

Memorandum

TO: Phil Gall
FROM: Tom Hird
SUBJECT: Response to ACCC Issues on Indexation
DATE: 24 January 2005

On 19 January we met with the ACCC to discuss indexation of TransGrid's *ex ante* cap. In that meeting the ACCC raised three areas where it would like further information, specifically:

- the materiality of the projected increase in construction activity and its likely impact on construction (output) prices;
- the consistency with incentive regulation of TransGrid's proposed indexation regime; and
- the practical aspects of constructing an index as proposed by TransGrid.

The NERA memo you handed over in that meeting addressed the last of these issues at a high level. This memo focuses on the first two of the above issues.

1 MATERIALITY OF REAL UNIT PRICE RISES IN ELECTRICAL CONSTRUCTION

Construction price inflation is a material issue for the forthcoming regulatory period. In this we present evidence for this assertion, including:

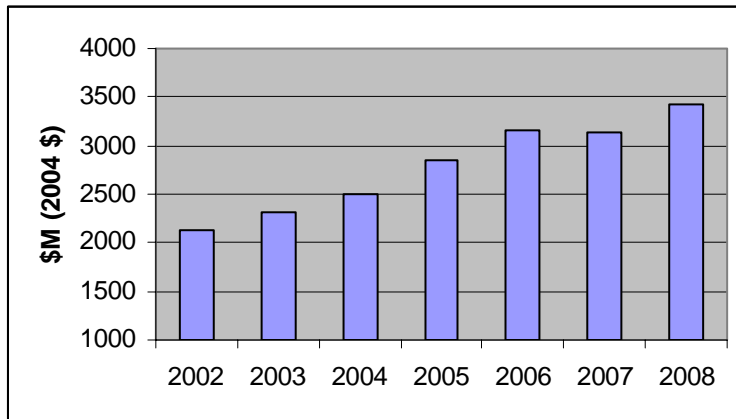
- evidence of a material increase in construction output over the next regulatory period; and
- evidence of the responsiveness of real unit prices to output.

1.1 Evidence of Increased Electricity Network Construction Output

An increase in real capital expenditure in the NEM of the order of 36% is expected over the next four years to 2008 (or 7.7 percent per annum). Figure 1 provides data on capital

expenditure by TNSPs and DNSPs in four states (NSW, Queensland, Victoria and South Australia), over the years 2002-2008.¹

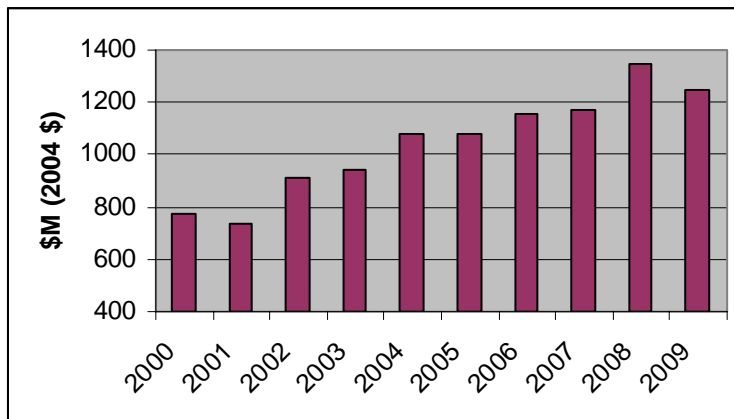
Figure 1: Real Capital Expenditure: TNSPs and DNSPs in Four States



The chart provides evidence of a material increase in capital expenditure over the next regulatory period, compared to expenditure levels over the past few years. In real terms (2004 dollars), the average annual total capital expenditure figure for 2005 to 2008 (\$3,140 million) is 35% higher than that for 2002 to 2004 (\$2,318 million). Similarly, the average compounding annual increase in activity between 2004 and 2008 is 7.7%. Most, if not all, of this increase in regulatory forecasts of real expenditure is due to increases in real output activity rather than increases in real prices per unit of output.

