ALLOCATION OF EFFICIENCY GAINS

A Report for TransGrid

Prepared by NERA

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Sydney

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TABLE OF CONTENTS

1 OVERVIEW

On 28 April 2004 the Australian Competition and Consumer Commission ('ACCC') published its Draft Decision on TransGrid's revenue cap ('the Draft Decision') for the period 1 July 2004 to 30 June 2009. The Draft Decision was the first of the 'second round' revenue cap decisions.

In parallel with the conduct of this review, the Commission has attempted to develop important elements of the regulatory regime with the aim of strengthening efficiency and service incentives. This parallel process involved the finalisation of the ACCC's Statement of Principles for the Regulation of Electricity Transmission Revenues (SRP) on which the ACCC released a Draft Decision in August 2004. The SRP Draft Decision includes the refinement of an efficiency incentive mechanism for operating and maintenance expenditure ('opex'). The detail of the regime in this area is yet to be fully consulted upon, thus the changes proposed by the Commission in its Draft Decision are not final.

NERA has been asked by TransGrid to review aspects of the Commission's Draft Decision on TransGrid's revenue cap Draft Decision with a view to informing a decision on how the ACCC should comply with the constraints placed on it by the National Electricity Code ('the Code') when dealing with anticipated efficiency gains made by Transmission Network Service Providers ('TNSPs'). Specifically, we have been asked to:

- define '***efficiency gains***' as per clauses 6.2.4(3)(c) and 6.2.2(b)(1) of the Code;
- determine, if possible, the level of efficiency gains the ACCC's Draft Decision anticipates as '***reasonably expected to be achievable***' as per clause 6.2.2(b)(1) of the Code; and
- detail the allocation of '***efficiency gains reasonably expected to be achievable***' explicit or implicit in the ACCC's Draft Decision.

The context for this work is to assist TransGrid in determining whether the Draft Decision complies with the requirements set out in the Code regarding how the ACCC must deal with anticipated efficiency gains made by TNSPs. In particular, clause 6.2.2(b)(1) of the Code ***requires*** that the ACCC provide for:

> ***'an equitable allocation between Transmission Network Users and Transmission Network Owners and/or Transmission Network Service Providers of efficiency gains reasonably expected to be achievable'.***

Our findings are that the standard economic and plain English definition of 'efficiency gains' both relate to reductions in the ratio of outputs to inputs. We also conclude that the Draft Decision's explicit estimate of 'reasonably expected efficiency gains' in opex is 2% pa, compounding. Under the ACCC's Draft Decision, if a 2% efficiency gain is achieved, we conclude that the highest allocation of these gains to TransGrid will be 0%. We also

conclude that the most likely allocation of these gains to TransGrid will be negative (given that the ACCC's opex benchmark implies a greater efficiency gain than the ACCC's explicit target of 2% pa).

Although we are not in a position to offer an expert opinion on the definition of 'equitable allocation' under clause 6.2.2(b)(1), we can say that it would be necessary for this definition to envisage zero or negative allocations as 'equitable' in order for the ACCC's Draft Decision to comply with this clause.

Moreover, it appears that to the extent that TransGrid achieves actual efficiency gains that differ from 'reasonably expected efficiency gains' then a case could be made that the allocation of these is also not 'equitable'. For example, if TransGrid achieves a 1% efficiency gain (ie, 1% less than the ACCC's estimate) the minimum negative allocation of this gain (penalty) it will receive is –36%, ie, TransGrid will be penalised to the tune of 36% of the total efficiency achieved. By contrast, if TransGrid achieves a 3% efficiency gain (ie, 1% more than the ACCC's estimate) the maximum benefit (positive allocation) it will receive is 12%. In other words, where efficiency gains deviate from the expected level (2%) the ACCC's Draft Decision has an implicitly asymmetric allocation of efficiency gains – with TransGrid being heavily penalised for not meeting the 2% target but being relatively moderately rewarded for exceeding it.

These results are exacerbated when it is recognised that the ACCC Draft Decision requires TransGrid to make a number of implicit efficiency gains above and beyond the explicit 2% target.

