

*Mountain Associates*



*PB ASSOCIATES*

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**A review of excluded projects to be identified  
in TransGrid's 2004 to 2009 revenue cap**

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A report to the ACCC

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***Final***

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# 1. Introduction and terms of reference

This report responds to the ACCC's request for examination of the definition of excluded projects and the process by which excluded investment should be assessed by the ACCC.

The analysis presented in this report takes account of:

- TransGrid's expenditure application;
- PB Associates' recommendation on the list of projects to be excluded; and
- The regulatory framework to be applied, as defined in the ACCC's Statement of Regulatory Principles.

The focus of this report is on the implementation of the regulatory framework defined in the SRP. The report begins by summarising TransGrid's application for excluded projects and PB Associates' recommendation on which projects are to be excluded. It then proposes a definition for excluded projects applicable to TransGrid and reviews:

- the specific projects to be excluded;
- the "triggers" that would justify such projects becoming eligible for consideration by the ACCC; and
- the relationship between investment in those projects and investment included in the determination of the main ex-ante cap.

Finally, the last section sets out some suggestions on the process to be followed by the ACCC for the assessment of excluded projects.

## 2. TransGrid's submission on excluded projects

TransGrid proposed four excluded projects:

- A new 500 kV line between the Hunter Valley area and the Newcastle area and possibly including a new 500/330kV substation;
- A new 500 kV line between Bannaby and Sydney and possibly the redevelopment of 500/330 kV transformation at Sydney West;
- Series compensation on lines from Dumeresq to Bulli Creek and from Dumeresq to Armidale;
- A new 330 kV line from Yass to Wagga.
- Investment in augmenting the capacity of the existing Kemps Creek to Sydney 330 kV line costing \$3m in the 2004 to 2009 regulatory period.

For each of these excluded projects, TransGrid explained why they considered that they should be excluded, and what they considered to be the triggers for such projects.

### **3. PB Associates’ recommendation on projects to be excluded**

PB Associates agreed with TransGrid that the four projects that TransGrid considered should be excluded, should be excluded. However PB suggested that eight additional projects should also be excluded:

- The Royalla 330 kV sub-station (stage 1)
- The Holroyd 330 kV switching station and 330 kV cable
- Mason Park 330/132 kV GIS substation
- QNI upgrade (series compensation)
- Yass-Wagga 330 kV transmission line
- Upgrade of western system to 500 kV
- Hunter Valley to Newcastle 500 kV line and substation
- Bannaby - Sydney 500 kV development

## **4. Definition of TransGrid excluded projects consistent with ACCC's principles**

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### **4.1. Summary of relevant provisions of Statement of Regulatory Principles**

The objectives underlying the provision for excluded projects is set out in the 2004 SRP and the Background Paper to the SRP. From this it appears that the provision for excluded projects is intended to reduce the prospect of inefficient under-investment, declining service quality or excessive windfall gains or losses that would arise if provision was made (or was not made) for such excluded projects in the determination of the ex-ante cap. Such windfall gains or losses would be attributable to forecasting errors associated with large projects with a high degree of uncertainty with respect to their probability of proceeding or their cost of development.

Excluding significant but uncertain investments from the main ex ante capex allowance is intended to improve the accuracy of the allowance and hence ensure that it remains reasonably aligned with efficient costs. However it is clear that only in exceptional circumstances should possible projects be explicitly excluded from the ex-ante cap.

The SRP establishes specific criteria that excluded projects are required to meet in order to qualify as excluded projects. Specifically:

- Projects should be excluded if their inclusion would lead to a significant error in the ex ante allowance, rather than on the basis of the size of the project alone.
- Projects excluded from the ex ante capex allowance must be linked to unique investment drivers — such as a major point load or expected power station — rather than to general investment drivers (such as expectations of load growth within a region).
- The ACCC will generally exclude projects from the ex ante cap if the expected error presented by the inclusion of that project in the allowance, is equal to more than 10 per cent of the ex ante capex allowance. The threshold of 10 per cent is an indicative number and the final decision as to whether a project should be excluded will be at the ACCC's discretion.

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## **4.2. Suggested definition of excluded projects consistent with SRP**

We understand that the provision for excluded projects provides one avenue for TNSPs to obtain compensation for capital expenditure. The other avenue is through inclusion in the ex-ante allowance, or by seeking to re-open the revenue cap during a regulatory control period.

The ACCC's intention in excluding expenditure from the main control is clear. However, there may be an incentive to define all remaining possible projects or events not covered by the ex-ante allowance (regardless of how improbable such projects may be) as excluded projects. This incentive would arise if the approval process for excluded projects provides less downside risk to TNSPs than would be the case if the TNSP was to seek re-open the revenue control during a control period.

An excessive number of excluded projects can risk undermining the integrity of an incentive regime and can pose significant administrative challenges for the ACCC. This suggests that a sufficiently narrow definition for excluded projects should be adopted.

