 was added to investigate whether the preferred network option can be efficiently deferred using **non-network solutions**. Deferral by one year is economically efficient, and as such TransGrid and Ausgrid propose this option as the preferred option. The option is based on network Option 3B deferred by one year using non-network solutions.

Of the **network options** assessed, TransGrid and Ausgrid consider Option 3B to be the preferred network option. While all options are found to deliver effectively similar net market benefits, Option 3B is capable of maximising the network transfer capability by utilising the remaining service life of Cable 41. This is considered vital should the high demand scenario materialise.

Further, the proposed cable route for all network options will pass through the highly developed Inner Sydney area. It is expected that project construction works will have a significant impact to the community and environment including inconvenience caused by traffic control, increased noise levels due to excavation works etc. Option 3B can minimise the impact to the local community by delivering two cables in one stage, compared to other credible network options that install these two cables in two separate stages. While the cable installation in two stage options has a lower initial capital investment compared to Option 3B, the relatively short interval between the two stages would cause prolonged disruption to the local community.

The credible options have each been tested against different future states of the world through extensive testing of key assumptions

The assessment of each option has involved different states of the world ('reasonable scenarios') that have been used to estimate market benefits. In particular, TransGrid and Ausgrid have constructed three scenarios for the assessment, each with variables and/or parameters that are likely to affect the market benefits of the credible options – as summarised in Table E.2.

Table E.2 Reasonable scenarios assumed

Key variable/parameter	Scenario 1 – Low	Scenario 2 – Central	Scenario 3 – High
VCR estimates	AEMO VCR Value	Base VCR Value ($170/kWh for the Sydney CBD and $90/kWh for Inner Sydney)	Base VCR Value + 20%
Demand	Low	Medium	High
Discount rate	8.78%	6.13%	3.48%

TransGrid and Ausgrid have also investigated the effects of varying individual key assumptions by undertaking a number of sensitivity tests, including a 25% increase/decrease in the network costs.

Further, a major assumption in this report is that Cable 41 has a remaining service life of 10 years. However, there is a possibility that the service life of Cable 41 may extend to beyond 10 years provided that more periodic maintenance works are carried out and the temperature of the hottest spots along the cable route are carefully monitored to avoid any over-temperature events. TransGrid and Ausgrid have therefore also considered an additional sensitivity test based on an assumed Cable 41 service life of 20 years (ie, the end of the NPV period).

Overall, TransGrid and Ausgrid consider that the range of assumptions embodied in these various scenarios and sensitivities ensures that the credible options are robustly tested across a reasonable number of future states of the world.

What does the new transmission reliability standard for Inner Sydney mean?

The reliability standards for electricity transmission in New South Wales from 1 July 2018 onwards were recently finalised by the Independent Pricing and Regulatory Tribunal (IPART). The reliability standard for Inner Sydney[3] is expressed in two parts:

[3] IPART published a final Supplementary Report on 22December 2016 which recommended unserved energy allowances for Inner Sydney as well as Broken Hill, Molong, Mudgee, Munyang and Wellington Town.

- a level of redundancy is required – the required level remains unchanged from the current standard and is referred to as 'modified N-2', i.e. a non-zero amount of load must be supplied following the simultaneous outage of a single 330 kV cable and any 132 kV feeder or 330/132 kV transformer; and
- an unserved energy allowance – the system is required to be designed such that the annual expected unserved energy in respect to bulk supply points[4] does not exceed a pre-specified allowance.

The second part marks a departure from the current standard, and all previous standards and explicitly acknowledges the value of unserved energy to customers. TransGrid and Ausgrid have therefore applied an approach in this RIT-T to valuing reductions in the expected unserved energy associated with each credible option to be consistent with the approach used to derive the new standard.

Importantly, while the reliability standard is an important compliance obligation, it does not affect the high-level decision that investment is required in order to ensure a secure electricity supply to Inner Sydney from 2021/22. Specifically, there are a number of factors independent of the reliability standard that mean the amount of unserved energy to customers will increase markedly going forward without investment – these factors relate primarily to the ageing/deteriorating nature of existing cables and forecast increases in customer demand due to renewed economic activity. The identified need for this RIT-T is that the future value of unserved energy and other costs to electricity consumers, associated with ageing cables exceeds the cost of investment to avoid the unserved energy and other costs.

TransGrid and Ausgrid will now advance discussions with potential providers of non-network solutions in order to reach a final conclusion on their role(s) in this project

TransGrid and Ausgrid consider that a combination of non-network solutions can defer the timing of the preferred network option by one year, as evidenced by the NPV assessment of Option 7. In addition, the non-network options have been assessed and determined that they can assist in managing the risk of unserved energy between now and when a network option can be commissioned.

To this end, TransGrid and Ausgrid will now advance discussions with potential providers of non-network solutions in parallel with the third and final stage of the RIT-T process, the Project Assessment Conclusion Report (PACR).

[4] A bulk supply point is a location within the transmission network where electricity supply is provided to the distribution network or a directly connected customer.

Submissions and next steps

TransGrid and Ausgrid welcome written submissions on this PADR.

Submissions are due on or before 23 June 2017.

Submissions should be made via the following email address: PSFConsultations@transgrid.com.au.

TransGrid is bound by the Privacy Act 1988 (Cth). In making a submission in response to our consultation process in relation to the Powering Sydney's Future RIT-T submission, TransGrid will collect and hold your personal information (that is, information about you such as your name, email address, employer and phone number). TransGrid will collect this information for the purpose of receiving your submission and may use your contact details to follow up on your submission. A copy of your submission, as well as your personal information, will also be provided to Ausgrid. In making a submission, you consent to TransGrid collecting and holding your personal information for this purpose, and providing this information to Ausgrid. Under the National Electricity Law there are circumstances where TransGrid may be compelled to provide information to the AER. We will advise you should this occur.

At the conclusion of the submissions process, all submissions received will be published on the TransGrid and Ausgrid websites. If you do not wish for your submission to be made publicly available, then please clearly specify this at the time of lodging your submission.

Our Privacy Policy sets out our approach to managing your personal information. In particular, it explains how you may seek to access and/or correct the personal information that we hold about you, as well as how to make a complaint about a breach of our obligations under the Privacy Act, and how we will deal with complaints. You can access our Privacy Policy here.

A PACR is expected to be published by 14 August 2017