FINAL REPORT

PROPOSED NEW LARGE TRANSMISSION NETWORK ASSET

PROPOSED NEW SMALL DISTRIBUTION NETWORK ASSET

DEVELOPMENT OF THE SOUTHERN SUPPLY TO THE ACT

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Executive Summary

This final report has been prepared to document TransGrid's and ActewAGL's to consultation with National Electricity Market registered participants, NEMMCO and interested parties on options for the development of the Southern Supply to the ACT, application of the Australian Energy Regulator's regulatory test to those options and determination of their proposed actions.

Section 1 provides the context of this final report within the regulatory process and summarises the outcomes of that process.

Section 2 describes the regulatory requirements relating to proposals for new large transmission network assets and new small distribution network assets.

The local supply arrangements that will be in place following completion of the first stage of the Southern Supply to the ACT in 2009 are also described. Also described is the Network Service Criteria that inter alia requires the further development of the Southern Supply to the ACT by 30th June 2012.

In Section 3 two feasible network augmentation options that will meet the Network Service Criteria's 30th June 2012 requirement are described together with other developments that were considered but not put forward as options.

Option 1 involves construction by TransGrid of a new 330 kV switching station in the Wallaroo area, re-routing and extension of the Canberra – Williamsdale 330 kV line to form a Wallaroo – Williamsdale 330 kV circuit and installation of a second 375 MVA 330/132 kV transformer at Williamsdale plus upgrading by ActewAGL of the existing subtransmission lines between Gilmore and Theodore zone substations.

Option 2 involves construction by TransGrid of a new single circuit 330 kV transmission line between Yass and the Canberra – Williamsdale line, formation of a Yass – Williamsdale 330 kV circuit and installation of a second 375 MVA 330/132 kV transformer at Williamsdale plus (identically to Option 1) upgrading by ActewAGL of the existing subtransmission lines between Gilmore and Theodore zone substations. The new 330 kV line would be constructed adjacent to the existing No. 9 Yass – Canberra 330 kV line and be approximately 50km in length.

Either of these options would result in the 330 kV supply to the ACT from Williamsdale being independent of Canberra 330 kV substation supply.

In Section 4 the results of an application of the regulatory test considering Options 1 and 2 are presented. The results indicate that Option 1 has the lowest present worth of costs in all cases.

In Section 5 it is concluded that as Option 1 is the highest ranked option in all the cases considered it satisfies the regulatory test.

TransGrid and ActewAGLs' proposed actions are for the implementation of Option 1 at an estimated cost of $36.1 Million to TransGrid and $7.8 Million to ActewAGL, to be completed by 30th June 2012.

Section 6 provides information relevant to notification of disputes.

1. Introduction

1.1. Purpose and Scope

TransGrid owns the majority of the transmission network within NSW (from which the ACT is supplied) and is responsible, inter alia, for planning and developing its network to meet the requirements of customers within the state and the ACT and to facilitate operation of the National Electricity Market (NEM). As part of its planning responsibilities and the requirements of the National Electricity Rules (the Rules) TransGrid consults with NEM registered participants, NEMMCO and interested parties on emerging limitations within its transmission network and options being considered to relieve them.

ActewAGL owns the subtransmission and distribution networks within the ACT and is responsible for planning and developing those networks.

TransGrid and ActewAGL have responsibilities under the Rules to carry out joint planning to facilitate the optimal development of connections between the transmission and distribution networks within ActewAGL's network area.

This final report has been prepared in accordance with Clause 5.6.6 (h) of the Rules. It relates to a proposal for a new large transmission network asset and a new small distribution network asset that will address the requirements of the ACT Government in relation to the electricity networks supplying the ACT.

It includes:

- A description of the Network Service Criteria that has been promulgated by the ACT Government;
- A description of all reasonable options that have been identified to meet the criteria;
- An analysis of the ranking of these options in accordance with the Australian Energy Regulator's (AER's) regulatory test;
- An assessment of the outcome of the regulatory test and proposed actions; and
- Information which may be relevant to persons who may wish to dispute any aspect of this final report.

1.2. Outline of Consultation Process

TransGrid has published a description of the need to develop the transmission network supplying the ACT in its Annual Planning Reports (APRs) for 2004, 2005, 2006, 2007 and 2008.

In 2006 TransGrid and ActewAGL consulted on options to meet the requirements of the ACT jurisdiction. This consultation culminated in a proposal that would meet these requirements in the period to 30th June 2009. The proposal covered the establishment of a new 330/132 kV substation at Williamsdale, the conversion of a 132 kV transmission line between Canberra and Williamsdale to operate at its design voltage of 330 kV and the construction of two new 132 kV circuits between Williamsdale and the Gilmore/Theodore area in the ACT.

It was recognised that further requirements would need to be met by 30th June 2012. The 2008 APR describes the preferred option to meet these further requirements.

In April 2009 TransGrid and ActewAGL published an application notice covering a proposal for a new large transmission network asset and new small distribution network asset that would address these further requirements. A summary of the application notice was placed on NEMMCO's website on 17th April 2009. Interested parties were invited to make submissions in the period to 29th April 2009. No submissions were received.

