FINAL REPORT

PROPOSED NEW LARGE TRANSMISSION NETWORK ASSET

PROPOSED NEW LARGE DISTRIBUTION NETWORK ASSET

DEVELOPMENT OF ELECTRICITY SUPPLY TO THE MID NORTH COAST

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Executive Summary

This final report covers a proposal for the construction of the new large transmission network asset and a new large distribution network asset to overcome limitations in the capacity of the networks supplying the NSW Mid North Coast.

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 to be assessed, is also presented.

In Section 3 four network augmentation options are described. Option 1 makes use of an existing transmission line. Given constraints on new line routes this is the only feasible network option. It involves the establishment of a number of 132 kV substations and construction of short sections of 132 kV line to enable a circuit of a 132 kV double circuit line, which presently operates at 66 kV, to operate at 132 kV between Coffs Harbour and Kempsey. These works are expected to cost $62 million (± 25%) and could be completed by mid 2009.

In Section 4 the results of an application of the regulatory test are presented. As there is only one feasible option it is clearly the lowest cost option. The present values of its costs are calculated in accordance with the requirements of the regulatory test and are considered reasonable.

In Section 5 it is concluded that Option 1 satisfies the regulatory test and it is proposed to construct that option as described above.

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 on the NSW mid north coast 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 Clauses 5.6.6 (h) and 5.6.2(h) of the Rules. It relates to a proposal for a new large transmission network asset and a new large distribution network asset that will address emerging limitations in the transmission network supplying the NSW mid north coast.

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 and distribution networks supplying the Mid North Coast;
- 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 preferred 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 mid north coast in its Annual Planning Statements for 1999 - 2001 and its Annual Planning Reports (APRs) for 2002 - 2006. The 2006 APR includes a summary new large transmission network asset proposal.

In April 2006 TransGrid published a document entitled "Transmission Network Limitations on the NSW Mid North Coast". This document described emerging network limitations affecting supply to the area and called for proposals for non-network options from the market that may address them. A number of responses were received. These are discussed in Section 2.9.

In May 2007 TransGrid and Country Energy published an application notice on their web sites covering a proposal for new large transmission and distribution network assets that would address the limitations that are described above and in Section 2.5. A summary of the application notice was published on NEMMCO's website on 2nd May 2007. Interested parties were invited to make submissions in the period to 14th June 2007. No submissions were received.

Accordingly TransGrid and Country Energy have completed their obligations under clauses 5.6.6 (b) and 5.6.2(f) of the Rules and will proceed in accordance with the proposed actions detailed in Section 5 of this final report. This involves converting an existing double circuit 132 kV line between Coffs Harbour and Kempsey (one circuit of which presently operates at 66 kV) to operate with both circuits at 132 kV.

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 and a new large distribution 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.

This requires DNSPs (in this case Country Energy), inter-alia, to:

- Identify a necessity for augmentation of its network, or implementation of a non-network alternative;
- Consult with NEM registered participants, NEMMCO and interested parties on possible options to meet the necessity for augmentation;
- Carry out an economic cost effectiveness analysis of possible options to identify options that satisfy the regulatory test;
- Publish the results of the consultation and regulatory test analysis in a report that recommends the action to be taken.

These 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 TNSP/DNSP 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 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 sustained emergency 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 section of NSW Mid North Coast of interest covers the Taree to Nambucca area as indicated in Figure 1 on the next page.

The population of the whole North Coast (which includes the Taree to Nambucca Area) area has grown at above the State average for many years this above average growth is expected to continue. The Taree to Nambucca area presently has a population of around 200,000.

As with population growth, the demand for electricity has also grown at above average rates and is expected to continue to do so. To meet this requirement the transmission network supplying the North Coast has been progressively developed over the years. Broadly, there has been a progression to higher voltage (and higher capacity) developments as the demand for electricity has grown.

Prior to the 1950s, the North Coast was supplied by a 66 kV network. That network has been progressively reinforced by establishment of a 132 kV network and in more recent times by the first elements of a 330 kV network. The major developments are shown in Table 1.

Table 1 Development of the 330 kV and 132 kV Network Supplying the NSW North Coast