The remainder of this report is structured as follows:

- section two outlines the pertinent requirements with which the ACCC must comply under the Code when dealing with anticipated efficiency gains;
- section three provides a definition of 'efficiency' and 'efficiency gains';
- section four evaluates the ACCC's Draft Decision and includes:
  - (i) a summary of the Commission's view of '***efficiency gains reasonably expected to be achievable'***;
  - (ii) a discussion of other reasonable interpretations of '***efficiency gains reasonably expected to be achievable'***;
  - (iii) an analysis of the allocation of those gains between TransGrid and customers implicit in the ACCC's Draft Decision; and
  - (iv) an opinion on whether the Commission's approach is consistent with the Code requirements set out in section two.
  - section five addresses potential amendments to the Draft Decision that may achieve compliance with the Code; and

- section six summarises our key conclusions.

2 CODE REQUIREMENTS

The Code places at least two relevant constraints on how the ACCC must deal with anticipated efficiency gains made by TNSPs. Clause 6.2.4(c)(3) states that when setting regulated revenues the ACCC can, amongst other things, have regard for its:

> ***'[R]easonable judgment of the potential for efficiency gains to be realised by the Transmission Network Owner and/or Transmission Network Service Provider (as appropriate) in expected operating, maintenance and capital costs, taking into account the expected demand growth and service standards referred to in clauses 6.2.4(c)(1) and (2)'.***

In addition, clause 6.2.2(b)(1) also ***requires*** that the ACCC allow:

> ***'[A]n equitable allocation between Transmission Network Users and Transmission Network Owners and/or Transmission Network Service Providers of efficiency gains reasonably expected to be achievable'.***

From an economic perspective, these two clauses are mutually consistent. Arguably, there are numerous ways in which the Commission might fulfil its obligations under 6.2.4(c)(3) by having regard for the ***potential*** for efficiency gains. However, 6.2.2(b)(1) is more specific, requiring the Commission to allow an equitable allocation of ***reasonably expected*** efficiency gains. Notwithstanding the means by which the ACCC has had regard for ***the potential*** for efficiency gains, 6.2.2(b)(1) requires the Commission to devise some mechanism for equitably allocating ***reasonably expected*** efficiency gains between the TNSP and its customers.

It would appear that, if the ACCC has formed a view concerning ***'efficiency gains reasonably expected to be achievable'*** then the ACCC's decision must allow for an '***equitable allocation'*** of those gains.

3 DEFINING EFFICIENCY

In order to interpret ***efficiency gains reasonably expected to be achievable***, it is necessary to first define the terms 'efficiency' and 'efficiency gain'. When the ordinary English definition of efficiency is considered, it appears plain that the relationship between scarce factor inputs and outputs is critical. Dictionary definitions of 'efficiency' include:

> ***'The ratio of the effective or useful output to the total input in any system.'***[1]
>
> ***'The ratio of useful work to energy expended.'***[2]
>
> ***'The ratio of useful work performed by a device or system to the total energy input.'***[3]

These definitions imply that, in a general sense, efficiency can be thought of as a ratio – with 'outputs' in the numerator and 'inputs' in the denominator. To the extent that outputs increase without inputs increasing (or inputs decrease without outputs decreasing) then efficiency has been improved, ie, an ***efficiency gain*** has been achieved.

$$\textbf{\textit{Efficiency}} = \frac{TotalOutput}{TotalInput}$$

Defining and measuring efficiency in this fashion is also well-accepted in the economics literature and corresponds to the term 'productive' or 'technical' efficiency. We note this form of efficiency can be distinguished from allocative (dynamic) efficiency, which relates to the choice of which goods or services to produce (and when) rather than the efficiency of producing any one good or service.

Technical efficiency measures how well a production process has utilised all of its resources to produce that good or service. This appears to be the type of efficiency that drafters had in mind when drafting clauses 6.2.4(c)(3) and 6.2.2(b)(1). Moreover, economic definitions of technical efficiency are largely identical to the 'ordinary English' definitions of efficiency outlined above. These definitions reinforce the notion that efficiency can be generally thought of as the ratio of output to input, for example:

> ***'Technical or productive efficiency: output per unit of input.'***[4]
>
> ***'Technical efficiency requires that for any given amount of output the amount of inputs used to produce it is minimised.'***[5]

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1 The American Heritage Dictionary of the English Language, fourth edition, 2000.