However, in many cases it is likely that the reason that a project is excluded is that there is significant uncertainty on the need for, design or cost of the project. This suggests that attempting to precisely define an excluded project at the time of the revenue control decision is likely to be fruitless in most cases.

Instead we suggest that the focus should be on defining the circumstances (or triggers) that would give rise to the range of possible excluded projects.

These triggers should not relate to "systemic" investment drivers such as demand growth or changes in input costs or statutory requirements. Instead, the triggers should focus on specific limitations or events at defined elements in the network that would justify greater investment than had been provided in setting the ex-ante cap.

Similarly, it is important that investment already provided-for in the ex-ante cap, is clearly identified and taken into account in defining the additional investment allowance needed to respond to specific triggers. This will be necessary to guard against the opportunity to "game" the incentive scheme by obtaining revenue associated with investment included in the ex-ante cap, but then applying for recovery of the same investment again as part of an excluded project.

With these points in mind, the rest of this section reviews each of the projects identified in PB Associates' report as excluded projects and then:

- considers whether these projects should remain as excluded projects;
- suggests the definition of the triggers for investment in these projects; and
- identifies related investments included in the calculation of the ex-ante capex allowance.

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### 4.3. Possible excluded projects

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#### 4.3.1. Royalla project

*Should the Royalla project be excluded?*

The “Royalla project” referred to here relates to works specifically designed to improve the security of supplies to Canberra. Included in the Royalla project are the following proposed investments:

- Advancing the establishment of the Royalla 132 kV switching station;
- Construction of a Royalla- Gilmore 132 kV line;
- Development of a 330/132 kV substation at Royalla;
- Establishment of Bungendore 330/132 kV substation;
- Construction of a Bungendore-Royalla 330 kV line.

The costs of establishing the Royalla 132 kV switching station can also be justified on the basis of voltage supply problems in Cooma, which is unrelated to the security of supply to Canberra. In the PB Associates Report an allowance for the cost of the Royalla 132 kV switching station has been included in the ex-ante allowance. The first issue for consideration is therefore whether the additional projects identified above should be defined as excluded projects.

The need for expenditure on these projects is entirely dependent on possible changes to planning standards for supplies to Canberra. We understand that discussions amongst the relevant authorities have been on-going for some years on possible changes to the planning criteria that should apply to supplies to Canberra. At this point, we understand that it is still uncertain whether the relevant authorities will be seeking to change the planning criteria for supplies to Canberra. As such, the need for the Royalla works during this regulatory period remains unclear.

Besides the 132 kV switching station, TransGrid had only applied for expenditure relating to the establishment of the 330/132 kV substation at Royalla, during this regulatory period. The remaining expenditure on the establishment of the Bungendore substation and Bungendore-Royalla line would be included in the next regulatory period.

The cost of the 330 kV part of the Royalla substation is around \$68m. When added to the cost of establishing the Bungendore substation and Bungendore-Royalla 330kV substation, it is likely that over the two regulatory periods that this expenditure would fall, the total expenditure on the Royalla project would satisfy the 10% rule established by the ACCC as part of the decision for excluded projects.

TransGrid has argued that if the cost of developing the 330 kV substation at Royalla is not to be included in the ex-ante allowance then it should be an excluded project, since it is a significant project and the need for the expenditure



may arise during the regulatory period, pending a decision by the relevant authorities on an upgrade to the security of Canberra supplies.

However, there are likely to be other circumstances where agreements may be reached during the regulatory period on changes to the application of planning standards, which would impact the need for investment. For example, from time to time, TransGrid and the relevant electricity distributors agree changes to the expected amount of energy/load at risk at distributor supply points. This is typically accompanied by co-operation in the switching of load or network control in the event of critical contingencies. In this way, TransGrid is able to economically defer expenditure.

There are likely to be several instances where TransGrid may be able to defer expenditure through such co-operation with distributors. We understand that the ACCC does not intend to treat such expenditure as excluded from the ex-ante cap. Instead in determining the ex-ante allowance, provision has been made for the expenditure on the basis of no change to the application of the planning standard. Reliance is placed on the incentive mechanism whereby TransGrid would obtain the benefit of such expenditure deferral during the regulatory period, and the benefit will be passed to consumers at the end of the regulatory period.

If the Royalla project is to be treated as an excluded project on the basis of potential changes in the application of planning standards, then it could be argued that changes in expected expenditure attributable to all such changes in the application of planning standards, throughout TransGrid's network, should be classified as excluded expenditure.

However, we understand that the ACCC has no intention of excluding all such projects. On the basis of consistent treatment, we therefore consider that expenditure on the Royalla project should not be treated as excluded expenditure.

Rather, if it becomes clear that expenditure on the Royalla project becomes necessary during the regulatory period, then we suggest that this would justify reopening the revenue control under the proposed Code changes currently proposed by the ACCC.