TransGrid and ActewAGL have applied the regulatory test to all known reasonable options to meet the requirements of the ACT jurisdiction and have determined the option that satisfies the test.

Accordingly TransGrid and Country Energy have completed their obligations under Clause 5.6.6(b) of the Rules and will proceed in accordance with the proposed actions detailed in Section 5 of this final report.

Persons wishing to dispute any aspect of this final report are referred to Section 6.

A summary of this final report has been posted on NEMMCO's website.

2. Identification of a Necessity for Augmentation

2.1. Regulatory Requirements

2.1.1. Requirements of the National Electricity Rules

This final report covers a proposal for a new large transmission network asset and a new small distribution network asset.

The requirements of the Rules for new large transmission network asset proposals are set out in Clause 5.6.6. This requires applicants (in this case TransGrid) inter-alia to:

- Set out the reasons for proposing the new large transmission network asset, including the actual or potential constraint or inability to meet network performance requirements;
- Describe all reasonable network and non-network options to address the constraint;
- Rank the options in accordance with the principles of the AER's regulatory test including detailed analysis of why the applicant considers the new large transmission network asset satisfies the regulatory test;
- Where relevant provide analysis of why the applicant considers the new large transmission network asset is a reliability augmentation; and
- Provide an augmentation technical report or consents to proceed from affected TNSPs if the new large transmission network asset is likely to have a material inter-network impact.

The requirements of the Rules for new distribution network asset proposals are set out in Clause 5.6.2. They do not require DNSPs to consult on new small distribution network asset proposals. Nevertheless ActewAGL's proposed works have been included in this final report for completeness of information.

The above requirements are underpinned by Clauses 5.6.2 (a), (b) and (c) of the Rules which require network service providers to:

- Analyse their networks and conduct joint annual planning reviews to identify necessities for augmentation or extension of those networks; and
- Undertake joint planning in order to determine plans that can be considered by registered participants, NEMMCO and interested parties.

2.1.2. Requirements of the Regulatory Test

The regulatory test may be applied in either one of two ways. The regulatory test states that an option satisfies the test if:

(a) in the event the option is necessitated principally by inability to meet the service standards linked to the technical requirements of schedule 5.1 of the NER or in applicable regulatory instruments - the option minimises the costs of meeting those requirements, compared with alternative option/s in a majority of reasonable scenarios;

(b) in all other cases - the option maximises the expected net economic benefit to all those who produce, consume and transport electricity in the national electricity market compared to the likely alternative option/s in a majority of reasonable scenarios. Net economic benefit equals the market benefit less costs.

The Rules define a reliability augmentation as:

> A transmission network augmentation that is necessitated principally by inability to meet the minimum network performance requirements set out in schedule 5.1 or in relevant legislation, regulations or any statutory instrument of a participating jurisdiction.

Thus for reliability augmentations Clause (a) of the test should be used. That is for reliability augmentations the option that satisfies the regulatory test is the one that minimises the cost of meeting the minimum network performance requirements set out in schedule 5.1 of the Rules or via a jurisdictional or customer requirement.

2.2. Jurisdictional Requirements

2.2.1. Requirements of the Energy Services Corporations Act

TransGrid's enabling legislation is the Energy Services Corporation Act 1995. Section 6B of the Act sets out the five principal objectives which in summary are:

1. To be a successful business. This includes:
    a. To operate at least as efficiently as any comparable business;
    b. To maximise the net worth of the State's investment in it;
    c. To exhibit a sense of social responsibility by having regard to the interest of the community in which it operates;
2. To protect the environment by conducting its operations in compliance with the principles of ecologically sustainable development;
3. To exhibit a sense of responsibility to regional development;
4. To operate efficient, safe and reliable facilities; and
5. To promote effective access.

It is important to note that the Act explicitly identifies that each of these objectives is of equal value, and thus a balanced approach must be taken in decision making to reflect this obligation. In particular it is worth noting that efficiency is not superior to the environment or the community.

When developing options to overcome actual or potential network constraints, TransGrid initially assesses possible options against the above requirements and then applies the regulatory test to those which satisfy them.

Possible options which were considered but not pursued are described in Section 3.4.

2.2.2. Network Service Criteria

The ACT Government has promulgated Network Service Criteria applying to TransGrid's network supplying the ACT. They are contained in the Australian Capital Territory Disallowable Instrument, Utilities Exemption 2006 No 1 under Utilities Act 2000. They require TransGrid to inter alia provide two or more geographically separate connection points at 132 kV and above to supply the ACT by 30th June 2009. Prior to 30th June 2012 the combined supply points should be capable of supplying 375 MVA to the ACT following a Special Contingency Event[1]. From 30th June 2012 onwards each supply point should be capable of supplying the expected ACT maximum demand within 48 hours of a Special Contingency Event.

Essentially this requires the establishment of a second 330/132 kV substation and 132 kV connections to the existing ActewAGL network by 30th June 2009 and provision of a 330 kV supply to this new substation that is independent of Canberra 330/132 kV substation by 30th June 2012.