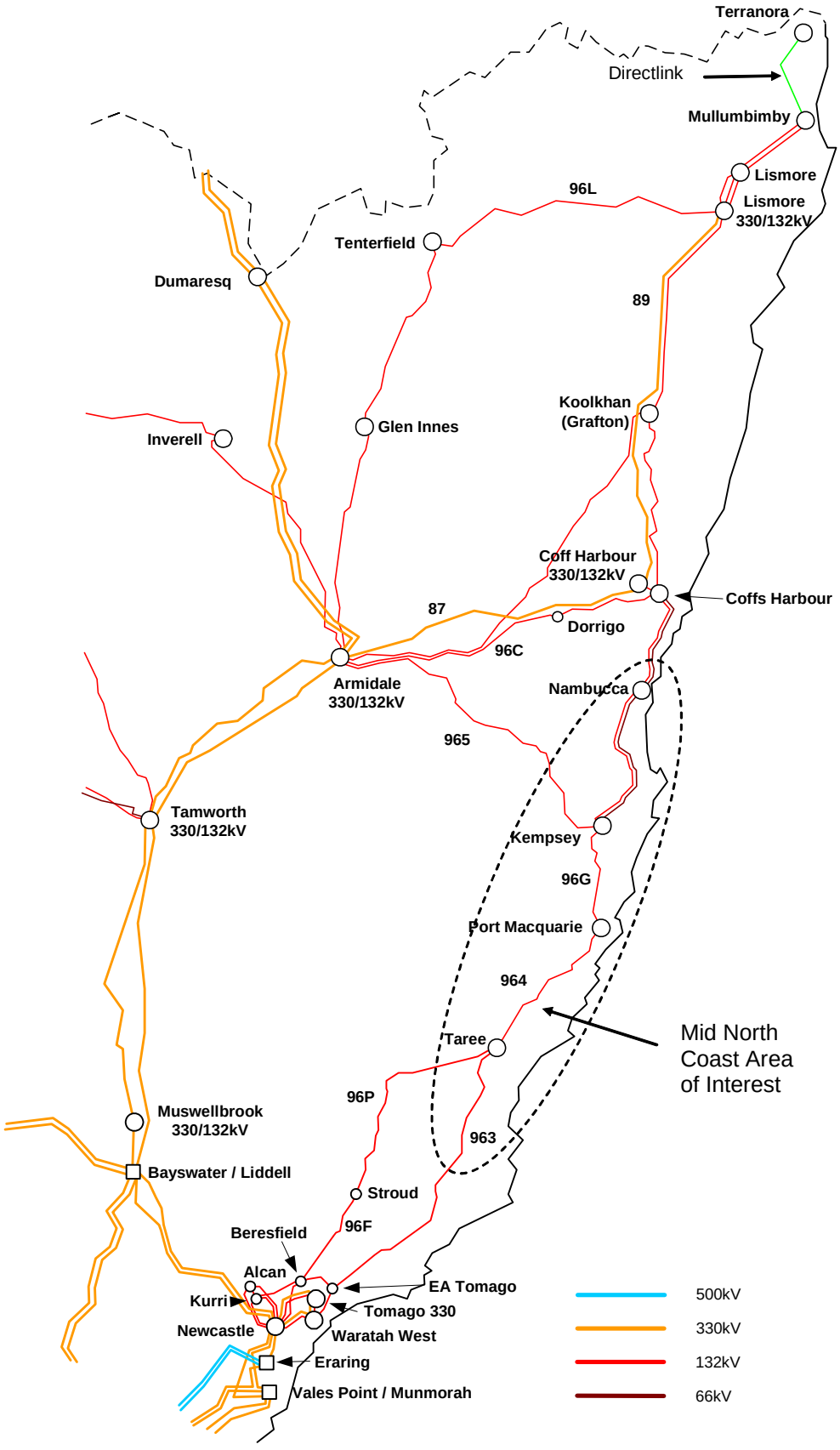
Development	Date
First Newcastle – Taree line and Taree substation	Mid/late 1950s
Armidale – Koolkhan line and Koolkhan substation	Early 1960s
Armidale – Kempsey line and Kempsey substation	Mid 1960s
Koolkhan – Lismore 132 kV line and Lismore substation Armidale – Glen Innes – Tenterfield 132 kV line and Glen Innes and Tenterfield substations	Late 1960s
Tenterfield – Lismore 132 kV line	Early 1970s
Second Newcastle – Taree 132 kV line	Mid 1970s
Armidale – Coffs Harbour 132 kV line and Coffs Harbour 132 kV substation Coffs Harbour – Koolkhan 132 kV line	Late 1970s
Taree – Port Macquarie 132 kV line and Port Macquarie substation	Late 1970s
Armidale Coffs Harbour 132 kV line (330 kV construction) Koolkhan – Lismore 132 kV line (330 kV construction)	Early 1980s
Port Macquarie – Kempsey 132 kV line	Mid 1980s
Coffs Harbour – Koolkhan 132 kV line (330 kV construction) Operation of 330 kV construction lines at 330 kV Lismore 330/132 kV substation	Early 1990s
Coffs Harbour – Nambucca – Kempsey 132 kV line and Nambucca substation	2002
Coffs Harbour 330/132 kV substation	2006

Presently the Mid North Coast is supplied by a network of 132 kV lines emanating from 330/132 kV substations at Newcastle and Armidale. The recently commissioned 330/132 kV substation at Coffs Harbour is now the third 330/132 kV substation supplying the area. None the less, the major load centres of Port Macquarie and Taree are remote from these 330/132 kV substations and the 132 kV network supplying them is heavily loaded.