Figure 2 considers similar data, focusing on TransGrid and the four NSW distributors. Here the picture is similar, with significantly higher levels of expenditure expected in the forthcoming regulatory period.

¹ Generally, the figures for 2002-2004 are actual expenditure, and those for 2005-2008 are allowed or forecast expenditure. In some cases actual figures could not be obtained, and average figures have been substituted.

Figure 2: Real Capital Expenditure in NSW: TransGrid + DNSPs

The chart provides evidence of a significant increase in capital expenditure over the next regulatory period. In real terms (2004 dollars), the average annual total capital expenditure figure for 2005 to 2009 (\$1,200 million) is 35% higher than that for 2000 to 2004 (\$888 million). This is consistent with the 7.7% annual percentage increase in construction output for the NEM as a whole.

1.2 The relationship between prices and output

We understand that there is a limited supply of contractors skilled in the supply and installation of electrical capital items such as substations and power lines. When the demand for such services expands rapidly it is standard economics to expect a corresponding increase in the real unit cost of purchasing those services.

The ACCC must incorporate some forecast of real unit prices in its regulatory determination. (TransGrid's proposal is that the ACCC also commit to revisit this forecast if evidence becomes available that it is materially inaccurate.) In order to develop a forecast of unit construction costs it would be ideal to examine past evidence of the relationship between construction prices and construction output in the electricity network construction industry. Unfortunately no such evidence is currently available due to the lack of information on historical unit prices.

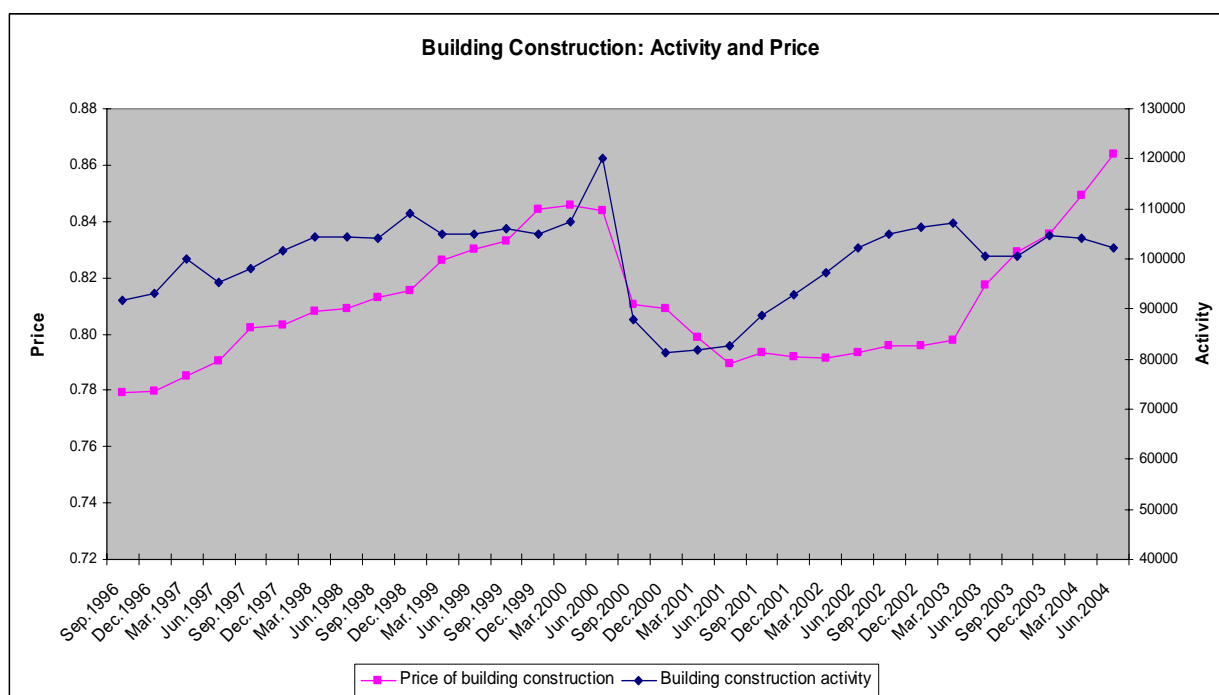
However, it is possible to infer a relationship between prices and output by examining the historical relationship between prices and outputs in other construction industries. Since the appropriate pricing data is not available for electrical supply and installation prices, we have

