FINAL REPORT

PROPOSED NEW LARGE TRANSMISSION NETWORK ASSET

DEVELOPMENT OF ELECTRICITY SUPPLY TO THE COWRA/FORBES/PARKES AREA

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Executive Summary

This final report covers a proposal for the construction of the new large transmission network asset to overcome limitations in the capacity of the networks supplying the Cowra/Forbes/Parkes area of NSW.

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

Section 2 describes in detail the regulatory requirements, nature of the growing load in the area, the limitations affecting the transmission network in the area and the need for augmentation of supply to the area. The agreed network performance requirements (planning criterion), against which the need and effectiveness of augmentation options are assessed, is also presented.

In Section 3 two network augmentation options are described. Option 1 involves construction of a 132 kV line between Manildra and Parkes. Option 2 involves construction of a 132 kV line between Wellington and Parkes. The capital costs of these options are in the range of $30 to $40 million.

In Section 4 the results of an application of the regulatory test considering Options 1and 2 are presented.

In Section 5 it is concluded that Option 1 satisfies the regulatory test. Consequently it is proposed to construct that option.

Section 6 provides information that may be relevant to persons who may wish to dispute any aspect of this final report.

1. Introduction

1.1. Purpose and Scope

TransGrid owns the majority of the transmission network within NSW and is responsible, inter alia, for planning and developing its network to meet the requirements of customers within the State 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.

Country Energy owns the subtransmission and distribution networks in the Cowra/Forbes/Parkes area and is responsible for planning and developing those networks.

TransGrid and Country Energy have responsibilities under the Rules to carry out joint planning to facilitate the optimal development of connections between the transmission and distribution networks within Country Energy'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 that will address limitations in the transmission network supplying the Cowra/Forbes/Parkes area.

It includes:

- A summary of the load forecast for the area;
- A description of the network reliability criterion that has been adopted for planning purposes;
- A description of transmission network limitations identified by TransGrid and Country Energy that have led to the necessity for an augmentation of the transmission network supplying the Cowra/Forbes/Parkes area;
- A description of all reasonable network and non-network options that have been identified to meet these limitations;
- 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 that may be relevant to persons who may wish to dispute any aspect of this final report.

1.2. Outline of Consultation Process

TransGrid published a description of limitations affecting the transmission network supplying the Cowra/Forbes/Parkes area in its Annual Planning Statements for 1999 to 2001 and its Annual Planning Reports (APRs) for 2002 to 2007.

In March 2006, TransGrid and Country Energy jointly published a document titled "Transmission Network Limitations in the Cowra/Forbes/Parkes Area - Needs Statement" (the Needs Statement), which described transmission network limitations affecting supply to the area and requested submissions regarding proposals for non-network developments which may relieve them.

In October 2006 TransGrid issued a Request for Proposals (RFP) covering network support in the West and Central West of NSW. That RFP sought, inter alia, network support in the Cowra/Forbes/Parkes area. A number of responses were received. These are discussed in Section 2.9.

In July 2007 TransGrid and Country Energy published an application notice covering a proposal for a new large transmission network asset that would address the network limitations described in Section 2.5. A summary of the application notice was published on NEMMCO's website on 24th July 2007. Interested parties were invited to make submissions in the period to 4th September 2007. No submissions were received.

TransGrid and Country Energy have applied the regulatory test to all known reasonable options to meet the network limitations described in this final report and have determined the option that satisfies the test.

Accordingly TransGrid has completed its 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. These involve the construction of a new 132 kV transmission line between Manildra and Parkes to be in service by late 2010.

Persons wishing to dispute any matter in this final report are referred to Section 6.

A summary of this final report has been published 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

The requirements of the National Electricity 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 internetwork impact.

These requirements are underpinned by Clause 5.6.2 (c) of the Rules, which requires that a necessity for an *augmentation* or *extension* to the transmission system should be identified by network service providers.

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 solely by the inability to meet the minimum network performance requirements set out in schedule 5.1 of the Rules or in relevant legislation, regulations or any statutory instrument of a participating jurisdiction - the option minimises the present value of costs, compared with a number of alternative options in a majority of reasonable scenarios;

(b) in all other cases - the option maximises the expected net present value of the market benefit (or in other words the present value of the market benefit less the present value of costs) compared with a number of alternative options and timings, in a majority of reasonable scenarios.