The most recent transmission line development was the construction of the Coffs Harbour – Nambucca – Kempsey 132 kV line, which was completed in 2002. The environmental/community consultation for that line determined that the most appropriate development was to replace an existing Country Energy 66 kV line. Consequently a double circuit 132 kV line was constructed. One circuit of that line presently operates at 66 kV to supply three Country Energy 66/11 kV substations and to provide a backup to Nambucca 132/66 kV substation which presently has only a single transformer.

It is expected that as the demand for electricity grows, it will be necessary to continue to strengthen the 330 kV network as well as the underlying 132 kV network on the North Coast. Key 330 kV developments are expected to include provision of a second 330 kV line to Lismore (possibly from Dumaresq) and the progressive development of a 330 kV network to supply the Mid North Coast. In the longer term a 330 kV network may be developed between the Newcastle area and Armidale supplying the Mid North Coast.

Figure 1 Transmission System Supplying the NSW North Coast



2.4. Local Load Forecast

Demand in the Taree to Kempsey area has the greatest influence on voltage levels at those locations, although demands in nearby areas between Stroud and Coffs Harbour do have an effect. Forecast winter and summer maximum demands for the Taree to Kempsey area and the total for the Stroud to Coffs Harbour area are shown in Table 2 and Table 3.

Table 2 Stroud to Coffs Harbour - Winter Peak Demand Forecasts (MW)

Supply Point	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Coffs Harbour	82.0	84.7	71.5	73.9	76.3	78.8	81.4	84.1	86.9	89.7
Dorrigo	4.0	4.1	4.2	4.4	4.5	4.6	4.8	4.9	5.1	5.2
Hawks Nest				10.0	10.3	10.7	11.1	11.4	11.8	12.2
Herons Creek				22.0	22.7	23.5	24.3	25.1	26.0	26.9
Kempsey 33 kV	37.0	38.1	39.3	40.4	41.6	42.9	44.2	45.5	46.9	48.3
Kempsey 66 kV	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9
Macksville			9.0	9.3	9.5	9.8	10.1	10.4	10.7	11.1
Nabiac					40.0	41.4	42.9	44.5	46.1	47.7
Nambucca	32.0	33.0	12.9	13.3	13.7	14.1	14.6	15.0	15.5	15.9
Port Macquarie	76.0	78.6	81.3	77.0	79.6	82.3	85.1	88.0	91.0	94.1
Raleigh			12.0	12.4	12.7	13.1	13.5	13.9	14.3	14.8
Stroud	32.0	33.0	34.1	25.2	26.0	26.8	27.7	28.6	29.5	30.4
Taree 33 kV	28.0	28.7	29.4	30.2	30.9	31.7	32.5	33.3	34.1	35.0
Taree 66 kV	75.0	77.5	80.0	67.7	29.9	30.9	31.9	33.0	34.1	35.2
West Sawtell			16.0	16.5	17.0	17.6	18.1	18.7	19.3	19.9
Taree to Kempsey	**219**	**226**	**233**	**241**	**248**	**256**	**265**	**273**	**282**	**291**
Diversified Taree to Kempsey	**215**	**221**	**228**	**236**	**243**	**251**	**259**	**268**	**276**	**285**
Stroud to Coffs Harbour	**369**	**381**	**393**	**405**	**418**	**432**	**446**	**460**	**475**	**490**
Diversified Stroud to Coffs Harbour	**351**	**362**	**373**	**385**	**397**	**410**	**424**	**437**	**451**	**466**

Table 3 Stroud to Coffs Harbour - Summer Peak Demand Forecasts (MW)

Supply Point	2006/ 07	2007/ 08	2008/ 09	2009/ 10	2010/ 11	2011/ 12	2012/ 13	2013/ 14	2014/ 15	2015/ 16
Coffs Harbour	82.4	86.3	74.5	78.0	81.8	85.7	89.8	94.1	98.7	103.4
Dorrigo	4.2	4.4	4.5	4.6	4.8	4.9	5.1	5.2	5.4	5.5
Hawks Nest				11.0	11.6	12.3	13.0	13.8	14.6	15.4
Herons Creek				21.0	22.2	23.5	24.9	26.3	27.8	29.5
Kempsey 33 kV	33.1	34.7	36.5	38.3	40.2	42.2	44.3	46.5	48.9	51.3
Kempsey 66 kV	2.1	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.7	2.8
Macksville			9.0	9.3	9.6	10.0	10.3	10.7	11.1	11.5
Nabiac					38.0	40.2	42.5	44.9	47.4	50.1
Nambucca	32.6	34.0	14.5	15.1	15.8	16.5	17.2	17.9	18.7	19.5
Port Macquarie	74.2	78.6	83.3	82.3	87.3	92.5	98.0	103.9	110.2	116.8
Raleigh			12.0	12.4	12.9	13.3	13.8	14.3	14.8	15.3
Stroud	35.1	36.8	38.6	29.5	30.9	32.3	33.9	35.5	37.2	39.0
Taree 33 kV	29.4	30.6	32.0	33.3	34.8	36.3	37.8	39.4	41.1	42.9
Taree 66 kV	72.1	76.4	81.0	70.8	37.1	39.3	41.7	44.2	46.8	49.6
West Sawtell			16.0	16.7	17.5	18.3	19.2	20.0	21.0	21.9