2.3. Local Supply Arrangements

TransGrid's 330 kV and 132 kV system in supplying the ACT is shown in Figure 1a including the yet to be completed Williamsdale 330/132 kV substation. ActewAGL takes supply at 132 kV from Canberra and (when completed) Williamsdale 330/132 kV substations and at 66 kV from Queanbeyan 132/66 kV substation. Canberra 330/132 kV substation supplies Queanbeyan 132/66 kV substation and (when completed) Williamsdale 330/132 kV substation also supplies the Cooma/Bega area.

The relevant part of the ActewAGL network is shown in Figure 1b.

[1] A Special Contingency Event involves the unexpected disconnection of multiple elements at a single geographical location for an extended period.

Figure 1a TransGrid's Transmission System in the Canberra Area with Williamsdale Completed

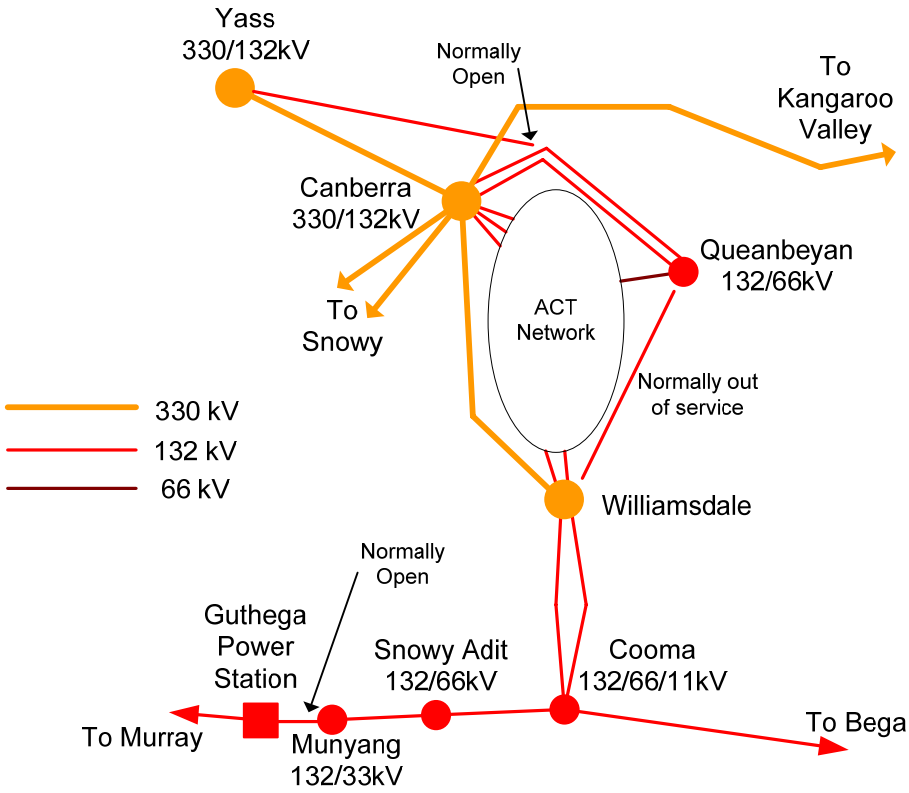
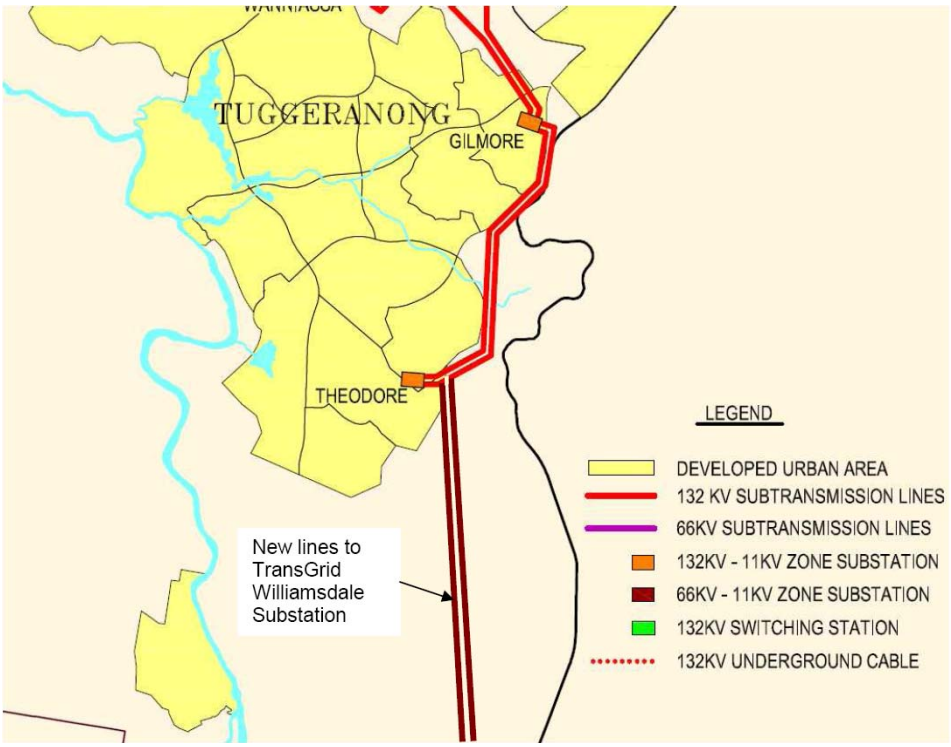


Figure 1b ActewAGL's Subtransmission System in the South Canberra Area with lines to Williamsdale Substation



2.4. Joint Planning

ActewAGL and TransGrid have jointly planned the 330 kV and 132 kV networks supplying the Canberra area for many years.