2 Webster's Revised Unabridged Dictionary, 1998.

3 The New Shorter Oxford Dictionary, 1993.

4 Dictionary of Free-Market Economics, Edward Elgar Publishing Ltd, 1998.

> ***'The relationship between scarce factor inputs and outputs of goods and services.'***[6]
>
> ***'Technical efficiency requires a firm to produce the maximum output given the level of inputs employed.'***[7]

In our opinion, the phrase referring to the ***efficiency gains reasonably expected to be achievable*** by TransGrid should be interpreted as the change in the ratio of TransGrid's output to its inputs used.

This still leaves the question as to how TransGrid's 'output' and 'inputs' should be defined. Broadly speaking TransGrid's 'output' is the provision of electricity transmission services to the National Electricity Market (NEM). In order to deliver this output TransGrid must invest in extensions/replacements to the transmission network (such as new transmission lines and substations) when the demand for electricity transmission exceeds the network's ability to deliver that transmission to a desirable level of reliability. Similarly, TransGrid must maintain and operate existing assets. As a consequence, two broad categories of inputs (capital and operating) are required to deliver the output that is 'transmission services'.

In this report we are interested in examining the contribution to efficiency gains delivered as a result of efficiencies in operating and maintenance activities. If the level of output and capital inputs is held constant then an opex efficiency gain will, by definition, be achieved if the number of opex inputs used falls. Of course, in practice, TransGrid's total output and its total capital inputs (eg, new lines and substations) are constantly increasing. Consequently, it is not possible to 'hold constant' total output and capital inputs when examining the efficiency of opex.[8] However, it is extremely difficult to place a magnitude on how total output is changing.[9] In any event, even if the impact of capital expenditure (capex) on output could be quantified, the ACCC Draft Decision on capex has not yet been released – meaning it is not possible to judge the capex program's contribution to either inputs or outputs

For the present purpose, it is therefore expedient to define opex outputs and opex inputs independently of the contribution of capex to both output and inputs. We believe that this is relatively uncontroversial in that the output associated with opex can be defined as the operation and maintenance of the existing network to a given level of reliability while

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5 The World Bank, See: http://www.worldbank.org/wbi/healthflagship/module1/gloss1.html

6 Collins Dictionary of Economics, Second Edition, 1993, p.160.

7 Kumbhaker & Lovell (2000) ***Stochastic Frontier Analysis***, Cambridge, Cambridge University Press.

8 For example, load and generation growth (as well as locational shifts in the pattern of load and generation) mean that TransGrid's output is constantly growing to meet the demands placed on the network. This inevitably involves increases in capital inputs.

9 For example, what contribution does an improvement in reliability/losses due to upgrades of the Western Area network contribute to output versus a similar reliability improvement in the Sydney CBD?

meeting all the relevant legal and regulatory obligations placed on a transmission business.[10] This output will, other things constant, increase with the number of assets being operated and maintained, and the number of legal/regulatory obligations placed on the TNSP (quantifying the way in which output increases with new assets is potentially more controversial than recognition of the fact that it does so). The inputs associated with opex relate to units of resources (eg, person hours of particular skill grades, number of vehicles, etc) required to deliver these outputs.

It is therefore possible to define an opex efficiency gain as having occurred if the size of the number of opex inputs falls without any reduction in the number of assets operated/maintained or obligations met by TransGrid.

[10] We note, however, that this assumption does not capture potential interactions between capex and opex, such as the possibility that some capex may specifically be intended to reduce opex costs.

4 EVALUATION OF ACCC DECISION

4.1 Efficiency Gains Expected by the ACCC

It is clear from the ACCC's analysis in its Draft Decision that it considered a key task in formulating TransGrid's opex allowance was to estimate the ***efficiency gains reasonably expected to be achievable*** during the regulatory period. Several statements by the Commission confirm this, for instance on page 24 the ACCC states:

> ***'The ACCC has sought to establish an opex target that reflects its estimate of the average expected opex efficiency. By implication, TransGrid will derive above average returns on equity if it achieves above average opex efficiency'*** (Emphasis added.)