The Rules define a reliability augmentation as:

> A transmission network augmentation that is necessitated solely 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 passes 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 requirement.

2.2. Jurisdictional Requirements – Reliability Criterion

As stated in its Annual Planning Report, TransGrid is expected by the NSW jurisdiction to plan and develop its transmission network on an "N-1" basis. That is, unless specifically agreed otherwise by TransGrid and the affected distribution network owner or major directly connected end-use customer, there will be no inadvertent loss of load (other than load which is interruptible or dispatchable) following an outage of a single circuit (a line or a cable) or transformer, during periods of forecast high load.

These requirements are underpinned by the introduction in 2005 of mandatory licence conditions for DNSPs which inter-alia set out reliability standards for subtransmission and distribution networks. The

licence conditions specify N-1, one minute reliability levels for sub-transmission lines and zone substations supplying loads greater than or equal to 15 MVA in urban and non-urban areas.

Consequently, Country Energy has requested that TransGrid incorporates N-1 reliability levels into its planning standards and processes.

In accordance with these principles TransGrid and Country Energy have jointly agreed that the network performance requirements for reliability to be applied to this area are as follows:

1. With all network elements in service, the loading on each element is not to exceed the continuous rating of that element and the voltage levels at end-user premises are to be within acceptable levels.
2. Following outage of one network element, the loading on each remaining element is not to exceed the short time emergency rating of that element whilst operator actions, such as opening of other network elements and transferring of loads via lower voltage networks, are taking place.
3. With one network element out of service and following operator actions:
   - The loading on each remaining element is not to exceed the contingency rating of that element;
   - The voltage levels at end-user premises are to be within acceptable levels following switching of reactive plant and operation of transformer tap-changers.

In terms of network reliability standards as described in the Rules, this constitutes a nominal “N-1” reliability criterion (as described in S5.1.2.2 (b) (4)).

2.3. Local Supply Arrangements

The Cowra/Forbes/Parkes area includes the Cowra, Forbes, Parkes and Weddin shires as well as parts of Lachlan shire. It has a resident population of around 50,000. The area electrical load is characterised primarily by rural loads with urban residential loads and commercial/light industrial loads in the main population centres.

The area is supplied via a 132 kV transmission network some 350 kilometres long linking Yass and Wellington 330/132 kV substations, as shown in Figure 1 on the next page. This 132 kV network supplies 132/66 kV substations at Cowra, Forbes and Parkes, which in turn supply Country Energy’s 66 kV networks in those areas. Country Energy also owns the 132 kV line supplying the North Parkes mine.

The major developments in establishing TransGrid’s 132 kV network are shown in Table 1.

Table 1 Major 132 kV Line and Substation Developments

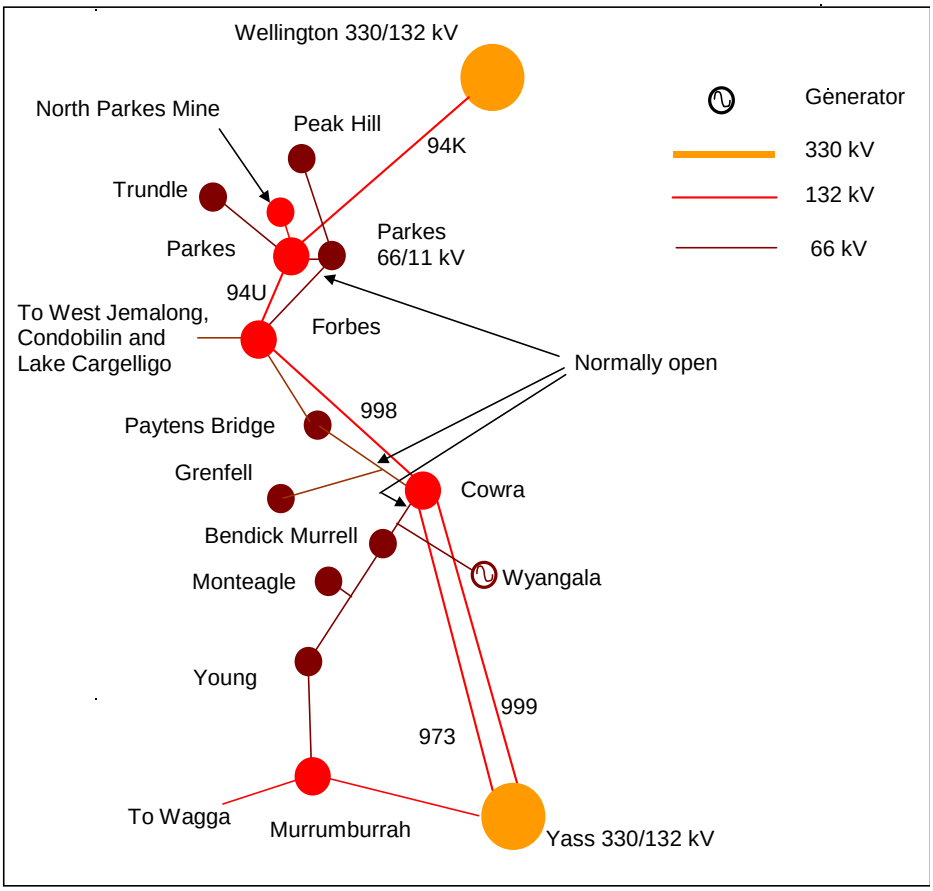
Period	Substations	Lines
Early 1960s	Cowra	Yass – Cowra (999 line) Cowra – Forbes (initially operating at 66 kV)
Late 1960s	Forbes	Yass – Cowra (973 line)
Mid 1980s		Wellington – Forbes (via Parkes)
Early 1990s	Parkes	