used the historical relationship between output and prices in a comparable sector (building construction)² as a proxy.

There has been a significant increase in building construction activity over the last three years: the average quantity of work done as measured by the ABS in the year to June 2004 was 23% higher than in the year to June 2001. Over the same period annual building construction prices as measured by the ABS increased by 14% over the same period (ie, a 5% increase in real unit prices given CPI increase of 8.5% over the same period).

This positive relationship is illustrated further in the chart below, which plots quarterly figures for the real output price of building construction against seasonally adjusted building construction activity between September 1996 and July 2004.³ The graph shows the two series moving roughly in tandem, with a period of increase in the early years of the period, a sharp decline, and further growth in recent years. Generally, the rises and falls in construction activity are marginally earlier than the corresponding change in price.

Figure 3: Building Construction: Activity and Price



² ABS series 8782, table 1. Construction Activity, Chain Volume Measures - Seasonally Adjusted - Value of work done - Total building, including Residential building and Non-Residential building. This value index was deflated by the ABS's building construction output price index to derive an output index (ABS series 6427 (Producer Price Indices), table 16. Output of the general construction industry - Building construction, including House building, other Residential building and Non-Residential building construction.)

³ These dates reflect the availability of ABS data: September 1996 is the earliest that both series were available. NB: the scale of the axes represents relative price movements only: the absolute numerical values are not meaningful.

Our statistical analysis using the above data also finds a significant positive relationship between contemporaneous and lagged building construction activity and building construction prices. On the basis of this analysis a permanent increase of 1% in construction activity results in an increase in prices of 0.42% after 6 quarters.

1.3 Conclusion on materiality and forecasts

On the basis of the above analysis we consider there is ample evidence to suggest that the potential for positive real inflation in the unit construction prices faced by TransGrid (and other TNSPs) over the remainder of the regulatory period is high.

Based on the last three years of data from the building construction industry (where a 23% increase in average activity was associated with an average 5% increase in real prices) we could expect the forecast average 7.7% per annum increase in average levels of activity in construction of electrical networks to result in around 1.7% per annum ($=5/23*7.7$) increase in real prices over the five years to 2008/09. This is equivalent to a 8.7% increase in real construction prices by the end of the regulatory period. Based on our regression analysis using building construction quarterly data since September 1998 the best forecast for real price growth in construction activity is even higher at around a 0.42% increase in real prices for every 1% increase in output. If this relationship held then the forecast 7.7% per annum increase in construction of electrical networks would result in a 3.2% per annum increase in real construction prices per annum over the next five years.

However, these estimates are highly uncertain as they are based on extrapolation from the building construction industry to the industry for the construction of electrical networks. This extrapolation may not be accurate for a number of reasons. For example, the relationship between prices and output may be even stronger for electrical network construction due to the existence of more specialised skills. Alternatively, it may be even weaker, say, due to the fact that the industry is smaller and may be able to draw on factors of production from the wider construction industry without pushing up prices as much. Moreover, it is possible that the observed historical relationship in building construction is itself a historical anomaly - with the forward-looking relationship being weaker/stronger.

These caveats notwithstanding, the best estimate of the real increase in construction prices is something above 1.7% per annum (or over 8.7% by the end of the period) This underscores two important conclusions:

- the potential for real increases in construction prices is not only material but is actually likely; and
- the high probability of material forecast error makes the case even stronger for developing a robust estimate of actual price increases with a view to making an appropriate adjustment in the event of such forecasting error.