TransGrid and ActewAGL have carried out joint annual planning reviews as required by Clause 5.6.2 (b) of the Rules. As required by Clause 5.6.2(c) they have identified that the new Network Service Criteria give rise to a need for network augmentations and have carried out joint planning to determine options for these augmentations.

As a result of joint planning for this proposal it has been agreed that in meeting the above requirements TransGrid will construct any required 330 kV line and substation works and that ActewAGL will construct any required 132 kV connections to its existing network and upgrade existing network infrastructure.

2.5. Reliability Augmentation

It follows from Section 2.2 that the proposals covered by this final report constitute a reliability augmentation and that the regulatory test should be applied in accordance with Clause (a) of the test.

2.6. Material Internetwork Impact

The Rules require TransGrid to assess whether a proposed new large transmission network asset is reasonably likely to have a material internetwork impact.

TransGrid has determined that none of the transmission works in the options described in Section 3 will impose power transfer constraints or adversely impact on the quality of supply to adjoining transmission networks.

2.7. Consideration of Demand Management and/or Local Generation

As the Network Service Criteria (refer to Section 2.2) require provision and development of a second supply point non-network options are not applicable up to 30th June 2012. Beyond 30th June 2012 demand management and/or local generation may have the potential to defer the need for future additional 330/132 kV transformer capacity.

3. Options

TransGrid and ActewAGL have developed two network options to meet the network service criteria described in Section 2.2. These are described in the following sections together with other developments that were considered but are not being put forward as options.

Both options result in the 330 kV supply to Williamsdale 330/132 kV substation being independent of Canberra 330/132 kV substation.

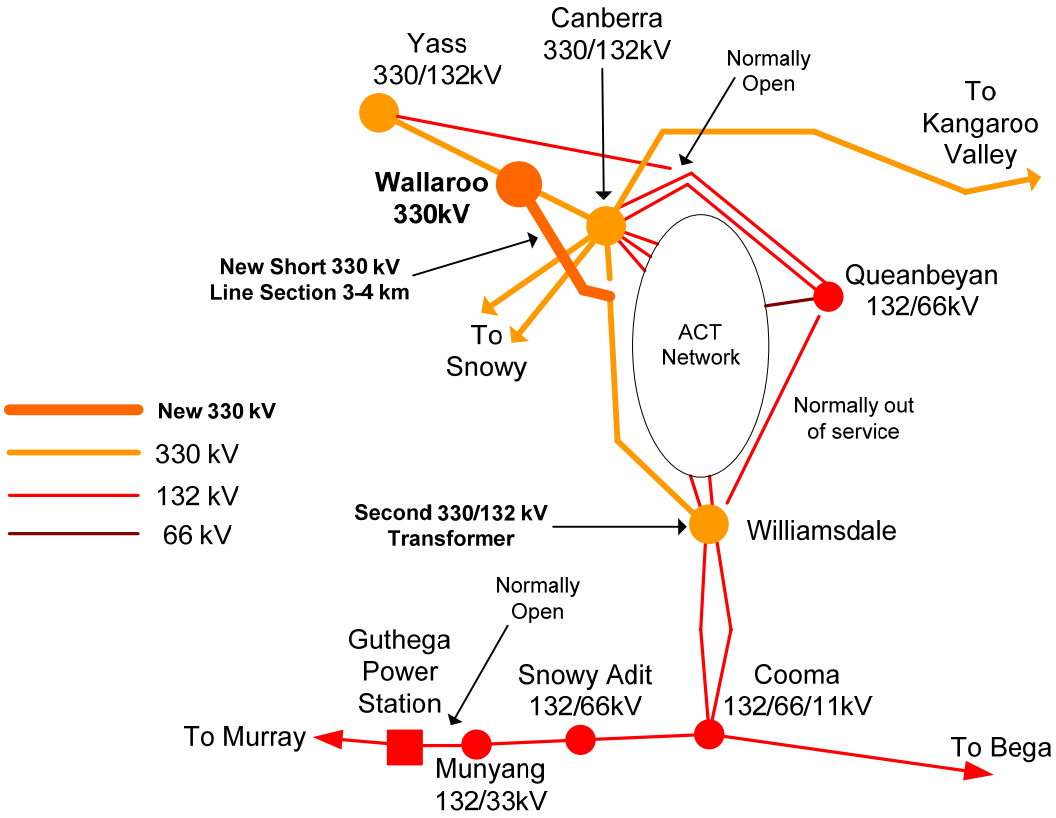
3.1. Option 1: Establishment of Wallaroo 330 kV Switching Station

This option is depicted in Figure 2 below and would involve (by 30th June 2012):

- Establishment of a new 330 kV switching substation at Wallaroo (northwest of Canberra) on the route of the Yass – Canberra 330 kV transmission line no 9;
- Formation of 330 kV circuits from Yass – Wallaroo and from Wallaroo – Canberra;
- Construction of a short section (approx 3 km) of 330 kV line from Wallaroo to the route of the Canberra – Williamsdale 330 kV line;
- Connection of the new line at Wallaroo and to the Canberra – Williamsdale 330 kV line. A section of 330 kV line from Canberra would be disconnected at this point;
- Provision of an additional 375 MVA 330/132 kV transformer at Williamsdale; and
- Upgrading by ActewAGL of the existing Gilmore to Theodore 132 kV lines as detailed in Section 3.3

The total estimated cost for Option 1 is $36.1 Million for TransGrid works and $ 7.8 Million for ActewAGL works.