Over the years, capacitor banks have been installed at Forbes and Parkes to improve voltage levels both with all elements in service and following an outage of one network element. TransGrid plans to install additional capacitors at Cowra and Forbes during the latter part of 2007. Capacitors installed/to be installed at TransGrid substations in the area are detailed in Table 2.

Table 2 Capacitors at TransGrid Substations in the Cowra/Forbes/Parkes area

Location	Capacitors Installed
Cowra	2 x 8 MVAr 66 kV (to be installed in 2007)
Forbes	1 x 12 MVAr 132 kV (to be installed in 2007) 2 x 9 MVAr 66 kV
Parkes	1 x 10 MVAr 66 kV 1 x 8 MVAr 66 kV (recently installed)

Figure 1 Transmission Network Supplying the Cowra/Forbes/Parkes Area



Parkes 132/66 kV substation has only a single transformer, with a back-up supply being provided from Forbes via Country Energy's 895 Forbes – Parkes 66 kV line. TransGrid plans to install a second transformer at Parkes as the capacity of Country Energy's 66 kV line is limited.

There is a hydro generator at Wyangala dam which operates when water is released for irrigation. Connection arrangements have required the output to be directed to Young rather than reducing the load normally supplied from Cowra. The availability and capacity of generation depends on the quantity of water able to be released which in turn depends on the water level in the dam. Due to its unpredictable nature, generation at Wyangala cannot be relied upon to be available at times of high area load. Consequently generation from this source has not been considered in determining the need for network augmentation.

2.4. Local Load Forecast

The forecast summer and winter maximum demands for the Cowra/Forbes/Parkes area are shown in Table 3 and Table 4.

Table 3 Summer Maximum Demand Forecasts (MW)

Supply Point	2007/ 08	2008/ 09	2009/ 10	2010/ 11	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16	2016/ 17
Cowra	37.3	38.2	39.1	40.0	40.9	41.8	42.8	43.8	44.8	45.8
Forbes	35.6	36.6	37.6	38.7	39.8	40.9	42.0	43.2	44.4	45.7
Parkes	27.7	27.7	27.7	27.7	27.7	27.7	27.7	27.7	27.7	27.7
North Parkes	25.6	26.4	27.3	28.2	29.1	30.1	31.1	32.1	33.1	34.2
Total	**126**	**129**	**132**	**135**	**138**	**141**	**144**	**147**	**150**	**153**
Diversified Total	**119**	**122**	**124**	**127**	**130**	**133**	**136**	**139**	**142**	**145**

Table 4 Winter Maximum Demand Forecasts (MW)

Supply Point	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Cowra	26.6	27.4	28.4	29.3	30.3	31.3	32.3	33.4	34.5	35.6
Forbes	29.4	30.0	30.5	31.0	31.6	32.2	32.8	33.3	33.9	34.6
Parkes	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1
North Parkes	21.3	21.8	22.2	22.6	23.1	23.5	24.0	24.5	25.0	25.5
Total	**105**	**107**	**109**	**111**	**113**	**115**	**117**	**119**	**121**	**124**
Diversified Total	**102**	**104**	**105**	**107**	**109**	**111**	**113**	**115**	**117**	**119**

Figure 2 and Figure 3 show historical and diversified forecast summer and winter maximum demands for the area.