Further, at page 31 the Commission concludes:

> ***'[T]he ACCC has confidence that a 2 per cent compound productivity improvement is a suitable mid-point of range of expected productivity improvements that TransGrid is able to achieve over the coming control period, and that its actual performance could be significantly higher than this.'*** (Emphasis added.)

In practical terms the Draft Decision implements its ***'2 per cent compound productivity improvement'*** in a manner that is perfectly consistent with the definition of an efficiency gain developed in the previous section. That is, the Draft Decision calculates a baseline operating expenditure 'as if' there is no change in the number (and mix) of inputs and then imposes a uniform 2% compounding reduction in the number of these inputs in order to derive its benchmark operating expenditure.

In terms of code compliance it should be noted that:

i. both of the above quotes strongly imply that the ACCC's 'best estimate' of opex ***efficiency gains reasonably expected to be achievable*** is 2% pa compounding; and

ii. the first of the above quotes clearly show that the intended allocation of this anticipated efficiency gain is 0% to TransGrid and 100% to customers. That is, ***'by implication, TransGrid will derive above average returns on equity if it achieves above average opex efficiency'.***[11]

Since the anticipated 2% pa efficiency gain appears to fall clearly within the ambit of clause 6.2.2(b)(1), one would expect it to be equitably allocated. It follows that in order for the ACCC's Draft Decision to be Code compliant it must be the case that 0% is an equitable

[11] ACCC Draft Decision, p.24.

allocation to TransGrid. However, it may well be the case that a 0% allocation was not what the legislators meant by 'equitable allocation' when they passed the Code into law.

Moreover, if the scope of 6.2.2(b)(1) was interpreted more widely so that it dealt not just with the allocation of expected efficiency gains but also with achieved efficiency gains, an even stronger case may exist that the Draft Decision is not Code compliant. Employing the Commission's methodology, all efficiency improvements falling short of the expected efficiency gain included in the ***ex-ante*** benchmark will result in a ***negative*** allocation to TransGrid. By contrast, its customers will receive 100% of all expected efficiency gains that have been included in the ex-ante benchmark ***plus*** the value of any financial penalty imposed on TransGrid in the next regulatory period. For example, imagine that the value of expected efficiencies incorporated in the ***ex ante*** opex benchmark was $200 but TransGrid achieved only $150 then TransGrid would receive an allocation of less than -$50[12] and customers would receive an allocation of more than +$200. That is, customers would receive more than both:

i. the actual value of efficiency achieved in the regulatory period; and

ii. more than the ACCC's best estimate of efficiency achievable in that regulatory period; and

It is difficult to conceive of negative allocations of efficiency gains being 'equitable' – even if those efficiency gains fell short of the ***efficiency gains reasonably expected to be achievable***. In other words, it is difficult to conceive of a framework under which 50% of the time a TNSP receives a negative allocation of efficiency gains achieved and customers receive over 100%. In fact, it is difficult to envision how an 'allocation' could be negative, within the ordinary meaning of clause 6.2.2(b)(1) - the term ***'allocate'*** appears to presuppose a positive sum.

The following table describes the allocation of efficiency gains between TransGrid and its customers for various levels of efficiency achieved by it. The assumptions underlying these estimates are as follows:

- the ACCC's benchmark allowance for opex in the Draft Decision does not include any implicit efficiency gains above and beyond the explicit 2% compounding efficiency gain. (As discussed later we believe that this assumption is very conservative and that, in reality, the ACCC's opex benchmark incorporates significantly more than the explicit 2% efficiency gain.);

[12] TransGrid's allocation is ***less than*** -$50 because not only does it have its revenues set 'as though' it achieved efficiencies worth $200 during the regulatory period but it is also penalised in the next regulatory period for not achieving the ACCC's target efficiency gain.