However, we appreciate that the ACCC needs to balance a range of issues in deciding its approach to this issue. We have therefore defined the expected triggers for expenditure on the Royalla project, should the ACCC decide to treat this project as an excluded project.

#### *Excluded project trigger*

The trigger for a project related to increasing the security of supply to Canberra in this regulatory period would be a change in the security of supply criteria adopted for Canberra during the regulatory period, above the existing N-1 level.

The change in criteria would have to address:

- the need for 2 separate points of supply and how deep that separation must be;
- the definition of the N-1 or N-2 level that must be available continuously and after switching; and
- the % PoE forecast that this security of supply should be within.

*Related investments included in the calculation of the ex-ante capex allowance*

As described above, the cost of the Royalla 132 kV switching station has been included in PB Associates' recommendation of the ex ante allowance. This expenditure will provide for the 132 kV side of the Royalla 330/132 kV substation if the Royalla 330 kV substation was commissioned. The ACCC should ensure that costs associated with the 132 kV works already allowed for in the ex ante cap are not also included in the costs associated with a project in response to the suggested trigger.

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**4.3.2. Holroyd complex and Mason Park 330/132 kV GIS substation**

*Should the Holroyd complex and Mason Park 330/132 kV GIS substation be excluded?*

The “Holroyd complex” describes the development of a 132 kV switching station at Holroyd, and the subsequent development into a 330/132 kV transformation. The “Mason Park 330/132 kV GIS substation” project includes the later construction of 330 kV cables linking the new Holroyd substation with a yet to be established 330/132 kV GIS substation at Mason Park.

PB Associates has grouped the Holroyd complex and Mason Park 330 /132 kV substation together. The need for investment in this case relates to three separate limitations:

- Limitation 1 (need for Holroyd 132 kV) - Integral Energy supplies to Parramatta limitation: This is a TransGrid/Integral Energy planning issue. Information provided by TransGrid indicates that Integral Energy could manage this limitation until well past this regulatory period if an adequate refurbishment strategy of the existing Integral Energy 132 kV cables is implemented. As such it appears that joint planning with Integral Energy is still required on this issue.
- Limitation 2 (need for Holroyd 330 kV) - Sydney West 330/132 kV transformer limitation: Based upon information provided by TransGrid, limitation 2 (Sydney West transformers) will not occur until the next regulatory period. As such we do not consider that this limitation can be cast as a trigger for the developed of 330 kV capacity at Holroyd during this regulatory period.

- Limitation 3 (need for Masons Park 330/132 kV) - EA 330/132 kV supplies to inner Sydney. TransGrid study results indicated that Limitation 3 could occur in summer 2008/09.

From the above, Holroyd 330 kV can not be justified as a stand-alone project. However if the Masons Park development is required as a solution to limitation 3 then part of the Holroyd 330 kV project may be justifiable.

It is noted however that the studies provided by TransGrid indicate Limitation 3 to occur initially in 2008/09. It is reasonable to expect that following joint planning with Energy Australia, a smaller scale augmentation probably on Energy Australia's 132 kV network would be justified prior to a far more significant project such as the Mason Park development by TransGrid.

As such we consider the probability of the Mason Park development (and associated need for the Holroyd 330 kV works) or a similar scale TransGrid project, to be low during this regulatory period. On this basis, we consider that it would be reasonable to suggest that no provision be made for any excluded expenditure in the Holroyd/Mason Park area during the regulatory period.

However, in the case that the ACCC decides to make provision for excluded expenditure, we have defined two specific triggers that would provide the basis for further consideration of two specific projects.

#### *Excluded project triggers*

The first trigger relates to the need for Mason Park (and the associated Holroyd 330 kV works). This trigger is an overload of 330/132 kV supply points to the southern and inner city areas of the Energy Australia 132 kV Sydney network, presently supplied by Sydney North (Dural), Sydney South (Picnic Point), Beaconsfield West and Haymarket 330/132 kV substations.

The planning criteria defined for this trigger would be an N-2 type criteria including:

- the outage of a 330 kV cables; and
- another critical 132 kV circuit or 330/132 kV transformer.

The second trigger relates to the need for the Holroyd 132 kV switching station. This trigger is the Integral Energy overload of the existing 132 kV cable circuits to Parramatta under an N-1 condition.

#### *Related investments included in the calculation of the ex-ante capex allowance*

The upgrade of the Sydney South transformers from 250 MVA to 375 MVA has been recommended for inclusion in the ex ante cap in the PB Associates report and as such, costs associated with this upgrade should not be included in any review associated with this trigger.

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### 4.3.3. Augmentation of capacity to Newcastle-Sydney-Wollongong corridor

*Should projects augmenting capacity to the Newcastle-Sydney-Wollongong corridor be excluded?*

TransGrid applied for expenditure for several major projects to increase the transfer capacity to the N-S-W corridor. Additional supply for the N-S-W corridor is justified on the basis of expected thermal and reactive deficiency/voltage limitations.