Figure 2 Historical and Forecast Summer Maximum Demands

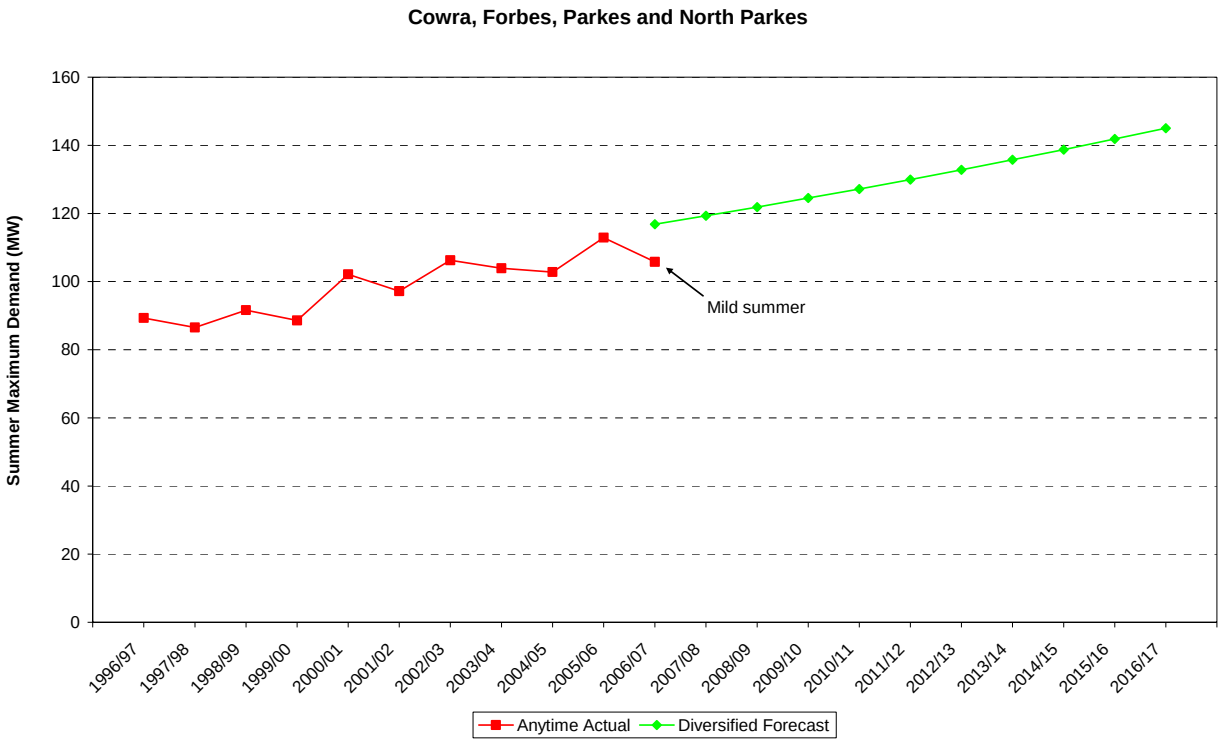
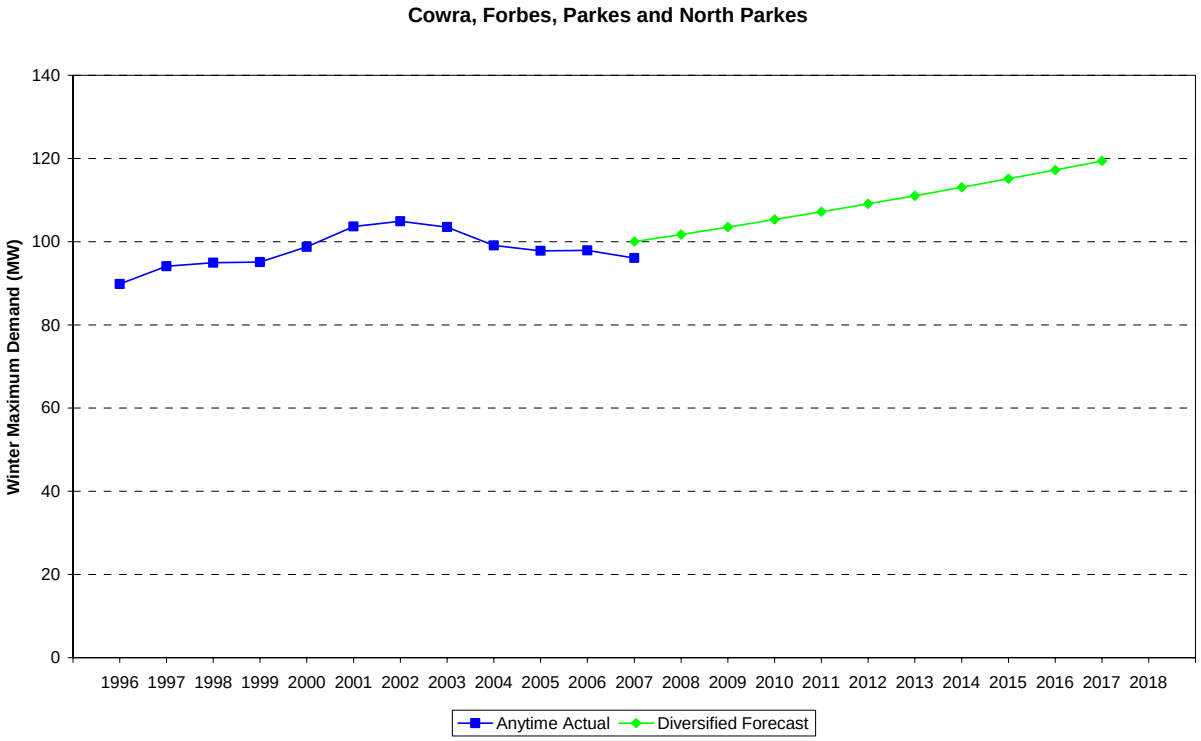