Figure 2 Proposed TransGrid New Works – Option 1



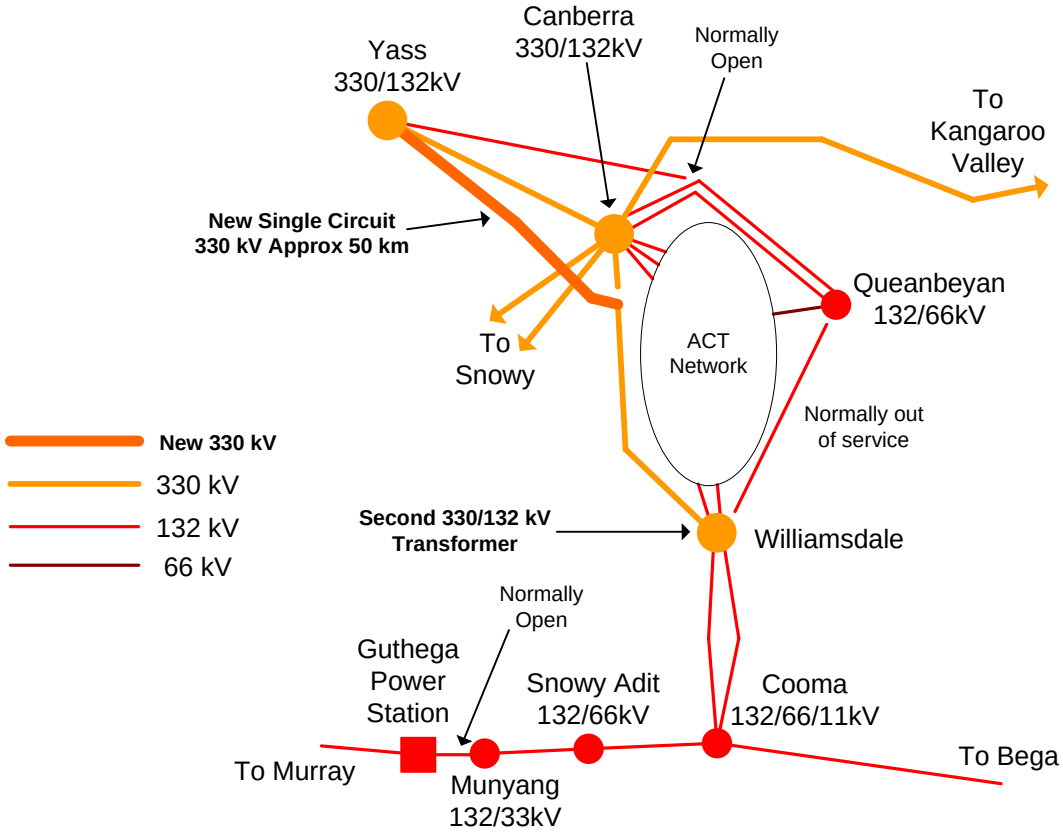
3.2. Option 2: Yass – Williamsdale Single Circuit 330 kV Line

This option is depicted in Figure 3 below and would involve (by 30th June 2012):

- Construction of a single circuit 330 kV line (approximately 50 km in length) between Yass 330/132 kV Substation and a suitable point on the Canberra – Williamsdale 330 kV line;
- Connection of the new line at Yass and to the Canberra – Williamsdale 330 kV line. A section of 330 kV line from Canberra would be disconnected at this point;
- Provision of an additional 375 MVA 330/132 kV transformer at Williamsdale; and
- Upgrading by ActewAGL of the existing Gilmore to Theodore 132 kV lines as detailed in Section 3.3

The total estimated cost for Option 1 is $58.8 Million for TransGrid works and $ 7.8 Million for ActewAGL works.