The transfers to N-S-W corridor issue relates to two main network limitations to transferring power to the Sydney and Newcastle load centres via the existing 330 kV (and 500 kV) system. Both limitations are a function of the demand in Sydney and Newcastle, the dispatch pattern of generation in NSW, and interconnector flows into NSW from both the Queensland and the Vic/Snowy region.

- Limitation 1: Thermal Limitation - Hunter valley to Central Coast 330 kV line (Liddell to Newcastle 330 kV DC): The line ratings associated with the Liddell to Newcastle and Tomago 330 kV lines are as follows: Continuous rating 1220 MVA; sustained emergency rating 1430 MVA; 15 min 1500 MVA (15 min rating applicable for post contingency generation re-dispatch or network switching). The worst case contingency for loading the remaining in service 330 kV circuit is an outage of the other Liddell to Tomago or Liddell to Newcastle 330 kV circuit.
- Limitation 2: Reactive deficiency / voltage stability for transfers to Sydney: The reactive margin criteria discussed here is defined as: Reactive deficiency (Sydney West)<sup>1</sup> + 200 MVar – 280 MVar (Sydney West SVC). The worst case contingency for calculation of this limitation is an outage of either the Bayswater to Regentville or Wallerawang to Ingleburn 330 kV circuits.

TransGrid is proposing to account for the reactive deficiency increase due to the proposed load growth during the initial years of the regulatory period via additional shunt capacitor banks. Ultimately however, a major reinforcement of the network will be required.

TransGrid has assumed that a major network augmentation is required by 2008/09 to alleviate both limitations. Their study results for both limitations indicate that the combination of high central coast dispatch plus high Vic/Snowy flows may remove the overload and reactive deficiency / voltage instability beyond 2008/09, assuming small augmentations, particularly the capacitor banks are in service - although it is unclear if a reliable system could still be

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<sup>1</sup> The reactive deficiency at Sydney West has been calculated from a load flow study with a QV type generator at Sydney West. The voltage of the QV generator is adjusted to determine the knee point and the reactive deficiency is calculated as the Q value at this knee point. The knee point is the voltage that results in the minimum Q value.

maintained under these conditions. Their study results also indicate that the limitations will occur prior to 2008/09 for certain dispatch patterns, and so generation dispatch may be impacted prior to 2008/09.

For the medium growth background, the Western 500 kV upgrade would need to be followed by a major new line project the following year: either the Hunter Valley to Central Coast new line or Bannaby to Sydney new line. TransGrid studies also indicate that a new line project *prior* to the Western 500 kV upgrade may have a greater impact on the limitations, noting that some fault level work may be required and there may be difficulties with the lead times required for a new line. If a major upgrade is required then the most prudent staging of the work needs considerable further assessment. It is also important to determine how non-network solutions would impact the need for network investment.

We consider that considerable uncertainties remain on the timing of a major augmentation, and associated scope of work. It is also not clear if the need for such works would be due to a reliability issue or market benefits. A sufficiently robust probabilistic assessment has not been undertaken to allow a probabilistic expenditure allowance to be included in the ex ante bucket.

As such we recommend that all projects related to these limitations be excluded.

#### *Excluded project triggers*

The trigger for projects related to these limitations would be as defined for the two limitations above, encompassing both the thermal and/or reactive deficiency/voltage stability limitations.

#### *Related investments included in the calculation of the ex-ante capex allowance*

The ACCC should have regard to the following projects that had been included in ex-ante cap. These projects relate to the need to increase the capability of the network by removing certain constraints related to minor issues (e.g. line terminal uprating). The ex ante cap also included shunt capacitor bank installations to improve the reactive deficiency issue.

The determination of incremental expenditure based on augmentations of capacity to the N-S-W corridor should take account of the allowance that has already been made in the calculation of the ex-ante cap in respect of the following projects:

- Line uprates: Liddell – Tomago; Wallerawang – Ingleburn
- Line rearrangements on central coast (turn Vales Pt Newcastle line into Eraring)
- Line terminal uprates: UTSS-Canberra No 1; UTSS – Yass No 2; LTSS – Yass No 3; LTSS – Canberra No 7; Marulan – Avon; Marulan – Dapto; Marulan – Yass Bayswater – Liddell No 33 and No 34; Vales Pt – Newcastle No 24; Munmorah – Tuggerah
- Capacitor Banks: Sydney West 330 kV 200 MVAR; Vales Pt 330 kV 2 x 200 MVAR; Canberra 132 kV 120 MVAR; Darlington Pt 132 kV 2 x

20 MVAR; Sydney region 330 kV 5 x 200 MVAR (2 x 2006/07, 2 x 2007/08, 1 x 2008/09); Regentville 80 MVAR

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#### **4.3.4. Kemps Creek to Sydney South project**

*Should the Kemps Creek to Sydney South project be excluded?*

TransGrid have proposed that expenditure related to the Kemps Creek to Sydney South project should be excluded from the main control. The expenditure in the application relating to this project for the coming regulatory period is \$3m, plus \$188m in the next period, including \$115m for easements so that a new transmission line can be constructed.