Figure 3 Historical and Forecast Winter Maximum Demands



2.5. Description of Network Limitations

If all elements of the network are in service, it is presently capable of adequately supplying the area at all times. However, with the 94K Wellington – Parkes 132 kV line out of service, the network is affected by the limitations described below.

2.5.1. Voltage Limitation

For this outage Cowra, Forbes and Parkes are supplied from Yass, a distance of around 230 kilometres. At times of high demand in summer and winter low voltages are expected to occur at Forbes.

The limit of the network's capacity is reached when the transformer tap changers at Forbes and at the substations within the underlying Country Energy network can no longer restore the voltage at end use customer premises to within the acceptable range. TransGrid and Country Energy have agreed that this limit be described in terms of a minimum 66 kV voltage that TransGrid must maintain at Forbes. At present this is 1.05 per unit (69.3 kV), the relatively high value being due to the need to maintain satisfactory voltage levels within Country Energy's 66 kV network which extends westwards to Condobolin and Lake Cargelligo.

The tap-changer on the 132/66 kV transformer at Parkes is capable of providing 20% boost whereas the older units at Forbes and Cowra have only 15% boost. Consequently for this outage the voltages at Forbes and Parkes 66 kV busbars are similar (once the tap-changers have reached maximum boost position).

Following installation of additional capacitors at Cowra and Forbes (refer to Table 2) this constraint is not expected to re-emerge until around summer 2009/10. As the maximum demand in the Cowra/Forbes/Parkes area is growing at around 3 MW p.a. demand reductions of this order would be required each year from around 2010 to manage this limitation.

Demand reductions at Parkes and Forbes would be the most effective in managing the voltage limitation, with reductions at Cowra being much less effective. The approximate effectiveness of reductions at Cowra and Forbes relative to reductions at Parkes is shown in Table 5.

Table 5 Relative Effectiveness of Demand Reductions at Various Locations (Voltage Limit)

Location	Cowra	Forbes	Parkes
Relative Effectiveness	0.4	0.95	1.0

2.5.2. Thermal Rating Limitation

For an outage of the 94K Wellington – Parkes 132 kV line at times of high summer demand, the thermal rating of the 999 Yass – Cowra 132 kV line can be exceeded.

The 999 Yass – Cowra 132 kV line was the first 132 kV line in the area. It has light steel tower structures and was designed for a lower operating temperature than other lines in the area. Table 6 shows the approximate maximum load reduction in the Cowra/Forbes/Parkes area and the approximate total duration of periods during which load reductions may be required to manage the thermal rating limitation.