2 INCENTIVE REGULATION AND INDEXATION

Our 19 January meeting with the ACCC also discussed the consistency with incentive regulation of TransGrid's proposal to index its *ex ante* cap to a cost index derived from businesses' own contract data (or possibly solely from TransGrid's contract data). There was some discussion around whether such a proposal moved the regulatory regime away from incentive regulation and towards 'rate of return' regulation.

In our opinion the potential for harm to incentives from the proposed indexation regime is limited to two possibilities. The first is that there may be some inefficiency in TransGrid's own contracting procedures that gets incorporated into the prices for the output (ie, the data may not be truly exogenous despite it being sourced from competitive tender). Second, even if it is accepted that the raw data is exogenous, if the index weights are based TransGrid's actual assets installed then TransGrid may have a reduced incentive to substitute away from inputs/projects whose costs have the (relatively) fastest rate of increase.

We examine each of these in turn, however, we first restate TransGrid's proposal in simple terms. Finally, we examine the negative effects on incentive regulation of **not** adopting TransGrid's indexation proposal.

2.1 TransGrid's Proposal

TransGrid's proposal can be broken down into the following stages:

- 1st The ACCC carries out (or audits) sampling of TNSP's construction contracts with a view to establishing the average unit costs associated with the construction of particular units or sub indexes in any particular year (eg, cost per transmission tower or cost per kilometre of transmission line of a particular voltage or cost per substation etc);
- 2nd The ACCC then constructs an overall capex construction index by applying weights to each cost component (sub index) that is consistent with the weights implicit in TNSPs' capex programs;
- 3rd The ACCC includes in its revenue modelling a forecast of average real unit cost increases over the regulatory period; and
- 4th If actual cost escalation (estimated in step 2) *materially* differs from forecast cost escalation (assumed in step 3) then the ACCC adjusts its decision to take account of this forecasting error (either during or at the end of the regulatory period).

2.2 Possible problem with step 1 - exogeneity of data derived from competitive tender

If it is the case that TransGrid can exert material control over the prices at which contractors bid for contracts then it is possible that using these prices to index TransGrid's *ex ante* cap will undermine TransGrid's incentives to keep these prices low.⁴ That is, TransGrid may lose the incentive to invest in activities that tenders deliver the lowest possible price – such as ensuring that a large enough number of contractors are invited to tender for a project.

It is unclear to us that TransGrid can exert material control over the prices at which contractors bid for projects. However, to the extent that this is the case an incentive for TransGrid to minimise these prices would nonetheless be preserved under TransGrid's proposal by virtue of the fact that:

- the *ex ante* cap is only adjusted when a *material* difference exists between forecast and actual construction price inflation; and
- the use of more than one TNSP's tender data dilutes the impact of any price rises that are specific to a TNSP's inefficient contracting.

These aspects of TransGrid's proposal suggest that TransGrid will have a large incentive to invest in activities that ensure the lowest possible tender prices. While differences in actual and forecast prices are within a 'material' band then TransGrid receives 100% of the benefit from lowering tender prices. Even when this band is breached TransGrid will still benefit from lowering tender prices to the extent that the final index used by the ACCC is based on tender data of other TNSPs and not just TransGrid's data.

Moreover, it appears likely to us that any control TransGrid has over tender prices can be exerted at relatively low cost to TransGrid (eg, inviting more contractors to bid). As a result, even a small incentive to minimise these prices should be sufficient to ensure that TransGrid actually undertakes those activities.

2.3 Possible problem with step 2 – Substitution between asset types

If it was the case that the weights applied to each sub index in order to develop an average construction price were based on the actual assets installed by TransGrid (rather than the probabilistic forecast of assets used by the ACCC to set the *ex ante* cap) then TransGrid may

⁴ It is important to note that even if TransGrid's construction **prices** were fully passed through to final customers TransGrid would still have an incentive to minimise total construction **expenditure** (ie, TransGrid would have an incentive to minimise the number of assets constructed in order to meet its service standards). This is because TransGrid is *not* proposing a pass through of its expenditure but rather is proposing that the forecast level of expenditure is adjusted for differences between assumed and actual unit prices.