In verbal discussions, TransGrid emphasised that it is necessary to provide funding so that the necessary easements can be purchased and that this may prove to be the most economical approach in the long run, since it may avoid costly investment in cables further into the future, if land for an overhead transmission line is no longer available.

However TransGrid also suggest that there are a number of alternative means to achieve the necessary reinforcement including the application of high temperature conductors and the development of switching stations where lines running south of Kemps Creek intersect with the Wallerawang-Sydney South/Ingleburn double circuit.

On the basis of the information presented to us, it seems that there is a low probability that the acquisition of easements between Kemps Creek and Sydney South, during this regulatory period can be justified. Furthermore, the projected level of expenditure in this regulatory period - \$3m – is unlikely to place TransGrid at any significant financial disadvantage even if all of this expenditure became liable during this regulatory period (which we don't believe to be the case anyway). On balance we therefore consider that the case to separately account for the Kemps Creek to Sydney South easement augmentation as an excluded project, is weak. This project has therefore not been considered further in this report.

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#### **4.3.5. QNI upgrade and Yass-Wagga transmission line**

*Should these interconnector projects be excluded?*

TransGrid has proposed two potential interconnector projects:

- A major upgrade of the Queensland-NSW interconnection, through the installation of series capacitors;
- The construction of a transmission line between Yass and Wagga that would enhance interconnector capacity to Victoria/Snowy.

TransGrid has not suggested that these upgrades could be justifiable against its statutory reliability criteria. Instead, it would appear that the case for this

expenditure would rest on a demonstration that the economic benefit of this investment exceeds its cost.

A key determinant of the economic benefit in both cases is likely to relate to the ability to augment capacity to the key Newcastle-Sydney-Wollongong load corridor. In this regard we note that the TransGrid backgrounds (medium growth) assume the QNI major upgrade is in service for 2008/09 providing an increase in interconnector capability of 150 MW. Since flows from Vic/Snowy are preferred to flows from Queensland with respect to reducing the limitations on flows to the Newcastle – Sydney – Wollongong corridor, it would appear reasonable to expect that the upgrading of the interconnections should be considered within the evaluation of any project related to the transfers to Sydney. This will relate to the prospective levels of generation in the all regions and the coincidence of peak demand in NSW with the other regions.

The 2004 SOO indicates that the combined Vic/SA region has a tighter supply demand balance, with a forecast minimum reserve deficit in 2006/07, over that of Queensland. This may tend to indicate a preference for transfers to NSW from Queensland, particularly noting the commitment of Cogan Creek. However, the 2004 SOO also indicates that at a time of NSW 2003/04 summer peak demand (Table 17.3), Queensland is at 94% of peak demand, Victoria is at 71% of peak demand and SA is at 60% of peak demand. This tends to indicate that there still may be scope to utilise Vic/SA/Snowy transfers to relieve the limitations discussed above.

Whether or not the prospective levels of generation in the Vic/SA region could be used to economically relieve the transfer issue to Sydney with the existing interconnector capability or an upgraded interconnector capability, would need to be examined within the overall evaluation of the prudent project to relieve the above discussed limitations. Depending on regional generation levels there may be significant avoided network augmentation costs that could be attributed to an upgrade of the Vic/Snowy interconnection. This may favour a Vic/Snowy upgrade over the QNI upgrade.

On balance, at this point neither of these projects appear to have a high probability of proceeding during the coming regulatory period. This is supported by the fact that the recent Annual National Transmission Statement (ANTS)<sup>2</sup>, and the Inter Regional Planning Committee (IRPC) report<sup>3</sup> does not even mention the augmentation of the Victoria/Snowy/NSW capacity through the construction of a Yass Wagga line. Similarly the IRPC report notes that on the basis of the flow gap indicator only a “modest capacity increase may be economically justified”. Nevertheless both of these projects are significant investments and, if they were to proceed during the coming regulatory period, could potentially lead to significant windfall losses to TransGrid unless they were recognised as excluded projects.

### *Triggers*

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<sup>2</sup> NEMMCo, January 2005. Annual National Transmission Statement, Version 1.0.

<sup>3</sup> IRPC, January 2005. Assessment of the 2004 ANTS options, Version 1.06.

We suggest that the trigger for each of these interconnector projects should be a demonstration that the expected benefit from investment in the interconnector is likely to exceed the cost of the investment.