Table 6 Approximate Load Reductions to Manage the Thermal Rating Limitation

Summer	Approximate Maximum Load Reduction (MW)	Approximate Total Duration of Load Reductions (hours)
2006/07	42	575
2007/08	46	595
2008/09	50	620
2009/10	54	645
2010/11	59	670
2011/12	65	700
2012/13	71	730

Effectively, with the Wellington – Parkes 132 kV line out of service, the rating of the 999 Yass – Cowra line limits the maximum load which can be supplied at Cowra, Forbes and Parkes 66 kV busbars to just over 70 MW on summer days.

Demand reductions at Parkes and Forbes would be the most effective in managing the thermal limitation, with reductions at Cowra being less effective. The approximate effectiveness of reductions at Cowra and Forbes relative to reductions at Parkes is shown in Table 7.

Table 7 Relative Effectiveness of Demand Reductions at Various Locations (Thermal Limit)

Location	Cowra	Forbes	Parkes
Relative Effectiveness	0.85	1.0	1.0

2.5.3. Network Constraints Summary

The network constraints are discussed in Sections 2.5.1 and 2.5.2. The timing of the expected occurrence of each constraint is shown in Table 8 below.

Table 8 Onset of Network Constraints

Constraint	Year of Onset
Overloading of the 999 Yass – Cowra 132 kV line on outage of the 94K Wellington – Parkes 132 kV line.	Existing
Unacceptably low voltages at Forbes on outage of the 94K Wellington – Parkes 132 kV line in summer.	Around 2010
Unacceptably low voltages at Forbes on outage of the 94K Wellington – Parkes 132 kV line in winter.	Beyond 2010

2.6. Joint Planning

Country Energy and TransGrid have jointly planned the 330 kV and 132 kV network supplying the central western areas of the state for many years.

TransGrid and Country Energy 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 above limitations give rise to a need for network augmentations and have carried out joint planning to determine options for these augmentations.

2.7. Reliability Augmentation

It follows from Sections 2.1 – 2.5 that the proposals covered by this final report constitute a reliability augmentation and that the regulatory test should be applied in accordance with Clause 1(a) of the test.

2.8. 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 options described in Section 3 will impose power transfer constraints or adversely impact on the quality of supply to adjoining transmission networks.

2.9. Consideration of DSM and Local Generation

As part of Country Energy's normal planning processes demand management options are investigated as alternatives and compared with network expansion options. The most technically feasible and cost effective option(s) are selected for implementation. This is also a regulatory requirement as stipulated in the Demand Management for Electricity Distributors Code of Practice.

As discussed in Section 1.2 the network limitations in the Cowra/Forbes/Parkes area have previously been described in TransGrid's Annual Planning Statements and Annual Planning Reports from 1999 to 2007 as well as in the Needs Statement.

In October 2006 TransGrid issued a Request for Proposals (RFP) covering network support in the West and Central West of NSW. That RFP sought, inter alia, network support in the Cowra/Forbes/Parkes area. Three submissions offering demand reductions or generation within this area were received. Despite the fact that no definitive non-network options for the Cowra/Parkes/Forbes area had arisen out of these submissions, or from any other source, a generic non-network option based on the least expensive offer received to the RFP was included in the preliminary application of the regulatory test in the application notice. The results indicated that a non-network option with costs similar to those of the generic non-network option would not satisfy the regulatory test.

No submissions to the application notice have been received from proponents of non-network options and no definitive non-network options for the Cowra/Parkes/Forbes area have arisen since its publication. Consequently there are no non-network options in the application of the regulatory test summarised in Section 4.

3. Options

TransGrid and Country Energy have developed two network options to relieve the network limitations described in Section 2.5. A generic local generation option (based on offers received in response to TransGrid's October 2006 RFP) was included in the application notice but is not included in this final report (refer to Section 2.9).

3.1. Option 1: Manildra – Parkes 132 kV Line

This option would involve:

- Construction of a new 132 kV line between Manildra 132/11 kV substation and Parkes 132/66 kV substation; and
- Provision of a 132 kV line switchbay at each of those substations to connect the new line.

The new line would be between 70 km and 85 km long depending on the route selected.