Supply Point	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
Taree to Kempsey	211	223	235	248	262	276	292	308	325	343
Diversified Taree to Kempsey	200	211	223	236	249	263	277	292	309	326
Stroud to Coffs Harbour	365	384	404	425	447	470	494	519	546	574
Diversified Stroud to Coffs Harbour	336	353	372	391	411	432	454	478	503	529

These forecasts include new supply points. Those new supply points and the existing supply points at which they reduce demand are shown in Table 4 below.

Table 4 New Supply Points

New Supply Point	Existing Supply Point(s) Off-loaded
Hawks Nest	Stroud and EnergyAustralia Tomago
Herons Creek	Taree 66 kV and Port Macquarie
Macksville	Nambucca
Nabiac	Taree 66 kV
Raleigh	Nambucca
West Sawtell	Coffs Harbour

Figure 2 and Figure 3 show actual and forecast winter maximum demands (in MW) for the Stroud to Coffs Harbour area and the Nabiac/Taree to Kempsey area.

Figure 2 Stroud to Coffs Harbour - Actual and Forecast Winter Max Demands

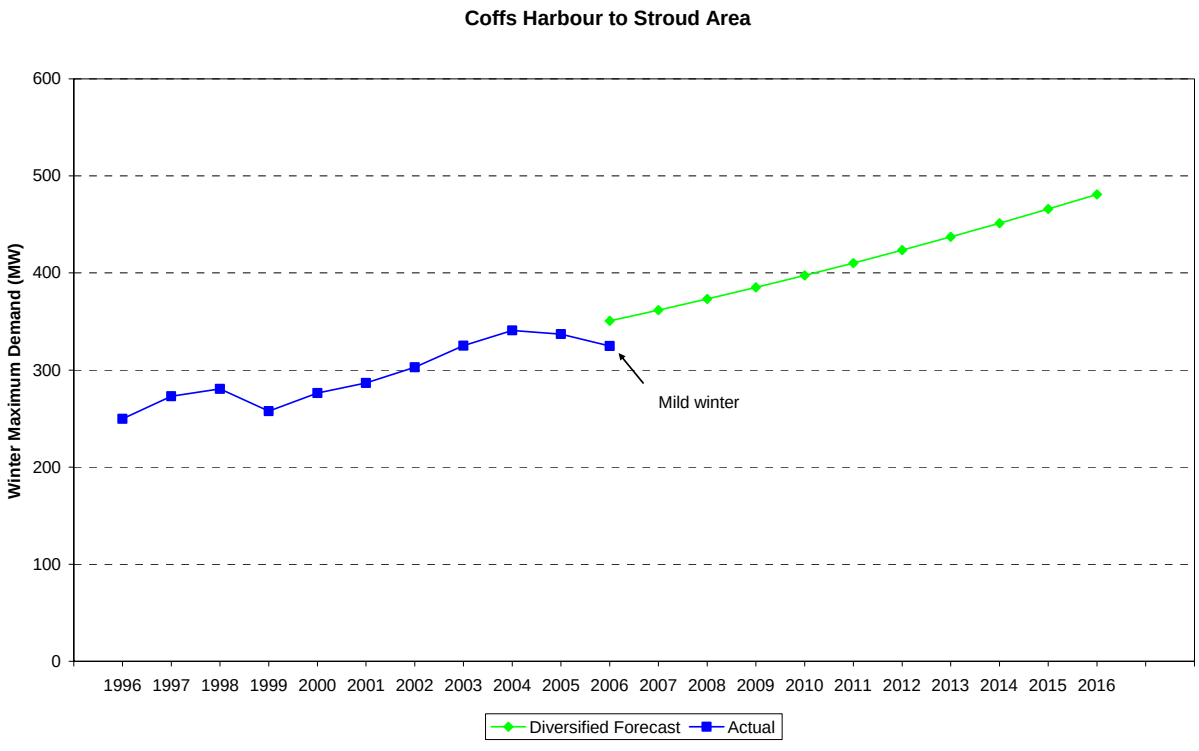


Figure 3 Nabiac/Taree to Kempsey - Actual and Forecast Winter Max Demands

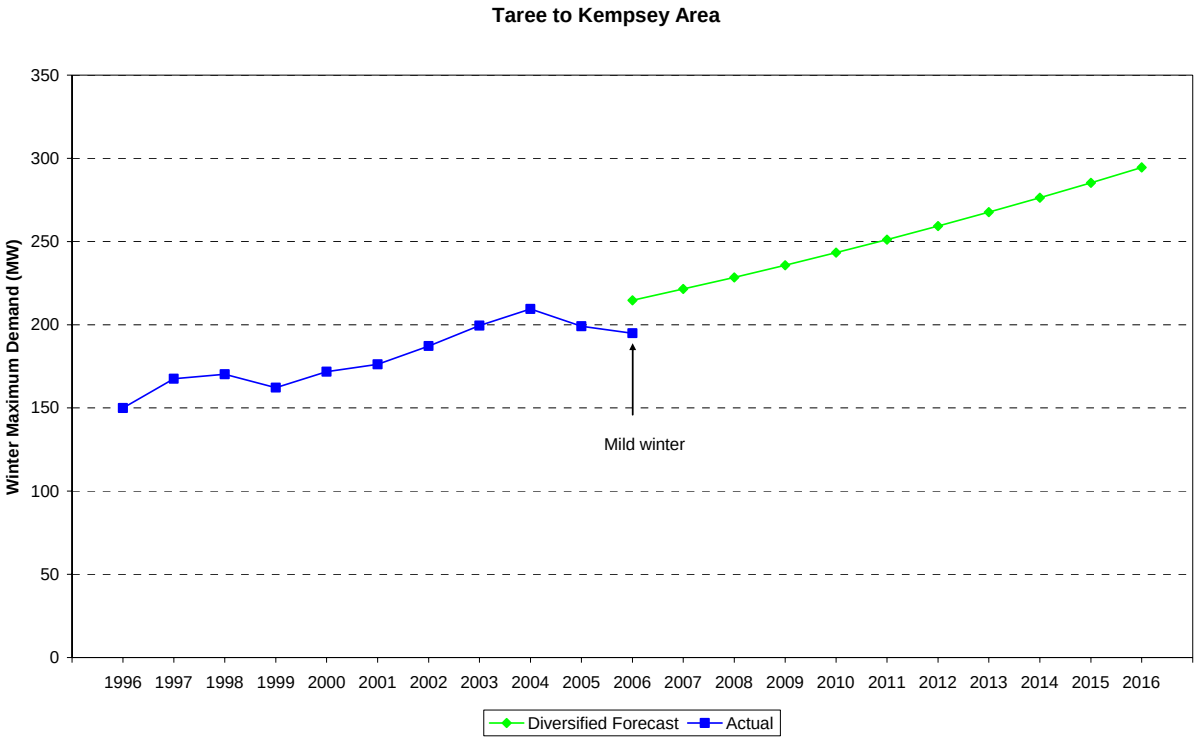


Figure 4 and Figure 5 show historical and forecast winter maximum demands (in MW) for the Stroud to Coffs Harbour and the Nabiac/Taree to Kempsey areas.