*Related investments included in the calculation of the ex-ante capex allowance*

- QNI - 132 kV Phase angle regulator at Armidale
- Refurbishment of the 132 kV Yass-Wagga line (990)

The ACCC should also be mindful of the related augmentations listed in the “Augmentation of capacity to Newcastle-Sydney-Wollongong corridor” excluded project discussed above. Some of these projects also relate to maintaining the capability of the existing system, including allowing the transfer from the interconnectors. The projects which may be linked to maintaining the transfer capability from the VIC/Snowy interconnector would be:

- Line terminal uprates: UTSS-Canberra No 1; UTSS – Yass No 2; LTSS – Yass No 3; LTSS – Canberra No 7; Marulan – Avon; Marulan – Dapto; Marulan – Yass.
- Capacitor Banks: Canberra 132 kV 120 MVAR; and Darlington Pt 132 kV 2 x 20 MVAR.



# 5. Process for review and assessment of excluded projects during the regulatory period

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## 5.1. Summary of SRP requirements

Appendix G of the Background paper to the Statement of Regulatory Principles sets out the procedures for the assessment of an excluded project event, and the process by which an excluded project incentive will be established.

A two step process is described in establishing an excluded project incentive:

- Step 1: The TNSP notifies the ACCC of its intention to invoke an excluded project event. This should only occur once it becomes clear that investment in response to the excluded event will be necessary. The ACCC will consider the TNSP's application and if approved, the TNSP can proceed to the second step confident that it can proceed to a more formal economic assessment of alternatives, detailed project design, environmental and planning consent approval etc. with the knowledge that, subject to the excluded project incentive, costs arising in the development of Stage 2, will be recognised by the ACCC.
- Step 2: In this phase an excluded project incentive is established after the excluded project has been subject to the Regulatory Test assessment. The ACCC envisages completing the setting of an incentive four months after the application is submitted by the TNSP. The ACCC has emphasised the importance of close liaison with the TNSP in agreeing the key assumptions and analytical approach, in helping to ensure that an excluded project incentive can be developed expeditiously.

In the rest of this section we review each of the possible excluded projects defined in the previous section, with a view to identifying the analysis necessary to demonstrate that an excluded project has been triggered. Although we do not explicitly consider the analytical requirements for the second step, the focus of this second step is to justify that the proposed excluded investment is the most efficient alternative possible and as such extends the analysis needed to demonstrate that a project has been triggered, to the assessment and approval of the most efficient investment alternative.

It should be noted however, that there is an inevitable overlap between the analysis in Step 1 and Step 2. Specifically, while Step 1 is focussed on the need for investment, the assessment of the need for investment can not be conducted

in isolation of the consideration of alternatives that could mitigate or defer that need. For example, an analysis might suggest that an excluded project may be triggered. However, this would not necessarily provide a basis for additional investment, if it was found for example that generation redispatch could mitigate the need for the investment. In other words, while the focus in step 1 is predominantly on the need for expenditure on excluded projects, and step 2 is predominantly focussed on the most efficient way to meet that need, in practice in many cases there is unlikely to be a clear line between the required analysis for steps 1 and 2. This particular point has been brought out in greater detail in the next subsection examining the specific requirements of the analysis of the needed to justify investment in each of the possible excluded projects discussed in the previous section.

## 5.2. Step 1: Demonstration of the need for excluded project expenditure

Possible excluded project	Demonstration of the need for excluded project expenditure
Royalla	<p>To the extent that the ACCC decides to exclude expenditure on the Royalla project, Section 4 identified criteria that TransGrid should satisfy in justifying excluded project expenditure related to the Royalla project. These criteria included:</p> <ul style="list-style-type: none"> <li>the need for 2 separate points of supply and how deep that separation must be;</li> <li>the definition of the N-1 or N-2 level that must be available continuously and after switching; and</li> <li>the % Probability of Exceedance forecast that this security of supply should be within.</li> </ul> <p>The technical and economic evaluation of solutions related to this trigger would have to show how a medium/long term horizon impacts the prudent network development, particularly with respect to the needs of the Cooma region. Information provided by TransGrid has also indicated the possibility of generation in this region. An argument that Royalla investment has been triggered would need to explicitly and objectively demonstrate how existing or committed generation can be utilised to secure the Canberra load.</p>
Holroyd complex and Mason Park substation	<p>The three relevant triggers (for different elements of the Holroyd complex and Mason Park substation expenditure) identified in Section 4 are as follows:</p> <ul style="list-style-type: none"> <li>Limitation 1 (need for Holroyd 132 kV) - Integral Energy supplies to Parramatta limitation: This is a TransGrid/Integral Energy planning issue. Information provided</li> </ul>