- the ACCC adopts the efficiency carryover mechanism described in its Draft Decision on the SRP;[13]
- that in all future regulatory periods opex benchmarks are set equal to actual opex in those periods (this allows us to focus solely on the implications of the current regulatory period); and
- a discount rate of 8.0% (based on the ACCC's Draft Decision estimate of the pre-tax real WACC).[14]

Table 1: Allocation of Actual Efficiency Gains - Based on ACCC Assumptions

Annual compounding efficiency gain achieved by TransGrid	Associated efficiency gain over the 5 year period	Allocation of actually achieved efficiency gain to TransGrid (%)	Allocation of actually efficiency gains to customers (%)
0%	0%	Div by zero	Div by zero
1%	5%	-36%	136%
2%	10%	0%	100%
3%	16%	12%	88%
4%	22%	18%	82%

This table shows***, inter alia***, that if TransGrid falls short of the ACCC's anticipated 2% pa efficiency gain by 1% (ie, if it achieved a 1.0% annual compounding reduction in inputs equivalent to a 5% efficiency gain over five years) then TransGrid will receive a penalty equal to 36% of the actual efficiency achieved (ie, an 'allocation' of negative 36%). Under the same scenario, customers would receive an allocation of 136% (ie, they would receive the full value of the efficiency gain ***plus*** the value of the penalty imposed on TransGrid). By contrast, if TransGrid outperformed the ACCC's estimate of anticipated efficiency gains by the same amount it would only receive an 18% allocation of the benefits created while customers would receive an 82% allocation. In other words, the allocation to TransGrid is not symmetric – it is penalised relatively more heavily for falling short of the ACCC's target than it is rewarded for exceeding it.

In summary, taken literally, 6.2.2(b)(1) refers only to the allocation of ***expected*** efficiency gains. Under this interpretation the ACCC's Draft Decision would only comply with the Code if a 0% allocation to TransGrid is considered an 'equitable allocation'. Interpreted more broadly, 6.2.2(b)(1) may also refer to the allocation of actually achieved efficiency gains – even if they depart from expected efficiency gains. Under this interpretation Code

[13] The effect of this mechanism is to allow a TNSP to benefit from efficiency gains (in excess of those already incorporated in the ***ex ante*** benchmark) for a period of 6 years at which time customers receive the full value of those benefits in perpetuity. Thus, if a 2% efficiency target is incorporated into the ***ex ante*** benchmark and TransGrid exactly achieves this then customers will 100% of the value of those benefits. If TransGrid achieves more than 2% (say 3%) then it will benefit to the tune of 1% (3-2) for a period of 6 years. By contrast, customers will immediately benefit from the 2% anticipated efficiency gain for 6 years and then will benefit from the full 3% efficiency gain actually achieved in perpetuity after that.

[14] The use of pre-tax WACC reflects the fact that any gains to TransGrid will be fully taxable.

compliance requires not only that a 0% allocation to TransGrid of expected efficiency gains be considered equitable but also that a negative allocation of efficiency gains actually achieved (but less than expected) be considered equitable.

In our view, there is a reasonable case that the methodology employed by the ACCC in reaching its Draft Decision regarding TransGrid's annual opex allowance fails to comply with clause 6.2.2(b)(1) of the Code in that it does not facilitate an equitable allocation of reasonably expected efficiency gains (nor actual efficiency gains) between TransGrid and its customers.

4.2 Efficiency Gains Understated

The previous section concluded that the general methodology employed by the Commission in its Draft Decision may not have met the stipulated Code requirements for equitable allocation of efficiency gains – even on the basis of the Commission's analysis. However, the more likely allocation of efficiency gains to TransGrid is lower than the allocation calculated on the basis of the Commission's assumptions. This stems from the fact that the 2% pa expected efficiency gain explicitly incorporated into the opex allowance is not the only forecast efficiency improvement. TransGrid illustrates in its Response to the ACCC Draft Decision[15] that the ACCC's opex benchmark is calculated on the basis of a 2% pa cumulative reduction in inputs used ***plus***:

1. an implicit efficiency gain by assuming TransGrid's wages costs are growing slower than the NSW industry average;
2. an implicit efficiency gain by making no allowance for the cost of new assets in the next regulatory period;
3. an implicit (and retrospective) efficiency gain by rolling forward 2002/03 costs to 2003/04 using CPI rather than TransGrid's actual unit cost increases (most importantly, labour costs at 5% pa);
4. an implicit (and retrospective) efficiency gain by removing $1.55m from 2002/03 insurance premium costs; and
5. a further implicit prospective efficiency gain by assuming that underlying costs grow only by the rate of inflation between 2007/08 and 2008/09.