Figure 4 Stroud to Coffs Harbour - Actual and Forecast Summer Maximum Demands

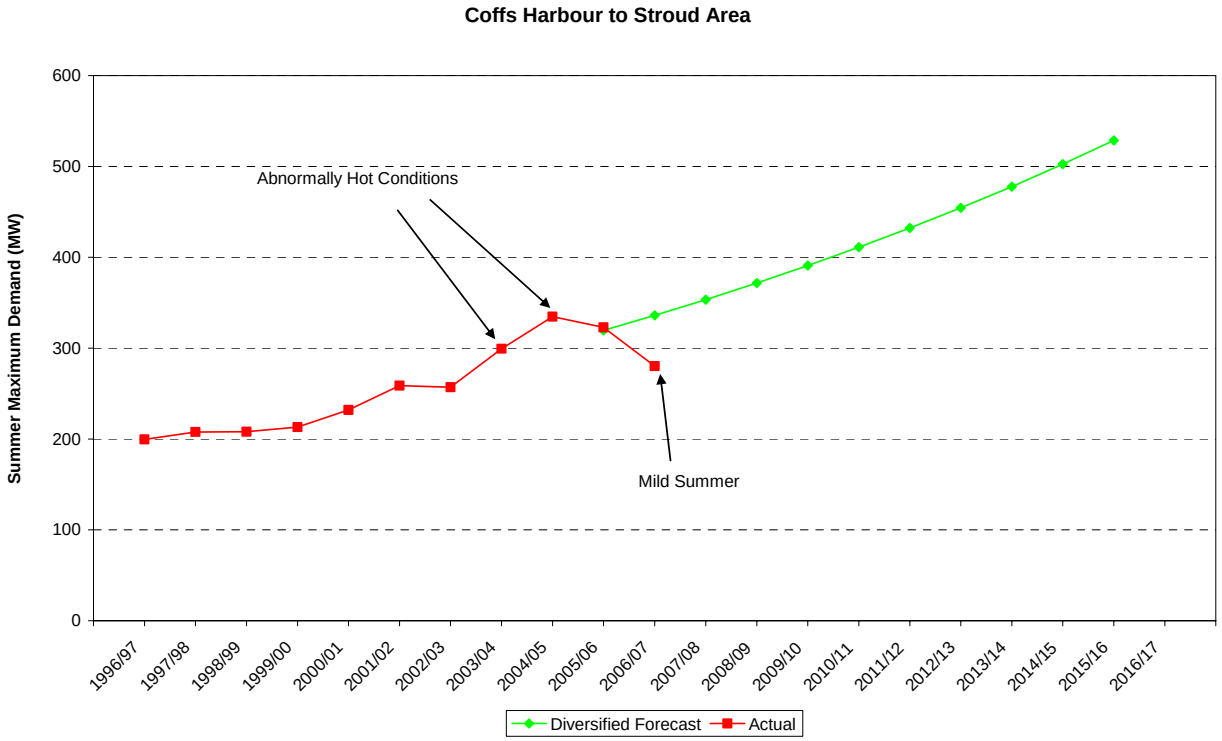
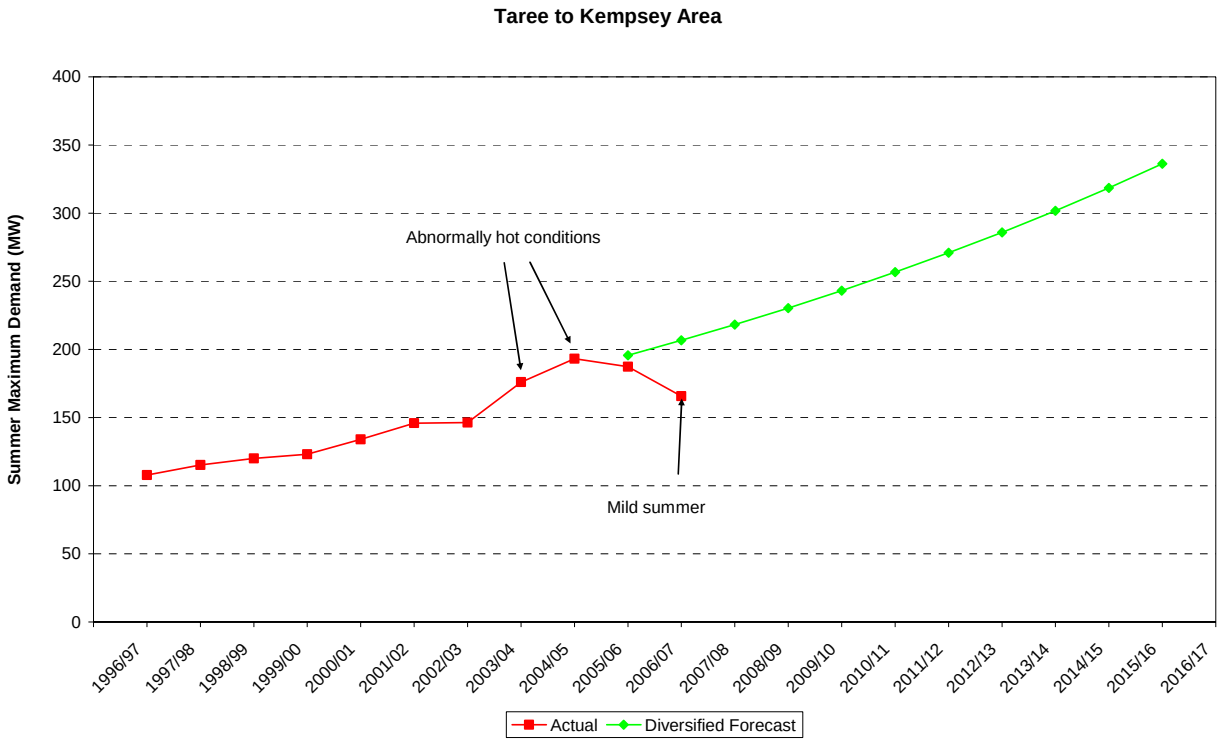


Figure 5 Nabiac/Taree to Kempsey - Actual and Forecast Summer Maximum Demands



2.5. Description of Network Limitations

If all elements of the 132 kV network are in service, it is presently capable of adequately supplying the Mid North Coast at all times. However, within the next few years should the Coffs Harbour – Nambucca 132 kV line or the Nambucca - Kempsey 132 kV line be out of service at times of high demand, unacceptably low voltages would occur at Kempsey and Port Macquarie. The transformers at Taree would be very close to their limit of voltage regulation (bottom tap-changer position).

Of these two line outages, the most severe is an outage of the Coffs Harbour – Nambucca line as it results in the Nambucca load being supplied from Kempsey. It is possible to transfer some load from Nambucca to Coffs Harbour via the 66 kV network (and this has been assumed to have taken place).