Figure 3 Proposed New Works – Option 2



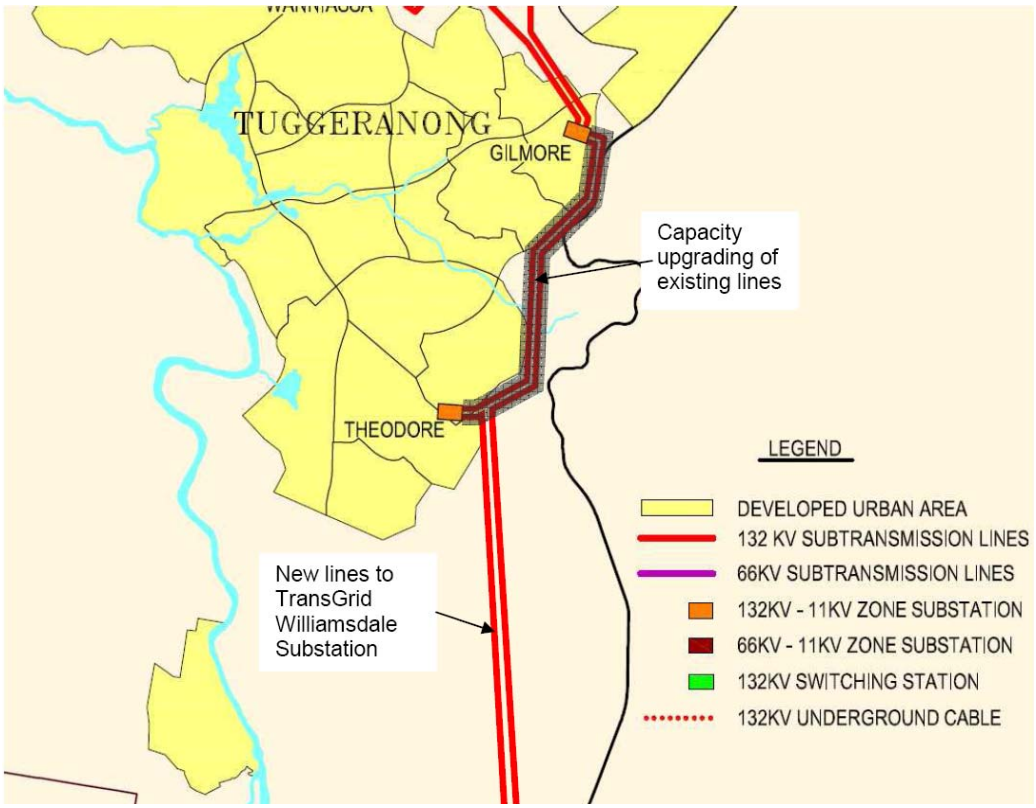
3.3. Details of ActewAGL Works for Options 1 and 2

The existing lines between Gilmore and Theodore zone substations do not have sufficient capacity to supply the total ACT load from Williamsdale supply point. To meet the required Network Service Criteria the capacity of the lines are proposed to be upgraded by ActewAGL as detailed below and shown in Figure 4.

- Upgrade the capacity of Gilmore – Theodore circuit GI-TH2 from 220 MVA to 440 MVA;
- Upgrade the capacity of Gilmore – Theodore circuit GI-TH1 section that would form part of Williamsdale - Gilmore circuit from 220 MVA to 440 MVA
- Upgrade the capacity of Gilmore – Theodore circuit GI-TH1 section that would form part of Williamsdale – Theodore circuit from 220 MVA to 440 MVA

The total estimated cost for this work is $7.8 Million.

Figure 4 Proposed ActewAGL Line Upgrading

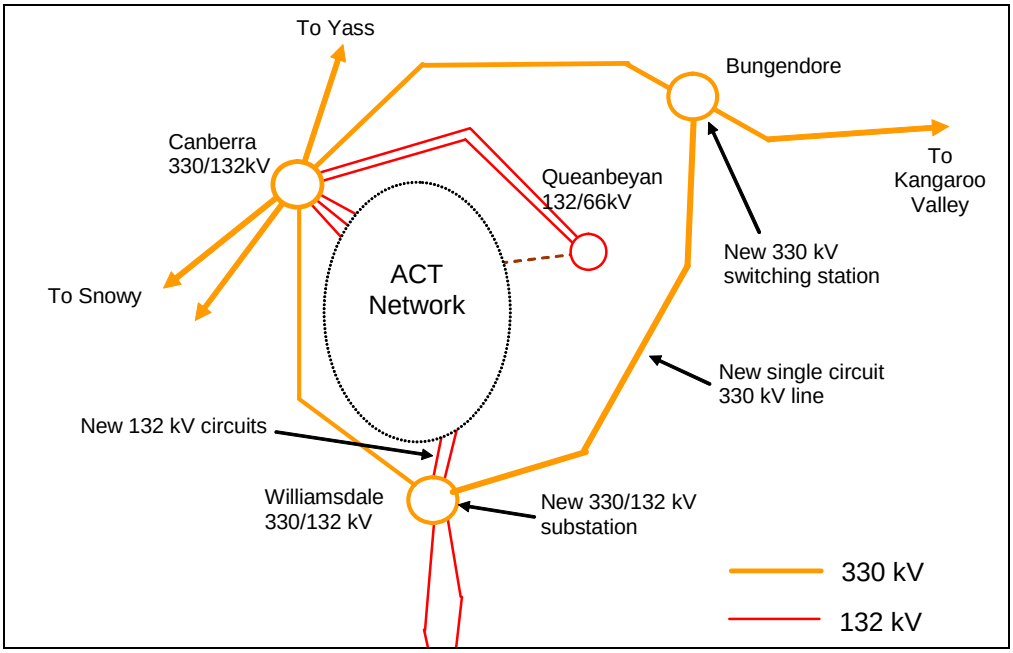


3.4. Consideration of Other Network Developments

3.4.1. Second Supply to Williamsdale from the Bungendore Area

TransGrid and ActewAGL have considered the provision of a second 330 kV supply to Williamsdale from the Bungendore area as shown in Figure 5 below.