	<p>by TransGrid indicates that Integral Energy could manage this limitation until well past this regulatory period if an adequate refurbishment strategy of the existing Integral Energy 132 kV cables is implemented. As such it appears that joint planning with Integral Energy is still required on this issue.</p> <p>Limitation 2 (need for Holroyd 330 kV) - Sydney West 330/132 kV transformer limitation: Based upon information provided by TransGrid, limitation 2 (Sydney West transformers) will not occur until the next regulatory period. As such we do not consider that this limitation can be cast as a trigger for the development of 330 kV capacity at Holroyd during this regulatory period.</p> <p>Limitation 3 (need for Masons Park 330/132 kV) –330/132 kV supplies to Energy Australia inner Sydney. TransGrid study results indicated that Limitation 3 could occur in summer 2008/09.</p> <p>In an assessment that Holroyd complex and/or Mason Park investment in response to any of these three limitations has been triggered, the TransGrid technical and economic evaluation (taking account of joint planning with Energy Australia and Integral Energy) would need to demonstrate consideration of a range of solutions addressing both Energy Australia and Integral Energy longer term plans, and that all opportunities to economically defer investment through short term network or non-network solutions, had been exhausted.</p> <p>Short term network solutions that could defer substantial investment in the Mason Park substation and associated Holroyd complex works would include pre or post contingency network switching (particularly on Energy Australia’s 132 kV system) possibly linked with short term transformer ratings or a special protection scheme. Longer term network solutions would include:</p> <ul style="list-style-type: none"> <li>phase shift compensation to control power flows;</li> <li>increase in 330 /132 kV transformer capacity</li> <li>new Energy Australia 132 kV circuits</li> <li>new 330/132 kV supply (one option for location is Mason Park – other options would have to be considered)</li> </ul>
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	<p>combinations of the above (e.g. new 132 kV cable plus transformer capacity increase)</p> <p>The technical and economic evaluation of the 132 kV supplies to Parramatta limitation would have to be conducted through the joint planning process with Integral Energy. It should include the range of possible Integral Energy and TransGrid options, clearly discussing any issues relating to the Integral Energy 132 kV cable refurbishment option and the medium to long term needs of the 330 kV supply from Sydney West.</p>
Increased capacity to N-S-W corridor	<p>In Section 4, the trigger for investment needed to increase capacity to the N-S-W corridor included:</p> <p>Limitation 1 - Thermal Limitation - Hunter valley to Central Coast 330 kV line (Liddell to Newcastle 330 kV DC): The line ratings associated with the Liddell to Newcastle and Tomago 330 kV lines are as follows: Continuous rating 1220 MVA; sustained emergency rating 1430 MVA; 15 min 1500 MVA (15 min rating applicable for post contingency generation re-dispatch or network switching). The worst case contingency for loading the remaining in service 330 kV circuit is an outage of the other Liddell to Tomago or Liddell to Newcastle 330 kV circuit.</p> <p>Limitation 2: Reactive deficiency / voltage stability for transfers to Sydney: The reactive margin criteria discussed here is defined as: Reactive deficiency (Sydney West)<sup>4</sup> + 200 MVar – 280 MVar (Sydney West SVC). The worst case contingency for calculation of this limitation is an outage of either the Bayswater to Regentville or Wallerawang to Ingleburn 330 kV circuits.</p> <p>Any application by TransGrid for excluded project expenditure related to augmentation of capacity to the N-S-W corridor should be related to specific demonstration that one or both of the above limitations are binding. Much of the existing power system studies conducted by TransGrid assist in defining the network limitation and relationships with the generation dispatch pattern. For a future of review of whether</p>

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<sup>4</sup> The reactive deficiency at Sydney West has been calculated from a load flow study with a QV type generator at Sydney West. The voltage of the QV generator is adjusted to determine the knee point and the reactive deficiency is calculated as the Q value at this knee point. The knee point is the voltage that results in the minimum Q value.