In addition, there are existing limitations in the 132 kV networks south of Armidale/Coffs Harbour and within and to the north of Greater Newcastle. These two networks provide the “northern” and “southern” supplies to the Mid North Coast. Outages of critical lines within these networks can result in overloads of other lines within the affected network or the other network. The location of the overloads depends inter alia on the magnitude of flows on QNI. It is planned to install a phase angle regulator (phase shifting transformer) in the 965 Armidale – Kempsey 132 kV line to manage flows on that line. This will help to “rebalance” flows to the Mid North Coast from the north and the south (thereby providing a small increase in supply capability), but it does not relieve the voltage limitations.

The timing of the expected emergence of each limitation is shown in Table 5 below.

Table 5 Onset of Network Limitations

Limitation	Year of Onset
Overload of 132 kV lines within or to the north of the Greater Newcastle area or the Armidale – Kempsey 132 kV line on outage of the Coffs Harbour – Nambucca 132 kV line at times of high demand.	Existing
Unacceptably low voltages at Kempsey and Port Macquarie on outage of the Coffs Harbour - Nambucca 132 kV line at times of high demand.	Summer 2008/09
Unacceptably low voltages at Kempsey and Port Macquarie on outage of the Nambucca - Kempsey 132 kV line at times of high demand.	Summer 2009/10

When modelling the onset of the voltage limitations it is assumed that all capacitors are in service and all transformers are on maximum voltage boost. In practice typical operating conditions would require that prior to an outage some capacitors would not be in service and transformers would not be on maximum voltage boost. Thus it is likely, that prior to the dates shown in Table 5 if a critical outage occurs at a time of high load, some load may be interrupted although it should be possible to restore that load following switching of capacitors and allowing for response of transformer tap changers.

2.6. Joint Planning

Country Energy and TransGrid have jointly planned the 330 kV and 132 kV network supplying the Mid North Coast 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 2.5 the network limitations on the Mid North Coast have previously been described in TransGrid's Annual Planning Statements and Annual Planning Reports from 1999 to 2006.

In addition a document titled "Transmission Network Limitations on the New South Wales Mid North Coast" (the needs statement), was jointly published by TransGrid and Country Energy in 2002. An updated version was jointly published in April 2006. It included a call for proposals for non-network options from the market that would address the various limitations affecting the transmission network supplying the Mid North Coast.

There were a number of responses to the 2006 needs statement. However none of these responses has led to a proposal for a non-network option that is sufficiently well developed to be included as an option in the application of the regulatory test summarised in Section 4.

3. Options

TransGrid and Country Energy have considered four network options to meet the network limitations described in Section 2.5. These options are described in the following sections.

Only Option 1 is considered to be feasible.

3.1. Option 1: Conversion of the Coffs Harbour – Nambucca – Kempsey Double Circuit 132 kV Line so that both Circuits Operate at 132 kV

As described in Section 2.3, one circuit of the Coffs Harbour – Nambucca – Kempsey double circuit 132 kV transmission line presently operates at 66 kV. That circuit supplies three Country Energy 66/11 kV substations and provides a backup to TransGrid's Nambucca substation, which has a single 132/66 kV transformer.

This option involves conversion of the circuit operating at 66 kV to operate at its design voltage of 132 kV.

This would include:

- Establishment of a new West Sawtell (South Boambee) 132/66/11 kV substation to provide a 66 kV supply for Country Energy's existing Sawtell 66/11 kV substation and to provide an 11 kV supply to meet the emerging needs of Country Energy's distribution network.

  Note 1: This 11 kV supply would be less expensive than works by Country Energy which would otherwise be required.

- Establishment of a 132/33/11 kV substation at Raleigh to replace Country Energy's existing 66/11 kV substation;

- Establishment of a 132/11 kV substation at Macksville to replace Country Energy's Newee Creek 66/11 kV substation.

  Note 2: Newee Creek substation is approaching the end of its serviceable life and would be replaced within five to ten years.

- Provision by TransGrid of short sections of 132 kV line to connect the new West Sawtell, Raleigh and Macksville substations;

- Provision by TransGrid of 132 kV line switchbays at Coffs Harbour and Kempsey;

- Provision by TransGrid of a second 132/66 kV transformer at Nambucca; and

- Near Kempsey, stringing of conductors on a short section of the existing 132 kV line and provision of a short section of single circuit 132 kV line.

These works are estimated to cost $ 62 million (± 25%) and could be completed by mid 2009. The 132 kV substations at West Sawtell, Raleigh and Macksville will be constructed jointly by TransGrid and Country Energy. The cost of the TransGrid works is estimated to be $26 million and Country Energy works $36 million. The cost of the works that would be avoided by construction of this option (See Notes 1 and 2 above) is estimated to be $12 Million (± 25%).

This option would overcome the limitations described in Section 2.5.

3.2. Option 2: Construct a New 132 kV Line from Coffs Harbour to Kempsey

This option would involve construction of a 132 kV line on a new route between Coffs Harbour and Kempsey, a distance of around 110 km.