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have a reduced incentive to substitute away from projects whose costs are increasing faster than other projects. Although, once more the fact that adjustments are only proposed for material deviations between forecast and estimated unit costs combined with the proposed use of data from more than one TNSP suggests indexation would preserve the incentive to substitute away from (relatively) more expensive projects.

In any event, if the weights used to construct the index were set on the basis of the probabilistic weights in the *ex ante* forecast then TransGrid would have an unchanged incentive to substitute away from projects whose costs have increased relative to other projects.

TransGrid's proposal to date is silent on the application of weights to each of the sub indexes of unit costs. It would be a relatively simple activity for the ACCC to construct its own index of average unit construction costs based on whatever weights it considered appropriate.

2.4 Incentive properties of not adopting TransGrid's proposal

Based on the evidence supplied elsewhere in this note there is a material probability that TNSP's will face exogenous real construction price increases in the order of 20% or more over the next five years. If a TNSP does not expect to be fully compensated for these cost increases it will have an increased incentive to defer investments into the next regulatory period - even if that compromises service standards and even if it would be lower cost to make that investment today. This has the potential to introduce inefficient investment signals that dwarf those discussed above.

2.5 Conclusion of incentives

On the basis of the above analysis it is possible to conceive of an indexation regime that reduced TransGrid's incentives to efficiently tender for projects and to efficiently choose between projects. However, we believe that TransGrid's proposed approach to indexation has the effect of greatly reducing or even eliminating such risks. Moreover, it has the positive efficiency benefit of reducing the incentive to inefficiently under invest if exogenous construction price increases exceed forecast price increases.

3 PROPOSED WORDS FOR THE ACCC'S DRAFT DECISION

A form of words addressing indexation of the *ex ante* cap for the ACCC's draft decision are as follows.

"TransGrid has presented evidence to the ACCC that there will be a material increase in construction by TNSP's and DNSPs in eastern Australia over the next five years. TransGrid has also presented evidence that real construction unit prices are likely to be sensitive to

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total construction activity – such that the increase in construction in electricity networks can be expected to cause unit construction prices to rise faster than CPI. However, TransGrid admits that the likely impact on real construction prices is highly uncertain as there is insufficient data on how past prices have responded to changes in demand.

Given this uncertainty TransGrid has proposed that the ACCC adopt a forecast of real increases in unit construction prices over the regulatory period and that it compares this with estimates of actual unit price increases at the end of the regulatory period. TransGrid proposes that if there is a material difference (positive or negative) between forecast and estimated price increases then an adjustment be performed to ensure that customers or TransGrid do not receive windfall losses/gains as a result of forecasting error.

In order to do this TransGrid proposes to collect information from its contract data capable of shedding light on how changes in unit costs vary over the current regulatory period. TransGrid further proposes that the ACCC should consider working with other TNSPs and DNSPs to collect similar data – with a view to developing an industry wide index of electrical network construction costs.

The ACCC recognises TransGrid's concerns over the uncertainty of future construction prices as legitimate. As a consequence the ACCC is open to receiving information from TransGrid on how its own unit costs have changed and to considering the costs and benefits of developing an industry wide index of construction costs. However, the ACCC remains to be convinced that all the practical obstacles can be overcome in developing a credible and transparent estimate of exogenous changes in unit cost increases. Consequently, the ACCC gives no commitment to making an adjustment based on data supplied to it by TransGrid.

Nonetheless, the ACCC recognises that it must adopt an estimate of real unit construction price increases in forming its own forecast of the *ex ante* cap. In weighing up all the available evidence the ACCC has forecast real unit construction costs to increase by 1.7% per annum on average over the regulatory period."