Figure 5 Alternative Second Supply to Williamsdale

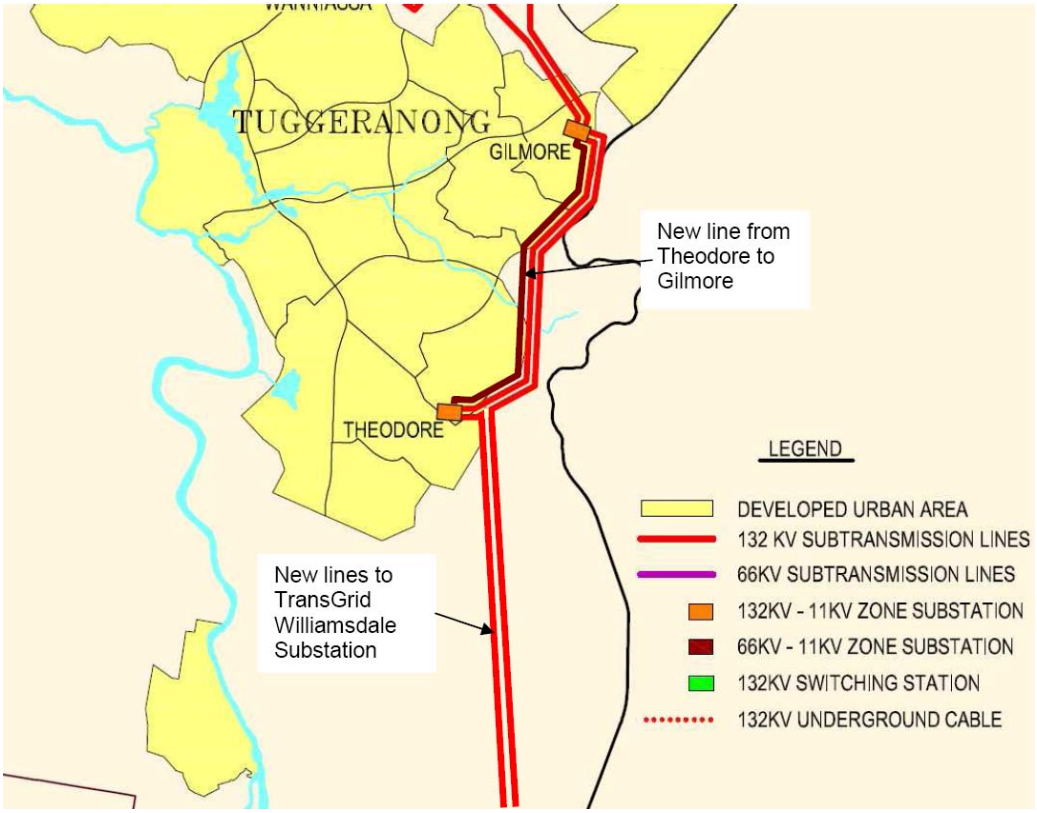


At the time of publication of the final report for the Southern Supply to the ACT in 2006 this was considered to be the preferred development to meet the network service criteria 30th June 2012 requirement. Subsequent investigations have revealed that obtaining a 330 kV line route from Bungendore to Williamsdale would be problematic. In addition, the capital cost of this option is approximately double that of Option 1. Accordingly this development will not be considered further.

3.4.2. Additional 132 kV Circuit between Gilmore and Theodore Substations

ActewAGL has considered construction of additional circuit between Theodore and Gilmore zone substations as an alternative to the works detailed in Section 3.3. This is shown in Figure 6.

Figure 6 Alternative ActewAGL Line Upgrading



Investigations by ActewAGL have revealed that obtaining a 132kV line route along the Monaro Highway would not be possible and the total connection capacity after this augmentation would not satisfy the network service criteria. Consequently this development will not be considered further.

4. Application of the Regulatory Test

An application of the regulatory test considering network Options 1 and 2 has been carried out. A summary of the results is provided in the following sections.

4.1. Form of the Regulatory Test

As discussed in Section 2 the options covered by this final report are a reliability augmentation and the regulatory test is to be applied in accordance with Clause (a) of the test:

(a) in the event the option is necessitated principally by inability to meet the service standards linked to the technical requirements of schedule 5.1 of the NER or in applicable regulatory instruments - the option minimises the costs of meeting those requirements, compared with alternative option/s in a majority of reasonable scenarios;

TransGrid's interpretation of the regulatory test for reliability augmentations is as follows.

The following costs should be included:

- Capital costs of options;
- O&M costs of options; and
- Costs of complying with laws, regulations and applicable administrative requirements in relation to the option;

The following avoided costs should not be included:

- Reductions in electrical losses;
- Reductions in unserved energy;
- Deferrals or avoidance of generation or transmission investment elsewhere in the NEM (ie not associated with the option); and
- Avoided fuel costs elsewhere in the NEM.