This option is not considered to be feasible (as environmental approval for the new line would be very difficult to obtain) and has not been considered further. The community/environmental impact of a new line would be difficult to justify given the existence of a viable alternative (Option 1) which does not involve construction of an additional line on a new route in the Coffs Harbour to Kempsey area.

3.3. Option 3: Construct a New Line from Armidale to Kempsey

This option would involve construction of a transmission line from Armidale to Kempsey, a distance of around 140 km. It is likely that this line would utilise at least parts of the route of the existing 965 Armidale

- Kempsey 132 kV line. Obtaining outages of 965 line to reconstruct those parts would be very difficult; during these outages then for either of the critical outages described in Section 2.5, all of the Mid North Coast load would have to be supplied from Newcastle.

This option is not considered to be feasible at this stage (given these outage problems and the availability of Option 1) and has not been considered further.

3.4. Option 4: Construct a New Line from the Newcastle Area to the Taree Area

This option would involve construction of a new line from the Newcastle area to the Taree area, a distance of around 135 km. It would face difficulties similar to those described in Section 3.2 and Section 3.3; as sections of new line route would be required and/or sections of existing lines would need to be reconstructed with the required outages being very difficult to obtain.

This option is not considered to be feasible at this stage (given these new line route and/or outage problems and the availability of Option 1) and has not been considered further.

4. Application of the Regulatory Test

An application of the regulatory test, considering the single feasible network option, 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 constraints.

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 constraints and/or the ability of options to meet those constraints.

4.2. Regulatory Test Application – Summary

4.2.1. Costs

For the regulatory test application only the capital and operating & maintenance costs of Option 1 have been explicitly included. As noted in Section 3.1 Option 1 would avoid the need for the construction of works to an estimated cost of $12 Million. As these avoided works do not form part of that option they are not taken into account in calculating the present worth value of its costs.

There are no known committed, advanced or publicly announced generation developments that are likely to affect the timing of the onset of the network limitations described in Section 2.5 or the ability of Option 1 to meet those limitations.

As there is only one feasible option being considered the operation of government tax or subsidy schemes such as the New South Wales Greenhouse Gas Abatement Scheme need not be explicitly included as they will not affect the ranking of options.

As there is only one option being considered the inclusion of other network limitations in the area that may occur within the 10 year planning horizon need not be explicitly included as they will not affect the ranking of options.

4.2.2. Scenarios

There are no known committed or advanced generation developments that are likely to affect the timing of the onset of the network limitations described in Section 2.5 or the ability of Option 1 to meet those limitations.

4.2.3. Results

The present value of the costs of Option 1 has been calculated for a base case of financial and technical assumptions. 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 6. The results of the analysis are shown in Table 7 and Table 8. Details of the base case economic model are shown in Appendix A.

Table 6 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 7 Comparison of Options – Base Case

		PV of Costs ($M)	Rank
Option 1	Coffs Harbour – Nambucca – Kempsey Line Conversion	40.6	1

Table 8 Comparison of Options - Results of Sensitivity Studies for Scenario 1

Sensitivity Case	Option 1 Coffs Harbour – Nambucca – Kempsey Line Conversion	
	PV of Costs ($M)	Rank
Base Case	40.6	1
Decreased O&M Cost	37.7	1
Increased O&M Cost	43.4	1
12% Discount Rate	41.4	1
6% Discount Rate	38.5	1
25% Increase in Capital Costs	50.7	1
25% Decrease in Capital Costs	30.4	1
Decrease in Asset Lives	44.0	1
Increase in Asset Lives	38.9	1

Clearly as there is only one option this is the highest ranked option in each case. These results have been included because:

- Sensitivity testing on key input variables is a mandatory requirement of the regulatory test; and
- To show that for the range of key input variables, the present values of the costs of Option 1 are reasonable.

5. Conclusions and Proposed Actions

Given that there is only one reasonable Option to meet the limitations described in Section 2.5, and that an application of the regulatory test to this option has shown that the present value of its costs are reasonable, it is concluded that it satisfies the regulatory test.

TransGrid and Country Energy therefore propose to 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 clauses 5.6.6 (j) and 5.6.2 (i) of the Rules.

In the case of disputes raised under clause 5.6.6(j) 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

In the case of disputes raised under clause 5.6.2(i) disputing parties must notify Country Energy within 40 business days of the publication of this final report. Disputing parties should contact:

Neville Cooper neville.cooper@countryenergy.com.au

Appendix A – Least Cost analysis of Base Case

Mid North Coast: Application of the Regulatory Test
Option 1: Coffs - Kempsey 132 kV Circuit

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Residual
Capital Expenditure												
Option 1 Line Costs			8.3									-6.7
Option 1 Substation Costs			53.3									-37.3
O & M Expenditure												
Option 1 O&M Costs				1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	
Total Expenditure			61.61	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	-43.96
PV of Costs ($Million)	**40.6**											