	<p>investment has been triggered an analysis encompassing the following would be desirable:</p> <p>Clear descriptions of both limitations indicating the multi dimensional nature with Sydney/Newcastle demand levels and generation dispatch patterns. This would probably be in the form of some type of equation such that a demand and dispatch pattern can be defined, and from this it can be seen whether the limitation is violated or not. This would need to address the overload, voltage knee point, and reactive deficiency. The definition of the limitations would need to be supported by power system studies results that can be reviewed to verify the limitations.</p> <p>For a medium to long term assessment of the network development, further development of the network limitations following the assumed network developments would be required similar to those above.</p> <p>NEM supply / demand / minimum reserve market analysis to better define the capability of the NEM system to supply NSW at the peak, and the ability to economically and reliably alleviate the limitations, particularly via dispatch of central coast generation and generation from south of Sydney.</p> <p>The technical and economic evaluation would have to show how an economic assessment across a medium/long term horizon impacts the prudent network development. This is particularly important to assess the optimal timing of a major network reinforcement such as the western 500 kV upgrade with a new line development, and which stage should be first and second.</p> <p>TransGrid has also advised that environmental and planning issues result in difficulties with obtaining new lines which results in a preference for no new line solutions. We understand this issue, however, it is still important that all reasonable options are evaluated first from the technical and economic perspective. Following some form of PV or NPV type of analysis, the criticality of planning issues and potential lead times can be better understood.</p> <p>Based upon the information provided by TransGrid to date, there is a range of possible solutions to the limitations discussed above. The discussion of the limitations in the PB Associates report indicates the</p>
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	<p>possible non-network options that would defer the need for major network reinforcement. However, if firm commitments on the non network options can not be obtained, or a reliable system and economic outcome can not be maintained, then some form of network option may be required during this regulatory period.</p> <p>The non-network options that should be evaluated could include:</p> <ul style="list-style-type: none"> <li>generation dispatch patterns favouring dispatch in the Sydney / Newcastle region, and south of Sydney; or</li> <li>pre contingent load curtailment, or automatic load curtailment system in the Sydney/Newcastle region; or</li> <li>additional generation in favourable locations (Newcastle, Sydney and south of Sydney); or</li> <li>the combination of above.</li> </ul> <p>Network solutions could include:</p> <ul style="list-style-type: none"> <li>Some form of network switching option (this would probably require a special protection scheme to automatically operate post contingent)</li> <li>Shunt compensation – capacitor banks above those assumed in tht TransGrid application (TransGrid indicate options for this are exhausted by 2008/09 – only impacts reactive limitation)</li> <li>Line series compensation on existing 330 kV lines</li> <li>Phase angle regulator(s) on existing 330 kV lines</li> <li>Western 500 kV upgrade</li> <li>New line development – Hunter Valley to Central Coast</li> <li>New line development – Bannaby/Marulan to Sydney</li> <li>Other line upgrade or development option</li> <li>Combinations of above, particularly over medium/long term</li> </ul>
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	<p>For an evaluation over the short, medium and long term planning horizon, it would be expected that a combination of the above would be obtained. The optimal outcomes across a range of generation development scenarios should also be obtained. These scenarios should assess the network developments required if generation is obtained in more favourable locations and times as well as the minimum reserve margin scenario (as in the existing TransGrid backgrounds) to better understand the relationship between future generation levels and locations, and the impact on the future network development.</p> <p><b><i>Note on major interconnector upgrades</i></b></p> <p>A major upgrade of the Queensland-NSW interconnection or VIC/Snowy-NSW interconnector is discussed in the section below. At times of peak NSW demand, interconnector flows must transfer power into NSW. However, the flows from Vic/Snowy are more favourable than those from Queensland in reducing the two limitations discussed above.</p> <p>The TG backgrounds (medium growth) assume the QNI major upgrade is in service for 2008/09 providing an increase in interconnector capability of 150 MW. As flows from Vic/Snowy are preferential over flows from Queensland with respect to reducing the limitations, it would appear reasonable to expect that the upgrading of the interconnections should be considered within the evaluation of any project related to the transfers to Sydney. This will relate to the prospective levels of generation in the all regions and the coincidence of peak demand in NSW with the other regions.</p> <p>The 2004 SOO indicates that the combined Vic/SA region has a tighter supply demand balance, with a forecast minimum reserve deficit in 2006/07, over that of Queensland. This may tend to indicate a preference for transfers to NSW from Queensland, particularly noting the commitment of Cogan Creek. However, the 2004 SOO also indicates that at a time of NSW 2003/04 summer peak demand (Table 17.3), Queensland is at 94% of peak demand, Victoria is at 71% of peak demand and SA is at 60% of peak demand. This tends to indicate that there still may be scope to utilise Vic/SA/Snowy transfers to relieve the limitations discussed above.</p> <p>Whether or not the prospective levels of generation in the Vic/SA region could be used to economically</p>
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	<p>relieve the transfer issue to Sydney, with the existing interconnector capability or an upgraded interconnector capability, would need to be examined within the overall evaluation of the prudent project to relieve the above discussed limitations. Depending on regional generation levels there may be significant avoided network augmentation costs that could be attributed to an upgrade of the Vic/Snowy interconnection. This may favour a VIC/Snowy upgrade over the QNI upgrade.</p> <p><b><i>Note on Kemp Creek to Sydney South development.</i></b></p> <p>The needs for this project are not related to those of the transfers to Sydney. However, the prudent solution of both projects may be interrelated. The Kemps Creek to Sydney South project is most likely required in the next regulatory period (2011/12 in the TransGrid medium growth scenario). The prudent solution to this requirement may well be impacted by the developments related to the transfers to Sydney and as such the possible options for developments related to the Kemps Creek to Sydney South development will be required to be included in the analysis related to the limitations discussed here.</p>
<p>QNI upgrade and Yass - Wagga transmission line</p>	<p>As noted in Section 4, these projects need to be justified against a net benefit criterion. As such, its likely that in this case there will be a strong overlap between the work required to justify the need for the investment (in Step 1) and the work required to assess the most efficient way to meet that need (Step 2), because a net benefit assessment requires a knowledge of both the benefits and the costs to be incurred to deliver those benefits.</p>