The implicit efficiency targets above represent a more imposing target than the explicit 2% pa target. Specifically, TransGrid have estimated that it would need to achieve a 3.9% pa

[15] TransGrid, ***Response to the ACCC's Draft Decision on TransGrid's 2004/05-2008/09 Revenue Caps: Section 2 – Operating Expenditure Targets,*** p.42 (hereafter 'TransGrid Response').

compounding reduction in costs over the regulatory period in order to avoid a financial penalty.[16] We have assessed TransGrid's claims and find that:

- we agree with the contention that the ACCC's opex benchmark includes additional implicit efficiency gains above and beyond 2% pa for all of the above reasons;
- that the magnitude of the required efficiency gains implicit in items 3 to 5 above is unambiguous and has been correctly calculated by TransGrid; and
- the magnitude of the required efficiency gains implicit in items 1 and 2 is somewhat ambiguous as it depends on forecasts of both real wage cost growth, the number of new network elements and the inputs required to operate/maintain those new elements. However, we consider the basis on which TransGrid has forecast these variables to be reasonable.

The Commission suggests in its Draft Decision that labour saving capital expenditure will negate the efficiency gain implied by the forecast increase in output in subsequent regulatory periods, ie, implied efficiency gain number 2 above. However, the ACCC does not, in our opinion, substantiate this view, and concedes that it 'has not analysed the relationship between opex and capex in TransGrid in detail'.[17] Moreover, the ACCC is yet to make its Draft Decision on a capex allowance – so it is impossible to analyse reliably any purported benefits from that expenditure. Even if the Commission were correct, the four other implicit efficiency gains outlined above remain. Moreover, statements made by the Commission in its Draft Decision indicate that to the extent that labour saving capex exists, it constitutes but one of several inputs into the benchmark:[18]

> ***'Taken together, the ACCC has confidence that a 2 per cent compound productivity improvement is a suitable mid-point of range of expected productivity improvements that TransGrid is able to achieve over the coming control period, and that its actual performance could be significantly higher than this.'***

In culmination, the factors outlined above mean that TransGrid must, in practice, achieve compounding efficiencies ***substantially in excess*** of the Commission's explicit 2% pa target, to avoid a financial penalty. In other words, the methodology employed by the Commission, which failed to comply with Code requirements in the general case, delivers an even ***less*** favourable outcome when the specifics of TransGrid's opex forecasts are considered.

The table below takes into account the above five implicit efficiencies when calculating the allocation of efficiency gains to TransGrid for different levels of efficiency gains actually achieved. In other words, the interpretation and assumptions underlying this Table are the

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16 TransGrid Response, p44.

17 ACCC Draft Decision, p.29.

18 ACCC Draft Decision, p.31 (emphasis added).

same as for Table 1 above except that we now take account of explicit and implicit efficiency gains incorporated into the ACCC's opex benchmark.

Table 2: Allocation of Actual Efficiency Gains Including All Implicit Efficiency Gains

Annual compounding efficiency gain achieved by TransGrid	Associated efficiency gain over the 5 year period	Allocation of actually achieved efficiency gain to TransGrid (%)	Allocation of actually achieved efficiency gain to customers (%)
0%	0%	Div by zero	Div by zero
1%	5%	-100%	200%
2%	10%	-33%	133%
3%	14%	-11%	111%
4%	18%	1%	99%
50%	97%	31%	69%

The results in this table suggest that, once account is taken of all the implicit efficiency gains incorporated into the ACCC's target opex benchmark, TransGrid will receive a negative allocation of any efficiency gains unless its achieved efficiency gains are around 4% pa or above. A 4% pa efficiency gain is equivalent to an 18% reduction in inputs by the end of the regulatory period. That is, in order to avoid being penalised TransGrid must employ 18% fewer staff (both directly employed and outsourced) and must utilise 18% fewer non-labour inputs into opex (eg, office and workshop leases, maintenance vehicles, computer equipment, etc).