Market development scenarios are only relevant to the extent that they affect the timing of the onset of network limitations and/or the ability of options to meet those limitations.

4.2. Regulatory Test Application – Summary

4.2.1. Costs

For the regulatory test application only the capital and operating and maintenance costs of Options 1 and 2 have been explicitly included.

There are no known existing or anticipated government tax or subsidy schemes that would apply materially differently to the operation of Options 1 and 2.

There are no known emerging network limitations in the area for which the solution would be materially affected by either Option 1 or 2.

4.2.2. Scenarios

As the network service criteria described in Section 2.2 require particular levels of service by particular times market development scenarios will not affect the timing of any of the components of Options 1 and 2.

4.2.3. Results

The present value of costs of each option has been calculated for a base case of financial and technical assumptions and the options ranked accordingly. Sensitivity tests of these calculations due to reasonable variations in the assumptions have been carried out.

The base case assumptions and the range over which the sensitivity tests were carried out are shown in | Table 1. The capital costs of each option are shown in Table 2 and the results of the present value of costs calculations are shown in Tables 3 and 4.

Detailed calculations for the base case are shown in Appendix A.

Table 1 Base Case Values and Range of Values Used in Sensitivity Tests

Parameter	Base Case Value	Sensitivity Checks at
Real Discount Rate	9%	6% and 12%
Annual O&M Cost	2% of Capital Cost	1% and 3% of Capital Cost
Asset Lifetimes		
Substations	30 years	20 and 40 years
Transmission Lines	45 years	30 and 60 years
Capital Costs	Nominal Value	±25% variation

Table 2 Capital Costs of Options

Option	Description	TransGrid Capital Costs ($M)	ActewAGL Capital Costs ($M)	Total Capital Costs ($M)
Option 1	Wallaroo 330 kV Switching Station	36.1	7.8	43.9
Option 2	Yass – Williamsdale Transmission Line	58.8	7.8	66.6

Table 3 Comparison of Options – Base Case

Option	Description	PV of Costs ($M)	Rank
Option 1	Wallaroo 330 kV Switching Station	29.0	1
Option 2	Yass – Williamsdale Transmission Line	43.2	2

Table 4 Comparison of Options - Results of Sensitivity Tests

Sensitivity Case	Option 1 PV of Costs ($M)	Rank	Option 2 PV of Costs ($M)	Rank
Base Case	29.0	1	43.2	2
12% Discount Rate	27.1	1	40.6	2
6% Discount Rate	30.3	1	44.5	2
25% Increase in Capital Costs	36.3	1	53.9	2
25% Decrease in Capital Costs	21.8	1	32.4	2
Decrease in Asset Lives	31.0	1	45.6	2
Increase in Asset Lives	28.0	1	41.9	2
Decreased O&M Cost	26.8	1	39.8	2
Increased O&M Cost	31.2	1	46.5	2

In each case Option 1 has the lower present value of costs.

5. Conclusions and Proposed Actions

As Option 1 is the highest ranked option in all the cases considered it is concluded that it satisfies the regulatory test.

Accordingly TransGrid and ActewAGLs' proposed actions are for the implementation of Option 1 at an estimated cost of $36.1 Million to TransGrid and $7.8 Million to ActewAGL, to be completed by 30th June 2012.

6. Notice of Disputes

Persons wishing to dispute the contents, findings, assumptions or recommendations of this final report are referred to Clause 5.6.6(j) of the Rules.

Disputing parties must lodge a notice of the dispute in writing to the AER and provide a copy of the dispute notice to TransGrid and ActewAGL within 30 business days of the publication of the summary of this final report on NEMMCO's website.

TransGrid copies of dispute notices regarding this final report should be forwarded to:

Garrie Chubb Tel: 02 9284 3553
fax: 02 9284 3456
email: garrie.chubb@transgrid.com.au

ActewAGL copies of dispute notices regarding this final report should be forwarded to:

Yili Zhu yili.zhu@actewagl.com.au

Appendix A - Least Cost Analysis of Base Case

Option 1: Wallaroo Switching Station																	
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Residual
TransGrid Line Works				7.1													-5.0
TransGrid Substation Works				29.0													-16.4
ActewAGL Year 1 Works				3.7													-2.6
ActewAGL Year 2 Works					4.1												-2.9
O & M Expenditure					0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	
Total Expenditure				39.8	4.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	-27.0
PV of Costs	**29.0**	**Million**															
TG Capital Cost	**36.1**	**Million**															
ActewAGL Capital Cost	**7.8**	**Million**															
Total Capital Cost	**43.9**	**Million**															

Option 2: Yass - Williamsdale Transmission Line																	
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Residual
TransGrid Line Works				44.3													-31.5
TransGrid Substation Works				14.5													-8.2
ActewAGL Year 1 Works				3.7													-2.6
ActewAGL Year 2 Works					4.1												-2.9
O & M Expenditure					1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	
Total Expenditure				62.5	5.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	-45.2
PV of Costs	**43.2**	**Million**															
TG Capital Cost	**58.8**	**Million**															
ActewAGL Capital Cost	**7.8**	**Million**															
Total Capital Cost	**66.6**	**Million**															