These works are estimated to cost $30 million (± 25%) and could be completed by late 2010.

This option would overcome the constraints described in Section 2.5 over a planning horizon of at least 15 years.

3.2. Option 2: Second Wellington – Parkes 132 kV Line

This option would involve:

- Construction of a new 132 kV line between Wellington 330/132 kV substation and Parkes 132/66 kV substation; and
- Provision of a 132 kV line switchbay at each of those substations to connect the new line.

The new line would be about 120 km long depending on the route selected.

The new line would cost around $40 million (± 25%) and could be completed by late 2010.

This option would overcome the constraints described in Section 2.5 over a planning horizon of at least 15 years.

4. Application of the Regulatory Test

An application of the regulatory test, considering 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 1(a) of the test:

> (a) in the event the option is necessitated solely by the inability to meet the minimum network performance requirements set out in schedule 5.1 of the Rules or in relevant legislation, regulations or any statutory instrument of a participating jurisdiction - the option minimises the present value of costs, compared with a number of alternative options in a majority of reasonable scenarios;

TransGrid and Country Energy'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;
- Costs associated with relevant government taxes;
- Negative costs associated with relevant government subsidies; and
- Costs of other transmission developments that may be required to address future network limitations.

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 this regulatory test application only the capital and operating & 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. The operation of schemes such as the New South Wales Greenhouse Gas Reduction Scheme would appear as common cost elements in Options 1 and 2 and thus have not been explicitly included.

4.2.2. Scenarios

There are no known committed or advanced generation or demand management developments that are likely to affect the timing of the onset of the network limitations described in Section 2.5 or the ability of any of the options to meet those limitations.

The need for network augmentation is determined by an existing thermal limitation. A significant amount of load is already at risk and therefore variations in the load forecast due, for example, to different economic growth rates, would not affect the need or timing of options.

Considering the above two factors only a single market development scenario has been considered, which corresponds to a medium economic growth outcome, and which does not explicitly model generation developments.

4.2.3. Results

The present value of the 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 to the major assumptions have been carried out.

The base case assumptions and the range over which sensitivity tests were conducted are shown in Table 9. The results of the analysis are shown in Table 10 and Table 11. Details of the costing model for the base case assumptions are shown in Appendix A.

Table 9 Base Case Values and Range of Values Used in Sensitivity Checks

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 10 Comparison of Options – Base Case

Option	Description	PV of Costs ($M)	Rank
Option 1	Manildra – Parkes 132 kV line	18.7	1
Option 2	Second Wellington – Parkes 132 kV line	24.3	2

Table 11 Comparison of Options - Results of Sensitivity Studies

	Option 1: Manildra – Parkes Line		Option 2: Wellington – Parkes Line	
	PV of Costs ($ M)	Rank	PV of Costs ($ M)	Rank
Base Case	18.7	1	24.3	2
12% Discount Rate	17.8	1	23.1	2
6% Discount Rate	19.0	1	24.6	2
25% Increase in Capital Costs	26.6	1	34.5	2
25% Decrease in Capital Costs	14.7	1	19.1	2
Decrease in Asset Lives	19.7	1	25.6	2
Increase in Asset Lives	18.1	1	23.6	2
Decreased O&M Cost	17.2	1	22.4	2
Increased O&M Cost	20.1	1	26.1	2

In all cases Option 1 has the lowest PV of costs.

5. Conclusions and Proposed Actions

Option 1 has the lowest present worth of costs in all cases considered. Consequently TransGrid and Country Energy have concluded that it satisfies the regulatory test.

TransGrid and Country Energy therefore propose that TransGrid proceed with the construction of Option 1 as described in Section 3.1.

6. Notice of Disputes

Persons wishing to dispute the contents, assumptions, findings 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 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

Appendix A – Least Cost analysis of Base Case

Option 1: Manildra - Parkes line + 2 line switchbays

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Residual
Capital Cost																
Line				28.0												-20.5
Substation				2.0												-1.2
O & M Cost																
Line					0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	
Substation					0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
Total Cost				30.0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	-21.7
PV of Costs	**18.7**	**million**														

Option 2: Wellington - Parkes line + 2 line switchbays

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Residual
Capital Cost																
Line				37.0												-27.1
Substation				2.0												-1.2
O & M Cost																
Line					0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	
Substation					0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
Total Cost				39.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	-28.3
PV of Costs	**24.3**	**million**														