The asymmetric nature of the allocation of efficiency gains in the Draft Decision can be illustrated by examining the last column of the above table. In particular, we note that for realistic potential efficiency gains up to 4% pa customers receive more than the full value of any gains received (ie, an allocation of more than 100%). However, even if TransGrid manages to all but eliminate opex costs (eg, achieve 50% pa efficiency gains for 5 consecutive years) customers still achieve a 69% allocation of those gains.

It may also be instructive to examine the actual allocation of efficiency gains when the implicit efficiencies numbered 1 to 2 above are set equal to zero. It should be recalled that the magnitude of these implicit efficiencies depended on forecasts and, as such, had an element of uncertainty to them. By contrast, efficiency gains numbered 3 to 5 above are, in NERA's opinion, unambiguous in their magnitude. Table 3 details the allocations of actual efficiency gains based on these assumptions.

Table 3: Allocation of Actual Efficiency Gains Including Implicit Efficiency Gains 3 to 5

Annual compounding efficiency gain achieved by TransGrid	Associated efficiency gain over the 5 year period	Allocation of actually achieved efficiency gain to TransGrid (%)	Allocation of actually achieved efficiency gain to customers (%)
0%	0%	Div by zero	Div by zero
1%	5%	-64%	164%
2%	10%	-14%	114%
3%	14%	2%	98%
4%	18%	10%	90%
50%	97%	32%	68%

Under these assumptions TransGrid would need to achieve a compounding efficiency gain of around 3% pa in order to avoid a penalty (negative allocation of efficiency gain). This still represents a 1% pa higher efficiency gain than the ACCC's estimate of reasonably expected efficiency gains.

5 REQUIRED AMENDMENTS TO THE DRAFT DECISION

To the extent that the foregoing analysis suggests that the ACCC's Draft Decision does not comply with the 'equitable allocation' envisaged in 6.2.2(b)(1) then the Draft Decision would need to be amended. Since the term 'equitable allocation' has no particular meaning within the economics discipline, NERA is not expertly placed to define what allocations would meet this criteria. However, we are able to analyse the implications of potential amendments to the ACCC's Draft Decision on the allocation of ***'efficiency gains reasonably expected to be achievable'***.

The following table details the efficiency gain that should be explicitly included in the opex benchmark in order to achieve a particular allocation of ***'efficiency gains reasonably expected to be achievable'***. It is assumed that the ACCC's 2% pa estimate of efficiency gains reasonably expected to be achievable is accurate – although we do not necessarily subscribe to this view. We also assume that all implicit efficiency gains are removed from the opex benchmark, ie, those items numbered 1 to 5 in the previous section.[19] The table below also relies on the assumption that the efficiency carryover mechanism, as outlined in the ACCC's Draft Decision on the SRP, will be implemented.[20]

Table 4: Explicit Efficiency Target Required to Achieve Desired Allocation of Expected 2% pa Efficiency Gains

Desired allocation of 2% pa 'efficiency gains reasonably expected to be achievable'	Required explicit efficiency target to be incorporated into the opex benchmark
0%	2.0%
10%	1.4%
20%	0.9%
30%	0.4%
40%	-0.2%
50%	-0.7%

The interpretation of this table is relatively straightforward. If it is considered equitable that TransGrid receive a zero allocation of the 2% expected efficiency gain then it is appropriate to incorporate the full 2% expected efficiency gain in the ***ex ante*** opex benchmark. By contrast, if an allocation of 30% is considered equitable then an efficiency target of just 0.4% pa should be incorporated into the ***ex ante*** opex benchmark.[21] If a 50% allocation of efficiency gains is considered equitable then this would require the ACCC to actually set the

[19] Clearly, to the extent that the opex benchmark already includes implicit efficiency gains then the level of explicit efficiency gains required to achieve a given allocation will be lower by the extent of those implicit efficiency gains.

[20] If this is not implemented then an even smaller explicit efficiency target will be required to achieve any given allocation of expected efficiency gains.

[21] Recall that the allocation to TransGrid is less than (2.0-0.4)/2.0 because TransGrid only gets to keep (2.0-0.4)/2.0 of the efficiency gain for five years after it is made at which points they lose all benefits. By contrast, customers receive 0.4/2.0 of the expected efficiency gain for 5 years after it is (anticipated to be) made and then receive the full benefits of the 2% efficiency gain in perpetuity.

ex ante benchmark at a cumulative 0.7% pa above the level of opex assuming zero efficiency. This reflects the fact that under the efficiency carryover mechanism proposed by the ACCC TransGrid would only be able to benefit from an efficiency gain for 5 years after that gain is made. This period is insufficient to allow it to achieve more than a 37% allocation of the net present value of benefits (discounted at 8.0%) created by that efficiency gain - unless the opex benchmark is set above costs associated with zero efficiency gains.

If the ACCC's efficiency carryover mechanism is adjusted a greater than 37% allocation to TransGrid could be achieved without needing to increase ***ex ante*** benchmarks above estimates of costs associated with zero efficiency gains. For example, it could be achieved by extending the length of the efficiency carryover mechanism beyond 5 years (ie, extending the length of time TransGrid would benefit from making a particular efficiency). Alternatively, it could be achieved by other amendments to that mechanism already canvassed in Dr Biggar's discussion paper for the ACCC[22] on the issue of efficiency carryover mechanisms.

[22] Biggar, D, ***"Incentive Regulation and Benchmarking"***, A report for the ACCC, Appendix B in: ACCC ***"Discussion Paper 2003, Review of the Draft Statement of Principles for the Regulation of Transmission Revenues"***, August 2003

6 CONCLUSIONS

1. The standard economic and plain English definition of 'efficiency gains' both relate to reductions in the ratio of outputs to inputs.

2. The Draft Decision's explicit estimate of 'reasonably expected efficiency gains' in opex is 2% pa compounding.

3. Under the ACCC's Draft Decision, if a 2% efficiency gain is achieved, the highest allocation of these gains to TransGrid will be 0%.

4. The most likely allocation of these gains to TransGrid will be negative (given that the ACCC's opex benchmark implicitly includes a greater efficiency gain than the ACCC's explicit target of 2% pa).

5. Although we are not in a position to offer an expert opinion on the definition of 'equitable allocation' under clause 6.2.2(b)(1), we can say that it would be necessary for this definition to envisage zero or negative allocations as 'equitable' in order for the ACCC's Draft Decision to comply with this clause.

6. To the extent that TransGrid achieves actual efficiency gains that differ from 'reasonably expected efficiency gains' then a case could be made that the allocation of these is also not 'equitable'. Where efficiency gains deviate from the expected level (2%) the ACCC's Draft Decision has an implicitly asymmetric allocation of efficiency gains – with TransGrid being heavily penalised for not meeting the 2% target but being only moderately rewarded for exceeding it.

7. The ACCC Draft Decision also requires TransGrid to make a number of implicit efficiency gains above and beyond the explicit 2% target.

8. When these implicit efficiency gains are taken into consideration, even if TransGrid manages all but to eliminate opex costs (eg, achieve 50% pa efficiency gains for 5 consecutive years) customers still achieve a 69% allocation of those gains.

9. If the ACCC's 2% pa estimate of efficiency gains reasonably expected to be achievable is accurate (we do not necessarily subscribe to this view), all implicit efficiency gains are removed from the opex benchmark and the ACCC's proposed efficiency carryover mechanism is implemented:

   - for TransGrid to receive a zero allocation of the 2% expected efficiency gain the full 2% expected efficiency gain must be included in the ***ex ante*** opex benchmark; and
   - for TransGrid to receive a 30% allocation of the 2% expected efficiency gain then only a 0.4% pa efficiency target must be incorporated into the ***ex ante*** opex benchmark.

10. Unless the opex benchmark is set above costs associated with zero efficiency gains, TransGrid can achieve no more than a 37% allocation of the net present value of benefits (discounted at 8.0%) created by any efficiency gain in this period.

11. If the ACCC's efficiency carryover mechanism is adjusted, a greater than 37% allocation to TransGrid could be achieved without needing to increase ***ex ante*** benchmarks above estimates of costs associated with zero efficiency gains.